Xcel Energy®

2017 / 2018 / 2019

Minnesota electric and natural gas

Conservation Improvement Program

E,G002/CIP-16-115

414 Nicollet Mall
Minneapolis, MN 55401

June 1, 2016

—Via Electronic Filing—

Mr. William Grant
Deputy Commissioner
Minnesota Department of Commerce
Division of Energy Resources
85 7th Place East, Suite 500
Saint Paul, MN 55101-2198

RE: 2017-2019 MINNESOTA ELECTRIC AND NATURAL GAS CONSERVATION IMPROVEMENT PROGRAM DOCKET NO. E,G002/CIP-16-115

Dear Deputy Commissioner Grant:

Northern States Power Company, doing business as Xcel Energy, respectfully submits to the Minnesota Department of Commerce, Division of Energy Resources this 2017-2019 Triennial Plan for its Minnesota Electric and Natural Gas Conservation Improvement Program. This Plan is filed pursuant to Minn. Stat. Minn. Stat. § § § 216B.2401, 216B.241, and 216B.2411 and Minn. R. 7690.0500.

We have electronically filed this document through the eDockets system maintained by the Minnesota Department of Commerce and the Minnesota Public Utilities Commission. By copy of this transmittal letter, Xcel Energy is notifying persons on the attached service list of this filing.

Parties wishing to access our 2017-2019 CIP Triennial Plan can retrieve the document by going to the eDockets homepage and searching for Docket No. E,G002/CIP-16-115. We provide a direct link to the eDockets website: https://www.edockets.state.mn.us/EFiling/home.jsp.

Please contact me at shawn.m.white@xcelenergy.com or 612-330-6096 if you have any questions regarding this response.

Sincerely,

/s/

SHAWN WHITE
MANAGER
DSM REGULATORY STRATEGY & PLANNING

Enclosures
c: Service Lists

CERTIFICATE OF SERVICE

I, Jim Erickson, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota; or

xx by electronic filing.

Docket No.: E,G002/CIP-16-115

Dated this 1st day of June 2016.

/s/

_____

Jim Erickson
Regulatory Administrator

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George	Crocker	gwillc@nawo.org	North American Water Office	PO Box 174 Lake Elmo, MN 55042	Electronic Service	No	OFF_SL_16-115_G002,E002.CIP-16-115
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Gary	Oetken	goetken@agp.com	Ag Processing, Inc.	12700 West Dodge Road P.O. Box 2047 Omaha, NE 681032047	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Audrey	Partridge	audrey.peer@centerpointenergy.com	CenterPoint Energy	800 Lasalle Avenue - 14th Floor Minneapolis, Minnesota 55402	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Lisa	Pickard	lpickard@minnkota.com	Minnkota Power Cooperative	1822 Mill Rd PO Box 13200 Grand Forks, ND 582083200	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Bill	Poppert		Technology North	2433 Highwood Ave St. Paul, MN 55119	Paper Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Dave	Reinke	dreinke@dakotaelectric.com	Dakota Electric Association	4300 220th St W Farmington, MN 55024-9583	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Christopher	Schoenherr	cp.schoenherr@smmpa.org	SMMPA	500 First Ave SW Rochester, MN 55902-3303	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
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Anna	Sherman	anna.sherman@centerpointenergy.com	CenterPoint Energy	505 Nicollet Mall PO Box 59038 Minneapolis, MN 55459	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Ken	Smith	ken.smith@districtenergy.com	District Energy St. Paul Inc.	76 W Kellogg Blvd St. Paul, MN 55102	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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SaGonna	Thompson	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Steve	Tomac	stomac@bepc.com	Basin Electric Power Cooperative	1717 E Interstate Ave Bismarck, ND 58501	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Sharon N.	Walsh	swalsh@shakopeeutilities.com	Shakopee Public Utilties	255 Sarazin St Shakopee, MN 55379	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
Robyn	Woeste	robynwoeste@alliantenergy.com	Interstate Power and Light Company	200 First St SE Cedar Rapids, IA 52401	Electronic Service	No	SPL_SL__CIP SPECIAL SERVICE LIST
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➢ EXECUTIVE SUMMARY

Northern States Power Company, doing business as Xcel Energy, submits to the Minnesota Department of Commerce, Division of Energy Resources ("DER") our 2017-2019 Conservation Improvement Program (CIP) Triennial Plan. The Plan proposes annual savings goals of 1.5% of retail sales for our electric portfolio and 1% for our natural gas portfolio. The Company respectfully requests that the DER approve this filing to guide our Minnesota electric and natural gas conservation and load management activities for 2017, 2018, and 2019.

With this Plan, we strive to maintain the success of previous plans. In 2015, our electric portfolio surpassed the statewide target of 1.5% for the fourth year in a row. Our objective with the 2017-2019 Triennial Plan is to meet or exceed the 1.5% electric and 1.0% gas savings threshold for the next three years.

Although the financial incentive mechanism is once again under review, we have put forth this Triennial Plan in good faith that the incentive will remain strong enough to motivate continued performance at the 1.5% level, as is proposed in this Plan for our electric portfolio. With continuation of the current incentive framework, we are well positioned for ongoing success.

Considerations for 2017-2019 Plan

While we continue many of the same strategies and programs implemented as part of our previous Plan, there are a few notable factors that influenced the development of this Plan and prompted changes to our portfolio. In recent years, the landscape of DSM has been changing in Minnesota and the benefits of DSM Investments are declining for both utilities and their customers as a whole. We discuss these factors and changes below.

Continued Reduction in Avoided Costs

As was the case with the 2013-2015 Plan, the net benefits created by our programs continue to decline. The primary factor can be attributed to the decline in avoided costs, specifically generation capacity and marginal energy costs. The costs of a vintage Combustion Turbine, which determines generation capacity costs, have declined by approximately 30% since the 2013-2015 Triennial Plan was filed. Further, marginal energy has decreased due to the fact that we are now avoiding cheaper wind resources. Natural gas prices continue to decline as well.

Codes and Standards

The adoption of more stringent codes and standards and significant naturally occurring savings outside of DSM programs have led to a decline in savings directly attributable to utility DSM programs. For example, in 2015 the Energy Design Assistance (EDA) baseline was updated based on the Minnesota State Energy Code referencing the ASHRAE 90.1 2010 Energy Standard which will impact the Business New Construction Program. The new 2015 Minnesota Residential Energy Code has raised the baseline requirements from the previous code which has and will impact the Efficient New Home Construction Program.

New Programmatic Approaches

To maintain high levels of savings in the face of the challenges described above, we have taken steps to engage hard-to-reach customers and improve our offerings. In the Business Segment, we will be adding a Building Operator Certification (BOC) measure to the Recommissioning Program. This

measure offers rebates to encourage the training and certification of building operators. Also added to the Recommissioning Program is the Benchmarking offering. This provides a streamlined approach for building owners to access whole-building usage data and measure the energy efficiency of their building(s). We have also added several measures to other programs such as mini-split heat pumps to the Residential Cooling Program.

Proposed Goals

In this Plan, we continue our legacy of providing customers with nearly unlimited options for saving energy. The proposed plan establishes ambitious goals of saving 1,300 GWh, 270 MW, and 2,161,516 Dth over the three year period at a cost of $341 million. The proposed Plan also includes estimated budgets and energy savings from anticipated alternative filings. In the following sections, we discuss our proposed goals by fuel and segment and overarching strategies for reaching the goals.

This plan is designed to achieve electric savings equal to 1.5% of retail sales and gas savings equal to 1.0% of retail sales in 2017, 2018, and 2019. Our proposal is consistent with the goal approved in our last resource plan (Docket No. E002/RP-10-0825) to strive to achieve the 1.5% savings goal over the planning horizon. The table below summarizes our proposed goals. The following tables provide proposed goals and budgets for each program and segment by year.

Goals and Budgets as a Percent of Retail Sales

	Electric				Gas			
Year	**Budget**	**Proposed Energy Savings (GWh)**	**Total Adjusted Sales (GWh)**	**Savings as % of Retail Sales**	**Budget**	**Proposed Energy Savings (Dth)**	**Total Adjusted Sales (Dth)**	**Savings as % of Retail Sales**
2017	$96,007,201	434	28,751	1.5%	$16,829,590	719,365	71,897,513	1.0%
2018	$94,110,123	433	28,751	1.5%	$17,169,355	721,929	71,897,513	1.0%
2019	$97,308,531	433	28,751	1.5%	$17,546,319	720,223	71,897,513	1.0%

We request that the Department approve goals and budgets by Segment. This is consistent with the DER's policy to maintain portfolio cost-effectiveness at the Segment, rather than the program-level. In addition, this approach allows greater flexibility to manage specific product performance within each segment, as well as the overall cost-effectiveness of our CIP Plan. The following tables provide the Segment goals:

2017 Segment-Level Goals

	Electric				Gas		
Segment	**Participation**	**Budget**	**Gen kW**	**Gen kWh**	**Participation**	**Budget**	**Dth**
Business	74,107	$40,410,066	40,540	239,629,655	20,948	$4,684,529	445,395
Residential	1,216,581	$26,140,470	37,293	138,834,726	601,911	$8,098,753	258,192
Low-Income	4,766	$2,362,870	358	3,063,965	1,900	$1,618,518	13,390
Planning		$3,841,856				$1,147,164	
Research, Evaluations, & Pilots	19,127	$4,353,312	873	3,985,111	586	$536,026	2,387
Assessments		$4,824,847				$345,600	
Alternative		$14,073,780	10,500	48,000,000		$399,000	
Total	1,314,582	$96,007,201	89,564	433,513,457	625,346	$16,829,590	719,365

2018 Segment-Level Goals

	Electric				Gas		
Segment	**Participation**	**Budget**	**Gen kW**	**Gen kWh**	**Participation**	**Budget**	**Dth**
Business	80,990	$39,217,663	39,664	232,583,617	21,443	$4,767,875	440,748
Residential	1,237,798	$25,798,817	37,832	144,310,216	602,070	$8,184,178	263,277
Low-Income	4,966	$2,375,297	358	3,063,965	1,900	$1,627,584	13,390
Planning		$3,864,009				$1,160,542	
Research, Evaluations, & Pilots	28,688	$3,852,959	1,267	5,489,034	881	$599,326	4,514
Assessments		$4,824,847				$345,600	
Alternative	0	$14,176,530	10,500	48,000,000		$484,250	
Total	1,352,442	$94,110,123	89,621	433,446,832	626,294	$17,169,355	721,929

2019 Segment-Level Goals

	Electric				Gas		
Segment	**Participation**	**Budget**	**Gen kW**	**Gen kWh**	**Participation**	**Budget**	**Dth**
Business	88,537	$40,428,912	40,871	237,171,202	22,217	$4,980,120	437,834
Residential	1,236,685	$26,156,372	37,277	137,943,610	602,166	$8,276,023	263,907
Low-Income	4,966	$2,386,897	358	3,063,965	1,900	$1,637,379	13,390
Planning		$3,884,183				$1,175,639	
Research, Evaluations, & Pilots	34,428	$3,988,727	1,519	6,587,483	1,061	$644,561	5,092
Assessments		$4,824,847				$345,600	
Alternative		$14,212,030	10,500	48,000,000		$487,000	
Total	1,364,616	$95,881,968	90,525	432,766,260	627,344	$17,546,319	720,223

Historical Achievements

The 2017-2019 CIP Triennial Plan continues our long-standing commitment to DSM. Although DSM activities in many states around the country have ebbed and flowed, Minnesota and Xcel Energy, as its largest electric utility, have generally maintained a consistent approach to DSM. This long-standing commitment and dedication to excellence in running cost-effective conservation and load management programs places the Company among the nation's top utilities in terms of energy and demand saved and most innovative programs.

In recent years, Minnesota utilities have been recognized nationwide for their long lasting commitment to DSM, innovative programs, and ranking highly amongst energy efficiency scorecards in delivering value to the customers they serve. In October 2015, the Department issued a study prepared by Cadmus that analyzed the economic impact on DSM for 2008-2013. This study assessed the impacts of DSM on several facets of Minnesota's economy and concluded that for every dollar invested in DSM, $4 to $4.30 is generated in new economic activity, energy savings, and environmental benefits. Xcel Energy in particular has been recognized for outstanding DSM performance. For instance, in July 2014, Ceres ranked 32 of the largest utilities on renewable energy and energy efficiency. Xcel Energy was ranked second for renewable energy sales and fifth in cumulative annual energy efficiency. Additionally, in 2012, Xcel Energy was honored with the Energy Star Award for Sustained Excellence for continuing to exhibit exceptional leadership year after year. Lastly, the American Council for an Energy Efficient Economy (ACEEE) ranked Minnesota's DSM programs as 10th best in the country in its October 2015 State Energy Efficiency Scorecard.

Between 1990 and 2015, Xcel Energy invested over $1.4 billion (nominal) resulting in 7,924 GWh of electric energy savings, 3,176 MW of electric demand savings and an estimated 14,311,533 Dth of natural gas savings. The following figures show our historical spending on CIP and energy savings achievements. Our approved 2016 goal as well as our proposed goals for 2017, 2018, and 2019 are provided for context.

Figure 1: CIP Electric Achievements, 2000-2019

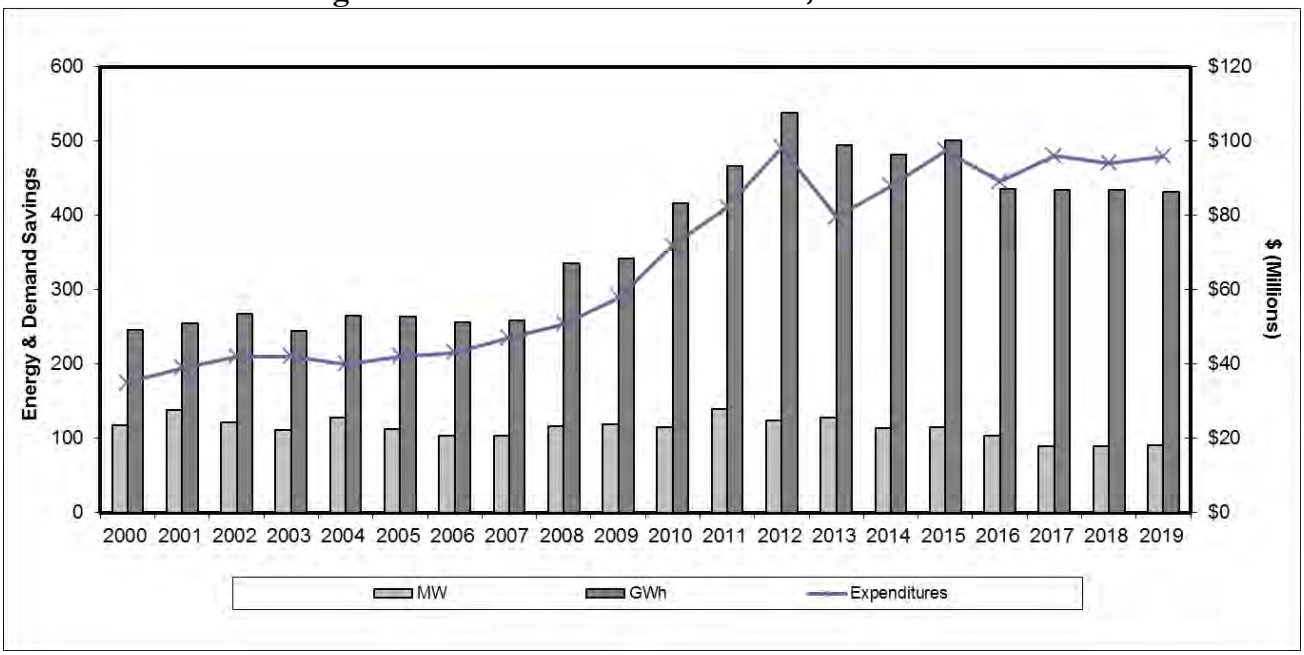
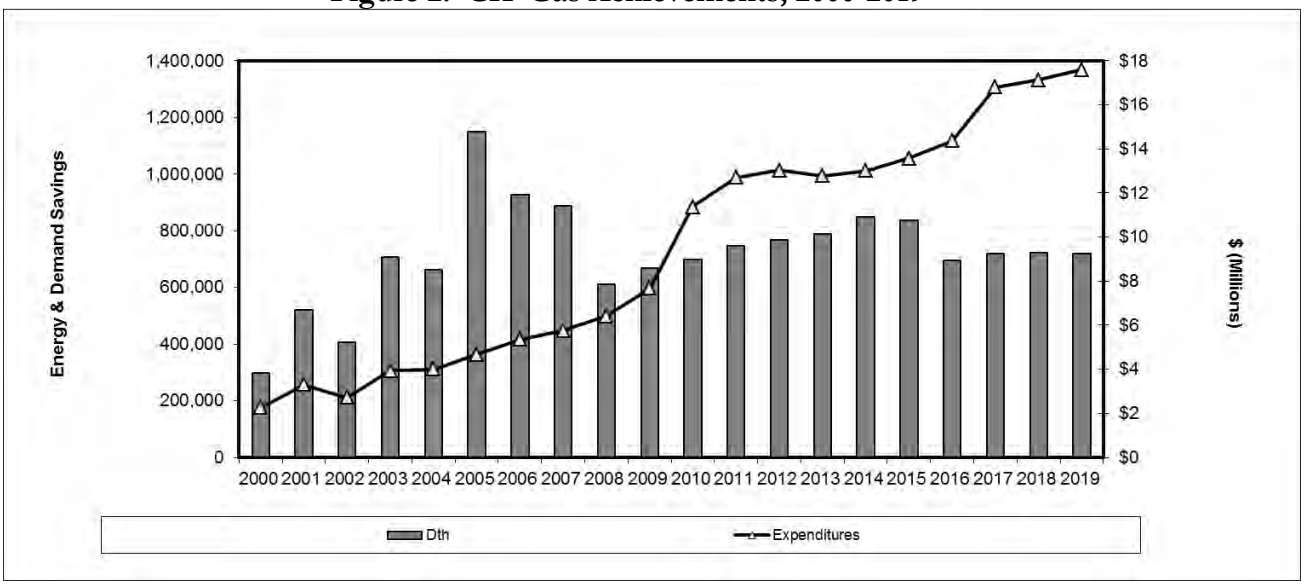


Figure 2: CIP Gas Achievements, 2000-2019



Executive Summary Table - 2017

2017	Electric Participants	Electric Budget	Customer kW	Generator kW	Generator kWh	Electric Societal	Electric Utility	Gas Participants	Gas Budget	Dth Savings	Gas Societal	Gas Utility
Business Segment												
Business New Construction	117	$7,600,959	7,420	5,810	37,010,688	2.03	3.01	19	$524,039	30,503	4.29	4.77
Commercial Efficiency	163	$3,409,609	3,932	3,385	24,954,472	2.26	4.03	46	$494,441	41,186	7.24	5.43
Computer Efficiency - PC Power MGMT	1,391	$547,850	446	472	3,655,837	1.34	1.67	0	$0	0		
Cooling Efficiency	1,638	$2,487,682	2,603	2,160	5,956,175	1.19	1.99	3	$48,579	5,968	5.51	8.07
Custom Efficiency	52	$1,141,645	984	783	4,894,015	3.72	2.55	20	$188,789	16,116	3.29	6.86
Data Center Efficiency	70	$1,110,092	1,049	849	8,559,913	1.58	2.83	0	$0	0		
Efficiency Controls	58	$1,075,917	1,017	230	7,515,754	2.13	2.46	16	$176,311	16,062	2.86	5.99
Fluid Systems Optimization	303	$1,508,902	2,087	1,744	13,175,959	1.96	4.21	0	$0	0		
Foodservice Equipment	51	$46,784	90	58	400,687	2.12	4.32	67	$93,377	5,992	2.02	3.55
Heating Efficiency	64	$7,830	40	32	156,350	4.75	10.90	576	$1,309,208	112,002	1.79	2.85
Lighting Efficiency	1,242	$5,907,661	8,893	6,230	48,000,199	1.61	4.05	0	$0	0		
Motor Efficiency	357	$2,558,062	4,258	3,493	21,000,592	1.77	4.46	0	$0	0		
Multi-Family Building Efficiency	3,038	$656,606	1,201	219	1,670,172	1.53	1.12	1,013	$280,740	4,177	3.02	0.89
Process Efficiency	249	$6,945,865	9,263	5,345	49,559,852	2.59	3.69	74	$1,104,763	188,853	1.55	3.38
Recommissioning	99	$869,686	1,183	650	7,643,979	1.73	2.08	47	$194,693	19,748	3.85	3.34
Self-Direct	0	$25,789	0	0	0	0.00	0.00	0	$8,401	0	0.00	0.00
Turn Key	238	$1,360,293	1,126	665	5,295,166	1.91	2.18	69	$223,776	4,786	1.60	1.22
Business Segment Energy Efficiency Total	**9,129**	**$37,261,232**	**45,593**	**32,124**	**239,449,813**	**2.00**	**3.34**	**1,949**	**$4,647,117**	**445,391**	**2.75**	**3.64**
Electric Rate Savings	45	$540,126	9,000	4,593	170,174	3.74	3.73	0	$0	0		
Saver's Switch for Business	933	$2,307,250	18,071	3,823	9,668	1.58	1.58	0	$0	0		
Business Segment Load Management Total	**978**	**$2,847,376**	**27,071**	**8,415**	**179,842**	**1.99**	**1.98**	**0**	**$0**	**0**		
Business Education	14,000	$247,498	0	0	0			19,000	$37,412	0		
Small Business Lamp Recycling	50,000	$53,960	0	0	0			0	$0	0		
Business Indirect Total	**64,000**	**$ 301,458**	**0**	**0**	**0**			**19,000**	**37,412**	**0**		
Business Segment w/ Indirect Participants	**74,107**	**$40,410,066**	**72,664**	**40,540**	**239,629,655**			**20,949**	**$4,684,529**	**445,391**		
Business Segment Direct Participants Only	**10,107**	**$40,108,608**	**72,664**	**40,540**	**239,629,655**			**1,949**	**$4,647,117**	**445,391**		
Residential Segment												
Efficient New Home Construction	2,024	$752,292	1,120	974	952,129	1.50	1.96	960	$1,573,311	30,514	1.37	1.59
Energy Efficient Showerhead	1,920	$42,252	111	87	1,057,403	16.58	8.62	14,080	$286,908	30,294	21.88	4.95
Energy Feedback Residential	256,320	$2,597,820	3,344	3,534	14,990,307	1.16	1.10	170,998	$312,982	23,786	1.30	1.21
Home Energy Squad	4,700	$863,079	3,894	438	4,095,645	1.55	1.32	2,200	$1,290,788	17,305	1.02	0.61
Home Lighting	151,040	$7,534,551	72,323	9,437	96,518,853	1.65	2.68	0	$0	0		
Insulation Rebate	491	$217,026	816	130	1,112,829	1.32	3.01	641	$275,266	13,776	1.24	3.87
Refrigerator Recycling	6,650	$939,664	1,165	816	7,114,131	2.98	2.24	0	$0	0		
Residential Cooling	11,857	$4,199,060	5,604	5,530	4,025,981	1.10	1.66	0	$0	0		
Residential Heating	10,000	$1,216,070	1,906	1,380	7,199,127	1.25	3.56	12,172	$2,488,238	120,000	1.83	3.67
School Education Kits	14,000	$461,442	1,212	136	1,559,062	1.36	0.93	14,000	$307,334	11,391	7.65	1.74
Water Heater Rebate	0	$0	0	0	0			948	$203,970	3,053	0.71	0.94
Whole Home Efficiency	200	$120,565	174	128	170,892	1.31	1.41	200	$287,852	8,074	1.21	1.85
Residential Segment Energy Efficiency Total	**459,202**	**$18,943,821**	**91,669**	**22,591**	**138,796,358**	**1.47**	**2.15**	**216,199**	**$7,026,650**	**258,192**	**2.04**	**2.35**
Residential Saver's Switch	**20,025**	**$5,435,250**	**48,155**	**14,702**	**38,368**	**2.63**	**2.63**	**0**	**$0**	**0**		
Consumer Education	433,854	$765,640	0	0	0			382,912	$540,806	0		
Home Energy Audit	3,500	$652,795	0	0	0			2,800	$531,297	0		
Lamp Recycling - Residential	300,000	$342,964	0	0	0			0	$0	0		
Residential Indirect Total	**737,354**	**$1,761,399**						**385,712**	**$1,072,103**			
Residential Segment with Indirect Participants	**1,216,581**	**$26,140,470**	**139,824**	**37,293**	**138,834,726**			**601,911**	**$8,098,753**	**258,192**		
Residential Segment Direct Participants Only	**479,227**	**$24,379,071**	**139,824**	**37,293**	**138,834,726**			**216,199**	**$7,026,650**	**258,192**		
Low Income Segment												
Home Energy Savings Program	1,100	$1,229,548	182	99	710,544	0.60	0.29	400	$1,208,910	3,612	0.30	0.20
LI Home Energy Squad	1,900	$327,676	1,305	152	1,374,942	1.41	1.17	1,500	$409,608	9,777	2.40	1.09
Multi-Family Energy Savings Program	1,766	$805,646	574	107	978,479	0.75	0.46					
Low Income Segment Total	**4,766**	**$2,362,870**	**2,060**	**358**	**3,063,965**	**0.73**	**0.47**	**1,900**	**$1,618,518**	**13,390**	**0.84**	**0.43**
Planning Segment												
Application Development and Maintenance	0	$1,238,038	0	0	0			0	$444,971	0		
Advertising & Promotion	0	$2,015,655	0	0	0			0	$501,766	0		
CIP Training	0	$136,842	0	0	0			0	$54,937	0		
Regulatory Affairs	0	$451,321	0	0	0			0	$145,490	0		
Planning Segment Total	**0**	**$3,841,856**	**0**	**0**	**0**			**0**	**$1,147,164**	**0**		
Research, Evaluations & Pilots Segment												
Market Research	0	$1,825,360	0	0	0			0	$223,006	0		
Product Development	0	$1,675,226	0	0	0			0	$207,088	0		
Energy Star Retail Products	19,102	$597,010	3,494	715	2,027,194	0.63	1.86	582	$27,240	291	0.15	0.58
Energy Information Systems	25	$255,716	289	159	1,957,917	1.30	1.52	4	$78,692	2,096	4.28	0.91
Research, Evaluations & Pilots Segment Total	**19,127**	**$4,353,312**	**3,783**	**873**	**3,985,111**	**0.34**	**0.34**	**586**	**$536,026**	**2,387**	**0.55**	**0.16**
PORTFOLIO SUBTOTAL	**1,314,582**	**$77,108,574**	**218,330**	**79,064**	**385,513,457**	**1.73**	**2.43**	**625,347**	**$16,084,990**	**719,360**	**2.05**	**2.13**
Anticipated Alternative Filings												
CEE One Stop Efficiency Shop	0	$12,964,780	10,419	10,500	48,000,000	1.26	1.94	0	$0	0		
EnerChange	0	$270,000	0	0	0			0	$330,000	0		
Energy Smart	0	$374,000	0	0	0			0	$17,000	0		
Trillion BTU	0	$105,000	0	0	0			0	$12,000	0		
Energy Intelligence	0	$360,000	0	0	0			0	$40,000	0		
Anticipated Alternative Filings Total	**0**	**$14,073,780**	**10,419**	**10,500**	**48,000,000**			**0**	**$399,000**	**0**		
Assessments Segment	**0**	**$1,974,981**	**0**	**0**	**0**			**0**	**$345,600**	**0**		
Made In Minnesota*	**0**	**$2,849,866**	**0**	**0**	**700,000**			**0**		**0**		
Electric Utility Infrastructure	**0**	**$0**	**0**	**0**	**0**			**0**	**$0**	**0**		
PORTFOLIO TOTAL	**1,314,582**	**$96,007,201**	**228,749**	**89,564**	**433,513,457**			**625,347**	**$16,829,590**	**719,360**		

* Made in Minnesota savings are not included in the portfolio total and are estimated

Executive Summary Table - 2018

2018	Electric Participants	Electric Budget	Customer kW	Generator kW	Generator kWh	Electric Societal	Electric Utility	Gas Participants	Gas Budget	Dth Savings	Gas Societal	Gas Utility
Business Segment												
Business New Construction	90	$4,782,576	4,903	3,834	23,017,690	2.14	3.20	21	$409,155	23,292	4.45	4.86
Commercial Efficiency	176	$3,607,502	4,264	3,671	27,058,233	2.38	4.31	46	$503,585	41,186	7.35	5.55
Computer Efficiency - PC Power MGMT	1,391	$549,850	453	472	3,712,549	1.37	1.72	0	$0	0		
Cooling Efficiency	1,736	$2,604,027	2,710	2,276	6,200,592	1.27	2.16	3	$48,579	5,968	5.73	8.39
Custom Efficiency	52	$1,254,844	984	783	4,894,015	3.60	2.45	21	$202,340	17,011	3.39	7.03
Data Center Efficiency	67	$1,325,356	1,065	906	8,920,888	1.55	2.55	0	$0	0		
Efficiency Controls	66	$1,178,880	1,165	264	8,608,955	2.24	2.62	17	$182,029	16,062	2.90	6.03
Fluid Systems Optimization	329	$1,585,904	2,192	1,848	13,680,520	2.06	4.41	0	$0	0		
Foodservice Equipment	67	$52,123	98	65	450,476	2.11	4.49	67	$95,099	5,992	2.08	3.63
Heating Efficiency	64	$7,830	40	32	156,350	5.02	11.54	558	$1,322,379	113,549	1.89	2.99
Lighting Efficiency	1,371	$6,297,800	9,415	6,618	51,500,104	1.63	4.23	0	$0	0		
Motor Efficiency	454	$2,610,873	4,358	3,577	21,500,212	1.85	4.68	0	$0	0		
Multi-Family Building Efficiency	4,556	$992,113	1,801	328	2,500,180	1.58	1.15	1,519	$413,993	6,075	3.03	0.90
Process Efficiency	243	$6,859,284	8,974	5,278	47,698,396	2.60	3.76	70	$1,094,838	183,927	1.50	3.39
Recommissioning	89	$808,898	1,022	561	6,626,083	1.72	1.98	51	$211,566	22,368	4.12	3.64
Self-Direct	0	$27,078	0	0	0	0.00	0.00	0	$8,820	0	0.00	0.00
Turn Key	261	$1,481,648	1,250	738	5,878,532	2.00	2.31	70	$238,080	5,317	1.74	1.32
Business Segment Energy Efficiency Total	**11,012**	**$36,026,586**	**44,696**	**31,249**	**232,403,775**	**2.03**	**3.47**	**2,443**	**$4,730,463**	**440,748**	**2.78**	**3.63**
Electric Rate Savings	45	$550,622	9,000	4,593	170,174	3.85	3.83	0	$0	0		
Saver's Switch for Business	933	$2,334,660	18,071	3,823	9,668	1.79	1.79	0	$0	0		
Business Segment Load Management Total	**978**	**$2,885,282**	**27,071**	**8,415**	**179,842**	**2.18**	**2.18**	**0**	**$0**	**0**		
Business Education	14,000	$247,498	0	0	0			19,000	$37,412	0		
Small Buisness Lamp Recycling	55,000	$58,297	0	0	0			0	$0	0		
Business Indirect Total	**69,000**	**$ 305,795**	**0**	**0**	**0**			**19,000**	**$ 37,412**	**0**		
Business Segment w/ Indirect Participants	**80,990**	**$39,217,663**	**71,766**	**39,664**	**232,583,617**			**21,443**	**$4,767,875**	**440,748**		
Business Segment Direct Participants Only	**11,990**	**$38,911,868**	**71,766**	**39,664**	**232,583,617**			**2,443**	**$4,730,463**	**440,748**		
Residential Segment												
Efficient New Home Construction	2,024	$752,322	1,120	974	952,129	1.64	2.23	960	$1,573,425	30,514	1.43	1.65
Energy Efficient Showerhead	1,920	$40,593	111	87	1,057,403	17.22	9.18	14,080	$257,517	30,294	24.65	5.73
Energy Feedback Residential	256,120	$2,118,865	3,686	3,896	16,555,081	1.58	1.50	170,898	$321,772	25,309	1.40	1.30
Home Energy Squad	4,700	$867,849	3,894	437	4,095,645	1.44	1.20	2,200	$1,296,594	17,305	1.05	0.63
Home Lighting	157,787	$7,534,601	75,049	9,793	100,229,391	1.74	2.56	0	$0	0		
Insulation Rebate	538	$229,204	986	145	1,403,591	1.48	3.62	704	$308,377	16,731	1.34	4.26
Refrigerator Recycling	6,700	$950,914	1,174	822	7,166,128	3.09	2.29	0	$0	0		
Residential Cooling	11,430	$4,080,696	5,403	5,332	3,883,398	1.18	1.83	0	$0	0		
Residential Heating	10,000	$1,224,713	1,906	1,380	7,199,127	1.32	3.74	12,222	$2,502,540	120,000	1.89	3.79
School Education Kits	14,000	$468,617	1,212	136	1,559,062	1.31	0.86	14,000	$316,706	11,391	7.51	1.75
Water Heater Rebate	0	$0	0	0	0			1,094	$228,981	3,659	0.77	1.05
Whole Home Efficiency	200	$120,680	174	128	170,892	1.41	1.54	200	$291,183	8,074	1.26	1.90
Residential Segment Energy Efficiency Total	**465,419**	**$18,389,054**	**94,714**	**23,130**	**144,271,848**	**1.57**	**2.24**	**216,358**	**$7,097,096**	**263,277**	**2.10**	**2.46**
Residential Saver's Switch	**20,025**	**$5,543,900**	**48,155**	**14,702**	**38,368**	**2.95**	**2.95**	**0**	**$0**	**0**		
Consumer Education	433,854	$765,640	0	0	0			382,912	$540,806	0		
Home Energy Audit	3,500	$671,989	0	0	0			2,800	$546,276	0		
Lamp Recycling - Residential	315,000	$428,234	0	0	0			0	$0	0		
Residential Indirect Total	**752,354**	**$1,865,863**						**385,712**	**$1,087,082**			
Residential Segment with Indirect Participants	**1,237,798**	**$25,798,817**	**142,869**	**37,832**	**144,310,216**			**602,070**	**$8,184,178**	**263,277**		
Residential Segment Direct Participants Only	**485,444**	**$23,932,954**	**142,869**	**37,832**	**144,310,216**			**216,358**	**$7,097,096**	**263,277**		
Low Income Segment												
Home Energy Savings Program	1,300	$1,237,552	182	99	710,544	0.61	0.30	400	$1,216,667	3,612	0.31	0.21
LI Home Energy Squad	1,900	$327,675	1,305	152	1,374,942	1.31	1.06	1,500	$410,917	9,777	2.44	1.13
Multi-Family Energy Savings Program	1,766	$810,070	574	107	978,479	0.75	0.45	0	$0	0		
Low Income Segment Total	**4,966**	**$2,375,297**	**2,060**	**358**	**3,063,965**	**0.73**	**0.46**	**1,900**	**$1,627,584**	**13,390**	**0.86**	**0.44**
Planning Segment												
Application Development and Maintenance	0	$1,240,356	0	0	0			0	$450,435	0		
Advertising & Promotion	0	$2,017,454	0	0	0			0	$508,687	0		
CIP Training	0	$144,090	0	0	0			0	$52,993	0		
Regulatory Affairs	0	$462,109	0	0	0			0	$148,427	0		
Planning Segment Total	**0**	**$3,864,009**	**0**	**0**	**0**			**0**	**$1,160,542**	**0**		
Research, Evaluations & Pilots Segment												
Market Research	0	$1,015,691	0	0	0			0	$235,057	0		
Product Development	0	$1,723,902	0	0	0			0	$211,882	0		
Energy Star Retail Products	28,653	$814,133	5,241	1,072	3,040,749	0.66	2.14	873	$40,408	437	0.16	0.62
Energy Information Systems	35	$299,233	356	195	2,448,285	1.43	1.59	8	$111,979	4,077		
Research, Evaluations & Pilots Segment Total	**28,688**	**$3,852,959**	**5,596**	**1,267**	**5,489,034**	**0.46**	**0.58**	**881**	**$599,326**	**4,514**	**0.87**	**0.28**
PORTFOLIO SUBTOTAL	**1,352,442**	**$75,108,746**	**222,291**	**79,121**	**385,446,832**	**1.79**	**2.56**	**626,294**	**$16,339,505**	**721,929**	**2.09**	**2.18**
Anticipated Alternative Filings												
CEE One Stop Efficiency Shop	0	$12,964,780	10,419	10,500	48,000,000	1.33	2.07	0	$0	0		
EnerChange	0	$337,500	0	0	0			0	$412,500	0		
Energy Smart	0	$388,250	0	0	0			0	$17,750	0		
Trillion BTU	0	$108,000	0	0	0			0	$12,000	0		
Energy Intelligence	0	$378,000	0	0	0			0	$42,000	0		
Anticipated Alternative Filings Total	**0**	**$14,176,530**	**10,419**	**10,500**	**48,000,000**			**0**	**$484,250**	**0**		
Assessments Segment	**0**	**$1,974,981**	**0**	**0**	**0**			**0**	**$345,600**	**0**		
Made In Minnesota	**0**	**$2,849,866**	**0**	**0**	**700,000**			**0**		**0**		
Electric Utility Infrastructure	**0**	**$0**	**0**	**0**	**0**			**0**	**$0**	**0**		
PORTFOLIO TOTAL	**1,352,442**	**$94,110,123**	**232,710**	**89,621**	**433,446,832**			**626,294**	**$17,169,355**	**721,929**		

* Made in Minnesota savings are not included in the portfolio total and are estimated

Executive Summary Table - 2019

2019	Electric Participants	Electric Budget	Customer kW	Generator kW	Generator kWh	Electric Societal	Electric Utility	Gas Participants	Gas Budget	Dth Savings	Gas Societal	Gas Utility
Business Segment												
Business New Construction	122	$4,671,924	5,502	4,316	23,001,531	2.49	3.44	25	$384,505	23,360	4.48	5.39
Commercial Efficiency	182	$3,709,232	4,417	3,803	28,029,199	2.44	4.39	46	$512,882	41,186	7.40	5.66
Computer Efficiency - PC Power MGMT	1,391	$549,850	453	472	3,712,549	1.40	1.74	0	$0	0		
Cooling Efficiency	1,806	$2,676,399	2,787	2,351	6,450,540	1.30	2.21	3	$48,579	5,968	5.93	8.73
Custom Efficiency	52	$1,385,389	984	783	4,894,015	3.40	2.24	21	$225,559	17,011	3.38	6.56
Data Center Efficiency	67	$1,351,810	1,133	955	9,453,345	1.62	2.66	0	$0	0		
Efficiency Controls	70	$1,232,065	1,239	280	9,155,555	2.32	2.68	17	$184,029	16,062	2.97	6.20
Fluid Systems Optimization	347	$1,644,768	2,275	1,930	14,117,816	2.10	4.46	0	$0	0		
Foodservice Equipment	73	$54,753	109	73	501,133	2.23	4.82	67	$96,428	5,992	2.14	3.72
Heating Efficiency	64	$7,830	40	32	156,350	5.14	11.69	558	$1,352,379	113,549	1.94	3.05
Lighting Efficiency	1,452	$6,628,404	9,637	6,786	53,100,025	1.60	4.15	0	$0	0		
Motor Efficiency	465	$2,650,698	4,458	3,661	22,000,025	1.89	4.77	0	$0	0		
Multi-Family Building Efficiency	6,865	$1,489,615	2,714	494	3,767,479	1.62	1.17	2,288	$619,898	9,234	3.14	0.95
Process Efficiency	238	$6,764,286	8,734	5,222	46,147,183	2.59	3.74	75	$1,088,323	180,160	1.58	3.51
Recommissioning	89	$808,898	1,022	561	6,626,083	1.77	2.01	49	$203,129	21,058	4.14	3.70
Self-Direct	0	$28,312	0	0	0	0.00	0.00	0	$9,243	0	0.00	0.00
Turn Key	276	$1,515,839	1,250	738	5,878,532	2.00	2.28	68	$217,752	4,254	1.57	1.20
Business Segment Energy Efficiency Total	**13,558**	**$37,170,072**	**46,756**	**32,456**	**236,991,360**	**2.06**	**3.48**	**3,217**	**$4,942,708**	**437,834**	**2.86**	**3.63**
Electric Rate Savings	45	$559,716	9,000	4,593	170,174	3.87	3.85	0	$0	0		
Saver's Switch for Business	933	$2,388,642	18,071	3,823	9,668	1.79	1.79	0	$0	0		
Business Segment Load Management Total	**978**	**$2,948,358**	**27,071**	**8,415**	**179,842**	**2.18**	**2.18**	**0**	**$0**	**0**		
Business Education	14,000	$247,498	0	0	0			19,000	$37,412	0		
Small Buisness Lamp Recycling	60,000	$62,983	0	0	0			0	$0	0		
Business Indirect Total	**$ 74,000**	**$ 310,481**	**0**	**0**	**0**			**19,000**	**$ 37,412**	**0**		
Business Segment w/ Indirect Participants	**88,537**	**$40,428,912**	**73,827**	**40,871**	**237,171,202**			**22,217**	**$4,980,120**	**437,834**		
Business Segment Direct Participants Only	**14,537**	**$40,118,430**	**73,827**	**40,871**	**237,171,202**			**3,217**	**$4,942,708**	**437,834**		
Residential Segment												
Efficient New Home Construction	2,024	$752,352	1,120	974	952,129	1.68	2.27	960	$1,573,561	30,514	1.48	1.72
Energy Efficient Showerhead	1,920	$41,801	111	87	1,057,403	16.96	9.01	14,080	$264,968	30,294	24.24	5.80
Energy Feedback Residential	256,320	$2,179,675	3,718	3,930	16,722,476	1.88	1.57	170,898	$330,672	24,762	1.38	1.29
Home Energy Squad	4,700	$872,773	3,894	437	4,095,645	1.31	1.05	2,200	$1,306,189	17,305	1.07	0.65
Home Lighting	146,067	$7,471,646	69,710	9,096	93,099,348	1.67	2.15	0	$0	0		
Insulation Rebate	593	$249,842	1,205	159	1,740,914	1.57	4.05	773	$330,435	17,985	1.39	4.42
Refrigerator Recycling	6,900	$965,934	1,208	845	7,374,117	3.24	2.35	0	$0	0		
Residential Cooling	11,582	$4,139,360	5,474	5,402	3,934,128	1.19	1.86	0	$0	0		
Residential Heating	10,000	$1,233,702	1,906	1,380	7,199,127	1.34	3.76	12,272	$2,517,413	120,000	1.96	3.92
School Education Kits	14,000	$476,011	1,212	136	1,559,062	1.26	0.78	14,000	$326,365	11,391	7.37	1.77
Water Heater Rebate	0	$0	0	0	0			1,071	$229,262	3,581	0.79	1.07
Whole Home Efficiency	200	$120,790	174	128	170,892	1.42	1.56	200	$294,648	8,074	1.30	1.95
Residential Segment Energy Efficiency Total	**454,306**	**$18,503,886**	**89,732**	**22,575**	**137,905,241**	**1.57**	**2.09**	**216,454**	**$7,173,513**	**263,907**	**2.15**	**2.54**
Residential Saver's Switch	**20,025**	**$5,681,560**	**48,155**	**14,702**	**38,368**	**2.95**	**2.94**	**0**	**$0**	**0**		
Consumer Education	433,854	$765,640	0	0	0			382,912	$540,806	0		
Home Energy Audit	3,500	$691,758	0	0	0			2,800	$561,704	0		
Lamp Recycling - Residential	325,000	$513,529	0	0	0			0	$0	0		
Residential Indirect Total	**762,354**	**$1,970,927**						**385,712**	**$1,102,510**			
Residential Segment with Indirect Participants	**1,236,685**	**$26,156,372**	**137,887**	**37,277**	**137,943,610**			**602,166**	**$8,276,023**	**263,907**		
Residential Segment Direct Participants Only	**474,331**	**$24,185,446**	**137,887**	**37,277**	**137,943,610**			**216,454**	**$7,173,513**	**263,907**		
Low Income Segment												
Home Energy Savings Program	1,300	$1,245,704	182	99	710,544	0.62	0.30	400	$1,224,402	3,612	0.32	0.21
LI Home Energy Squad	1,900	$327,675	1,305	152	1,374,942	1.18	0.94	1,500	$412,977	9,777	2.49	1.17
Multi-Family Energy Savings Program	1,766	$813,518	574	107	978,479	0.75	0.44	0	$0	0		
Low Income Segment Total	**4,966**	**$2,386,897**	**2,060**	**358**	**3,063,965**	**0.71**	**0.44**	**1,900**	**$1,637,379**	**13,390**	**0.88**	**0.46**
Planning Segment												
Application Development and Maintenance	0	$1,242,743	0	0	0			0	$455,912	0		
Advertising & Promotion	0	$2,019,307	0	0	0			0	$511,347	0		
CIP Training	0	$148,974	0	0	0			0	$54,847	0		
Regulatory Affairs	0	$473,159	0	0	0			0	$153,533	0		
Planning Segment Total	**0**	**$3,884,183**	**0**	**0**	**0**			**0**	**$1,175,639**	**0**		
Research, Evaluations & Pilots Segment												
Market Research	0	$953,478	0	0	0			0	$262,471	0		
Product Development	0	$1,764,124	0	0	0			0	$216,187	0		
Energy Star Retail Products	34,383	$944,545	6,289	1,286	3,648,829	0.68	2.24	1,048	$48,328	524	0.16	0.64
Energy Information Systems	45	$326,580	423	232	2,938,653	1.59	1.73	13	$117,575	4,568	5.83	1.37
Research, Evaluations & Pilots Segment Total	**34,428**	**$3,988,727**	**6,712**	**1,519**	**6,587,483**	**0.51**	**0.67**	**1,061**	**$644,561**	**5,092**	**0.88**	**0.30**
PORTFOLIO SUBTOTAL	**1,364,616**	**$76,845,091**	**220,485**	**80,025**	**384,766,260**	**1.80**	**2.53**	**627,344**	**$16,713,721**	**720,223**	**2.14**	**2.22**
Anticipated Alternative Filings												
CEE One Stop Efficiency Shop	0	$12,964,780	10,419	10,500	48,000,000	1.37	2.10	0	$0	0		
EnerChange	0	$337,500	0	0	0			0	$412,500	0		
Energy Smart	0	$402,750	0	0	0			0	$18,500	0		
Trillion BTU	0	$111,000	0	0	0			0	$12,000	0		
Energy Intelligence	0	$396,000	0	0	0			0	$44,000	0		
Anticipated Alternative Filings Total	**0**	**$14,212,030**	**10,419**	**10,500**	**48,000,000**			**0**	**$487,000**	**0**		
Assessments Segment	**0**	**$1,974,981**	**0**	**0**	**0**			**0**		**0**		
Made In Minnesota	**0**	**$2,849,866**	**0**	**0**	**700,000**			**0**	**$345,600**	**0**		
Electric Utility Infrastructure	**0**		**0**	**0**	**0**			**0**		**0**		
PORTFOLIO TOTAL	**1,364,616**	**$95,881,968**	**230,904**	**90,525**	**432,766,260**			**627,344**	**$17,546,319**	**720,223**		

* Made in Minnesota savings are not included in the portfolio total and are estimated

➢ COMPLIANCE WITH RULES & STATUTES

The 2017-2019 Triennial Plan fulfills Xcel Energy's compliance with Minn. Stat. § 216B.241, subd. 2(a), which requires public utilities to file CIP plans by June 1 of the applicable year. In 2001, Xcel Energy received Department of Commerce approval to file a combined gas and electric CIP plan; we continue this approach with the current filing.

Minn. R. 7690.0500 contains the requirements and procedures for CIP filings. Minn. Stat. § § § 216B.2401, 216B.241, and 216B.2411 contain provisions the Company must meet in its CIP. This section provides all of the compliance order points required therein.

Statutory Requirements

Minimum Spending Requirement

Minn. Stat. § 216B.241, requires that 2.0% of the Company's electric Gross Operating Revenues ("GOR") be spent on electric CIP and 0.5% of gas GOR be spent on gas CIP. The table below shows our spending in relation to our minimum spending requirement for 2017, 2018, and 2019.

Minimum Spending Requirement 2017-2019

	2015 Net Revenues (GOR – Exempt)	% of GOR	Minimum Spending Requirement	2017 Proposed Budget	2018 Proposed Budget	2019 Proposed Budget
Electric	$2,847,372,894	2.0%	$56,947,458	$96,007,201	$94,110,123	$95,881,968
Gas	$441,383,367	0.5%	$2,206,917	$16,829,590	$17,169,355	$17,546,319

Goals as a Percentage of Sales

Minn. Stat. § 216B.241, subd. 1c requires utilities to file a CIP Plan with no less than 1.0% goals and a statewide goal of 1.5%. The table below shows our proposed natural gas and electric goals annually, as percent of the previous three-year (2013, 2014 & 2015) weather-normalized sales, adjusted for exempt customers as of May 15, 2016. Should additional customers be approved for CIP exemption, we may request to modify the baseline to incorporate the effect of those exemptions.

Goals as a Percent of Sales 2017-2019

	Electric			Gas		
Year	**Energy Savings Proposed (MWh)**	**Total Adjusted Sales (MWh)**	**Savings as % of Retail Sales**	**Energy Savings Proposed (Dth)**	**Total Adjusted Sales (Dth)**	**Savings as % of Retail Sales**
2017	433,513	28,750,944	1.5%	719,365	71,897,513	1.0%
2018	433,447	28,750,944	1.5%	721,929	71,897,513	1.0%
2019	432,766	28,750,944	1.5%	720,223	71,897,513	1.0%

Low-Income Goals

The 2007 Legislature approved an amendment to Minn. Stat. § 216B.241, subd. 7, which required utilities to spend 0.4% of their residential natural gas GOR on low-income gas programs and 0.2% of their residential electric GOR on low-income electric programs, unless otherwise approved by the Commissioner. The following table provides our proposed low-income spending in comparison to the spending requirement.

Low-Income Spending Requirement 2017-2019

	% of 2013-2015 Residential GOR	% of GOR	Low-Income Spend Requirement	2017 Proposed LI Budget	2018 Proposed LI Budget	2019 Proposed LI Budget
Electric	$1,079,786,206	0.2%	$2,159,572	$2,362,870	$2,375,297	$2,386,897
Gas	$317,126,068	0.4%	$1,268,504	$1,618,518	$1,627,584	$1,637,379

Research & Development Spending Cap

Minn. Stat. § 216B.241, subd. 2(c), limits spending on Research & Development ("R&D") to 10% of the minimum spending requirement. CIP R&D identifies, assesses, and develops new load management and energy efficiency products and services. This work enables Xcel Energy to identify and promote promising new energy saving opportunities for its customers. Market potential studies fall into this category. The following table provides our proposed R&D spending over the Plan period in comparison to the spending cap.

Research & Development Spending Cap 2017-2019

	% of Min Spend	Min Spend	R&D Cap	2017 Proposed R&D Budget	2018 Proposed R&D Budget	2019 Proposed R&D Budget
Electric	10%	$56,947,458	$5,694,746	$2,675,226	$1,723,902	$1,764,124
Gas	10%	$2,206,917	$220,692	$207,088	$211,882	$216,187

Distributed Energy Resources Spending Cap

Minn. Stat. § 216B.2411, subd. 1 allows a utility to spend up to five percent of its minimum spending requirement on distributed generation projects.

Distributed Generation Cap 2017-2019

	% of Min Spend	Min Spend	Distributed Resources Cap	2017 Proposed Distributed Resources Budget	2018 Proposed Distributed Resources Budget	2019 Proposed Distributed Resources Budget
Made in MN	5%	$56,947,458	$2,847,373	$2,847,373	$2,847,373	$2,847,373

Lighting Use and Recycling Programs

Minn. Stat. § 216B.241 requires utilities to invest in projects that encourage the use of energy efficient lighting and reclamation or recycling of spent fluorescent and high intensity discharge lamps. Xcel Energy meets this requirement through its business and residential lighting and lamp recycling programs.

Facilities Energy Efficiency
Minn. Stat. § 216B.241, subd. 1f requires all utilities to include in their conservation plans programs that facilitate professional engineering verification to qualify a building as ENERGY STAR-labeled, Leadership in Energy and Environmental Design ("LEED") certified, or Green Globes-certified. Xcel Energy's Business New Construction and Turn Key Services programs satisfy this requirement.

Other Compliance

Combined Natural Gas and Electric DSM Plan
Minn. R. 7690.0500, subp. 1, governs the submission of investor-owned electric and natural gas utilities' Conservation Improvement Programs. On March 2, 2009, we filed a variance request to submit a combined electric and natural gas plan on June 1, 2009 as well as with each subsequent annual status report. On May 13, 2009, the Director approved our request for all future CIP Plans and Status Reports.

CIP Plan Contents
Minn. R. 7690.0500, subp. 2, governs the contents of each CIP Plan. Each content component is addressed below.

A. A comprehensive description of the proposed program, including a description of each project making up the program;

See description in each project and segment write-up.

B. For each individual project, a completed project information sheet that will be provided by the department. The project information sheet can be used to provide the information required in items E and F;

We now utilize the Energy Savings Platform (ESP), a cloud-based IT platform to satisfy this requirement. All information required in items E and F will be uploaded to ESP following the filing and approval of this Triennial Plan.

C. For each project making up the program, a description of the expected effect of each project on peak demand and energy consumption with supporting assumptions, including a list of each conservation technology or process to be promoted and the energy – and demand – savings assumptions associated with each identified technology;

See enclosed cost benefit analyses, BENCOST modeling, and technical assumptions for each project.

D. For each electric utility that must submit an integrated resource plan to the Public Utilities Commission, an explanation of how its overall conservation improvement program enables the utility to meet the long-term demand-side management goals established in its most recent integrated resource plan;

See enclosed executive summary. We note that the most recent Resource Plan Order in Docket No. E002/RP-10-0825 directs us to strive to achieve the 1.5% savings goal over the long-term planning horizon. This Plan establishes a goal to reach the 1.5% goal in the short-term, which will position us well to strive to sustain these high levels of savings over the longer-term. Our current Resource Plan is being considered in Docket No. E002/RP-15-21.

E. An estimate of the expected cost-effectiveness of each project to the utility, to the project's participants, to the utility's ratepayers, and to society;

See enclosed cost-benefit analyses and BENCOST modeling.

F. For each project targeted at residential consumers, an estimate of the anticipated percentage of use of each project among:

a. Low-income participants; and

b. Renters;

This information will be uploaded to ESP following the filing of this Triennial Plan.

G. A detailed budget for each project for the next three years;

See cost-benefit analyses and BENCOST modeling.

H. A description of the utility's ratemaking treatment and cost-recovery method;

The ratemaking and cost-recovery procedures for this CIP follow those currently approved by the Public Utilities Commission.

I. An estimate of participation in each project;

See enclosed cost-benefit analyses and BENCOST modeling. This information will be uploaded to ESP following the filing of this Triennial Plan.

J. An explanation of how the proposed projects provide for the involvement of community energy organizations, when appropriate;

See enclosed individual program descriptions

K. An outline of the proposed plan for evaluating the effectiveness of each proposed project;

See enclosed program descriptions as well as the Research, Evaluations, and Pilots Segment for a schedule of planned program evaluations. The Measurement and Verification policy is included within this segment.

L. For each renewable energy project, an estimate of the net energy and capacity to be produced by each project and the projected reliability of the technology that would be used; and

Renewable energy projects are no longer included within our CIP Plan.

M. Additional information that the Department determines is necessary as a result of its review or evaluation of previous projects of the particular utility.

None.

➢ Business Segment

Description
The Business Segment serves all Xcel Energy customers who are not on a residential rate. This broad and varied Segment has historically contributed a significant portion of the energy savings to the Company's DSM portfolio and is expected to continue to do so in the future.

Xcel Energy offers a variety of products including study funding, as well as prescriptive, custom and holistic rebates in order to best serve business customers over a broad range of technologies. Our program portfolio encourages customers to choose high efficiency options ranging from a simple lighting fixture replacement to the inclusion of energy efficiency in the design of an entire new facility. Study programs also offer assistance whether customers need to identify simple energy efficiency opportunities or they are considering a complex manufacturing process change. Holistic programs foster a deeper level of customer commitment to energy efficiency and engage customers in long-term energy planning intended to change the way customers look at energy and conduct their business.

Most of the programs in our business portfolio are available to all of our business customer sectors such as small and large retail, office, hospital, manufacturer, educational and government facilities. A few programs, such as Commercial Efficiency and Process Efficiency, are designed to serve specific market sectors by better targeting efficiency opportunities and customizing delivery options to better engage customers and match their operations and needs.

Programs
This comprehensive program portfolio ensures that Xcel Energy has something to offer almost any business customer in almost any energy efficiency situation. Our holistic Process Efficiency program has increased its contribution to our portfolio since the 2007 launch, and in 2013, we expanded our holistic offerings with a new Commercial Efficiency program. This individualized approach to identifying customer needs, measuring energy savings, and removing implementation barriers is popular with engaged customers and has proven successful in delivering sustainable energy savings.

For this Plan, our focus is on expanding and updating our existing program offerings to better serve the business market segment including more segment focused solutions to help customers identify and prioritize energy-saving projects.

Overall Goals
The Business Segment contributes a significant portion of Xcel Energy's planned conservation and load management achievements in this Plan. Planned achievements of 709 GWh and 1.3 million Dth over the three-year period account for 55% of the Company's total electric energy savings goal and 61% of the total natural gas goal.

Marketing/Advertising/Promotion
We rely on trade allies, end-use equipment vendors, account managers and dedicated energy efficiency sales specialists to drive conservation and load management achievements in the Business Segment. Although sales to the largest business customers typically require personal interaction, the Company also utilizes newsletters, customer events, direct mail, email communications, awareness advertising and social media to build awareness and drive program activity. To support its marketing efforts, the Company will employ an integrated approach to communications, where the tactics are designed to work in concert with each other and reinforce key messages over time.

We also market our programs as customer solutions to various business segments; focusing on the segments which have significant potential and the segments in which participation is under performing compared to others. Multi-media campaigns are used to provide each segment customized tools and information and to direct them to the most applicable programs in our portfolio.

Overall Policies

The Company has adopted several general policies that are followed in the Business Segment. Individual programs may follow different policies as noted in the program descriptions. The general policies provide overall management direction; however, they may be relaxed for specific time periods when warranted for promotional events or other purposes.

The segment-level policies include:

- Cost-Effectiveness Tests: All customer projects going through the custom analysis process must pass the Societal Tests with an absolute ratio of 1.0 or greater.
- Proof of Installation: All programs require documentation of installation, such as proof of purchase (e.g., invoices) or site verification.
- Installation Date: Rebates are provided for equipment installed within 12 months of purchase or project completion unless otherwise noted in the individual program policies.
- Payback Requirements: Projects must have a payback longer than nine months, and cannot exceed the expected lifetime of the equipment.
- Studies: Study funding cannot exceed 75% of the incremental cost unless otherwise noted in the individual program policies.
- Influenced Savings refers to projects for which Xcel Energy played a significant role in the customer's decision to implement an energy efficiency measure, and for which the customer participated in the normal Custom Efficiency project submission process, yet whose cost-effective analysis or payback period failed. For such projects, Xcel Energy denies the customer any rebate for the measure, but claims Influenced Savings in order to appropriately account in the Company's energy and demand savings for the implementation of the higher energy efficiency technology and to recognize the often significant labor investment and/or study costs involved in the project. Influenced savings guidelines are listed below:
    1. Project Preapproval – Must occur prior to purchase and installation.
    2. Cost-Effectiveness Tests – Projects must pass the Societal Test.
    3. Payback – Projects with a payback period of less than nine months may be considered only if they meet all the other Influenced Savings guidelines herein.
    4. Large Projects – Projects with savings of 2 GWh and greater require separate DER pre-review. All other projects will be reviewed as part of the Status Report.
    5. Savings Cap – Influenced Savings claims cannot exceed 4% of the Company's annual CIP achievements.
    6. Documentation – Documentation must be provided to show Xcel Energy's involvement was an important factor in implementing the energy saving project.
- Study-Driven Credit: If a customer implements measures identified in an Xcel Energy study or assessment, or identified in a study funded by Xcel Energy, and the measure has a payback period of less than nine months or longer than the expected lifetime of the equipment, the customer will not receive a rebate, but the Company will claim those savings as study-driven credit. We believe that our help identifying and analyzing the energy efficiency measures provides influence on the customer's decision to implement those measures. These savings do not count toward Influenced Savings. All programs that fund studies are eligible to claim study-driven credit.
- Program Incentives: Custom projects limit rebates to 60% of the actual project cost. Prescriptive rebate levels are set based on deemed incremental costs and rebates are capped at

60% of actual total project cost; this practice helps ensure we do not pay more than 60% of the incremental cost for a specific project for which the pricing varies from the deemed cost. Bonuses and special offers may increase the rebate cap as a percent of incremental cost, but we strive to ensure that it never exceeds 100%.

Stakeholder Involvement

In the course of developing this Plan, we interacted with many local organizations to refine existing programs, shape new programs, and discuss partnership opportunities. These local organizations include:

- Building Owners and Managers Association;
- Center for Energy and Environment;
- CenterPoint Energy;
- Enterprise Minnesota;
- Franklin Energy;
- Minnesota Blue Flame Gas Association's Conservation Committee; and
- Minnesota Technical Assistance Program.

In addition to local contacts, we also worked with regional and national organizations in developing the Plan, including:

- American Council for an Energy Efficient Economy;
- Cadmus;
- Cascade Energy;
- Chartwell, Inc.;
- CLEAResult Midwest;
- Compressed Air and Gas Institute (CAGI);
- Consortium for Energy Efficiency;
- Department of Energy/ENERGY STAR;
- Design Lights Consortium (DLC);
- Ecova;
- E Source;
- Electrical Apparatus Service Association;
- Evergreen Economics;
- Hydraulic Institute Pump Systems Matter (PSM);
- Michael's Energy;
- Midwest Energy Efficiency Alliance;
- Motors Decisions Matter (MDM); and
- Tetra Tech.

➢ Business New Construction

Description
The Business New Construction program influences owners, architects, and engineers to include energy efficient systems and equipment in their designs for new construction, additions to existing buildings and/or major renovation projects. We provide consulting services and energy modeling, as well as electricity and natural gas efficiency implementation rebates. The program is primarily marketed by our sales team and consultants to design teams and customers who want to build energy efficiency into their building design.

The program's main offerings include the following:

- Prescriptive rebates, including motors, cooling and heating equipment identified in the Energy Efficient Buildings program component; and
- Custom rebates for energy efficiency strategies incorporated into the building design through either the Energy Efficient Buildings or the Energy Design Assistance program component.

The main offerings are described below.

Energy Design Assistance (EDA)
The EDA offering provides energy expertise to encourage energy efficient building design and construction practices. EDA offers design assistance in support of an integrated design process by providing free computer energy modeling of the planned design, funding to offset the cost of design time associated with the increased energy analysis, financial incentives to improve the cost-effectiveness of a package of energy efficiency measures, and field verification to ensure that the strategies are installed per the design intent. EDA is a free service for our business customers and energy modeling is done in real-time, so the project team can visualize the impacts of their efficiency choices.

With the advancements in real-time modeling, the EDA program has combined the Quick and Basic tracks into a single offering, the Standard track. Therefore two tracks are now available for customer involvement: Standard and Enhanced. The Standard track is for customers interested in a collaborative design process to identify energy savings using new technologies. Projects must represent buildings with 20,000 square feet or greater that are in the schematic design or early design development phase. Rebates are based on demand and energy savings (kW, kWh, and Dth). The design team must strive to achieve a minimum of 5% demand and energy savings over the baseline. If 5% is not achieved, the customer is no longer eligible for that component of the rebate.

The Enhanced track is for customers interested in obtaining sustainable building certifications such as the United States Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED). The Enhanced track allows for further analysis in the early stages of design for HVAC, daylighting, and massing analysis. Projects in the Enhanced Track must represent buildings with a minimum of 50,000 square feet that are in the pre-design or early schematic phase. Design teams must strive to achieve a minimum of 30% demand savings over the baseline. Finally, the project must be registered with the USGBC LEED certification or equivalent certification (i.e. Minnesota B3 or Green Globes).

We administer the Business New Construction program with help from outside energy design consultants who facilitate meetings with the design teams and building owners, and complete energy modeling activities. The current EDA baseline is based on the updated Minnesota State Energy Code referencing the ASHRAE 90.1-2010 Energy Standard.

Energy Efficient Buildings (EEB)

The EEB offering is intended to provide a simplified approach to optimizing energy efficiency options in new construction, additions, and major renovations. This component addresses the portion of the new construction market not suited for the full-blown energy modeling of the EDA offering. It offers final design review, equipment recommendations, and onsite verification.

Focusing on the needs of smaller building owners, the EEB offering provides a comprehensive list of typical energy efficiency measures that can be incorporated into the new building design, as well as the rebate amounts for each measure. Incentives are provided for heating, cooling, lighting, building envelope, motors, and custom opportunities. We administer the product using both internal and external resources to review the calculations, recommend equipment, and verify installation. EEB is a free service to our business customers. Any size building may participate, but this component is best suited for buildings that are greater than 5,000 square feet. Projects must enter the program prior to completion of construction documents.

Unlike many other programs, the Business New Construction program verifies incremental project costs at a program level, rather than project level. Because of the large scale of most projects, the final costs for all energy savings measured within the building are difficult to identify individually. Instead, we use the best estimate of costs from the design team and use it to project the energy savings costs using the DOE2 energy model. The payback criterion is estimated using the same cost definitions as for incremental cost.

Program Changes

The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this plan.

Change	Rationale	DER Notification Method	Date Notified
Eliminated one of the EDA Tracks/Combined the Quick and Basic tracks to become the Standard track	Technological advances in energy modeling software streamlines the process and projects that previously would have qualified for the Quick track receive as much rigor as the Basic track has had in the past.	New to this plan	New

Budget and Goal Considerations
The program's participation, energy savings goals, and budgets were determined by reviewing historical achievement and the state of the construction market industry. In recent years, the construction market has been very active and we expect that to continue throughout this 2017-2019 CIP Plan. However, code changes will reduce energy savings attributed to this program. The main budget drivers include the following:

- Incentives – Incentives make up more than half the budget. In addition to customer incentives, the EDA product provides incentives to design teams. Up to $12,000 per project is available to reimburse customers and design teams for the extra expense associated with participation.
- Customer Service – These activities are associated with the cost of developing energy models, as well as time spent conducting customer meetings.
- Measurement and Verification – All Business New Construction projects are verified using on-site visits.

Involvement of Community Energy Organizations
The New Construction program engages customers, trade allies, and other stakeholders at the individual project level and supports organizations including the United States Green Building Council (USGBC-MN) and the Center for Sustainable Building Research (CSBR).

➢ Commercial Efficiency

Description
The Commercial Efficiency program offers large commercial customers customized resources to develop a holistic, sustainable energy management plan. This program provides funding for studies to identify and scope energy efficiency opportunities. Rebates are available to customers who implement qualifying energy efficiency recommendations. The Commercial Efficiency program was modeled after our successful Process Efficiency program with adjustments made to reflect the unique nature of the commercial market. This program is marketed to large commercial customers through Xcel Energy's account managers. The program targets commercial customers that have at least 1 GWh or 4,000 Dth of conservation potential.

The program offerings are delivered in three phases. Each phase is defined in a Memorandum of Understanding that is customized to reflect the needs of the specific customer.

Phase 1: Identification
Xcel Energy performs a high level analysis to identify opportunities for energy savings in the customer's business practices, facilities, and operations. This is completed at no cost to the customer. Phase 1 is delivered using internal resources or a third-party provider.

Phase 2: Scoping
This phase provides support and resources to further define, measure, and provide recommendations and assistance for energy savings opportunities while working with the customer to optimize the business practices identified in Phase 1. The customer pays up to 25% of approved funding for Phase 2 work up to $7,500 for Phase 2 efforts. Total funding for Phase 2 is based on estimated savings. The purpose of the customer contribution is to ensure management-level engagement and the customer's commitment to a holistic approach. Phase 2 is delivered using internal resources or third-party technical experts selected through an RFP process, or through technology-specific experts of the customer's choosing.

Phase 3: Implementation
We work with the customer to put together a schedule of efficiency and conservation goals that translates their energy management plans into actual conservation impacts. This phase includes a customized rebate and bonus schedule that rewards deep energy savings and/or a system-wide approach.

Upon project completion, customers earn rebates for improvements that qualify for any of our prescriptive or custom programs. The savings are included in the Commercial Efficiency program achievements, but mirror the rules and rebate levels of our other programs. If the improvements do not qualify for rebates due to program rules, we claim the project savings as study driven program savings due to the extensive level of investment and influence we have with these customers.

Due to the similar holistic nature of the Commercial Efficiency and Process Efficiency programs, we use similar program-specific policies for both programs. Unless otherwise noted, these policies previously have been filed and approved by the DER for the Process Efficiency program:

- Bundling: When customers identify multiple measures for installation, a bundle can be evaluated to see if it qualifies for a rebate versus each individual component. This allows

measures with too short of a payback for a rebate to be leveraged to drive projects with too long a payback for the customer to install so that both are implemented.

- Preapproval dates: Custom-type measures in Commercial Efficiency require a custom analysis, but the actual date the project is submitted and the analysis is completed does not disqualify a project if it was initiated after the customer entered into the program. This is due to the extensive resources used by the program to identify and scope ways to drive energy efficiency into how a customer does business. The goals and awareness created during Phases 1 and 2 can result in projects that drive energy savings in business areas that act without immediately notifying the personnel in contact with Xcel Energy.
- Rebate bonuses: We use the rebate structure of other end-use programs and then incorporate rebate bonuses for system optimization and/or exceeding annual achievement targets.
- Facility-level metering: This concept is being developed and may be tested through this program. We work in advance with the DER to define the methodology of how we propose to take credit under this metering scenario. Facility-level metering provides us the ability to accurately account for all savings generated by installation of a measure and incorporate the savings that may be driven plant-wide that we have been unable to accurately capture historically.
- Behavioral Savings: We use the DER's Average Savings Method to count behavioral savings created through single entity-based behavioral change efforts. This may apply to technical projects that require specific behaviors to maintain persistent energy savings throughout their lifetime.

Program Changes
None.

Budget and Goal Considerations
We determined the program's participation, energy savings goals, and budgets by examining historic participation levels, project and participation cycles, and costs.

The main budget drivers include the following:

- Administration – These costs are driven by marketing, sales, engineering, and external labor resources to support the Company's heavy engagement with the customer, as well as cover the costs of those projects requiring metered verification.
- Customer Service – The Company utilizes third-party resources to deliver the program's identification and scoping phases.
- Participant Incentives – The program has a robust rebate budget due to the size of projects initiated through the Commercial Efficiency program.

Involvement of Community Energy Organizations

The Commercial Efficiency program works with Community Energy Organizations to promote the program and deliver its offerings. In particular, the Trillion BTU financing delivered by the St. Paul Port Authority and Xcel Energy could collaborate to help customers fund large capital projects when financing is a barrier to implementation. We consider leveraging other resources as they become available through community and other organizations, and consider integrating their offerings into our program and customer's energy management plans.

➢ Computer Efficiency

Description
The Computer Efficiency program offers prescriptive rebates to computer and server manufacturers who sell and ship personal computers (PCs) and servers with efficient power supplies to customers in our service area. Prescriptive rebates are also offered to customers who install virtual desktop infrastructure or remote power management.

The main offerings are described below:

1) High Efficient Power Supply

- Desktop personal computer (PC)s; and
- Servers

Manufacturers that sign a participation agreement and turn in a claim form to the Company's third-party implementer can receive incentives to cover part of the incremental cost for installing high efficient power supplies. Manufacturers use this incentive to promote PC's with high effiency power supplies and to increase the number of products offered with high-efficiency power supplies. The third-party administrator delivers the incentives to manufacturers and provides monthly sales reports and invoices to Xcel Energy for reimbursement.

2) Desktop PC Virtualization
This downstream measure provides rebates to business customers who implement a Virtual Desktop Infrastructure (VDI) strategy. This strategy involves installing a VDI device (also known as "thin clients", "zero clients" or "ultra-thin clients") instead of the traditional desktop PC. The VDI device has a lower operating wattage and uses less energy than traditional desktop computers.

3) PC Power Management
This downstream measure provides rebates to business customers who install power management software that remotely controls a computer's power management strategy, such as PC inactivity and overnight sleep settings, from data centers or other central locations. The software, that manages the computer's power management settings, is locked and the computer user cannot override the power management settings.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Raise the baseline of desktop PC power supplies and virtual desktop incentives to meeting ENERGY STAR version 6.0 spec or	Encourage the sales of higher efficiency ENERGY STAR products and adjust power supply incentive levels to meet the current conditions of the personal computer market.	New to this Plan	New

higher. Also modify the desktop PC power supply incentive levels as a result of the increased baseline.			

Budget and Goal Considerations
The program's participation and energy savings goals and budget were determined by looking at the Company's overall electric goal and past participation levels.

The main budget drivers include the following:

- Customer Incentives – This budget reflects only the downstream rebates. This is based on historical participation across the offerings and includes predicted growth in products.
- Labor – A majority of the budget is allocated to the external administration of the upstream product. The product is currently being administered by Ecova. The internal labor budget is based on past program performance.
- Promotion and Advertising – Budgets for direct promotion and sales support materials are included in the total budget. Promotions are targeted to customers and trade partners and typically focus around activities such as new or revised product offerings, case studies featuring successful projects, educational opportunities, and campaigns to increase specific product awareness.
- Consulting – A large portion of the budget is allocated for upstream incentives to computer manufacturers. This budget reflects the new incentive levels, incentive tiers implemented in previous years and the projected totals in each tier.

Involvement of Community Energy Organizations
None.

➢ Cooling Efficiency

Description
The Cooling Efficiency program offers prescriptive and custom rebates to business customers who install efficient cooling systems used for space and process cooling. The program also offers rebates for cooling-focused studies. The Cooling Efficiency program encourages Xcel Energy business customers to choose the most efficient cooling equipment that best meets their needs.

The program's main offerings include the following:

- Prescriptive rebates for:
  - Cooling equipment that exceeds the minimum efficiency required by energy codes; or
  - VFD retrofits on chillers.
- Custom rebates for:
  - Cooling recovery and other non-prescriptive cooling projects.
- Study funding to identify and quantify energy saving cooling projects.

The main offerings are described below.

Prescriptive Cooling Efficiency Rebates
The program offers rebates for cooling equipment that exceeds the minimum efficiency of ASHRAE 90.1 -2010 standards. Eligible prescriptive equipment includes packaged terminal air conditioners, rooftop unit economizers, water source heat pumps, direct expansion units, variable frequency drive retrofits on chillers, and new chillers. Refrigeration measures are also included in the Cooling Efficiency program. These measures include zero loss energy doors, electronically commutated motor evaporator fans, close the case doors and anti-sweat heater controls. The prescriptive program does not require preapproval.

Custom Cooling Efficiency Rebates
Custom rebates are available for non-prescriptive energy efficiency cooling equipment. To be eligible for a custom rebate, preapproval is required before moving forward with the project. The energy savings are then analyzed and after completion, we issue a rebate.

Cooling Efficiency Study Funding
The program offers funding to identify energy efficiency opportunities. Customers must receive preapproval before moving forward with the study. The projected energy savings are then analyzed and after study completion, review rebates are paid. The study rebates are awarded based on projected savings.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Updated baseline efficiencies for DX units, chillers, PTACs and water source heat pumps	Updated program to meet 2015 MN Energy Code	New to this plan	New
Addition of mini-split systems	Product added for customers seeking a solution for spot heating and cooling	New to this Plan	New

Budget and Goal Considerations
The program's participation, energy savings goals, and budget were determined by looking at the Company's overall electric and gas goals, past program participation levels, and the typical ramp-up period for program changes and new offerings. We reviewed the equipment and project characteristics of historical projects to develop a projected average savings per participant for various program offerings. Reported energy savings for the program are determined by using project-specific inputs of actual use and efficiency.

The main budget drivers include the following:

- Participant Incentives – The budget reflects the rebate levels and projected customer participation in each offering, which was based on 2013-2015 participation across the offerings.
- Trade Incentives – The administration budget includes incentives for the trades.
- Administration – These budgets are based on past program performance with a slight increase built in for expanded program offerings, engineering, promotion, and participation. The Company occasionally utilizes analytical and consulting services for custom Cooling Efficiency projects.
- Advertising and Promotion – The promotional budget includes spending for several customer and trade communications per year, which are necessary to drive participation and awareness.

Involvement of Community Energy Organizations
Because cooling systems can be very complex, trade support is crucial to achieving our goals. We actively engage trade partners in program design, project implementation, and program promotion through regular meetings and correspondence with our Trade Relations Manager. We also partner with local energy groups such as the Minnesota ASHRAE Chapter and host trade partner training events to further local industries understanding of energy efficiency programs.

➢ Custom Efficiency

Description
The Custom Efficiency program offers rebates to electric and natural gas business customers who implement energy saving projects that are not available through our prescriptive programs. The program is marketed to all business customers regardless of size using direct contact with customers via our sales representatives, the internet, and trade channels.

Energy saving non-prescriptive projects encompasses installing new equipment, replacing existing equipment, retrofitting equipment or improving processes that lower a customer's electric or natural gas use. The project list includes, but is not limited to, boilers, compressed air, cooling, lighting, motors, and other technologies, all of which must pass cost-effectiveness on an individual project basis.

This program also offers study funding to help customers determine project viability and energy savings potential.

Equipment Rebates
Rebate amounts are defined by the engineering examination of the demand and energy savings attributed to the project. The analysis incorporates standard engineering principals, relative to industry standards and the interactive energy effects of the equipment and/or system components. Successful applicants receive a rebate if their completed project passes the benefit/cost-effectiveness parameter.

Study Funding
Successful applicants receive partial funding based on an engineering assessment of the estimated demand and energy savings of the project.

Program Changes
None

Budget and Goal Considerations
The program's participation, energy savings goals, and budgets were determined by looking at the overall electric and gas goals, analyzing historical data, reviewing projects in the pipeline, and evaluating the forecasted economic conditions. We also included other variables such as promotions needed to reach goals, rebate levels, and staffing. Projected customer participation and savings are based on expected average project size and mix of technologies anticipated. The opportunity for program achievement continues to decline as the traditional market base has opted into holistic programs and as technologies migrate from a custom to prescriptive rebate structure.

Involvement of Community Energy Organizations
None

➢ Data Center Efficiency

Description
The Data Center Efficiency program offers prescriptive and custom rebates to business customers who install energy saving measures in their existing or new data center. The program also offers rebates for data center energy studies. The program is primarily marketed to our enterprise and colocation data center customers through our account managers and the Business Solutions Center, but any size data center can participate. We also work closely with our trade partners, specifically engineering firms, technology services firms, mechanical contractors and manufacturers' representatives to market the program.

The program's main offerings include the following:

- Prescriptive rebates for efficiency improvements falling under any of the end-use prescriptive programs we offer.
- Custom rebates are awarded for efficiency measures such as:
    - Air-flow management;
    - Server and IT systems;
    - Cooling systems;
    - Humidification systems;
    - Transformers; and
    - Uninterruptable Power Supplies (UPS).
- Study funding to identify and/or quantify energy savings projects. Exceptions to the cap may apply for very large or complex studies.
- For customers who are building a new data center, we offer knowledge and resources, free of charge, to help data center owners optimize the efficiency of their facilities during the siting, design, and early operation stages of the new data center. Our consultant guides data center owners and design teams through a series of analyses to identify a set of high energy performance design elements to incorporate into the facility.

Program Changes
None.

Budget and Goal Considerations
The program's participation, energy savings goals, and budgets were determined by looking at the Company's overall electric goal, past participation levels, current pipeline, and expected project lead time. We also reviewed the equipment and project characteristics of recent project analyses to develop a projected average savings per participant for various program offerings.

The main budget drivers include the following:

- Rebates – The rebate budget reflects the current rebate levels and projected customer participation in each offering, which was based on 2014 and 2015 participation combined with future pipeline data.
- Labor – These budgets are based on past program performance.
- Promotion and Advertising – Promotion budgets are based on historical spend. Additional money was allocated towards advertising to perform data center specific advertising.

- Consulting – Fees to hire a consultant to provide the services for new construction projects were based on historical trends within the Energy Design Assistance component of the Business New Construction program as well as the quantity of projects we are forecasting for this track.

Involvement of Community Energy Organizations

The Data Center Efficiency program works with multiple community energy organizations, ranging from trade partners and installers to local industry organizations. Xcel Energy hosts program and technical training and information sessions for trade partners and sponsors and presents at local industry chapter organization meetings and events.

➢ Efficiency Controls

Description
The Efficiency Controls program offers custom electric and gas rebates to customers who install automated control systems resulting in energy savings. These systems are centralized networks programmed to monitor and control mechanical and sometimes lighting systems within a building, allowing customers to reduce energy costs by adjusting usage of equipment. The program is marketed to all business customers.

The program offers custom rebates for:

- Installation of automated control systems;
- Addition of control points to an existing system; and
- Microprocessor-based control panels.

The main offerings are described below.

Offerings
To be eligible for a rebate, customers are required to submit their rebate application and project proposal for preapproval prior to purchase or ordering equipment. Xcel Energy evaluates each application, estimates energy savings of the proposed system, and notifies the customer of rebate qualification and estimated rebate amount.

Current market information suggests that customers continue to have a strong interest in energy control systems; however the face of the controls market is shifting. We may expect reduced customer demand for digital control system rebates due to the following short term factors:

- Reduced customer interest in rebates as more customers have already converted to newer digital control systems;
- Early rebate program participants (c.2005) are just over halfway through equipment life;
- Customers already using a digital control system have an increased interest in other services, such as data-driven, cloud-based energy reporting systems (Xcel Energy is running a pilot program for EMIS type systems); and
- New LED fixtures with integrated controls are far more cost-effective with greater overall energy savings than simply retrofitting controls for existing lighting.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Reduced forecast	Better alignment with actual market conditions	New to this Plan	New
Increased rebates	Better alignment with actual market conditions	New to this Plan	New

Budget and Goal Considerations
The program's participation and energy savings goals and budget were determined by analyzing the overall electric and gas goals, historical program performance, current technology and market conditions as described above.

The main budget drivers include the following:

- Rebates – As the market becomes more saturated with digital control systems, the customers left to convert require greater assistance and higher rebate incentives to influence project implementation. The budgets were estimated based on fewer participants and higher rebates.
- Labor – Internal labor to market and administer program offerings are estimated based on historic spend.
- Consulting – Supporting engineering and staff augmentation to ensure accurate consistent analyses and support any M&V efforts as needed.

Involvement of Community Energy Organizations
The Efficiency Controls program employs the services of an energy engineering firm to conduct and analysis of each project for cost-effectiveness.

➢ Fluid Systems Optimization

Description
The Fluid Systems Optimization program, historically known as the Compressed Air program, offers study funding to perform system diagnostics, as well as prescriptive and custom rebates for the purchase of energy saving equipment. The major systems supported by the program are compressed air, pumping, fans, blowers, vacuums, and hydraulics. System diagnostic studies based on the laws of fluid system dynamics are funded as a means to identify and correct inefficiencies within customers' air and fluid systems. Studies often identify additional measures to improve system efficiency. The program is primarily marketed to mid- to large-sized industrial customers.

The program's main offerings include the following:

- Prescriptive Rebates for:
  - Variable speed drive compressors;
  - No loss air drains;
  - Cycling refrigerated dryers;
  - Dew point demand controls; and
  - Mist eliminators.
- Custom and Recommissioning rebates including, but not limited to:
  - Calibration/tune-up of system set points;
  - Adjustment of valves and dampers;
  - Reducing system demand;
  - Air to electric conversions;
  - Capital equipment replacements and upgrades; and
  - System redesigns.
- Compressed air supply-side and demand-side studies.
- Additional System Studies for:
  - Pumping;
  - Fan systems;
  - Blower systems;
  - Vacuum systems; and
  - Hydraulic systems.

The main offerings are described below.

Prescriptive Rebates
The Fluid Systems Optimization program offers rebates for qualifying prescriptive equipment.

Custom Rebates
The program pays custom rebates for qualifying energy saving measures that are not included under the prescriptive rebate category. Such projects are evaluated under the Custom Efficiency analysis and must follow the rules of the Custom Efficiency program. The Company also rebates qualifying system tune-ups, waste reduction efforts, and non-capital equipment changes that are identified in a study and do not fit into the prescriptive rebate category.

Compressed Air Supply-Side Study
A customer's pre-approved Compressed Air Supply-Side Study cost is eligible for reimbursement after 75% of the leaks identified have been repaired and the study has been reviewed by an Xcel Energy engineer or an authorized consultant. The studies are based on the customer's existing system horsepower and identify a customer's supply baseline and system improvements.

System Studies
The Company will pay study funding of up to 75% of the study cost not to exceed $25,000. An extra rebate incentive is offered to customers to cover their out-of-pocket study costs. This incentive applies to all implemented measures from the study, regardless of the payback, and the cap of the extra incentive is the customer's out of pocket cost for their study (i.e. study cost minus study rebate).

Program Changes
None.

Budget and Goal Considerations
The program's participation and energy savings goals and budget were determined by looking at the Company's overall electric goal and past participation levels.

The main budget drivers include the following:

- Participant Incentives – This budget represents the rebates we will pay for products and studies. This is based on 2015 participation across the offering and includes predicted growth in the legacy products and new opportunities from the new study offerings.
- Administration – These budgets are based on past program performance with an increase built in for increased participation and technical engineer support.

Involvement of Community Energy Organizations
The Fluid Systems Optimization program partners with the Department of Energy (DOE) to provide training on the Compressed Air Challenge program and Fan Systems. We also work with the Hydraulic Institute promoting pump system optimization and creating pumping standards and best practices. We have partnered with the Consortium for Energy Efficiency to establish best practices for industrial systems including blower systems and pumping.

➢ Foodservice Equipment

Description
The Foodservice Equipment program offers prescriptive gas and electric rebates to business customers who purchase and install qualifying energy efficient foodservice equipment. The objective of the program is to encourage customers to purchase higher efficiency foodservice equipment.

The program's main offerings include prescriptive rebates for the following:

- Gas Equipment
    - Broilers (charbroilers, salamander, upright);
    - Demand controlled ventilation;
    - Dishwashers (gas water heating);
    - Fryers;
    - Ovens (combination, convection, conveyor, rotisserie, rotating rack); and
    - Pasta cookers.
- Electric Equipment
    - Demand controlled ventilation;
    - Dishwashers (electric water heating); and
    - Hot food holding cabinets.

Program Changes
None.

Budget and Goal Considerations
The saving levels were established using the latest Arkansas TRM and Energy Star assumptions. We used historical participation levels to estimate participants.

The main budget drivers include the following:

- Administration – The budgets were based on historical performance.
- Advertising and Promotion – This budget provides funds to promote the program through customer and trade education and awareness through events and direct communication.
- Participant Incentives – The rebate budget reflects the current rebate levels and projected customer participation in each offering.

Involvement of Community Energy Organizations
We work with community organizations, distributors and manufacturers of foodservice equipment to help educate customers of this program offering.

➢ Heating Efficiency

Description
The Heating Efficiency program offers prescriptive and custom natural gas rebates to business customers who install energy efficiency boilers, furnaces, water heaters, unit heaters and other system improvements. The program also offers funding to conduct heating engineering assistance studies. The program is primarily marketed through our account managers for our large customers and energy efficiency specialists for our small business customers. We also work closely with our trade partners, specifically manufacturers' representatives, to market the program.

The program's main offerings include the following:

- Prescriptive rebates for:
  - New boilers, furnaces, water heaters and unit heaters that exceed the minimum efficiency required by energy codes;
  - Optional auxiliary boiler equipment that further improves a new or existing boiler's efficiency; and
  - Distribution-system improvements, including steam trap repair and replacement and pipe insulation.
- Custom rebates for:
  - Heat recovery projects and other energy saving projects that lower a customer's natural gas use and pass the required Societal and Participant Tests on a per project basis; and
  - Heating systems with more than 30% process load or larger than 10 million BTUH.
- Study funding to identify and quantify heating-related energy savings projects.

The main offerings are described below.

Prescriptive Rebates
The program offers prescriptive rebates for boilers, furnaces, water heaters and unit heaters that substantially exceed the minimum efficiency required by energy codes. Prescriptive rebates are also available for auxiliary boiler equipment to improve a boiler's efficiency or distribution-system improvements to reduce heat loss. New packaged boiler systems do not qualify for auxiliary equipment rebates unless the customer can show that the same boiler is available and qualifies for the base boiler rebate without the auxiliary equipment.

Custom Rebates
The program offers custom rebates for efficiency equipment that is non-prescriptive. These projects require pre-approval and are funded based on anticipated energy savings. The Custom rebate process is more complex than the prescriptive rebate process, as each project is analyzed on an individual basis rather than based on deemed savings.

Study Funding
The program offers two types of study funding for customers interested in identifying and analyzing potential heating-related energy efficiency projects: prescriptive steam trap audits and custom studies. Prescriptive steam trap audits are rebated and may receive funding up to 100% of the audit cost. These audits do not require preapproval; however, all faulty traps identified in the study must

be replaced. Custom studies are funded based on anticipated savings. These studies require preapproval and each project is analyzed individually.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Increased baseline efficiency for hot water boilers greater than 2.5 Million BTUH	In compliance with MN Commercial Energy Code	New to this Plan	New
Increased minimum pipe insulation requirements	In compliance with MN Commercial Energy Code	New to this Plan	New
Reduced the assumed average operating efficiency for condensing boilers	As suggested in Commercial Condensing Boiler Optimization CARD	New to this Plan	New
Decreased the efficiency improvement for tune-ups performed on condensing boilers	As suggested in Commercial Condensing Boiler Optimization CARD	New to this Plan	New
Add Electrically Commuted Motors (ECMs) for furnaces to the program (moved from the Motor and Drive Efficiency Program)	Capitalize on market efficiencies with similar segment (promote with furnace rebates)	New to this Plan	New

Budget and Goal Considerations
The program's participation, energy savings goal, and budget were determined by looking at the Company's overall gas goal, past participation levels, the typical ramp-up period for program changes, and new offerings. We reviewed the equipment chosen and general characteristics of historical projects to develop a projected average savings per participant for various program offerings.

The main budget drivers include the following:

- Rebates – The rebate budget reflects the new measure levels and projected customer participation in each offering, which was based on 2014 and 2015 participation across the offerings.

- Trade Incentives – These budgets are based on a percentage of anticipated customer rebates. These incentives are paid to motivate trade partners to participate by helping to educate and install energy efficiency improvements.
- Labor – These budgets are based on past program performance with a slight increase build in for expanded program offerings, engineering, and participation.
- Promotion and Advertising – Promotions may include direct mail to customers and trade, training events, email marketing, and trade publications

Involvement of Community Energy Organizations

The Commercial Heating program works with multiple community energy organizations from trade vendors and installers, to the Minnesota Blue Flame Association. We meet with the trade annually to assess engagement, program strengths and weaknesses, as well as to get feedback on the market. The Minnesota Blue Flame Association is used to drive awareness of natural gas conservation topics and increase educational resources for energy savings options.

➢ Lighting Efficiency

Description
The Lighting Efficiency program offers prescriptive and custom rebates to Xcel Energy electric business customers who install qualifying energy efficient lighting equipment in existing or new buildings. The program also offers rebates for Lighting Redesign studies to customers needing assistance to optimize the lighting systems within their facilities. The program is primarily marketed through our account managers for our large customers. We also work closely with our trade partners, manufacturers' representatives, distributors, and contractors to market the program.

The program's main offerings include the following:

- Prescriptive rebates for products from a pre-defined list of lighting measures that save energy. Typical options include:
    - Light emitting diode (LED) lamps and fixtures that replace inefficient systems, including incandescent, high intensity discharge (HID), and fluorescent technologies; and
    - Low-wattage fluorescent lamps and fixtures that replace higher-wattage fluorescent and HID lighting.
- Custom rebates for energy saving lighting projects that do not fall within the requirements of the prescriptive rebates.
- Study funding is available for customers who have facilities that are under or mis-lit. Studies identify and quantify lighting solutions that include energy saving opportunities.
- Midstream LED lamp incentives for local distributors, called Business LED Instant Rebate.

The main offerings are described below.

<u>Prescriptive Lighting Rebates</u>
The program offers rebates for qualifying lighting equipment that is more efficient than existing equipment in retrofit situations or more efficient than standard equipment in new construction applications. Lighting measures most applicable to a prescriptive rebate format are ones that are commonly installed in the marketplace and have an easily identifiable means to determine energy savings.

<u>Custom Lighting Rebates and Advanced Lighting Controls</u>
Applications for energy saving lighting projects that do not fit into the prescriptive paths may be reviewed using the Custom Efficiency or Advanced Lighting Control product preapproval application and the accompanying Lighting Evaluation Worksheet. Project analysis and preapproval of Custom Efficiency and Advanced Lighting Control lighting projects is required prior to equipment purchase and installation.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Addition of additional rebate tiers for LED area lights	Customer demand	New to this Plan	New
Addition of LED screw-in lamps (HID replacement) rebates	Customer demand	New to this Plan	New
Addition of LED PL lamps (CFL replacement) rebates	Customer demand	New to this Plan	New
Addition of LED down lights (with fluorescent baseline) rebates	Customer demand	New to this Plan	New
Addition of integral fixture sensor rebates	Customer demand	New to this Plan	New

Budget and Goal Considerations
The program's participation, energy savings goals, and budgets were determined by looking at the Company's overall electric goal, past participation levels, as well as the large number of LED products that are expected to becomes commercially available during the time period of this Plan. We reviewed the equipment and project characteristics of historical projects to develop projected average cents per kWh rebates for each measure. Anticipated energy savings for the program was determined using Xcel Energy's deemed savings database.

The main budget drivers include the following:

- Participant Incentives – The vast majority of the budget is allocated for rebates. This budget reflects the new rebate levels and projected customer participation in each measure, which was based on 2014 and 2015 participation across the offerings.
- Administration – These budgets are based on past program performance with a slight increase built in for expanded program offerings, engineering, and account management involvement. The budget also includes third-party implementer costs for the implementation of Business LED Instant Rebate efforts and technical assistance with complex lighting projects.
- Advertising and Promotion – A small promotional budget was derived using historical data from past activities. Promotions are targeted to customers and trade partners and typically focus around activities such as new or revised product offerings, case studies featuring successful projects, educational opportunities, and bonus rebates.
- Customer Service – This budget is applied to consulting and analytical services for lighting projects that are analyzed through the Custom Efficiency program.

Involvement of Community Energy Organizations

The Lighting Efficiency program is promoted through a number of community organizations. The Minnesota Chamber of Commerce's Energy Smart program actively promotes lighting efficiency and refers their membership to the program as part of their overall initiative to promote energy efficiency. We coordinate regularly with the Center for Energy and Environment and the One-Stop Shop program to ensure the rebate levels, policies, and practices are relatively consistent. Additionally, we work with trade organizations, such as the Building Owners and Managers Association, as a means to promote energy efficiency to their membership.

➢ Motor and Drive Efficiency

Description
The Motor and Drive Efficiency program offers prescriptive and custom rebates to electric business customers that install National Electrical Manufacturers Association (NEMA) Premium motors, Enhanced NEMA Premium motors, constant speed motor controllers (CSMCs), HVAC and non-HVAC variable frequency drives (VFDs) and water well pump (WWP) VFDs. Rebates for motor and drive system studies are also available. The Motor and Drive Efficiency program offers products to customers that are looking to improve their motor and drive system efficiency and system reliability, while reducing electricity consumption and costs.

The program is primarily marketed through our account managers and Energy Efficiency Specialists to our large and mid-range customers. We also work closely with our trade partners, specifically manufacturers' representatives, to market the program.

The program's main offerings include the following:

- Prescriptive rebates for:
  - New or replacement equipment that meets or exceeds the NEMA Premium efficiency energy standards for Motors;
  - New or replacement equipment CSMCs used to control any constant speed motor that is lightly loaded when the speed cannot vary;
  - HVAC and non-HVAC VFDs used to control the motor speed of fans and pumps; and
  - WWP VFDs used to control motor speed for water well pumping in specific applications.
- Custom rebates for:
  - Projects and equipment that do not meet the prescriptive criteria.
- Study funding.

The main offerings are described below.

Prescriptive Rebates
The prescriptive rebates are available to electric business customers with projects that meet the prescriptive requirements of the Motor and Drive Efficiency program.

The program offers prescriptive rebates for HVAC and non-HVAC VFDs or drives, CSMCs and NEMA Premium efficiency motors. As well as alternating current permanent magnet (PMAC) motors that fall under the Enhanced Motor portion of the program and WWP VFDs. The PMAC motors and WWP VFD products were added to the prescriptive portion of the program to reduce the barriers that prevent customers from purchasing the more efficient but higher priced innovative technologies.

Custom Rebates
The custom rebates are available to customers with projects that fall outside the prescriptive program criteria and/or for new technologies in the market place.

Study Rebates

The Motor and Drive Efficiency program offers study funding for customers that want a deeper understanding of how their motors and drives work within their facility.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Move Electronically Commutated Motors (ECMs) to the Heating Efficiency Program	Capitalize on market efficiencies with similar segment (promote with furnace rebates)	New to this Plan	New

Budget and Goal Considerations
The program's participation, energy savings goals, and budgets were determined by looking at the programs historical electric goals and historical participation levels. Our analysis included the review of equipment and characteristics of historical projects to develop a projected average savings per participant for various program offerings.

The main budget drivers include the following:

- Participant Incentives – The budget reflects rebates to help offset initial costs associated with the capital investment in energy efficient equipment.
- Administration – These budgets are based on past program performance with a slight increase built in for expanded program offerings, engineering and participation.
- Advertising and Promotion – A small promotional budget was derived using historical data from past activities. Promotions are targeted to customers and typically focus around activities such as new or revised product offerings, or bonus rebates.
- Customer Service – The Company employs consulting and analytical services for motor projects that are analyzed through the Custom Efficiency program, as well as for motor engineering studies.

Involvement of Community Energy Organizations
The Motor Efficiency program works with multiple community energy organizations including trade vendors, distributors and installers. This is done by hosting training sessions for both customers and trade partners. We also participate regularly with Motors Decisions Matter to ensure practices, product offerings and rebates are relatively consistent. Additionally, we work with trade organizations, such as the Building Owners and Managers Association and Electrical Apparatus Service Association, Inc. as a means to promote energy efficiency to their membership.

➢ Multi-Family Building Efficiency

Description
The Multi-Family Building Efficiency (MFBE) program is a joint offering with CenterPoint Energy that provides a streamlined approach to whole-building energy savings in multifamily properties. Offered through one program implementer, it is designed to engage building owners by helping them understand their energy use, achieve immediate energy savings through low-cost improvements, and move beyond the initial measures for deep energy savings. The structure is a combined approach of a building audit/direct-install phase to engage the building owners and achieve early savings, and a performance-based component to encourage further improvements in the building.

The incentives offered through this program are based on a percent of the cost of the energy saving improvements, making it easy for owners to understand the incentive available relative to their share in the cost. Additionally, instead of encouraging specific measures, the program seeks to drive property owners to achieve the maximum savings possible by offering increasing incentives for higher levels of savings, regardless of how the savings are achieved, the form of energy saved (electricity or natural gas), or location of energy savings (resident or common space). The allocation of energy savings between spaces, fuels, and rate classes occurs "behind the scenes" as much as possible, in order to avoid confusing participants and maximize accessibility. The program is marketed to building owners/managers and is available to both market rate and affordable housing properties.

The program's main offerings include the following:

- Whole-building energy audit & direct install of low-cost energy savings measures;
- Project consultation; and
- Incentives for whole-building energy savings.

The main offerings are described below.

<u>Whole-building energy audit and direct install of low-cost energy savings measures</u>
The MFBE program target is building owners/managers, those who can make decisions and take action to implement energy efficient improvements in the building as a whole. Eligible properties must have Xcel Energy as their electric service provider and either CenterPoint Energy or Xcel Energy as their natural gas provider. The multifamily building must also have a common entrance, common space(s) and in-unit kitchens to qualify for participation in the program. The determination of whether a property is eligible to participate is reviewed on a case-by-case basis.

To encourage engagement, the program starts with a free audit and direct install of energy saving measures, with all services being provided by one third party program implementer. After completion of the whole-building energy audit and direct installations, a written report identifying the audit findings and recommended energy savings actions necessary to achieve the various incentive levels is provided to the building owner/manager.

Direct install measures include:

- In unit LEDs;
- Common area screw-in LEDs;
- LED exit signs;
- Kitchen and bath faucet aerators;
- Energy efficient showerheads; and
- Water heater blankets.

Project consultation

The building owner/manager works with the program implementer to select a specific set of improvements. The program implementer develops job specifications, establishes a timeline for installation of improvements, assesses bids received from contractors, and works with the owner to select a winning bid. The selected contractor performs the specified work and the implementer oversees QA/QC to ensure improvements are performed as specified.

Incentives for whole-building energy savings

Participants moving beyond the assessment and direct-install phase of the program and choosing to undertake energy efficiency upgrades are eligible for financial incentive payments based on the level of whole-building energy savings achieved, according to the following schedule:

Achievement Level	Whole-building Energy Savings Achieved	Incentive Level
Tier 1	15%	25% of cost
Tier 2	20%	35% of cost
Tier 3	25%	40% of cost

The incentive level is applied to the total cost of installing approved energy-related measures. Thus, if a building owner elects to undertake building improvements unrelated to saving energy, the costs of those improvements would not be included in the calculation of the final incentive. The program implementer confirms the owner understands which measures and costs are or are not included in the calculation of the incentive before the work begins. If the improvements selected by the owner are not cost-effective, the Companies may refuse to pay an incentive; this is also communicated to the owner before work begins.

The incentives are paid when the participant reaches either the completion of their project as a whole (whether that gets them to tier 1, 2 or 3) or when they reach any one tier on the way to their end goal. To qualify for the incentive payment, projects must be completed and operational within two years of the audit.

Buildings qualifying as low-income (based on the August 2012 guidance document from the Department of Commerce, Division of Energy Resources) are eligible for incentives double those available to market-rate buildings (e.g. 50%, 70%, 80% of cost). Although the MFBE program is not a dedicated low-income program, the use of this program adds additional value for these customers and the associated program costs for low-income buildings (both incentive spending and

project delivery expenses) may be used for purposes of demonstrating compliance with the statutory low-income spending requirement.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Changed to LEDs for in-unit direct install lighting measure	Market availability of CFLs is decreasing as LEDs become more prevalent and affordable	New to this Plan	New

Budget and Goal Considerations
The program's participation and energy savings goals and budget increased each year due to the high level of interest experienced with the launch.

The main budget drivers include the following:

- Administration – This budget covers internal labor and expenses for program planning and implementation and vendor administration.
- Customer Services – Services provided by Third-party program implementers is funded through this budget.
- Rebates – This budget covers the incentives paid when whole-building energy savings are achieved.

Involvement of Community Energy Organizations
We are participating in the MN Multifamily Affordable Housing Energy Network, which consists of various community stakeholders and initiated by Fresh Energy and the National Housing Trust. We are also members of a national ACEEE working group focused on energy efficiency in multifamily properties.

➢ Process Efficiency

Description
The Process Efficiency program offers large to mid-sized industrial customer's customized resources to develop a holistic, sustainable energy management plan. This program provides funding for studies to identify and scope energy efficiency opportunities. Rebates are available to customers who implement qualifying energy efficiency recommendations. This program is primarily marketed to industrial customers through account managers. The program targets industrial customers that have at least 0.5 GWh or 2,000 Dth of conservation potential.

The program offerings are delivered in three phases. Each phase is defined in a Memorandum of Understanding that is customized to reflect the needs of the specific customer.

Phase 1: Identification
Xcel Energy performs a high level analysis to identify opportunities for energy savings in the customer's business practices, facilities, and operations. This is completed at no cost to the customer. Phase 1 is delivered using a third-party provider selected through an RFP process.

Phase 2: Scoping
This phase provides support and resources to further define, measure, and provide recommendations and assistance for energy savings opportunities while working with the customer to optimize the business practices identified in Phase 1. Total funding for Phase 2 is based on estimated savings and a typical customer is asked to contribute up to 25% with a maximum amount of $7,500. The purpose of the customer contribution is to ensure management-level engagement and the customer's commitment to a holistic approach. Phase 2 is delivered using internal resources or third-party technical experts selected through an RFP process, or through technology-specific experts of the customer's choosing.

Phase 3: Implementation
We work with the customer to put together an energy management plan which includes conservation goals and energy conservation projects. This phase includes a customized rebate and bonus schedule that rewards deep energy savings and/or a system-wide approach.

Upon project completion, customers earn rebates for improvements that qualify for any of our prescriptive or custom programs. The savings are included in the Process Efficiency program achievements, but mirror the rules and rebate levels of our other programs. If the improvements do not qualify for rebates due to program rules, we claim the project savings in a manner consistent with our study driven credit policy.

Due to the holistic nature of this program, several policies have been previously filed and approved by the DER and continue to remain in effect:

- Bundling: When customers identify multiple measures for installation, a bundle can be evaluated to see if it qualifies for a rebate versus each individual component. This allows measures with too short of a payback for a rebate to be leveraged to drive projects with too long a payback for the customer to install so that both are implemented.
- Preapproval dates: Custom-type measures in Process Efficiency require a custom analysis, but the actual date the project is submitted and the analysis is completed does not disqualify

a project if it was initiated after the customer entered into the program. This is due to the extensive resources used by the program to identify and scope ways to drive energy efficiency into how a customer does business. The goals and awareness created during Phases 1 and 2 can result in projects that drive energy savings in business areas that act without immediately notifying the personnel in contact with Xcel Energy.

- Rebate bonuses: We will use the rebate structure of the other end-use programs and then incorporate additional rebate bonuses for system optimization and/or exceeding annual achievement targets.
- Facility-level metering: This concept is being developed and may be tested through this program. We work in advance with the DER to define the methodology of how we propose to take credit under this metering scenario. Facility-level metering provides us the ability to accurately account for all savings generated by installation of a measure and incorporate the savings that may be driven plant-wide that we have been unable to accurately capture historically.
- Behavioral Savings: We use the DER's Average Savings Method to count behavioral savings created through single entity-based behavioral change efforts. This also could apply to technical projects that require specific behaviors to maintain persistent energy savings throughout their lifetime.

Program Changes
None.

Budget and Goal Considerations
We determined the program's participation, energy savings goals, and budgets by examining historic participation levels, project and participation cycles, and costs.

The main budget drivers include the following:

- Administration – These costs are driven by marketing, sales, engineering, and external labor resources to support the Company's heavy engagement with the customer, as well as cover the costs of those projects requiring metered verification.
- Customer Service – The Company utilizes third-party resources to deliver the program's identification and scoping phases.
- Participant Incentives – The program has a robust rebate budget due to the size of projects likely to be initiated through the Process Efficiency program. In addition to standard rebates, Process Efficiency offers lucrative bonus rebates for exceeding energy savings and/or implementing projects on a system-wide approach.

Involvement of Community Energy Organizations
The Process Efficiency program works with Community Energy Organizations to promote the program and deliver its offerings. In particular, The Trillion BTU financing delivered by the St. Paul Port Authority, and Xcel Energy could collaborate to help customers fund large capital projects when financing is a barrier to implementation. We consider leveraging resources as they become available through these and other external organizations and consider integrating their offerings into our program and our customers' energy management plans.

➢ Recommissioning

Description
The Recommissioning program offers study funding and electric and natural gas implementation rebates to commercial customers who optimize their existing equipment to make it more energy efficient. The program is primarily marketed through our account managers, Business Solutions Center, and recommissioning study providers.

The program's main offerings include the following:

- Study funding to identify and quantify Recommissioning-related energy saving measures;
- Rebates for implementing recommissioning or building system tune up measures identified through a study;
- Building benchmarking tools to provide customers with a streamlined, consistent process for obtaining whole building energy usage data and measure the energy efficiency of buildings; and
- Rebates to off-set the cost of Building Operator Certification training.

Recommissioning Study
Customers may receive rebates for both the study and implementation of their recommissioning measures. Our study funding helps customers pay a study provider to identify the recommissioning opportunities that exist within their building. Typical measures that are identified include, but are not limited to:

- Adjustment of outside air and return air dampers;
- Calibration/tune-up of Energy Management System points;
- Eliminating simultaneous heating and cooling;
- Optimum start/stop of air handlers and makeup air units (early shutdown in the evening, late start in the morning);
- Resetting of a chiller's condenser water temperature; and
- Resetting the chilled water and hot water supply temperatures.

Fast Track Implementation Path
This path is for customers who have either performed a study outside of our program or have identified recommissioning measures within their building without an Xcel Energy funded study. To qualify, we review their recommissioning savings opportunities to determine implementation rebates. We perform the same detailed review as we do for studies that we fund. Because our review helps customers make decisions, we claim Study-Driven credit for the resulting savings, no matter what the payback is, when customers implement the recommendations.

Refrigeration Recommissioning Path
This path is focused on analyzing grocery and convenience store refrigeration systems to determine how their refrigeration systems (i.e. compressors, condensers, display cases, suction and discharge temperatures) can be adjusted and optimized to save energy. Due to the nature of the recommended measures, implementation of the energy savings recommendations occur as the provider is conducting the analysis.

Building Benchmarking Offering

Benchmarking provides a streamlined and consistent approach for building owners to access whole-building usage data and measure the energy efficiency of their building(s). The service relies upon ENERGY STAR Portfolio Manager to assist Xcel Energy customers in benchmarking their buildings. Key features of the offering include:

- Building owner authorization;
- Tenant identification;
- Data privacy rule implementation;
- Consumption data aggregation and normalization; and
- Automated data transfer to the ENERGY STAR Portfolio Manager.

Building Operator Certification Offering

Rebates offered to encourage the training and certification of building operators in our Minnesota service territory through the Building Operator Certification (BOC) offering. Rebates are paid to participants who complete Level I or Level II of the BOC training. Energy savings is captured on a per-participant basis and is derived through the training's influence on building operators to identify energy efficient opportunities and make energy conscious decisions.

The DER has previously approved the following policies:

- If it is too burdensome for the customer to provide invoices for a project, we will accept their signature as documentation of implementation as long as the customer is willing to forego any potential rebate.
- Study-driven credit: If a customer implements measures that have less than a nine month payback or greater than a 15 year payback, the customer will not receive a standard implementation rebate (customer may be eligible for a bonus rebate if measure is implemented within 9 months) but we will claim those study-driven savings. We believe that our help identifying and analyzing energy efficiency measures provides sufficient influence on the customer's decision to implement those measures.
- Nine month bonus incentive: Because most recommissioning measures have a less than nine month payback, the Recommissioning program offers a bonus incentive of $0.03/kWh and $3/Dth for customers who implement recommended recommissioning measures within nine months of the study approval date (date on the customer's study approval letter).
- Maintenance: The program claims energy savings for maintenance items identified and implemented through the Recommissioning process.
- Secondary credit: We will offer rebates and take credit for measures that have secondary benefits in addition to on-site energy benefits. These secondary benefits could include purchase chilled water, city water, etc. The electricity savings embedded in these secondary benefits will be added to the on-site reduction.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Addition of Building Operator Certification Measure	Added to encourage building operators to become leaders in their field and identify energy efficient opportunities in their building(s).	New to this Plan	New
Addition of Building Benchmarking Measure	Building Benchmarking was approved through Product Development in 2016 and will be converted to a measure under the Recommissioning Program for the 2017-2019 Triennial Plan.	Formal Modification	Filed on October 15, 2015 and approved on January 21st, 2016

Budget and Goal Considerations
The program's participation and energy savings goals and budget were determined by past participation levels for the program.

The main budget drivers include the following:

- Rebates – The budget includes costs for study rebates, implementation rebates, and the nine month implementation bonus. Historically, we have paid out more in study rebates than implementation rebates.
- Labor – These budgets are based on historical actuals for the program.
- Promotion and Advertising – This budget is for customer mailings, literature and trainings.
- Consulting – We offer a vendor incentive to encourage study providers to aid customers in implementing their recommended recommissioning measures.

Involvement of Community Energy Organizations
We value feedback from customers and study providers and make an effort to gather their input to ensure the program is effective. As ideas are generated, the team reviews and implements if feasible. The program team, as well as the trade relations manager, meets both formally and informally with active trade allies to discuss the program and obtain feedback, as necessary.

➢ Self-Direct

Description
The Self-Direct program is targeted toward "self-sufficient" business customers who have the resources to manage their own energy efficiency improvement projects and the capability to perform measurement and verification (M&V). Some customers may prefer to use their in-house experience and resources, while others may choose an energy service company (ESCO) or other energy partner to assist them with their efforts. Regardless, customers who implement and commission qualifying projects can receive rebates based upon the amount of energy savings achieved.

Program Changes
None

Budget and Goal Considerations
The program has not had any participation since its inception. However, customers have expressed interest in the program, but for their own reasons have not pursued participation beyond initial discussions or gravitate to our holistic, full-service programs. Though there are no demand and energy goals within the plan, we will continue to offer it as a customer choice; therefore, the program budget reflects what spending may occur should a customer avail themselves to this opportunity.

➢ Turn Key Services

Description
The Turn Key Services program is designed to remove hurdles for our business customers of all sizes when identifying and implementing energy efficiency projects. The program is primarily promoted through our energy efficiency specialists and account managers. We work closely with our third-party consultant to implement the program.

The program's main offerings include the following:
- Prescriptive rebates for the end-uses rebated in our other prescriptive programs;
- Custom rebates for any measure eligible for rebates under our other custom programs;
- A subsidized audit that identifies energy saving opportunities. Customers pay a portion of the audit cost based on their size; and
- Free implementation services to help customers implement energy efficiency projects.

The main offerings are described below.

Identification of Measures
Customers signing up for an assessment receive an ASHRAE Level I audit. This assessment is a walkthrough of the entire facility and involves an analysis of the customer's utility bills and includes graphs that show how much energy is being used by each end use. The audit identifies simple low/no cost opportunities in addition to higher cost conservation opportunities. An ENERGY STAR Benchmarking score is calculated for all applicable building segments. All opportunities also include energy savings estimates, cost savings and applicable rebates.

Implementation Services
The program offers a variety of services that customers may choose from depending on their specific needs to help them implement their projects. Services include, but are not limited to:
- Attending internal stakeholder customer meetings to obtain approval;
- Assistance with prioritizing projects;
- Financial analysis of implementing measures;
- Bidding process review;
- Coordination of implementation;
- Verification of installation; and
- Paperwork compilation and rebate submission.

Funding
Participants are eligible for prescriptive and custom rebates for installed and implemented energy efficiency measures. Customers can qualify for a bonus rebate if they implement their recommendations within a certain timeframe. In addition, we subsidize audits and implementation services to encourage customers to move beyond the barriers to participation.

Consistent with other custom type projects, we anticipate there will be projects identified through this program that are custom in nature and payback to the customer is less than nine months. The Company claims study-driven credit for these projects.

Program Changes
None.

Budget and Goal Considerations
The program's participation, energy savings goals, and budgets were determined by looking at historical program performance and study participation.

The main budget drivers include the following:

- Administration – This budget includes labor estimates which are based on historical spending.
- Third Party Customer Services – This cost includes scoping, and project management services provided directly to the customer.
- Promotion – This cost includes promotional outreach tactics to increase awareness and encourage participation. It is always important to build a pipeline of audits for Turn Key to help with future goals.
- Participant Incentives – The rebate budget reflects the assumed participation across multiple end-use programs based on projects implemented in 2015.

Involvement of Community Energy Organizations
The Turn Key Services program employs the services of a third-party company to deliver the assessments and the project scoping and implementation assistance for the program.

➢ Electric Rate Savings

Description
The Electric Rate Savings program is offered to any business customer who can reduce their electric loads during control periods by at least 50 kW. In return for reducing their loads, they receive a monthly discount on their demand charges. Participants save as much as 50 percent on demand charges over the year. Currently, the Electric Rate Savings program is promoted directly through Xcel Energy's account management and Business Solutions Center team.

Program Changes
None.

Budget and Goal Considerations
The program's participation, energy savings goals, and budgets were estimated using historical program performance and emerging market influences expected in the near future. The budget for this program includes labor costs for associated services, with the remaining costs attributed to customer communications. Customer communications include, program information packets sent to each participating customer, explaining any program changes, reminders of their responsibility as an interruptible customer on a control day, and their historical control information.

We anticipate changes in demand response rules at an independent system operation level, and environmental rules for the operation of back-up generators will likely have an adverse effect on participation. Therefore, participation has been limited over the three year period as these rules are finalized. Consequently, the budget for the program will remain steady in an effort to maintain current participation levels for the 2017 – 2019 periods.

The main components of the program budget include:

- Administration – This category includes labor costs for internal sales, sales support and fulfillment, marketing administration and planning, equipment installation and maintenance, project planning and implementation.
- Advertising and Promotion – We have budgeted to conduct an annual customer mailing, test event mailings, customer town meetings, and program collateral materials.

Involvement of Community Energy Organizations
None.

➢ Saver's Switch® for Business

Description
Saver's Switch is a load management program available to business electric customers with central air conditioning. Participating customers receive a monthly discount on their June through September bills. In exchange for the discounts, participants allow Xcel Energy to cycle their air conditioner on and off during control events, which typically occur on hot, humid summer days. Air conditioners are controlled via a radio operated switch installed by a licensed electrician on or near the customer's air conditioner. The switches utilize an adaptive algorithm designed to ensure a 50% reduction in air conditioner load during a control event. In the past decade, we have had relatively few control events. The tariff allows for up to 300 control hours each year.

Program Changes
None.

Budget and Goal Considerations
The program budget and savings were developed based on equipment and installation costs for the number of switches to be installed and replaced. During the course of this Plan, in addition to recruiting new participants, we intend to replace switches older than 20 years. We also conduct inspections of additional older switches to verify functionality and, if needed, replace with new hardware. The overall participant target is met with a combination of new installations and maintenance replacements.

The main budget drivers included the following:

- Administration – This budget category covers the costs of internal labor for program planning and implementation, as well as the costs of external contract labor and software maintenance.
- Customer Service – The program uses a third-party to install the switches.
- Advertising and Promotion – The program has a limited promotional budget in this Plan, as a signficiant portion of the installations are from the replacement of old switches.
- Measurement and Verification – The program hires a third-party to conduct data collection for measurement and verification to determine the savings per switch.

Involvement of Community Energy Organizations
The program utilizes specialized hardware and contracted installers. Therefore, other than for promotions, there is no involvement from community energy organizations.

➢ Business Education

Description
The Business Education program focuses on creating awareness of energy efficiency and providing business customers with information about what they can do to reduce energy use in their buildings. The program encourages customers to make Xcel Energy their first contact when considering equipment or process upgrades and engages customers to make changes that lower their energy use. The program focuses on removing the barriers to adoption of energy efficiency measures by educating customers and their employees on the impacts of their energy use and offering information on how to take action to achieve long-term energy savings.

The program is primarily marketed to small and mid-sized business customers through sponsorships and customer outreach, advertising campaigns, direct mail and email newsletters, and the Energy Efficiency Specialists at the Business Solutions Center.

The program's main offerings include the following:

- Sponsorship and Customer Outreach;
- Digital Communications; and
- Online Energy Assessments.

The main offerings are described below.

Sponsorships and Customer Outreach
A variety of grassroots community events, sponsorships and workshops are targeted with the program to promote energy efficiency rebates and energy conservation strategies to a wide range of customers. This in-person, one-on-one customer outreach is critical to driving onsite customer leads and program signups.

Digital Communications
The program takes part in targeted digital communications to reach a variety of small business customers, taking into account the wide range of industries and customer segments. Examples of digital communications include:

- Targeted email campaigns;
- Energy efficiency newsletters;
- Social media; and
- Energy conservation video series.

Online Energy Assessment
This free, half-hour, do-it-yourself analysis helps businesses discover potential ways to save on their annual energy bills. Customers enter 12 months of billing data, their specific industry, equipment, and age of their facility. The assessment provides specific energy saving recommendations and applicable rebate and program offerings.

Program Changes
None.

Budget and Goal Considerations
The program's participation goals and budgets were determined by estimating direct mail and email campaign read and open rates, educational material requests, community outreach sponsorships and online energy assessment participation.

The main budget drivers include the following:

- Administration – This budget provides funds for internal staff and external fulfillment.
- Advertising and Promotion – This budget includes funds for direct mail promotion of no cost/low cost energy saving tips, Online Energy Assessments, energy efficiency events, sponsorships, and print and interactive advertising.

Involvement of Community Energy Organizations
The Business Education program participates in a variety of community-hosted customer outreach events. The program provides displays, staffing, and materials to promote energy conservation and efficiency to attendees.

➢ Small Business Lamp Recycling

Description
The Small Business Lamp Recycling program encourages electric customers in Minnesota to recycle their spent fluorescent bulbs instead of discarding them.

The program's main offerings include the following:

- Free compact fluorescent light bulb recycling at participating local hardware stores and partnering county hazardous waste facilities; and
- Coupons for 50¢ off the recycling fee for each fluorescent tube and HID bulb at participating hardware stores. The coupons are available at participating hardware stores and on the xcelenergy.com website.

The Small Business Lamp Recycling Program is marketed primarily through Xcel Energy's Home Lighting program promotions, participating hardware stores, and on the Xcel Energy website. A search feature allows customers to search by zip code to find the nearest recycling locations.

The Company follows the requirements of Minn. Stat. 216B.241, subd 5, which necessitates public utilities to notify customers that fluorescent recycling is the law in Minnesota. Every Small Business Lamp Recycling and Home Lighting promotional piece includes a disclaimer regarding the statute, such as, "Fluorescent lamps contain small amounts of mercury that are harmful to the environment. In Minnesota, it is illegal to dispose of spent mercury bulbs in household trash receptacles."

Program Changes
None.

Budget and Goal Considerations
The budget was developed based on historical spending and the expected number of bulbs to be recycled in the coming years. The budget is set to increase about five percent annually to account for additional bulbs that we anticipate will be recycled each year. The promotional budgets remain consistent throughout the Triennial Plan.

The main budget drivers include the following:

- Administration – This provides funds for internal labor for planning and program implementation.
- Promotion and Advertising– We market this program with the Home Lighting program promotions.

Involvement of Community Energy Organizations
Xcel Energy stays active in the Minnesota and national Lamp Recycling community through its partnerships with Mercury Technologies of Minnesota, Inc., and the Center for Energy and Environment.

➢ Residential Segment

Description
The Residential Segment consists of more than 1.2 million electric and more than 448,000 natural gas customers who reflect a diverse population with a variety of lifestyles. In this Plan, the Residential portfolio will offer a comprehensive set of programs including prescriptive rebates for heating, cooling and water heating equipment, whole house solutions for new and existing homes, and educational offerings. The Residential Segment also contains Saver's Switch, a load management program available to residential customers with central air conditioning and electric water heaters.

Programs
The Residential Segment proposes 16 program offerings for this Plan. These include 12 direct impact programs, three indirect programs, and one load management program. We will offer all programs from the 2013-2015 Triennial and 2016 Extension plans to be continued during the next three-year period.

Overall Goals
The Residential Segment portfolio is designed to provide all Residential customers with an opportunity to participate. Planned achievements of more than 421 GWh and 785,377 Dth during the three-year period account for 32% of the Company's total electric energy savings goal and 36% of the total natural gas goal. The majority of energy savings within the Residential Segment will come from key programs including Home Lighting, Energy Feedback, Residential Cooling, and Residential Heating.

Market Analysis
We anticipate challenges in our efforts to provide clarity for customers shopping for energy efficient lighting. As the phase out of incandescent standard bulbs continues and lower cost light emitting diodes (LED) begin to replace compact fluorescent light (CFL) bulbs, the confusion mounts in the marketplace. This Plan includes marketing and education efforts to move consumers toward the purchase and installation of LED lighting. In other programs, an improved economy since the 2013-2015 Triennial Plan was taken into account when determining program savings plans and consumers' ability and willingness to invest in higher efficiency equipment.

Marketing/Advertising/Promotion
The Company primarily relies upon trade allies, end-use equipment vendors, and our call center representatives to drive energy efficiency and load management participation in the Residential Segment. To support our marketing efforts we will employ an integrated approach to communications where the tactics will work in concert with each other and reinforce key messages over time. A strategic plan for mass market advertising, promotions and marketing including event planning will help us to reach our customers and to encourage program participation. We follow the "AIDA" (awareness, interest, desire, action) process for encouraging customers to use the rebate programs: create awareness, create interest, create desire and move toward action. When communicating with customers, the Company will use several overarching key messages including reduced consumption, lower operating costs, decreased utility bills, and impact on the environment.

Overall Policies
The Residential Segment does not have any unique, segment-based policies. Each program will enforce its participation and equipment eligibility rules and requirements.

Stakeholder Involvement
In the course of developing this Plan, we met with many local organizations to refine existing programs, shape new programs, and discuss partnership opportunities. These local organizations include:

- CenterPoint Energy;
- Great River Energy;
- Neighborhood Energy Connection;
- Center for Energy and Environment;
- Minnesota Energy Resources Corporation;
- American Council for an Energy Efficient Economy;
- National Renewable Energy Lab;
- Center for Building and Science;
- U.S. Department of Energy and ENERGYSTAR;
- Consortium for Energy Efficiency;
- Wisconsin Energy Conservation Corporation; and
- Air Conditioning Contractors Association.

➢ Efficient New Home Construction

Description
The Efficient New Home Construction program encourages home builders to construct energy efficient residential homes by providing incentives for achieving total energy savings of at least 10% better than code.

This program applies to builders of residential single-family, duplex, triplex, fourplex, town homes, and condo units that have individual heating systems and residential meters for Xcel Energy gas and/or electric service. We use a third-party implementer to recruit raters and to provide product training for raters and builders. The third-party implementer is responsible for collecting and reviewing building information from the raters and providing information to Xcel Energy for use in determining savings. The implementer also maintains all of the collected data in its own database. Builders hire their own RESNET-certified house raters who coordinate with their own RESNET providers.

The program's main offerings include the following:

- Builder rebates for gas homes achieving a total energy savings level of at least 10% above the level established by code;
- Builder rebates for electric-only homes achieving a total energy savings level of at least 10% above the level established by code;
- Appliance rebates for qualifying homes with Xcel Energy electric service; and
- Rater incentives.

The main offerings are described below.

Gas and Gas/Electric Homes
New in 2017 builders will be able to hire the RESNET-certified house rater of their choice. This also allows them to choose the services beyond the house rating itself that they would like to purchase. Homes must test out at a minimum of 10% total energy savings above code and must have positive therm savings. Homes not reaching that minimum are not eligible to participate and no incentives or payments to the builder or the rater will be available. For each qualified new home completed in our gas service territory, the builder is eligible for rebates.

Electric-only Homes
For homes built in our electric-only service territory, the builder receives a rebate when the home achieves the minimum 10% total energy savings above code and has positive kWh savings.

Appliance rebates
Prescriptive appliance rebates for ENERGY STAR rated clothes washers and ENERGY STAR rated refrigerators are available for homes successfully participating in either of the offers above and where Xcel Energy is the electric provider.

Rater Incentive
An incentive is paid to raters for each eligible home they submit to the program. This incentive recognizes the additional work required for data collection and entry.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Methodology	Date Notified
Program name change to Efficient New Home Construction from ENERGY STAR Homes	Reduces confusion in the market as to which homes are tested and which actually meet ENERGY STAR certification requirements. In addition, the name change provides consistency between Xcel Energy and its partnering utility, CenterPoint Energy.	New to this Plan	New
Removal of the program model of a single house rater contracted by the utility	Changes to the program structure allow the builders to choose their own house raters. This opens the market to new raters and is consistent with the new CenterPoint Energy model.	New to this Plan	New
Addition of rebates for gas homes achieving 10% or more energy savings over the code baseline	Changes to the Minnesota energy code raised the baseline for energy savings in new construction.	New to this Plan	New
Removal of electronically commutated motor (ECM) appliance rebate	ECMs must be modeled in the home analysis in order to achieve the correct HERS score.	New to this Plan	New
Removal of ENERGY STAR rated dishwasher appliance rebate	Changes to DOE appliance efficiency baselines have made savings with dishwashers negligible.	New to this Plan	New

Budget and Goal Considerations
The program's budgets and electric and gas energy savings goals were determined by cost estimates based on historical program expenses and forecasted participation rates.

The main budget drivers include the following:

- Administration – This category funds project planning and implementation along with program management. This includes the payment for the data aggregator serving the program.
- Advertising and Promotion – The program's direct promotion through sponsorship of the Parade of Homes and sales support materials are supported with these funds.
- Participant Incentives – These funds cover builder rebates.

Involvement of Community Energy Organizations

We are involved with the Builders' Association of the Twin Cities in promoting the construction and sale of new, energy efficient homes. We are the sponsor for the Green Path Energy Efficient Homes Tour which accompanies both spring and fall Parade of Homes events.

➢ Energy Efficient Showerheads

Description
The Energy Efficient Showerheads program is designed to offer year-round natural gas and electric savings to Xcel Energy customers. Residential natural gas and combination gas and electric customers in the Minnesota service territory are eligible to receive free 1.5-gallon-per-minute (GPM) high efficiency showerheads, 1.0 GPM bathroom faucet aerators, and a 1.5 GPM kitchen faucet aerator to help reduce energy costs and water use.

Eligible customers are contacted and offered a free kit, valued at approximately $10-$14 depending on the specific combination of measures. The kit is shipped to customers who respond to the offer within the promotional period. Kit contents include a combination of showerheads, kitchen and bath aerators, Teflon tape, and illustrated installation instructions.

The Company contracts with a third-party to manage all customer responses and distribute the energy efficient showerheads and aerators. The third-party is a recognized distributor of energy efficiency-related products in the United States. Customer responses are tracked by the provider, given to us following the distribution, and kept in a tracking system to calculate savings.

The program's main offerings include the following:

- 1.5 GPM high efficiency showerhead;
- 1.5 GPM kitchen aerator; and
- 1.0 GPM bathroom aerator.

The main offerings are described below.

- Customers who have two bathrooms and have not yet participated in the program or participated more than six years ago are eligible to receive a kit containing:
    - Two 1.5 GPM high efficiency showerheads;
    - One 1.5 GPM kitchen aerator; and
    - Two 1.0 GPM bathroom aerators.
- Customers who have one bathroom and have not yet participated in the program or participated more than six years ago are eligible to receive a kit containing:
    - One 1.5 GPM high efficiency showerhead;
    - One 1.5 GPM kitchen aerator; and
    - One 1.0 GPM bathroom aerator.

Customers responding to the promotional offer must indicate if they have one or two bathrooms in their home and what fuel serves their water heater (gas, electric or unknown). Other kit combinations may be developed based on customer demand and eligibility determined by past participation.

Each new participant is allowed one kit and customers may participate in the program once every 10 years. However, previous measure life was deemed at 6 years and therefore past participants are eligible for the free measures after 6 years.

Program Changes

The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Measure lifetimes increased to 10 years	Updated via DEER Database for Energy Efficient Resources	New to this Plan	New
Demand savings for showerhead measure	10-20 percent of savings determined during peak	New to this Plan	New
Secondary showerhead and bathroom faucet aerator measures added	Assumed most households have a second bathroom	New to this Plan	New
Changed assumption of customers with electric water heaters	Based on previous years' data of self-reported water heater types	New to this Plan	New

Budget and Goal Considerations
The product budget was developed based upon the expected participation level. Using the past program performance as a guide, the cost of the measures, fulfillment, postage, and all necessary marketing efforts were included to develop the budgets.

The main budget drivers include the following:

- Administration – This covers the costs of external fulfillment, web development, rebate costs, project planning, and implementation.
- Advertising and Promotion – The program uses direct mail and email to attract customers.
- Measurement and Verification – This category provides funds to survey participating customers.

Involvement of Community Energy Organizations
None.

➢ Energy Feedback

Description
The Energy Feedback program is a behavioral conservation program based on the Residential Home Energy Reporting System, a patented program developed by Opower. The program provides a targeted direct mailing called the Home Energy Report to a designated group of residential customers, giving them specific information and recommendations on ways to reduce their energy consumption. Customers receive new information with each Home Energy Report. Savings are quantified by comparing the energy consumption of the recipient group to that of a non-participating control group. The program also features an online web portal known as "My Energy" that features even more ways for customers to learn about energy use in their homes and possibilities for reduction. My Energy is available to all customers, with the only qualification being enrollment in My Account.

The program's main offerings include the following:

Personalized Home Energy Reports
These individualized reports are mailed and/or emailed to customers on a cadence prescribed by their tenure in the program. Reports provide:

- Customer's energy use compared to the average 100 "neighbors" in similarly sized homes with similar characteristics;
- Targeted efficiency recommendations based on home profile data available; and
- Other information such as consumption graphs or year to year bill comparisons.

Recipients are selected from among Xcel Energy Minnesota residential customers and may "opt out" of the program at any time upon request.

The Company anticipates doing an expansion in 2017, adding approximately 49,000 combo customers and 25,000 electric-only customers. In 2018 and 2019, smaller refills will be done as necessary to maintain participation levels.

My Energy Online Portal
This feature is available to all Minnesota residential customers. It provides the same information as the Home Energy Report on demand, along with more detail and other options. When going to the web portal, customers can:

- See their neighbor comparison;
- See graphs showing energy consumption by fuel type by bill period or day; and
- Take a Home Energy Analysis which provides insight into how energy is used in the home.

Customers are encouraged to visit My Energy through the use of emails, targeted messaging, and social channels.

Program Changes
None.

Budget and Goal Considerations
The budget and goals were developed with the costs supplied by Opower for delivery of the Home Energy Reports and for hosting the My Energy portal.

The main budget driver for the program is:

- Administration – This budget provides for program management and implementation along with data management and program development.

Involvement of Community Energy Organizations
The Center for Energy and the Environment has been instrumental in the development, implementation, and evaluation of this program as a pilot project. Subsequently we have worked with Cadmus to validate savings identified through the My Energy portal.

➢ Home Energy Squad®

Description
The Home Energy Squad program offers installation services to electric and gas customers who seek to improve their homes' energy efficiency and comfort, and lower their utility bills. The program directly installs a number of moderate-impact, low-cost measures for combination gas and electric customers and for electric-only customers who are natural gas customers of CenterPoint Energy. In addition and where cost effective, the program installs fuel-appropriate measures in Xcel Energy electric-only and gas-only territories where the operations vendor has identified potential customers. The program seeks to assist customers' efforts to overcome barriers related to making energy improvements, including confusion about product choices, varying costs, and finding qualified installers. The program charges a flat fee and offers customers to choose from a suite of energy saving measures. The program is marketed primarily within the metro area and larger out-of-state cities.

The program's main offerings include the following:

- Electric measures, including:
  - LED light bulbs of various types and wattages.
- Heating and cooling measures, including:
  - Weather-stripping of two external doors;
  - Programmable thermostat installation; and
  - Setback of pre-existing programmable thermostats.
- Hot water measures, including:
  - Insulation blanket for water heater;
  - High efficiency showerheads and faucet aerators; and
  - Temperature assessment and setback of water heater.
- Optional measures for customer purchase, including:
  - Electronics timer;
  - Second programmable thermostat installation; and
  - Weather-stripping of additional doors.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Switching from CFLs to LEDs	Increased customer demand and market availability in addition to discontinued CFL manufacturing	New to this Plan	New
Installation of measures in homes that are served by Xcel Energy gas-only or electricity-	Pre-identified opportunities where customers will benefit from single-fuel measure installation	New to this Plan	New

only			
Upon customer request conduct, a Home Energy Audit at the same time as a Home Energy Squad visit ("enhanced visit")	Provides customer convenience	New to this Plan	New
During an enhanced visit, perform an insulation evaluation and if warranted provide a list of qualified insulation installers from the Company's approved BPI list along with a bid	Provides customer convenience and encourages additional home energy efficiency	New to this Plan	New

Budget and Goal Considerations

The program's participation and energy savings goals and budget were determined by cost estimates based on vendor proposals, potential number of participants, and historical program expenses. The main budget drivers include the following:

- Administration – This category funds program administration costs through third-party vendors, as well as third-party labor for the installation of energy efficient measures in customers' homes.
- Promotion and Advertising – This category covers print, broadcast and interactive advertising, phone and street canvassing, and event promotion. As this program progresses it requires increased costs to build awareness and to directly reach participants.

Involvement of Community Energy Organizations

Xcel Energy partners with CenterPoint Energy to serve their common customers. Xcel Energy contracts with the Neighborhood Energy Connection in the utility's gas and electric combination territory, and with the Center for Energy and Environment and CenterPoint Energy in the utilities' shared territory.

➢ Home Lighting

Description
The Home Lighting program provides resources for customers to purchase energy efficient light bulbs. Using energy efficient bulbs is an easy and inexpensive way for customers to save electricity. The Company provides an avenue for customers to purchase discounted energy efficient bulbs through local retailers.

The Company motivates customers to purchase CFLs and LEDs by offering in-store retail discounts. The discounts are provided through collaboration with the bulb manufacturers and retailers. The three entities combine resources to offer instant rebates enabling customers to purchase a variety of energy efficient bulb models at a discounted price. The discount varies depending on the type of bulb and the manufacturer/retailer partner. There is no mail-in rebate form. The customer receives the discounted price at the cash register. Incentives are paid upstream and the discounts are passed on to the customer. The Company partners with retailers such as Home Depot, Walmart, Costco, Ace Hardware, and Menards.

In 2017, the Company will offer CFL discounts, but will focus on increasing the awareness and sales of LED bulbs. Continuing to offer CFL discounts to customers during 2017 will help ease the transition to LEDs while the marketplace is changing and allow energy efficient bulbs to be available to all customer types at a low cost. In 2017 - 2018, retailers will begin to discontinue stocking CFLs, replacing the product with value LEDs. Value LEDs are characterized by lower lifetime hours, commonly 10,000-15,000 hours. Also, the price is much lower than the traditional LEDs, making them more cost effective and attractive to customers who want to use LED technology but have been resistant to price. The program will offer a minimal amount of CFL discounts in 2017 to cover retailers that have not transitioned to LEDs. Beginning in 2018, the Company will discontinue the support of CFLs.

A new ENERGY STAR specification goes into effect January 2017, reducing the stringent requirements on LED bulbs. It will require lower lifetime hours: 15,000 versus 25,000. The Environmental Protection Agency (EPA) has eliminated the dimming requirement and changed the omni-directional requirement. This change in the ENERGY STAR specification will require lower cost LEDs to perform better and be more consistent in order to meet the certification.

The objective of the Home Lighting program is to motivate customers to purchase energy efficient bulbs. The Company will focus marketing dollars toward building awareness and sales of LED bulbs, in addition to helping educate customers about the product benefits and the changing marketplace. The Company will use various media channels to reach customers such as: radio, in-store signage, publications, bill inserts, social media, internet and sponsorship of community events. The peak sales period for energy efficient bulbs is in the fall and winter, as such, most of the promotions are scheduled during these peak buying periods.

The Company uses an RFP process each year to select participating retailers and to enable partnerships with a variety of retailers (including big box, mass merchandiser, and hardware and grocery outlets) which helps to ensure optimal pricing and reduces free-ridership. The Company uses a third-party implementer to implement the RFP and to help manage the program. The implementer is primarily responsible for tracking the product sales details, including the location,

types and quantities of bulbs sold each year and calculating the energy savings to be used in the annual Status Report.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
CFLs discounts eliminated in 2018	Product is being replaced with LEDs	New to this Plan	New

Budget and Goal Considerations
The energy savings target for the product was derived by analyzing the market potential and historical sales data, while considering new technologies, market potential, available retail channels and participating customer segments. All Xcel Energy Minnesota electric customers are eligible to participate in the program.

The Home Lighting budget has decreased slightly from 2015 spending because of a decline in the cost of LED bulbs and incentives. The upstream markdown incentives are typically between 30% and 70% of the incremental cost of the bulb and vary by the bulb manufacturer. The cost savings are passed on to the customer as an instant rebate.

Involvement of Community Energy Organizations
The Company collaborates with several organizations to monitor and incorporate best practices into lighting product design. These activities include: Consortium for Energy Efficiency membership, national ENERGY STAR Lighting Partner meeting attendance, and monitoring information published by lighting manufacturers, E-Source, the American Council for an Energy-Efficient Economy, the EPA, and the U.S. Department of Energy.

➢ Insulation Rebate

Description
The Insulation Rebate program offers prescriptive electric and natural gas rebates to customers who upgrade the insulation and air-sealing in their homes. The program captures natural gas and electric savings on existing single-family and multi-unit homes, up to four units, that professionally install insulation with a Residential Building Envelope Whole House Air Leakage Control Installer (RBE-WHALCI) certified through Building Performance Institute (BPI). Xcel Energy electric-only customers must use electricity as their main heating source in order to qualify.

The Insulation Rebate program is marketed primarily through a mix of social media, bill onserts, the Xcel Energy website, and cross-marketing opportunities with other Xcel Energy programs.

The program's main offerings include the following prescriptive rebates:

- Attic insulation and bypass sealing:
  - Must have a pre R-value of 20 or less; and
  - Must have a post R-value of 44 or greater.
    - Homes with existing insulation of R-21 or greater must add at least R-25 of additional insulation.
- Wall insulation:
  - Must have empty wall cavity; and
  - Must have a post R-value of 12 or more.
- Air-sealing and weather stripping.

The main offering is described below:

Participating customers must contract for insulation services with a BPI RBE-WHALCI certified insulation contractor in order to qualify for a rebate. Additionally, air sealing and weather stripping must follow industry-accepted practices for mitigating air leakage. Homes can participate in the program more than once every calendar year but rebates are not issued for the same measure completed either under the Insulation Rebate program or under a different rebate program, such as Whole Home Efficiency. With the changes to the Home Energy Audit program, participation in the Insulation Rebate program is expected to increase in this filing.

We rely upon a dealer network to aid in the success of the program. The Trade Relations Manager offers program-specific trainings and information sessions to the insulation trade.

An online registry of RBE-WHALCI BPI certified insulation contractors is available for customers to choose a certified insulation contractor. In order to qualify for rebates customers must choose an insulation contractor from this online registry.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Rebate values	Incentivize customers to implement more than one insulation project at a time	New to this Plan	New
Decouple rebate measures	Allowing customers to implement more than one insulation project at a time and be competitive with other utilities that offer insulation rebates	New to this Plan	New

Budget and Goal Considerations
The program's budgets and electric and gas energy savings goals were determined based on historical program performance, along with the costs associated with decoupling the rebate measures and increasing the rebate structure of all the program's measures. Marketing dollars focus on cross-marketing opportunities with other Xcel Energy programs and social media, proven cost-effective strategies for this program. In addition, dollars are being shifted from project delivery to measurement and verification to properly allocate costs associated with the site visits.

The main budget drivers include the following:

- Administration – This category funds program planning and implementation, channel management and rebate processing.
- Advertising and Promotion – The program utilizes social media, contractor training and cross-utility marketing to promote the program, and uses direct and indirect promotions such as community outreach events in partnership with other electric and natural gas rebate programs.
- Participant Incentives – These funds cover the costs of customer rebates.
- Measurement and Verification – The program uses these funds to perform verification of submitted paperwork.

Involvement of Community Energy Organizations
The Xcel Energy residential trade relations manager is involved with the Minnesota Building Performance Association, MN Blue Flame Natural Gas Association and the Xcel Energy trade partner network to help advance and promote the program.

➢ Refrigerator Recycling

Description
The Refrigerator Recycling program offers residential electric customers prescriptive rebates and pick-up services to dispose of their operable, inefficient refrigerator and freezer units in an environmentally safe and compliant manner. The program is designed to educate customers about inefficient refrigerators and freezers, and the potential long-term cost savings and energy usage reduction from removing them.

The main offerings are described below.

The program offers a prescriptive rebate for removing:

- Any functional refrigerator; or
- A freezer operating as a standalone unit.

The program is limited to two units removed per household per year. The program takes energy credit for each freezer or refrigerator based on its age and unit type. The Company utilizes the services of a qualified third-party vendor to perform the following services:

- Unit collection, recycling, transportation and storage;
- Qualification of unit at the time of scheduled pick up;
- Appliance processing and materials recycling;
- Issuance of incentive payments;
- Implementation of all customer service related to above activities;
- Product tracking and reporting; and
- Supporting Measurement and Verification requirements.

The vendor is required to comply with all local, state and federal requirements. This includes maintaining all permits and licenses required for any facilities, equipment and personnel used for this product. The vendor is bound by contract to de-manufacture and recycle all units received; none may be re-sold or placed back in service. The adherence to this process ensures that recycled units will not re-enter the market.

Xcel Energy and the third-party vendor both market the program. The target market consists of customers who are disposing of their functioning refrigerator and/or freezer. Generally these customers have a single-family home with two or more individuals in the household. The product is available to customers for a limited program period to limit free-ridership. The marketing strategy utilizes seasonal campaigns to promote the product. Product demand often peaks in the summer months, which is associated with customer home improvement and cleaning projects. Deployment of promotional tactics coincides with these seasonal time periods, with contingency plans if goals are not made by third quarter of each year. Additionally, the third-party vendor will survey participants annually to determine customer satisfaction and to verify energy savings.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Recycling any functional refrigerator	Encourage the retirement of all inefficient units and keep a primary unit from becoming a secondary unit in the home	New to this Plan	New

Budget and Goal Considerations
The program's participation and energy savings goals and budget were determined from historical program results and costs per participant. The main budget drivers include the following:

- Administration – The program uses a third-party vendor to implement the program, including: marketing planning, online scheduling, call center operations, refrigerator/freezer collection, transportation and storage, qualification of appliances, appliance processing and materials recycling, issuing of customer incentive payments, all customer service aspects related to recycling, product tracking, all reporting to Xcel Energy and environmental and compliance entities, supporting measurement and verification, and compliance with all local, state and federal requirements.
- Participant Incentives – The program pays customer rebates with these funds.
- Labor – This budget category is used for internal marketing and rebate operations labor.
- Promotion and Advertising – This effort includes: bill inserts, direct mail, print, outdoor, broadcast and online advertisements, community outreach, and social media.

Involvement of Community Energy Organizations
We market the program in cooperation with environmental organizations and events as opportunities arise.

➢ Residential Cooling

Description
The Residential Cooling program encourages customers to purchase new energy efficient cooling equipment and install this equipment using Quality Installation (QI) standards. QI specifications are based on the Air Conditioning Contractors of America (ACCA) Standard 5 which dictates proper sizing, airflow, duct sealing, and refrigeration charge. The program provides an incentive to Xcel Energy electric customers to purchase qualifying central air conditioning (AC) or air source heat pump (ASHP) equipment and have it installed using these industry guidelines. Ground source heat pumps (GSHP) are eligible for rebates when customers purchase and install ENERGY STAR equipment; however, these are not subject to QI requirements. Additionally, ductless mini-split heat pumps may receive a rebate based on certain criteria.

The program's main offerings include the following:

- Prescriptive rebates for:
    - Central Air Conditioners & Air Source Heat Pumps with Quality Installation;
    - Ground Source Heat Pumps; and
    - Ductless Mini-Split Heat Pumps.

The main offerings are described below.

Equipment	Criteria
Central AC Only	13 – 14.9 SEER with QI
ASHP Only	14 – 14.9 SEER with QI
Central AC & ASHP	15+ SEER/min 12.5 EER with QI
Central AC & ASHP	16+ SEER/min 13 EER with QI
GSHP	14.1 EER Closed Loop
Ductless Mini-Split Heat Pump	15.0 – 26.0 SEER, 9 – 12 HSPF

To be eligible for the AC and ASHP program incentives, customers must use a participating contractor for the installation. Participating installation companies have at least one installer who has taken and passed an online QI assessment. Xcel Energy also accepts, but does not require, North American Technician's Excellence (NATE) certification to become a participating contractor. A list of participating contractors is available to customers from Xcel Energy. GSHP and Ductless Mini-Split Heat Pump incentives are eligible to customers using any contractor.

Program Changes
The following table summarizes the program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Addition of Ductless Mini-Split Heat Pump rebates	Contractors and distributors have indicated that this market share is growing and in demand. Reasonable energy savings can be claimed.	New to this Plan	New

Budget and Goal Considerations and Participation Development
The budget for the Residential Cooling program was developed based on historical costs per participant and was estimated according to expected participation. Taking into consideration the economic state of the market, the program goals reflect steady participation and a decrease in the promotional budget to provide a cost-effective program for our stakeholders.

The main budget drivers include the following:

- Administration – This category funds administration labor, materials, postage and rebate processing labor and measure and verification.
- Promotion – The program utilizes low cost promotions including bill onserts, email marketing, direct mail marketing, social media, blogs, and Trade Partner outreach.
- Participant Incentives – These fund customer rebates for qualifying products.

Involvement of Community Energy Organizations
The Residential Cooling program works closely with the Minnesota Heating and Cooling Association and the Minnesota Building Performance Organization to align best practices and to help communicate and educate the trade about our programs. Additionally, Xcel Energy is a member of ACCA and the Heating, Air-conditioning and Refrigeration Distributors International (HARDI), both national organizations.

➢ Residential Heating (Heating System Rebate)

Description
The Residential Heating program offers prescriptive electric and natural gas rebates to Xcel Energy natural gas customers who install new high-efficiency furnaces and hot water boilers as well as Electronically Commutated Motors (ECM). The natural gas portion of the program is designed to encourage customers to choose high-efficiency heating equipment through a tiered rebate schedule, and the electric portion is designed to encourage customers to upgrade the fan motor of the forced-air furnace. The rebate schedule supports the "good, better, best" selling techniques among the trade partners and enables customers to better understand the benefits of choosing energy efficient equipment.

The program is marketed primarily to homeowners via various forms of mass media messaging and an extensive trade ally network that serves as in-home spokespeople for the program while selling new equipment. This program is also cross-marketed with the Insulation Rebate and Water Heating Rebate programs.

The program's main offerings include the following:

- Prescriptive rebates for:
    - Natural gas forced-air furnaces:
        - Add-on replacement and new construction.
    - Natural gas hot-water boilers:
        - Add-on replacement and new construction.
    - Electronically Commutated Motors:
        - Factory-installed and retrofit units.

Xcel Energy residential natural gas customers who install natural gas forced-air furnaces or hot water boilers are eligible to participate in this offering.

The company also offers ECM rebates to its residential electric customers. In late 2015 the Company filed, with approval early in 2016, to extend the ECM rebate to include retrofit units. Customers are not required to have natural gas to qualify for the ECM rebate. Alternate fuel furnaces that have an ECM also may qualify.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Discontinue 92% AFUE furnaces	A program evaluation recommended dropping the lower tier rebate to ensure a stronger net to gross ratio	New to this Plan	New
Add a 95% AFUE furnace tier	Encourage participation by matching the good, better,	New to this Plan	New

Add a 97% AFUE furnace tier	best selling model	New to this Plan	New
Increase the 90% AFUE boiler rebate amount	Differentiate higher efficiency units via a tiered rebate structure	New to this Plan	New
Increase the 95% AFUE boiler rebate amount		New to this Plan	New

Budget and Goal Considerations
The program's participation and energy savings goals and budgets were determined by analyzing historical program trends as well as industry market forecasts.

The main budget drivers include the following:

- Participant Incentives – Rebates represent the largest portion of the budget. The rebate schedule was developed to encourage participation and differentiate between efficiency levels. There is a marked increase in budget from previous years due to the tiered rebate schedule that should increase participation at the higher efficiency levels, which results in greater savings per unit.
- Administration – Labor charges are predominantly represented by product management and rebate processing.
- Advertising and Promotion – Advertising is generally covered via cross promotion among other programs. Promotional spending includes event promotion, community outreach and HVAC dealer trade shows as well as other ad-hoc opportunities.

Involvement of Community Energy Organizations
We collaborate with the Minnesota Heating & Cooling Association, the Minnesota Plumbing, Heating, Cooling Contractors of America, and the Heating, Air-Conditioning Distributors International to help advance the program.

➢ School Education Kits

Description
The School Education Kits program offers a multi-component kit that combines classroom activities and in-home projects to fifth or sixth grade students and their parents to teach them about energy and water conservation. The program targets schools within our Minnesota service territory that receive both electric and natural gas service and to those teachers and students who enroll in the program through the third-party implementers.

The program's main offering is the Take Action Kit typically containing the following:

- Natural Resources Fact Chart;
- Digital water/air thermometer;
- FilterTone alarm;
- Energy efficiency showerhead (1.5 GPM);
- Kitchen aerator (1.5 GPM);
- Bathroom aerator (1.0 GPM);
- Teflon tape;
- Two 9-Watt LED light bulb;
- Two 11-Watt LED light;
- Flow rate test bag;
- LED night light;
- Parent comment card; and
- Think, Talk, Take Action! Wristband.

This prescriptive program provides direct impact savings, helps to build awareness of energy conservation at a young age, and provides energy and water savings to customers of various income levels. Traditional marketing tactics are not needed since schools are selected to ensure maximum outreach. Once schools are selected and enrolled, a third-party implementer recruits and trains the teachers, provides all materials, distributes the kits, and continues ongoing support if the teachers have questions while implementing the program. Classroom support is available via fax, phone, email and by a toll-free 800 number.

Teachers can enroll through a variety of channels. If teacher response is insufficient, the third-party provider implements contingencies for additional outreach. Upon enrollment, teachers dictate to the third-party when in the school year they would like to use the program materials and provide accurate enrollment numbers. The third-party staff remains in contact with teachers throughout the school year to assist teachers as needed, as well as to ensure return of the surveys that provide Measurement and Verification results. It can take up to three months to receive the results from each elementary school depending on when the teachers begin the activity.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Replace CFLs with LEDs	Increased customer demand and market availability in addition to a decrease in CFL manufacturing	New to this Plan	New
Demand savings for showerhead measure	10-20 percent of savings determined during peak	New to this Plan	New

Budget and Goal Considerations
The program's participation, electric and natural gas energy savings goals, and budgets were estimated using historical program results and proposed third-party costs. The main budget drivers include the following:

- Administration – This funds the program's internal labor and external fulfillment by our third-party implementer, which includes: project planning, turn key coordination, implementation, marketing, tracking of installations/surveys, call center and online help centers, measurement and verification of the program, and enrollment/reporting.
- Participant Incentives – This category covers the costs of the kit contents.

Involvement of Community Energy Organizations
We work with our Community Affairs department, Account Management group, and local community non-profits to identify schools. We also look for additional opportunities when available for cross promotion, outreach, or cost sharing.

➢ Water Heater Rebate

Description
The Water Heater Rebate program offers prescriptive rebates to customers who purchase and install qualifying high efficiency natural gas water heating equipment for residential use. Storage tank and tankless models are eligible. Customers may choose to self-install units rather than working with a plumber.

We intend to market the program using a variety of communication tools, including: HVAC trade partner communication, email newsletters, tradeshows, and point-of-purchase materials at retailers. The program is cross-promoted with other Xcel Energy residential heating-related programs.

The program's main offerings include the following:

Equipment	Criteria
Natural Gas Storage Tank Water Heater	0.67 – 0.69 EF, ≤ 55 gallons
Natural Gas Storage Tank Water Heater	0.70+ EF, ≤ 55 gallons
Natural Gas Tankless Water Heater	0.90+ EF

In order to participate, customers must receive natural gas service from Xcel Energy. The program is applicable only for the purchase of qualifying new standard tank water heaters or tankless water heaters installed in new or replacement applications. Due to new manufacturing standards, units with tanks larger than 55 gallons are not eligible. While most standard tank water heaters do not pass the cost-benefit tests, they are included as a part of the Water Heater Rebate program to spur customer demand for high efficiency equipment in the marketplace and to satisfy customer choice.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Baseline for storage tank water heater increase to 0.62 EF	New manufacturing standards effectively make 0.62 EF the lowest efficiency possible to manufacture	New to this Plan	New

Budget and Goal Considerations
The program's participation and gas savings goals were developed based on historical program performance and expected participation throughout the Triennial period. The budget was determined based on the costs needed to rebate the expected number of eligible units and the appropriate rebate amounts per efficiency level.

The main budget drivers include the following:

- Administration – This category represents internal labor for project planning and implementation, as well as external contract labor, materials and postage.
- Advertising and Promotion – This program is promoted via trade partner communication, email newsletters, tradeshows, and point-of-purchase materials.
- Participant Incentives – The majority of the budget goes to pay customer rebates.

Involvement of Community Energy Organizations

Xcel Energy is an active member in the Consortium for Energy Efficiency's Coalition of ENERGY STAR Water Heaters. The Company is committed to assisting this group's mission of inspiring changes in the market through the promotion of energy efficient technologies.

➢ Whole Home Efficiency

Description
The Whole Home Efficiency program offers prescriptive electric and gas rebates to residential customers who take a whole-house approach to improving the energy efficiency of their existing, single-family homes. The program offers customers personal assistance from beginning to end of their projects, direct contractor resources, rebates to reduce the project cost, direct install options, and independent verification of the improvements after completion.

Customers must be both electric and natural gas customers of Xcel Energy to participate. An energy audit through Xcel Energy or by a company-approved contractor must precede the project and must include a blower door test. The program is marketed primarily through Xcel Energy's Home Energy Audit program and secondarily through the trades, with the objective of helping customers find and prioritize energy efficiency improvements in their homes.

The program's main offerings include prescriptive rebates for:

- Air leakage reduction;
- Attic and wall insulation;
- Boilers and furnaces;
- Central air conditioners and ductless mini-split heat pumps;
- Clothes washers;
- Electronically commutated motor fans;
- Programmable thermostats;
- Refrigerators; and
- Water heaters.

The program also offers direct install for:

- Value LEDs;
- Energy efficient showerheads;
- Faucet aerators; and
- Water heater blankets.

To receive rebates, customers are required to install either attic insulation or comprehensive wall insulation, defined as at least 75% of the exterior walls of the home. Customers then need to select two other improvements, not including the direct install options. The customer can receive rebates for a whole-house project within one year of signing up for the program. All improvements are verified by the auditor doing the final inspection. Customers must use company-approved contractors, and those contractors receive training about the program and its required processes. Customers also have the opportunity to have some measures directly installed as part of the final project inspection. We see this as a way to add value for the customer and take advantage of the inspector's presence in the home. Integrating these measures that also exist in other programs provides a more comprehensive whole-house approach, and also decreases customer confusion and frustration with program overlap and eligibility.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Remove Water Heater Setback	Minimal customer participation	New to this Plan	New
Remove Dishwasher	New DOE baseline makes it difficult to be cost-effective	New to this Plan	New
Remove Refrigerator Recycling	Easier for customers to manage through stand-alone program	New to this Plan	New
Remove Freezer Recycling	Easier for customers to manage through stand-alone program	New to this Plan	New
Remove TV peripherals	Minimal customer participation	New to this Plan	New
Remove LED bulbs	Now offered through direct install	New to this Plan	New
Remove CFLs	Market availability of CFLs is decreasing as LEDs become more prevalent and affordable	New to this Plan	New
Remove Programmable Thermostat setback	Minimal customer participation	New to this Plan	New
Remove .62 and .64 EF Water Heaters	Market availability	New to this Plan	New
Add Air Leakage Reduction – Tier 1 and Tier 2	More accurately capture the impacts of insulation by using pre- and post- blower door test results	New to this Plan	New
Add EC Fan Motor Retrofit on existing furnace	Offered in the Residential Heating program	New to this Plan	New
Add Ductless Mini-Split Heat Pump 15.0 – 26.0 SEER, 9 - 12 HSPF	Offered in the Residential Cooling program	New to this Plan	New
Add .67 .69 EF Storage Tank Water Heater ≤ 55 gallons	Offered in the Water Heating Rebate program	New to this Plan	New
Add .70+ EF Storage Tank Water Heater ≤ 55 gallons	Offered in the Water Heating Rebate program	New to this Plan	New
Add .90+ EF Tankless Water Heater	Offered in the Water Heating Rebate program	New to this Plan	New
Add 90% and 95% EF Boilers	Offered in the Residential Heating Program	New to this Plan	New

Add Value LED (Direct Install)	Customers benefit as a free measure; greater assurance of lamp quality, wattage and installation	New to this Plan	New
Add Water Heater Blanket (Direct Install)	Customers benefit as a free measure	New to this Plan	New
Add Energy Efficient Showerhead (Direct Install)	Customers benefit as a free measure	New to this Plan	New
Add Faucet Aerator (Direct Install)	Customers benefit as a free measure	New to this Plan	New
Change program name from Home Performance with ENERGY STAR	Places focus on whole home approach and on efficiency. Reduces customer confusion with other utility programs and with the fact that many of the ENERGY STAR appliance rebates have been removed.	New to this Plan	New
Allow approved contractors to conduct Home Energy Audit	Streamlines the process for both contractors and customers encouraging more participation	New to this Plan	New

Budget and Goal Considerations
The program's budgets and electric and gas energy savings goals were determined using cost and savings estimates based on discussions with vendor and by historical program performance.

The main budget drivers include the following:

- Administration – This category covers program planning and implementation as well as program management.
- Advertising and Promotion – The program is marketed through advertising and support materials, including brochures and welcome kits.
- Participant Incentives – This category covers rebates and costs for direct install measures.
- Measurement and Verification – The program funds a third-party to inspect 100% of projects completed and to do the exit blower door test.

Involvement of Community Energy Organizations
Xcel Energy contracts with the Neighborhood Energy Connection (NEC) to implement the program. NEC is responsible for program promotion support, sign-ups, customer follow-up, verification visits, paperwork administration, and program tracking. We are also looking to increase targeted marketing by collaborating with communities in Xcel Energy's Partners in Energy program.

➢ Saver's Switch®

Description
Saver's Switch is Xcel Energy's residential load management program. The program gives participating customers bill discounts in exchange for allowing the Company to reduce their air conditioning and, if applicable, water heater usage on days of peak demand. During a control event (typically a hot, humid day or evening), air conditioners are cycled on and off in a manner designed to reduce the load by 50%. Enrolled electric water heater load is shed entirely for the duration of the control event, which can occur at any time of year. Air conditioners and water heaters are controlled via a radio operated switch installed by a licensed electrician on or near the customer's central air conditioning unit. Participants in the air conditioning program have the option of enrolling a qualifying electric water heater; however, customers cannot enroll a water heater on its own. The program's main offerings include the following:

- Participating air conditioning customers receive a 15% discount off the electric energy charges on their bills between June and September; and
- Water heater participants receive 2% off the same charges year-round.

The Saver's Switch program has operated in Minnesota since 1990. Many of the switches installed early in the program are now beyond their estimated 15-year useful life. In this Plan, we intend to continue to use the Virtual Visit tool to identify switches that should be replaced. We also plan to proactively replace switches more than 20 years old.

Program Changes
None.

Budget and Goal Considerations
The program budget and savings were developed based on equipment and installation costs for the number of switches to be installed and replaced.

The main budget drivers include the following:

- Administration – This budget category will cover the costs of internal labor for program planning and implementation, as well as the costs of external contract labor and software maintenance.
- Customer Services – The program uses a third-party to install the switches.
- Advertising and Promotion – The program will have a limited promotional budget in this Plan, as most of the installations will be from the replacement of old switches.
- Measurement and Verification – The program hires a third-party consultant to conduct measurement and verification to determine the savings per switch achieved each year.

➢ Consumer Education

Description
The Consumer Education program is an indirect-impact program that provides residential customers with the information and resources to reduce their energy usage. Because the Residential Segment is demographically varied, Xcel Energy employs a variety of resources to communicate the conservation message.

The program's communication strategies include the following:

- Annual community and conservation events and local community event outreach with energy efficiency messages;
- Social media;
- Online messaging through local newspaper media websites;
- Direct mail marketing to address seasonal usage challenges;
- Sponsorship of local Earth Day events;
- Sponsorship of local conservation publications;
- Conservation messaging through Your Energy Newsletter;
- Publication of reference materials; and
- Sponsorship of seminars and conferences supporting residential conservation and energy efficiency.

The program focuses on renewing existing partnerships and establishing new partnerships with an enhanced focus on digital communication. In addition, the program employs social media strategies to drive active engagement in energy efficiency through Facebook, twitter and blogs. By continuing to diversify the communication channels, the program increases residential customer knowledge base and provides a greater variety of resource options and services.

Program Changes
None.

Budget and Goal Considerations and Participation Development
The program budgets were developed through identification of customer growth patterns, costs to produce materials, the reach of advertising, and sponsorship costs. The participation goals were established through targeted outreach to customer segments and use of multiple channels for delivery of energy efficiency messaging.

The main budget drivers include the following:

- Administration – This category represents the internal labor needed for program planning and implementation.
- Advertising and Promotion – Promotional events are the primary budget driver for this program.

Involvement of Community Energy Organizations
None.

➢ Home Energy Audits

Description
The Home Energy Audit program offers substantially discounted energy auditing services to residential customers. The purpose of this program is to improve energy savings by influencing homeowners' and renters' behaviors through conservation education. This program is marketed through seasonal advertising and bill inserts as increases in monthly energy bills tend to drive program activity. We take advantage of local "green event" opportunities and direct mail campaigns as needed.

The program's main offerings include the following two tiers of audits:

- Home Walkthrough ($30); and
- Standard Audit with Infrared ($60).

The main offerings are described below.

Walkthrough Audits
The Home Walkthrough begins with the auditor's review and analysis of the customer's billing history and a discussion surrounding any concerns or questions that the customer may have regarding home energy usage and related comfort. The auditor performs an assessment of the interior and exterior of the home and provide a review of the top recommendations to the homeowner. This option is free to income-qualifying customers. An electronic personalized audit report is emailed to the customer highlighting the top recommendations and providing rebate program information.

Standard Audit with Infrared
The Standard Audit with infrared includes all Home Walkthrough audit components, as well as a blower door test and a combustion appliance zone (CAZ) test. The blower door test is conducted in every home and the CAZ test is performed only if atmospherically vented appliances are present. Also included is an infrared scan to evaluate internal structures such as drywall and insulation and to determine temperature differences where insulation is present, missing, or not working effectively. In order for the infrared scan to be effective there needs to be a certain differential between the indoor and outdoor air temperatures. The infrared scan is offered when applicable.

Customers may get a Home Walkthrough audit every three years, or upgrade to a more extensive audit more frequently. The charges to the customer are assessed on bills after the audit is completed.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Eliminate Standard Audit and reduce cost to customer of Standard Audit with Infrared from $100 to $60	The cost to the customer of the higher tier has been reduced from $100 to $60 to stimulate demand	New to this Plan	New
Upon customer request, conduct a Home Energy Audit at the same time as a Home Energy Squad visit ("enhanced visit")	Provides customer convenience	New to this Plan	New
During an enhanced visit, perform an insulation evaluation and if warranted provide a list of qualified insulation installers from the Company's approved BPI list along with a bid	Provides customer convenience and encourages additional home energy efficiency	New to this Plan	New

Budget and Goal Considerations
The program's participation and budgets were determined by historical program participation targets and expenses.

The main budget drivers include the following:

- Administration – The budget includes the costs of internal labor and external contract labor to support the program.
- Customer Services – This category represents the costs of the third-party auditors, as well as the payments made by customers for their audits
- Advertising and Promotion – The program includes a modest promotional budget to steer customers to the audits.

Involvement of Community Energy Organizations
Xcel Energy contracts with the Neighborhood Energy Connection (NEC) to implement the Home Energy Audit program. NEC is responsible for program promotion, audit scheduling, auditor recruiting and subcontracting, paperwork administration and program tracking.

➢ Residential Lamp Recycling

Description
The Residential Lamp Recycling program encourages electric customers in Minnesota to recycle their spent fluorescent bulbs instead of discarding them, to ensure that mercury does not get into the environment.

The program's main offerings include the following:

- Free compact fluorescent light bulb recycling at participating local hardware stores and partnering county hazardous waste facilities; and
- Coupons for 50¢ off the recycling fee for each fluorescent tube and HID bulb at participating hardware stores. The coupons are available at participating hardware stores and on the xcelenergy.com website.

The Residential Lamp Recycling Program is marketed primarily through Xcel Energy's Home Lighting program promotions, participating hardware stores, and on the main Xcel Energy website. A search feature allows customers to search by zip code to find the nearest recycling locations.

The Company follows the requirements of Minn. Stat. 216B.241, subd 5, which necessitates public utilities to notify customers that fluorescent recycling is the law in Minnesota. Every Residential Lamp Recycling and Home Lighting promotional piece includes a disclaimer regarding the statute, such as, "Fluorescent lamps contain small amounts of mercury that are harmful to the environment. In Minnesota, it is illegal to dispose of spent mercury bulbs in household trash receptacles."

Program Changes
None.

Budget and Goal Considerations
The budget was developed based on historical spending and the expected number of bulbs to be recycled in the coming years. The budget is set to increase about five percent annually to account for additional bulbs that we anticipate will be recycled each year. The promotional budgets will remain consistent throughout the Triennial Plan.

The main budget drivers include the following:

- Administration – This provides funds for internal labor for planning and program implementation.
- Promotion and Advertising– We market this program with the Home Lighting promotions.

Involvement of Community Energy Organizations
Xcel Energy stays active in the Minnesota and national Lamp Recycling community through its partnerships with Mercury Technologies of Minnesota, Inc., and the Center for Energy and Environment.

➢ Low-Income Segment

Description
A subset of the Residential Segment, the Low-Income Segment customers traditionally reside in single- and multi-family rental homes. The goal of this Segment is to educate income-eligible customers about their energy usage and how to reduce their monthly utility bills. To address this customer group, we will provide materials and assistance to make permanent changes in low-income residences, which will improve comfort and lower costs.

Programs
The Low-Income Segment offers three programs in this Plan: Home Energy Savings (HESP), Low Income Home Energy Squad, and Multi-Family Energy Savings (MESP). The programs offer analyses of both gas and electric consumption to income-qualified customers and provide them with products and services that assist in lowering their monthly energy bills. Through HESP, customers may also be eligible for replacement of appliances based on the condition of the existing units identified during the analysis phase. MESP offers electric home energy efficiency measures and educational information to apartment dwellers. Third-party program implementers deliver all three programs' operations.

Overall Goals
We have estimated savings of more than 9.2 Gwh and 40,169 Dth over the three-year period from the Low-Income Segment, accounting for 1% of the Company's total electric energy savings goal and 2% of its total natural gas goal. Most of the energy savings within the Segment come from energy efficient lighting, insulation, and appliances. The Low-Income Segment budgets are increasing from the last Plan to account for increased labor, equipment costs and broadening the offering to include up to four unit properties

Market Analysis
The interest in and need for low-income energy efficiency services continues, and we anticipate customers struggling to pay their monthly bills. This Segment plays a vital role by providing programs and services to help lower energy bills and improve the comfort of low-income homes.

Marketing/Advertising/Promotion
We seek to economize promotional and advertising spends as we strive to build awareness of our low-income offerings as participating community agencies manage enrollment. We have found that there is always the need to build program awareness, so we are continuing to expand how we promote the Segment. In this Plan, the low-income programs are marketed through a variety of activities including neighborhood community events, workshops, and partnerships with local non-profits.

Overall Policies
To participate in the Low-Income Segment programs, customers must have incomes that fall below 50% of the State Median Income guidelines or below 200% of Federal Poverty levels, whichever income level is greater. The Segment does not have additional unique policies. Each program will enforce its participation and equipment eligibility rules and requirements.

Stakeholder Involvement

The Low-Income Segment programs are delivered through third party vendors located in our service territory. We also work with a variety of community outreach groups such as local food shelves and the Salvation Army.

➢ Home Energy Savings

Description
The Home Energy Savings program (HESP) offers free home energy education and improvement services to income-qualifying customers. Participating customers receive a home visit and energy bill analysis to learn about energy conservation. Based on the findings in the home visit, we determine the customer's eligibility for other offerings including home weatherization and appliance replacements.

To qualify for participation in HESP, Xcel Energy customers must:

- Have a household income that is at 50% of the State Median Income guidelines or at 200% of the federal poverty level, whichever is greater; and
- Properties with two to four housing units, at least 50% of the households must have incomes below 50% of the State Median Income guidelines or 200% of the federal poverty level, whichever is greater.
- Rental properties must agree to maintain affordable rent in order to receive benefits from this program.

The program is implemented through third-party providers who are responsible for customer recruitment, enrollment, income eligibility confirmation, subcontractor management, program forecasting, tracking, and reporting. The program is promoted by Xcel Energy through advertising and promotion efforts including out-of-home, direct mail, radio, and online. It is also supported with efforts by our Customer Care and Low Income Assistance departments.

The program's main offerings include the following:

- Free electric home services including:
    - Home energy educational visits;
    - Refrigerator replacements and recycling;
    - Freezer replacements and recycling;
    - Window/wall AC replacements and recycling;
    - Electronically commutated motors installed in new furnaces; and
    - Attic insulation for electrically heated homes.
- Free natural gas home services including:
    - Attic insulation and air-sealing;
    - Wall insulation;
    - Furnace or boiler replacement; and
    - Water heater replacement.

The main offerings are described below.

Electric Home Services

The home energy educational visits are available to all income-qualified customers in Xcel Energy's electric service territory and are provided during a Low Income Home Energy Squad visit. These visits include:

- Analysis of the electric bill;
- Home energy assessment and education;
- Inspection and evaluation of major appliances;
- Written energy savings recommendations; and
- Distribution of energy conservation educational materials.

Appliance replacements are available to those customers whose appliances meet the following criteria:

- Customer must own the appliance or provide a signed waver to allow replacement and recycling of the old inefficient appliance;
- Appliance must be used on a regular basis;
- Appliance must be in working condition;
- Refrigerators must be the primary unit in the home unless the customer agrees to recycle a second working appliance as well; and
- Window/wall AC units may have a maximum EER rating of 8.5.

Evaluation and installation of electric weatherization services is also available in electrically heated homes.

Natural Gas Home Services

These services are available to all income qualified customers in Xcel Energy's natural gas service territory:

- DOE standard energy audit including blower door testing;
- Detailed specifications for all weatherization measures;
- Insulation of attic and bypass sealing to an R-value of 44;
- Insulation of walls to an R-value of 14 or greater; and
- Carbon monoxide detector installed with any weatherization job.

We provide funding for the replacement of old inefficient furnaces, boilers and water heaters with the following:

- Furnaces with a minimum AFUE of 92%;
- Boilers with a minimum AFUE of 84%; and
- Natural gas water heaters with an EF of 0.67 or higher.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Expanding program offering to include 1-4 unit properties	This expands the program to provide energy saving services to a portion of the market that is not served by any other CIP program	New to this Plan	New
The home assessment for potential HESP measures will be performed during a Low Income Home Energy Squad visit	This creates cost efficiencies within the Low Income segment since the Low Income Home Energy Squad crew are already in the home. This eliminates the need for one of the HESP visits to the home. HESP program will continue to cover the assessment cost.	New to this Plan	New

Budget and Goal Considerations
The program's participation and energy savings goals and budgets were based on historical program data.

The main budget drivers include the following:

- Administration – Covers internal labor and expenses for program planning and implementation and vendor administration.
- Customer Services – Services provided by Third-party program implementers are funded through these funds.
- Rebates - Covers the cost of the equipment/measures installed.
- Promotion and Advertising - The program's direct advertising, bill onserts, communications outreach events and more are supported with these funds.

Involvement of Community Energy Organizations
We continuously try to build relationships with existing agencies and non-profit organizations in the state, such as the Salvation Army and Metro Meals on Wheels. These partnerships allow us to increase program awareness and increase program participation.

➢ Low Income Home Energy Squad®

Description
The Low Income Home Energy Squad program offers installation services to electric and gas customers who seek to improve their homes' comfort, and lower their utility bills. The program is marketed to income-qualifying customers. The program directly installs a number of moderate-impact, low-cost measures for combination gas and electric customers and for electric-only customers who are natural gas customers of CenterPoint Energy. The program pays for the equipment and labor costs to install a number of appropriate, moderate, impact measures. The program helps to remove barriers for customers to make energy improvements.

The program's main offerings include the following:

- Electric measures, including:
  - Value LED light bulbs or various types and wattages.
- Heating and cooling measures, including:
  - Weather-stripping of two external doors;
  - Programmable thermostat installation; and
  - Setback of pre-existing programmable thermostats.
- Hot water measures, including:
  - Insulation blanket for water heater;
  - High efficiency showerheads and faucet aerators; and
  - Temperature assessment and setback of water heater.

Program Changes
The following table summarizes changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Switching from CFLs to Value LEDs	Market availability of CFLs is decreasing as LEDs become more prevalent and affordable	New to this Plan	New
Installation of measures in homes that are served by Xcel Energy gas-only or electricity-only	Pre-identified opportunities where customers will benefit from single fuel measure installation	New to this Plan	New
Addition of electric-only program component so as to offer a program to customers whose gas is provided by CenterPoint Energy	Expand the program offering to all customers, beyond Xcel Energy combo customer territory	New to this Plan	New
Perform home	Creates cost efficiencies with	New to this Plan	New

assessment for potential Low Income Home Energy Savings Program	Low Income Home Energy Squad crew already in the home. This eliminates one of the HESP visits to the home. HESP program to cover the assessment cost.		

Budget and Goal Considerations
The program's participation and energy savings goals and budget were determined by cost estimates based on vendor proposals, potential number of participants, and historical program expenses. The main budget drivers include the following:

- Administration – This budget funds program administration costs through third-party vendors, as well as third-party labor for the installation of energy efficient measures in customers' homes.
- Promotion and Advertising – This category covers print, broadcast and interactive advertising, phone and street canvassing, and event promotion. As this program progresses it requires increased costs to build awareness and to directly reach participants.

Involvement of Community Energy Organizations
Xcel Energy contracts with third-party non-profit implementers to provide this service.

➢ Multi-Family Energy Savings

Description
The Multi-Family Energy Savings program offers free education and services to qualifying multi-family buildings. The Multi-Family program provides electric services to income-qualifying renters and is designed to reach these tenants and support low-income housing through building-wide projects. The program offers information on additional energy saving actions the building residents can take beyond the program, and free in-unit energy upgrades, including LEDs and electric appliance replacements.

To qualify, multi-family buildings with five or more units in our electric territory must meet the following criteria:

- For properties with five or more units, 66% of the households must have incomes below 50% of the State Median Income guidelines or 200% of the federal poverty level, whichever is greater.
- Properties with five or more units must follow the Low Income Verification guidelines posted on the MN Division of Energy Resources website.

The program is administered by a third-party implementer that can provide services throughout Xcel Energy's Minnesota electric service territory. The program is implemented through third-party providers that are responsible for customer recruitment, enrollment, income eligibility confirmation, subcontractor management, program forecasting, tracking, and reporting. The program is promoted through outreach with multifamily stakeholders and associations. Minimal promotional activities have been necessary to date, but tactics that would be deployed if needed are direct mail campaigns and sales calls to qualifying buildings, which are identified through local resources such as HUD and LIHEAP.

The program's main offering is free electric equipment and installations, including:

- LEDs;
- Refrigerator replacements and recycling;
- Freezer replacements and recycling;
- Window air conditioner (AC) replacements and recycling; and
- Wall/sleeve AC replacements and recycling.

This offering provides tenant educational materials, building energy assessments, and in-unit LED installation to qualified buildings. In addition, appliance replacement and recycling is provided to those buildings/units where the appliances meet the following criteria:

- Appliance must be used on a regular basis;
- Appliance must be in working condition;
- Refrigerator must be the primary one used in the unit, unless customer agrees to recycle a second working appliance as well; and
- Window/wall AC units must have an EER rating of 8.5 or less to be replaced.

Appliances that are replaced through this program continue to be the property of the original owner. For example, refrigerators owned by the building owner continue to be property of the building owner and AC units owned by the tenant continue to be property of the tenant.

Program Changes
The following table summarizes program changes made after the 2015 Status Report was filed, as well as changes new to this Plan.

Change	Rationale	DER Notification Method	Date Notified
Change from installation of CFLs to LEDs	Market availability of CFLs is decreasing as LEDs become more prevalent and affordable	New to this Plan	New
Educational seminars are no longer available	Challenges organizing seminars and getting tenants to attend has limited our ability to provide energy saving education. Energy conservation education is provided at the time of the assessment and LED install and with materials left behind for the tenants.	New to this Plan	New
2-4 unit weatherization for electrically heated homes removed	To streamline our Low Income portfolio offering, we are expanding the Home Energy Savings program (HESP) to provide services, including weatherization for electrically heated properties, for 1-4 unit properties	New to this Plan	New

Budget and Goal Considerations
The program's participation and energy savings goals and budget were based on historical program data.

The main budget drivers include the following:

- Administration – Covers internal labor and expenses for program planning and implementation and vendor administration.
- Customer Services – Services provided by third-party program implementers are paid through these funds.
- Rebates – Covers the cost of the equipment/measures installed.
- Promotion and Advertising – The program's direct advertising, bill onserts, communications outreach events and more are supported with these funds.

Involvement of Community Energy Organizations

Program training and information is provided to the MN Housing Finance Authority for consideration with the properties receiving funding.

➢ Planning Segment

Description
The Planning Segment includes indirect-impact efforts that are not directly affiliated with a specific direct-impact program. The Segment includes Advertising & Promotion, Application Development and Maintenance, CIP Training, and Regulatory Affairs.

The overall purpose of the Planning Segment is to:

- Increase awareness and participation in our programs through CIP-specific advertising and promotional messages;
- Provide software and hardware tools and processes to make it more efficient for internal staff operations and easier for customers to participate in our programs;
- Provide strategic direction for Xcel Energy's DSM portfolio;
- Ensure CIP-related regulatory compliance;
- Guide Xcel Energy internal policy issues related to CIP; and
- Train Xcel Energy's Marketing & Sales staff for effective performance.

Programs
The Segment includes Advertising & Promotion, Application Development and Maintenance, CIP Training, and Regulatory Affairs.

Overall Goals
The budgets for this Segment were developed based on historical costs. As an indirect-impact Segment, there are no savings goals associated with these efforts.

Market Analysis
Not applicable.

Marketing/Advertising/Promotion
Not applicable.

Overall Policies
Not applicable.

Stakeholder Involvement
Not applicable.

➢ Application Development & Maintenance

Description
The Application Development and Maintenance budget supports the extensive data and process management necessary to market, manage and deliver energy efficiency programs and report program achievement. In the process, Xcel Energy utilizes several different computer systems that require regular maintenance and sometimes new functionality. In this Plan, we intend to perform enhancements to our current systems as well as system updates to maintain the quality of our reporting. These necessary changes introduce additional reporting flexibility and efficiencies, improve back-office processes, and improve process management by injecting efficiencies into current operations.

Program Changes
None.

Budget and Goal Considerations
Our Application Development and Maintenance work is performed by a combination of in-house software developers and system administrators, and by contracted external resources. The budgets for this work represent software purchases and the labor required to configure the software to integrate with existing systems and processes. The budgets were developed using historical trends for existing system maintenance work and by identifying project-specific funds for new system development work.

The main budget drivers include the following:

- Administration – As technology advances, the costs incurred also increase. The budget reflects increases to ensure our ability to keep our existing systems and processes at optimum performance. All expenditures for the portfolio, including internal labor, software licenses, and application development and maintenance are covered by this budget category.

Involvement of Community Energy Organizations
Not applicable.

➢ Advertising & Promotion

Description
The Advertising & Promotion budget drives awareness of electric and gas conservation and energy efficiency options among all types of customers. These budgets also support program-specific strategies for programs that offer the broadest appeal to customers. The budget is allocated internally between residential and business segments to support their respective objectives. The advertising and promotion goal is to ensure that efficiency is top-of-mind when customers are faced with purchasing decisions that impact their energy use and to encourage customers to look at the lifetime savings rather than only initial costs. We strive to influence how customers think about their energy use on an ongoing basis and to take energy-wise actions in their home.

The main offerings are described below.

Various media types help us reach customers at different stages of the efficiency decision-making process. Through these various media channels we strive to:

- Build awareness via broadcast media;
- Capture attention through print media, sponsorship, and events; and
- Create engagement via interactive media and direct marketing.

Among our advertising and promotion strategies, we:

- Drive web visits for program information and educational content;
- Encourage engagement with our digital media and direct-marketing efforts;
- Maintain awareness, likeability and favorable opinion of our offerings;
- Create an emotional connection by appealing to individual needs and barriers;
- Sponsor cost-effective events and outreach; and
- Maintain traditional outreach via marketing tactics that deliver the most cost-effective impact.

Program Changes
None.

Budget and Goal Considerations
The program's budgets were determined by using cost estimates from past projects, vendor proposals, current customer counts, current conservation advertising budgets, known costs for creating new campaigns, and other general industry pricing knowledge. As we continue to optimize the marketing mix, the budgets give us the flexibility to choose the tactics and tools necessary to meet our needs for cost-effective results.

The main budget drivers include the following:

- Administration – This category covers the internal labor necessary for advertising and promotion marketing campaigns.
- Advertising and Promotion – These funds are spent directly on advertising and promotion costs to support individual programs and cross-marketing among programs.

Involvement of Community Energy Organizations

The Advertising & Promotion budget provides support to the Residential, Low Income and Business segment programs that partner with non-profit agencies and community organizations.

➢ CIP Training

Description
The CIP Training program allows Xcel Energy staff within marketing, engineering, regulatory, operations, and sales the opportunity for continued education. These education opportunities include learning more about energy efficient electric and natural gas equipment as well as new advances in technology and changes in the energy efficiency industry. To enhance our knowledge base, staff may attend internal or external training sessions, conferences and seminars on various technologies, industry best practices, and energy efficiency and conservation topics. With continued education, we are able to stay current on the energy efficiency industry in addition to keeping informed about future technologies and industry trends that ultimately better serve our customers. The CIP training budget allows us to overcome future challenges and help us meet our conservation goals.

Program Changes
None.

Budget and Goal Considerations
The program budget was developed by evaluating historical spending for staff to attend both internal and external conferences and seminars on energy efficiency education.

The main budget drivers include the following:

- Administration – This budget covers the internal labor, materials, and travel expenses for our staff to attend internal and external conferences, seminars and training sessions.

Involvement of Community Energy Organizations
Not applicable.

➢ Regulatory Affairs

Description
Regulatory Affairs manages all DSM regulatory filings, directs and prepares cost-benefit analyses, provides results of energy conservation achievements, manages electric and gas potential studies, and analyzes and prepares cost recovery reports. The group also provides procedures for effectively addressing requirements for the DSM regulatory process. These functions are needed to ensure a cohesive and high-quality DSM portfolio that meets legal requirements, as well as the expectations of Xcel Energy's customers, regulators and staff.

In addition, Regulatory Affairs supports the DSM component of resource planning, rate cases, and certificates of need, and provides strategic evaluation planning and internal policy guidance. These functions are needed to ensure the cost-effectiveness of DSM, to ensure the quality of DSM impact estimates, help generate ideas for future DSM projects, establish programmatic consistency, and manage DSM-related marketing information.

Budget and Goal Considerations
Program budgets were developed based on historical spending. Included in the Regulatory Affairs budgets are materials, administration, and outside consulting costs. Budgets have increased slightly to recognize we spent most, or exceeded, of what was budgeted in 2013-2015.

The main budget drivers include the following:

- Administration – This budget category covers the internal labor and materials, outside consulting and contracting necessary to deliver all CIP-related regulatory filings in Minnesota. In addition, annual software license fees for DSMore (used for cost-benefit analyses) are included in this budget.

Program Changes
None.

Involvement of Community Energy Organizations
The Regulatory Affairs group works with third-party alternative filers, community organizations, and other interested parties as applicable. In addition, we regularly attend energy efficiency stakeholder initiative meetings, conduct research into industry best practices and emerging trends and assist with legislative policy.

➢ Research, Evaluations, & Pilots Segment

Description
The Research, Evaluations, and Pilots Segment includes indirect research and development efforts that are not directly affiliated with a specific direct impact program. This Segment provides research, evaluation, and screening of new DSM products and concept testing.

Under this Segment, Market Research and Product Development:

- Evaluates achieved energy and demand savings;
- Quantifies the various levels of market potential for programs;
- Analyzes overall effects of Xcel Energy's CIP portfolio on customer usage and overall system peak demand and system energy usage;
- Develops new DSM programs;
- Researches, pilots, and monitors new conservation products to determine conservation opportunity;
- Provide overall informational support for DSM;
- Evaluate the processes and impacts of DSM Programs;
- Measure overall customer satisfaction with Xcel Energy's various DSM efforts;
- Provide segment and target market information; and
- Examine in further depth the various assumptions used within program design and management.

Portions of this Segment are subject to the Research and Development spending cap of 10% of our minimum-spending requirement. For the most part, Market Research projects fall outside of Research & Development, except for market potential studies, as the information is not intended exclusively to assist in developing new programs and mainly addresses existing programs through efforts such as program evaluations. Therefore, the market potential study anticipated during this Plan is subject to the cap. All of Product Development projects and costs are included within the R&D category and subject to the cap, except for pilot programs.

Programs
This Segment is comprised of the Market Research and Product Development teams.

Overall Goals
The budgets for Market Research and Product Development were based on past spending and adjusted for planned expenditures. Pilot projects may be proposed as either direct or indirect impact. Two pilots are included in this Plan and savings related to these pilots are anticipated during this plan.

Market Analysis
Not applicable.

Marketing/Advertising/Promotion
Not applicable.

Overall Policies

Not applicable.

Stakeholder Involvement
We involve external parties (government, manufacturers, vendors, installers) in our product development process. We also seek the input of manufacturers, vendors, and installers as we build the technical assumptions for each product in order to test for cost effectiveness.

➢ Market Research

Description
Market Research drives a variety of CIP-specific projects that are used to support effective design and implementation of DSM programs and services. This enhances understanding of current and potential customers, market segmentation, and engagement drivers. Additional research is conducted through procurement of third-party consultants who review primary and secondary data while purchased market research subscriptions offer energy efficiency and/or marketing resources that provide strategic information regarding customers, DSM products, and business direction for Xcel Energy DSM efforts. This research falls into four categories:

- Program Support Activities which primarily provide overall DSM informational support for several programs or segments;
- Program Evaluations which provide individual specific program process and / or impact studies;
- Program Assumptions Analysis which deeply examine the various assumptions used in program design, management, and assessment; and
- Portfolio Potential Studies that survey existing and emerging energy consuming technologies in homes and businesses to project how the DSM portfolio will evolve in the future.

Although research needs may change during the course of the Plan, we plan to continue the procurement of the following market research resources in 2017, 2018, and 2019:

- Program Support Activities
    - E Source membership provides unbiased, objective research and advisory services that help advance efficiency programs, improve the customer experience, and use energy more efficiently.
    - Dun & Bradstreet list purchase provides specific demographic information helpful in effectively identifying potential business customers capable of benefiting from existing and planned DSM programs.
    - Attitude, Awareness and Usage (AAU) research helps gain an understanding of current customer perceptions around energy conservation and gather feedback on product offerings.
    - Home Use Study provides valuable information regarding saturation of various home appliances and technologies in residential homes.
    - Residential and Business Advertising Tracking data ensures the effectiveness and reach of DSM advertising efforts by asking customers reactions and recall of specific campaigns.
- Program Evaluations: Comprehensive evaluations are completed by independent third-party consultants for specific programs each year. Factors that are taken into consideration in determining the priority and schedule of program evaluations include, but are not limited to: program tenure in Minnesota, savings achieved per participant and relative to total goals, program expenditures compared to total budgets, uncertainty and/or risk associated with savings or technical assumptions, and availability of other studies regarding the particular measures. Discussions with portfolio managers, program developers and technical consultants are used to finalize the priority and schedule of evaluations. We plan to conduct the following comprehensive evaluations: Heating Efficiency, Data Center Efficiency, and Insulation Rebates programs in 2017; the Motor Efficiency, Business New Construction, and

Water Heater Rebates programs in 2018; and the residential and business Saver's Switch, Heating System Rebates, and ENERGY STAR Homes programs in 2019.

- Program Assumptions Analysis:
    - Portfolio Wide Technical Assumptions Review.
- Portfolio Electric Potential Studies: The Company anticipates that a full potential study will need to be completed in 2017 for an Integrated Resource Plan (IRP) filing that will occur before the end of the 2017-2019 Triennial period. The previous IRP included only an update of the 2011 DSM Potential Study to save costs. However, that approach is not suitable again because the 2011 baseline information would be significantly outdated by the time a new IRP is submitted.

Program Changes
None.

Budget and Goal Considerations
The Market Research budget was developed based on historical project costs for similar research and /or studies of similar scope.

The main budget drivers include the following:

- Administration which covers the internal staff and external professional services needed for project planning and implementation.
- Measurement and Verification which provides funding for program evaluations and program assumption analysis.

Involvement of Community Energy Organizations
Not applicable.

➢ Measurement & Verification

This section documents our efforts to measure and verify direct-savings of electric and gas programs to ensure that reported savings are as accurate as possible while balancing measurement and verification (M&V) robustness against cost. M&V costs have been budgeted within each program's overall budget.

Prescriptive projects are subjected to realization rates, a calculated metric that compare verified savings with reported savings. The realization rate is then applied to all reported program savings to come up with total program impacts. Custom projects all adhere to pre-established M&V policy and threshold under Docket Number E, G999/CIP-06-1591. For programs not specifically listed in this document, project M&V is not conducted due to budgetary or logistical constraints, but may be validated in periodic program evaluations.

- **Rebate Application Validation (All Programs)**

  Step 1: Applications are validated prior to data entry and sent back to the customer or account manager if any data is missing or incorrect.

  Step 2: Daily audit is conducted on all rebates after data entry but before rebate is issued. Errors are corrected and rebate is paid.

- **Measurement & Verification (General)**

  Verifies on an ongoing basis during performance year the gross energy and demand savings.
  - **Prescriptive programs** using deemed savings technical assumptions have random sample field inspections to verify that the measure is installed and operating and the key parameters of the technical assumption match the rebate.
  - **Custom programs** go through stages of engineering review of the custom measure savings calculations. Random samples are sent to an outside engineering firm for further review. Projects with savings greater than 1 GWh or 20,000 Dth are pre- and post-metered, as are some projects that are metered at engineering discretion to verify assumptions for new technologies or other variables.
  - **Exception programs** conduct M&V as it makes sense from a financial, accuracy, logistical and customer investment standpoint.

Prescriptive Process

For most of the programs, the verification contractor selects a statistically valid number of projects to verify through field inspections or phone surveys. The sample size is designed to achieve accuracy levels of between 10% and 20% given a confidence level of 90% around the realization rate and is weighted to select larger projects. The number of randomly selected participants in the sample may increase or decrease during the year to ensure that the realization rate accuracy approximates the precision goals for the program. Sampling bias caused by poor response rates and deliberate exclusion of sample projects is reduced through a quality control process. Rebate forms notify all customers that their respective premises and measures are subject to verification inspections.

The realization rate is a calculated value that compares the verified savings with reported savings. The realization rate for a project is the ratio of the verified savings to the savings reported on the rebate application. The realization rate for the program as a whole is the ratio of the program's total verified savings to the total rebate reported savings. The program realization rate is applied to all program savings to determine program impacts.

The process is as follows:

Step 1: Customer submits rebate application and required documentation to the Company after measure is installed.

Step 2: Rebate Operations reviews all business and residential program rebate applications, supporting documentation, and vendor invoices. They check the customer information, equipment eligibility and proper rebate amounts. If information is missing or incorrect, the application is sent back to the account representative or customer to make changes.

Step 3: If project qualifies for rebate, Rebate Operations enters rebate application form data into the rebate tracking system and authorizes rebate payment. Prior to authorizing rebates, all applications are verified in a daily audit.

Step 4: On a monthly basis we'll send the third-party verification contractor (VC) all projects completed during the period.

Step 5: VC selects random samples, notifies the Company of the sample selections, and manages statistically valid sample process to achieve a 90% confidence level with 10% precision.

If it is not possible to achieve 90/10, a confidence and precision level of 90/20 is acceptable.

Step 6: VC contacts customer to schedule the inspection.

Step 7: VC visits site and verifies the savings factors and equipment information for that measure. VC also re-runs the rebate calculation worksheet for each project to ensure the inputs and outputs of the calculator are correct.

Step 8: VC documents discrepancies and submits report to the Company.

Step 9: Product management and technical staff evaluate the nature of the discrepancy and take appropriate follow-up actions.

Step 10: VC calculates realization rate for each project and cumulative year-to-date realization rate for each program.

Step 11: Corrective action such as communication of program requirements, changes to program rules or identification of intentional misuse of the programs are undertaken based on these audit results as necessary.

Applicable Prescriptive Programs

Including prescriptive projects of programs with prescriptive and custom components.

Business Programs

- Commercial Efficiency;
- Computer Efficiency;
- Cooling Efficiency;
- Data Center Efficiency;
- Fluid System Optimization;
- Foodservice Equipment;
- Heating Efficiency;

- Lighting Efficiency;
- Motor Efficiency;
- Multi-Family Building Efficiency;
- Process Efficiency; and
- Turn Key Services.

Residential Programs

- Residential Heating;
- Insulation Rebate;
- Low-Income Home Energy Savings;
- Multi-Family Energy Savings;
- Residential Cooling; and
- Water Heating Rebate.

Programs and/or Components with Variation from Prescriptive Process

- **The Boiler Tune-Up and Tune-Up Plus** measures from the Heating Efficiency program do not have audits performed.
- **Business New Construction - Energy Efficient Buildings (EEB) component**, EEB differs from the prescriptive process in that preapproval is required prior to equipment install, invoices are not required, and all projects are field verified.
- For **Computer Efficiency** program, all manufacturers provide sales data on quantity and type of computer equipment shipped.
- **Energy Feedback, Whole Home Efficiency, Home Energy Squad, Low-Income Home Energy Squad, Refrigerator Recycling**, and the third-party implementers are responsible for ensuring verification of measures.
- For **Efficient New Home Construction**, 100% of homes are verified through the Residential Energy Services Network (RESNET) rating and quality assurance protocols.
- For **Home Lighting**, all retailers provide sales data on quantity and type of bulbs sold.
- Select programs utilize third-party program implementers or survey companies to complete follow-up surveys to a sample of the participants to confirm and track whether the equipment was installed. An installation rate is applied to the program's annual savings.
- For **School Education Kits**, participants conduct and submit surveys.
- For **Energy Efficient Showerhead** program, third-party implementer reports on quantity of showerheads distributed. The third-party survey company reports on installation rates.

General Custom Process

Project Identification

Step 1: Project identification and scoping.

Step 2: Customer submits preapproval application to the Company.

Preapproval

Step 3: An engineer (or outside engineering firm) reviews the application and calculates the energy and demand savings based on the technical assumptions specific to that measure and the resulting rebate.

Step 4: Xcel Energy engineers review the calculations, regardless of whether internal or external

engineers completed Step 3.
Step 5: We select a random sample of committed projects and send this list to an outside engineering firm (if Xcel Energy engineer performed Step 3) to review the calculations.
Step 6: If the outside engineering firm disagrees with our engineer's analysis, they discuss the project and reach a consensus on the calculations.
Step 7: We send out a preapproval or rejection letter stating the preapproved demand and energy savings along with the rebate amount.

Monitoring

Step 8: If monitoring is needed, an Xcel Energy senior engineer drafts an M&V plan and sends a monitoring agreement for customer signature.
Step 9: If the customer does not have the appropriate meter structure, a third-party engineering firm installs metering equipment and collects the pre-data as set forth in the monitoring agreement.
Step 10: After the designated pre-monitoring period, the customer completes the project installation and contacts the account manager.
Step 11: The third-party engineering firm collects post-installation monitoring data and sends pre- and post-data to the Company.

Site Verification

Step 12: For managed accounts, the customer's account manager works with the customer to verify project installation and removal of old equipment, and obtain invoices or alternate cost documentation for submission to our DSM staff.

Approval and Rebate Payment

Step 13: For non-monitored projects, the invoices are reviewed and if the installed measure specifications match the proposed measure specifications, then the preapproved rebate is awarded. If project costs changed by >89% or less or greater than 111%, or the scope changed, the project is reevaluated (return to Step 3).
Step 14: For monitored projects, an engineer (or third-party engineering firm) determines actual savings based on monitoring results.
Step 15: For monitored projects, if an Xcel Energy engineer completes the analysis, 100% of projects are sent to third-party engineering firm for review.
Step 16: If the third-party engineering firm disagrees with our engineer's analysis, they discuss the project and reach consensus on the calculations.
Step 17: For monitored projects, if the incremental cost, customer kW savings, and generator kWh savings vary by <= 10% of the preapproved estimated savings, the preapproved rebate is paid and the monitored savings are claimed. A new analysis is conducted if the actual savings vary by >10%. The rebate paid is based on actual savings, and we claim the post-monitored results.
Step 18: Project savings are reported in the year that the rebate is awarded.

Applicable Custom Programs

Including custom and behavioral projects of programs with these components.

- Commercial Efficiency;
- Cooling Efficiency;

- Custom Efficiency;
- Data Center Efficiency;
- Efficiency Controls;
- Fluid System Optimization;
- Heating Efficiency;
- Lighting Efficiency;
- Motor Efficiency;
- Process Efficiency; and
- Turn Key Services.

Exceptions
Programs with special design elements are verified using processes unique to the program. The M&V process for these products is described below.

Business New Construction – We contract with a third-party consultant to develop the energy efficiency recommendations and M&V. Field verification is performed to ensure that the strategies are installed per the design intent. The rebate is not paid until savings are verified.

The following process shows the steps taken throughout the EDA process to ensure proper installation and energy savings:

Step 1: Application submittal.
Step 2: Meetings take place with the customer and design team.
Step 3: Consultant completes energy modeling to identify conservation packages.
Step 4: Construction documents are reviewed for measures identified through the energy model. The design team and customer are notified whether these measures were found within these documents.
Step 5: The customer completes construction.
Step 6: Consultant visits site and verifies that specified measures were installed. Selected equipment and systems are monitored for a two week timeframe, as appropriate, to evaluate performance variables against modeling assumptions.
Step 7: For projects with individual measures that have savings greater than or equal to 1.0 GWh or 20,000 Dth per year, the individual measures must be considered "selected equipment" as defined in Step 6 above.
Step 8: The actual results are compared to the estimated savings to determine the final rebate.
Step 9: Rebate is issued to customer based on final savings.

Recommissioning, Heating System Optimization and Study Driven Program (general process)
The customer hires an engineering firm to conduct a study of the building to determine energy savings for each measure. An Xcel Energy engineer then reviews and verifies 100% of the identified opportunities for savings calculation accuracy prior to approving and paying a rebate for the study.

When opportunities are implemented, an Xcel Energy engineer verifies that the implemented measures match what was approved and edits any changes implemented that do not exactly match the approved study. For Recommissioning, the customer needs to notify us when this happens. For

other programs, the quantity/equipment detail on the invoices may be used.

For study-driven projects that underwent a custom project evaluation to determine rebate eligibility but do not qualify for a rebate, those projects follow the custom verification and reporting processes.

Self-Direct Program
Qualifying customers submit M&V plans with their applications. M&V plans, which may include pre-installation monitoring, are reviewed and approved by an Xcel Energy engineer (or outside engineering firm).

Load Management
Electric Rate Savings
Customer participation and compliance is verified via the specialized meters deployed. This allows us to confirm the amount of load shed at each control event.

Saver's Switch
The Saver's Switch program (business and residential) contracts with a third-party to conduct annual load research on a sample of participant sites. This research measures the amount of load relief realized when a control is implemented.

In territories where the automated meter reading system is available, we are able to test switches remotely to identify sites with failed switches. We anticipate continuing this process annually going forward to ensure a healthy switch population.

➢ Product Development

Description
CIP Product Development identifies, assesses, and develops new energy efficiency and demand response products and services for eventual inclusion as new CIP programs, products, and measures. This work enables Xcel Energy to stay current and advance important new energy saving technologies for customers. The group also develops improvements to existing products.

The product development process begins with ideas for new energy conservation measures from customers, regulators, energy professionals, Xcel Energy staff, and others. Before a new product is approved, the group researches new ideas, evaluates them for savings potential, screens, and sometimes tests particular product ideas as we work through the development process.

During this triennial period, Product Development will continue to develop new products and expand existing products to help meet Xcel Energy's conservation goals. Products or programs are selected for development based on several criteria including, but not limited to, energy efficiency potential, level of effort to development, longevity of the offering (i.e. how long until a product becomes the industry standard), market barriers, and risk (technological, market) among others.

Program Changes
None.

Budget and Goal Considerations
Product Development is an indirect-impact program and, therefore, (generally) does not set any participation or energy savings goals. Product Development, on occasion, develops pilots with savings goals, for example rate programs that result in behavioral changes that save energy, performance based procurement, and interactive HVAC/lighting/envelope systems based program design. We seek approval to claim direct-impact savings in those cases. The program budgets were developed by reviewing historical program expenditures and estimating the time involved in completing future efforts.

The main budget drivers include the following:

- R&D – This category funds internal Product Development staff.
- Administration – Product Development contracts with external consultants to assist in project planning and implementation.
- Participant Incentives – The budget includes funds to provide subsidies for pilot programs.

Involvement of Community Energy Organizations
Product Development involves external parties (government entities, manufacturers, vendors and installers) in our product development process through one-on-one conversations about product ideas. We also seek the input of manufacturers, vendors and installers as we build the technical assumptions for each product in order to test for cost-effectiveness.

➢ ENERGY STAR® Retail Products Platform Pilot

Description
A continuation of the product development efforts which began in early 2016, this pilot engages retailers through midstream incentive payments to increase the demand and supply for the most energy efficient residential plug-load and appliance products on the market, driving greater sales of select ENERGY STAR® certified products to customers. With a combination of incentives and engagement, retailers assort, stock, and promote more energy efficient models than they would have absent the pilot. Eligible products are expected to include freezers, clothes dryers, room air cleaners, room air conditioners, and sound bars. The shift in product availability generates energy savings as utility customers purchase and installs these more efficient models in their homes.

The Company engages national retailers through the ENERGY STAR Retail Products Platform (ESRPP), an initiative facilitated by the U.S. Environmental Protection Agency (EPA). The ESRPP is based on the concept of developing a national-level structure for the design of pilot delivery and engagement with retailers. The ESRPP gives sponsors new access to a low-cost retail program through national coordination. The goal of the ESRPP is to transform markets by streamlining and harmonizing energy efficiency programs with retailers, making them less complex and more cost-effective.

Program Changes
None.

Budget and Goal Considerations
The forecasted expenditures for 2017-2019 are based on projected participation levels, promotion, and administration expenses for the 2016 program year. The majority of the product costs are for administration, promotions, and retailer incentives. As the Company learns more about how the pilot performs in 2016, administrative costs should decrease.

The energy savings and participation targets for this product were derived from historical data, market data, and equipment deemed savings values.

Involvement of Community Energy Organizations
None.

➢ Energy Information Systems Pilot

Description
The Energy Information Systems (EIS) pilot offers custom electric and gas rebates and consulting services to customers that implement behavior change and low cost/no cost operational improvements. The pilot is primarily marketed to large commercial and industrial customers and is currently limited to 10 participants who were recruited in 2016.

The pilot's main offerings include the following:

- Consulting services to help a customer select an EIS solution;
- Consulting services to support the customer through process of installation, integration, and commission of the EIS;
- A 30% incentive towards the purchase and installation of the EIS;
- Consulting services to develop a baseline energy model and M&V plan for the facility;
- Measurement and verification of energy savings due to behavior change and low-cost/no cost operational improvements;
- Ongoing consulting services for a period of up to 36 months of participation; and
- Custom rebates for energy savings due to behavior change and low-cost/no cost operational improvements.

EIS will use a three-phase approach to implement the process and capture deeper energy savings:

PHASE 1: Setup
Before the customer selects an EIS solution provider, the Company will work with the customer to identify the metering and communications needs, existing sources of data, and opportunities to improve data collection through new metering or data logging equipment for the site. At this time, the Company and the customer will establish a common understanding of goals for the metering solution as well as the definition for how efficiency for each building and system is characterized. The Company will help the customer select an EIS tool provider that meets their specific needs and pre-qualify EIS providers to ensure solutions will enable accurate and reliable M&V for the program. Once the system installation is verified and approved, the Company will pay an installation incentive to help cover the up-front cost of the EIS.

PHASE 2: Treatment
Once the EIS is operational it will take a period of time to sufficiently capture the data required to inform the identification of energy efficiency opportunities. These opportunities are expected to arise in a variety of behavioral, operational, and capital forms.

- Behavioral – with visibility and tighter management of energy performance metrics, occupants and end users are expected to be more engaged in reducing energy consumption.
- Operational – low cost /no cost measures associated with tune-up of equipment or scheduling of equipment operating times.
- Capital – expansion of controls systems or new/improved end-use equipment and systems.

Frequent communication with the customer and thorough documentation throughout this phase will be required to ensure that new measures are discovered and implemented.

PHASE 3: Verification

On an annual basis, an analysis will be compiled that delineates savings achievements from each primary measure identified in Phase 2. Capital measures will be analyzed and incented though the Company's prescriptive and custom programs. Behavioral and low cost/no cost operational measures will be analyzed using a "top-down" method through the multi-variable regression modeling capabilities embedded in the EIS tool.

To ensure persistence of savings, the Company will follow appropriate monitoring guidelines and participants will be held to those requirements in return for eligibility toward incentives related to energy-efficiency activities pursued.

Along with identification of behavioral and low cost/no cost energy savings opportunities, the Company anticipates that EIS pilot will identify additional capital improvement opportunities that will be captured in other DSM products as well.

The customer's formal acknowledgement of planned participation in the pilot begins with the customer signing a Memorandum of Understanding (MOU) prior to beginning Phase 1. The Company views the signing of the MOU to formally establish a date of influence for all projects completed under the umbrella of the product.

We hope to address the following questions with this pilot:

- How much will participants' electricity and natural gas use be reduced when an EIS is integrated into participants' strategic energy management (SEM) practices?
- Can an EIS enable efficiencies in the identification and verification of energy savings measures, and therefore reduce the total cost of program delivery to achieve these savings or achieve savings that otherwise would not occur?
- What types of measures do EIS typically assist in identifying, and does the additional information help drive increased measure implementation?
- Can EIS data enable the Company to identify, isolate and measure behavior-based energy savings measures?
- Are the measurement and verification methods to measure participants' savings robust and precise?

Program Changes

None.

Budget and Goal Considerations

The pilot's participation and energy savings goals and budget were determined from industry research which indicates that up to 20% energy savings is possible through the implementation of an EIS. In the projections for this pilot, the Company assumes 10% energy savings to be achieved over the course of five years of engagement relating to behavioral and low cost/no cost operational measure savings. The remaining 10% of expected savings are anticipated to come through capital measures and will be realized through the Company's prescriptive and custom programs.

The main budget drivers are from rebates and the consulting services provided directly to customers.

Involvement of Community Energy Organizations
None.

➢ Assessments

Description
The Assessments Segment accounts for monetary assessments from the Minnesota Department of Commerce, Division of Energy Security. Minn. Stat. § 216B.241, subd(s). 1d, e and f assess each utility a fee for technical assistance, applied research and development grants, and facilities energy efficiency.

Program Changes
None.

Budget and Goal Considerations and Participation Development
Segment budgets for this triennial period were developed based on the direct and indirect assessment invoices received in 2015 and assumes the assessments continue as they have historically.

The main budget drivers include the following:

- Other – All regulatory assessments are budgeted to this category.

Involvement of Community Energy Organizations
Not applicable.

➢ Electric Utility Infrastructure

Description
The Minnesota Next Generation Energy Act of 2007 ("Act") created the opportunity for an electric utility to claim savings from projects that improve the efficiency of the utility's infrastructure or system towards its electric savings goal, provided that the utility files a plan to achieve savings of at least one percent of retail sales through direct energy conservation programs. The Act also authorized a new rate schedule for recovery of electric utility infrastructure project costs, but does not require that a utility create a specific rate schedule in order to claim the related energy savings.

Electric utility infrastructure ("EUI") projects are defined in Minn. Stat. § 216B.1636 as electric utility-owned projects that:

1) Replace or modify existing electric utility infrastructure, including utility-owned buildings, if the replacement or modification is shown to conserve energy or use energy more efficiently, consistent with section 216B.241, subd. 1c; or
2) Conserve energy or use energy more efficiently by using waste heat recovery converted into electricity as defined in section 216B.241, subd. 1, paragraph (n).

Minn. Stat. § 216B.241, subd. 1c, also clarifies that EUI projects "must result in increased energy efficiency greater than that which would have occurred through normal maintenance activity." Sample projects include distribution system improvements that reduce line losses and heat rate improvements that increase the efficiency of energy production, such as process optimization and equipment design modifications.

In addition to contributing towards our CIP goals, EUI projects typically have the following benefits:

- Direct energy consumption savings;
- Reduced maintenance costs;
- Extended equipment life; and
- Better power plant performance.

The energy savings translate to less natural gas or coal that is needed to produce electricity, which reduces greenhouse gas emissions and fuel costs, thereby lowering the environmental impact and overall cost of generation.

Because we are expecting to meet the 1.5% goal through customer programs, EUI projects will likely play a minor role in this Triennial Plan. However, savings from EUI projects may become increasingly important over time as the savings potential from traditional programs declines.

Given the uncertainties in project funding, regulatory approvals and timing expected for EUI in this Plan period , we are not proposing specific savings goals or budgets for this Segment. Should we complete any EUI projects during the Plan, we will report the results in our annual status report, following established CIP guidelines, as applicable. For example,

for large custom-type projects, we propose to submit the relevant analysis and supporting documentation to the DER prior to submitting the Status Report. For each project, we provide a cost-benefit analysis showing that the project is in the public interest.

Program Changes
None.

Budget and Goal Considerations
As discussed above, we are not proposing any budgets or savings goals for this segment.

Involvement of Community Energy Organizations
Because this is an internal program, we do not anticipate the involvement of community energy organizations for smaller facility upgrades. If a project is planned that requires regulatory approval, external stakeholders would have the opportunity to review and comment.

ELECTRIC CIP TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$41,400,665	$41,400,665	$41,400,665	$41,400,665
T & D	N/A	$24,996,198	$24,996,198	$24,996,198	$24,996,198
Marginal Energy	N/A	$121,132,374	$121,132,374	$121,132,374	$121,132,374
Environmental Externality	N/A	N/A	N/A	N/A	$34,671,194
Subtotal	N/A	$187,529,238	$187,529,238	$187,529,238	$222,200,431
Participant Benefits					
Bill Reduction - Electric	$311,756,739	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$34,992,450	N/A	N/A	$34,992,450	$34,992,450
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$45,762,136	N/A	N/A	$22,074,768	$22,074,768
Subtotal	$392,511,325	N/A	N/A	$57,067,218	$57,067,218
Total Benefits	$392,511,325	$187,529,238	$187,529,238	$244,596,456	$279,267,649
Costs					
Utility Project Costs					
Customer Services	N/A	$4,244,923	$4,244,923	$4,244,923	$4,244,923
Project Administration	N/A	$27,448,308	$27,448,308	$27,448,308	$27,448,308
Advertising & Promotion	N/A	$6,626,292	$6,626,292	$6,626,292	$6,626,292
Measurement & Verification	N/A	$1,751,616	$1,751,616	$1,751,616	$1,751,616
Rebates	N/A	$34,992,450	$34,992,450	$34,992,450	$34,992,450
Other	N/A	$2,044,986	$2,044,986	$2,044,986	$2,044,986
Subtotal	N/A	$77,108,575	$77,108,575	$77,108,575	$77,108,575
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$311,756,739	N/A	N/A
Subtotal	N/A	N/A	$311,756,739	N/A	N/A
Participant Costs					
Incremental Capital Costs	$105,887,482	N/A	N/A	$84,610,608	$84,610,608
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$105,887,482	N/A	N/A	$84,610,608	$84,610,608
Total Costs	$105,887,482	$77,108,575	$388,865,315	$161,719,183	$161,719,183
Net Benefit (Cost)	$286,623,843	$110,420,662	($201,336,077)	$82,877,272	$117,548,466
Benefit/Cost Ratio	3.71	2.43	0.48	1.51	1.73

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	12.9 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	33.38%
Gross Load Factor at Customer	E	18.69%
Transmission Loss Factor (Energy)	F	7.277%
Transmission Loss Factor (Demand)	G	7.819%
Societal Net Benefit (Cost)	H	$538

Program Summary per Participant		
Gross kW Saved at Customer	I	0.17 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	272 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	293 kWh

Program Summary All Participants		
Total Participants	J	1,314,582
Total Budget	K	**$77,108,574**
Gross kW Saved at Customer	(J x I)	218,330 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**79,064 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	357,461,540 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**385,513,457 kWh**
Societal Net Benefits	(J x I x H)	**$117,548,466**

Utility Program Cost per kWh Lifetime	**$0.0155**
Utility Program Cost per kW at Gen	**$975**

ELECTRIC CIP TOTAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$46,344,003	$46,344,003	$46,344,003	$46,344,003
T & D	N/A	$28,189,922	$28,189,922	$28,189,922	$28,189,922
Marginal Energy	N/A	$117,613,730	$117,613,730	$117,613,730	$117,613,730
Environmental Externality	N/A	N/A	N/A	N/A	$36,631,027
Subtotal	N/A	$192,147,655	$192,147,655	$192,147,655	$228,778,682
Participant Benefits					
Bill Reduction - Electric	$309,891,028	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$34,703,356	N/A	N/A	$34,703,356	$34,703,356
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$43,616,699	N/A	N/A	$20,660,831	$20,660,831
Subtotal	$388,211,083	N/A	N/A	$55,364,187	$55,364,187
Total Benefits	$388,211,083	$192,147,655	$192,147,655	$247,511,841	$284,142,868
Costs					
Utility Project Costs					
Customer Services	N/A	$3,207,223	$3,207,223	$3,207,223	$3,207,223
Project Administration	N/A	$27,200,374	$27,200,374	$27,200,374	$27,200,374
Advertising & Promotion	N/A	$6,648,578	$6,648,578	$6,648,578	$6,648,578
Measurement & Verification	N/A	$1,618,944	$1,618,944	$1,618,944	$1,618,944
Rebates	N/A	$34,703,356	$34,703,356	$34,703,356	$34,703,356
Other	N/A	$1,730,272	$1,730,272	$1,730,272	$1,730,272
Subtotal	N/A	$75,108,747	$75,108,747	$75,108,747	$75,108,747
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$309,891,028	N/A	N/A
Subtotal	N/A	N/A	$309,891,028	N/A	N/A
Participant Costs					
Incremental Capital Costs	$103,281,823	N/A	N/A	$84,000,969	$84,000,969
	$0	N/A	N/A	$0	$0
Subtotal	$103,281,823	N/A	N/A	$84,000,969	$84,000,969
Total Costs	$103,281,823	$75,108,747	$384,999,775	$159,109,715	$159,109,715
Net Benefit (Cost)	$284,929,259	$117,038,908	($192,852,120)	$88,402,126	$125,033,153
Benefit/Cost Ratio	3.76	2.56	0.50	1.56	1.79

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	12.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	32.80%
Gross Load Factor at Customer	E	18.35%
Transmission Loss Factor (Energy)	F	7.309%
Transmission Loss Factor (Demand)	G	7.848%
Societal Net Benefit (Cost)	H	$562

Program Summary per Participant		
Gross kW Saved at Customer	I	0.16 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	264 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	285 kWh

Program Summary All Participants		
Total Participants	J	1,352,442
Total Budget	K	**$75,108,746**
Gross kW Saved at Customer	(J x I)	222,291 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**79,121 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	357,274,889 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**385,446,832 kWh**
Societal Net Benefits	(J x I x H)	**$125,033,153**

Utility Program Cost per kWh Lifetime	**$0.0157**
Utility Program Cost per kW at Gen	**$949**

ELECTRIC CIP TOTAL — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$47,918,354	$47,918,354	$47,918,354	$47,918,354
T & D	N/A	$29,183,732	$29,183,732	$29,183,732	$29,183,732
Marginal Energy	N/A	$117,625,551	$117,625,551	$117,625,551	$117,625,551
Environmental Externality	N/A	N/A	N/A	N/A	$40,496,296
Subtotal	N/A	$194,727,637	$194,727,637	$194,727,637	$235,223,932
Participant Benefits					
Bill Reduction - Electric	$314,340,239	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$35,359,177	N/A	N/A	$35,359,177	$35,359,177
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$42,087,413	N/A	N/A	$19,437,683	$19,437,683
Subtotal	$391,786,829	N/A	N/A	$54,796,860	$54,796,860
Total Benefits	$391,786,829	$194,727,637	$194,727,637	$249,524,497	$290,020,793
Costs					
Utility Project Costs					
Customer Services	N/A	$3,516,623	$3,516,623	$3,516,623	$3,516,623
Project Administration	N/A	$28,115,596	$28,115,596	$28,115,596	$28,115,596
Advertising & Promotion	N/A	$6,765,065	$6,765,065	$6,765,065	$6,765,065
Measurement & Verification	N/A	$1,368,104	$1,368,104	$1,368,104	$1,368,104
Rebates	N/A	$35,359,177	$35,359,177	$35,359,177	$35,359,177
Other	N/A	$1,720,527	$1,720,527	$1,720,527	$1,720,527
Subtotal	N/A	$76,845,092	$76,845,092	$76,845,092	$76,845,092
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$314,340,239	N/A	N/A
Subtotal	N/A	N/A	$314,340,239	N/A	N/A
Participant Costs					
Incremental Capital Costs	$104,440,994	N/A	N/A	$84,215,464	$84,215,464
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$104,440,994	N/A	N/A	$84,215,464	$84,215,464
Total Costs	$104,440,994	$76,845,092	$391,185,331	$161,060,556	$161,060,556
Net Benefit (Cost)	$287,345,835	$117,882,545	($196,457,694)	$88,463,941	$128,960,237
Benefit/Cost Ratio	3.75	2.53	0.50	1.55	1.80

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	12.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	33.45%
Gross Load Factor at Customer	E	18.47%
Transmission Loss Factor (Energy)	F	7.286%
Transmission Loss Factor (Demand)	G	7.830%
Societal Net Benefit (Cost)	H	$585

Program Summary per Participant		
Gross kW Saved at Customer	I	0.16 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	261 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	282 kWh

Program Summary All Participants		
Total Participants	J	1,364,616
Total Budget	K	**$76,845,091**
Gross kW Saved at Customer	(J x I)	220,485 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**80,025 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	356,731,306 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**384,766,260 kWh**
Societal Net Benefits	(J x I x H)	**$128,960,237**

Utility Program Cost per kWh Lifetime	**$0.0162**
Utility Program Cost per kW at Gen	**$960**

Conservation Improvement Program (CIP) BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Total Gas CIP With Indirect Participants**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$9,523,524	$9,665,341	$9,977,715
Incentive Costs =	$6,561,467	$6,674,163	$6,736,006
16) Total Utility Project Costs =	$16,084,990	$16,339,504	$16,713,721
17) Direct Participant Costs ($/Part.) =	$44	$44	$44
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$2	$2	$2
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	10.9	10.8	10.9
21) Avg. Dth/Part. Saved =	1.15	1.15	1.15
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	625,347	626,294	627,344
24) Total Annual Dth Saved =	719,360	721,929	720,223
25) Incentive/Participant =	$10.49	$10.66	$10.74

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$26	$26	$27
Cost per Participant per Dth =	$60.59	$60.98	$61.41
Lifetime Energy Reduction (Dth)	23,421,476		
Societal Cost per Dth	$4.09		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($77,199,254)	0.58
Utility Cost Test	$57,737,674	2.18
Societal Test	$101,506,628	2.06
Participant Test	$162,683,129	2.26

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Total Gas CIP Direct Participants Only**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$6,768,711	$6,845,960	$7,095,985
Incentive Costs =	$6,523,574	$6,609,182	$6,657,614
16) Total Utility Project Costs =	$13,292,285	$13,455,143	$13,753,599
17) Direct Participant Costs ($/Part.) =	$124	$124	$123
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$6	$6	$6
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	10.9	10.8	10.9
21) Avg. Dth/Part. Saved =	3.26	3.25	3.23
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	220,049	220,701	221,571
24) Total Annual Dth Saved =	716,973	717,415	715,131
25) Incentive/Participant =	$29.65	$29.95	$30.05

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$60	$61	$62
Cost per Participant per Dth =	$56.67	$56.99	$57.29
Lifetime Energy Reduction (Dth)	23,333,616		
Societal Cost per Dth	$3.70		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($68,445,120)	0.61
Utility Cost Test	$65,929,452	2.63
Societal Test	$108,864,007	2.26
Participant Test	$158,309,596	2.44

ELECTRIC CIP CONSERVATION TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$28,665,417	$28,665,417	$28,665,417	$28,665,417
T & D	N/A	$17,307,023	$17,307,023	$17,307,023	$17,307,023
Marginal Energy	N/A	$120,133,100	$120,133,100	$120,133,100	$120,133,100
Environmental Externality	N/A	N/A	N/A	N/A	$34,406,484
Subtotal	N/A	$166,105,541	$166,105,541	$166,105,541	$200,512,025
Participant Benefits					
Bill Reduction - Electric	$309,086,768	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$34,467,789	N/A	N/A	$34,467,789	$34,467,789
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$43,244,087	N/A	N/A	$22,077,410	$22,077,410
Subtotal	$386,798,644	N/A	N/A	$56,545,199	$56,545,199
Total Benefits	$386,798,644	$166,105,541	$166,105,541	$222,650,740	$257,057,223
Costs					
Utility Project Costs					
Customer Services	N/A	$4,244,923	$4,244,923	$4,244,923	$4,244,923
Project Administration	N/A	$13,729,241	$13,729,241	$13,729,241	$13,729,241
Advertising & Promotion	N/A	$3,310,567	$3,310,567	$3,310,567	$3,310,567
Measurement & Verification	N/A	$1,395,152	$1,395,152	$1,395,152	$1,395,152
Rebates	N/A	$34,467,789	$34,467,789	$34,467,789	$34,467,789
Other	N/A	$1,420,252	$1,420,252	$1,420,252	$1,420,252
Subtotal	N/A	$58,567,924	$58,567,924	$58,567,924	$58,567,924
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$309,086,768	N/A	N/A
Subtotal	N/A	N/A	$309,086,768	N/A	N/A
Participant Costs					
Incremental Capital Costs	$103,562,871	N/A	N/A	$82,300,738	$82,300,738
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$103,562,871	N/A	N/A	$82,300,738	$82,300,738
Total Costs	$103,562,871	$58,567,924	$367,654,692	$140,868,662	$140,868,662
Net Benefit (Cost)	$283,235,773	$107,537,617	($201,549,151)	$81,782,077	$116,188,561
Benefit/Cost Ratio	3.73	2.84	0.45	1.58	1.82

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	13.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	36.27%
Gross Load Factor at Customer	E	28.97%
Transmission Loss Factor (Energy)	F	7.274%
Transmission Loss Factor (Demand)	G	8.233%
Societal Net Benefit (Cost)	H	$834

Program Summary per Participant		
Gross kW Saved at Customer	I	0.29 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.12 kW
Gross Annual kWh Saved at Customer	(B x E x I)	747 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	806 kWh

Program Summary All Participants		
Total Participants	J	473,097
Total Budget	K	**$58,567,923**
Gross kW Saved at Customer	(J x I)	139,322 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**55,073 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	353,572,127 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**381,310,136 kWh**
Societal Net Benefits	(J x I x H)	**$116,188,561**

Utility Program Cost per kWh Lifetime	**$0.0118**
Utility Program Cost per kW at Gen	**$1,063**

ELECTRIC CIP CONSERVATION TOTAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$31,749,290	$31,749,290	$31,749,290	$31,749,290
T & D	N/A	$19,316,599	$19,316,599	$19,316,599	$19,316,599
Marginal Energy	N/A	$116,232,253	$116,232,253	$116,232,253	$116,232,253
Environmental Externality	N/A	N/A	N/A	N/A	$36,218,926
Subtotal	N/A	$167,298,142	$167,298,142	$167,298,142	$203,517,067
Participant Benefits					
Bill Reduction - Electric	$306,026,529	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$33,948,558	N/A	N/A	$33,948,558	$33,948,558
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$40,645,620	N/A	N/A	$20,674,534	$20,674,534
Subtotal	$380,620,708	N/A	N/A	$54,623,092	$54,623,092
Total Benefits	$380,620,708	$167,298,142	$167,298,142	$221,921,234	$258,140,160
Costs					
Utility Project Costs					
Customer Services	N/A	$3,207,223	$3,207,223	$3,207,223	$3,207,223
Project Administration	N/A	$14,071,752	$14,071,752	$14,071,752	$14,071,752
Advertising & Promotion	N/A	$3,334,414	$3,334,414	$3,334,414	$3,334,414
Measurement & Verification	N/A	$1,156,530	$1,156,530	$1,156,530	$1,156,530
Rebates	N/A	$33,948,558	$33,948,558	$33,948,558	$33,948,558
Other	N/A	$1,072,462	$1,072,462	$1,072,462	$1,072,462
Subtotal	N/A	$56,790,938	$56,790,938	$56,790,938	$56,790,938
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$306,026,529	N/A	N/A
Subtotal	N/A	N/A	$306,026,529	N/A	N/A
Participant Costs					
Incremental Capital Costs	$99,885,929	N/A	N/A	$80,622,402	$80,622,402
	$0	N/A	N/A	$0	$0
Subtotal	$99,885,929	N/A	N/A	$80,622,402	$80,622,402
Total Costs	$99,885,929	$56,790,938	$362,817,468	$137,413,341	$137,413,341
Net Benefit (Cost)	$280,734,779	$110,507,203	($195,519,326)	$84,507,893	$120,726,819
Benefit/Cost Ratio	3.81	2.95	0.46	1.61	1.88

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	12.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	35.50%
Gross Load Factor at Customer	E	28.40%
Transmission Loss Factor (Energy)	F	7.305%
Transmission Loss Factor (Demand)	G	8.260%
Societal Net Benefit (Cost)	H	$853

Program Summary per Participant		
Gross kW Saved at Customer	I	0.29 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.11 kW
Gross Annual kWh Saved at Customer	(B x E x I)	731 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	789 kWh

Program Summary All Participants		
Total Participants	J	481,397
Total Budget	K	**$56,790,937**
Gross kW Saved at Customer	(J x I)	141,470 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**54,737 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	351,999,057 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**379,739,588 kWh**
Societal Net Benefits	(J x I x H)	**$120,726,819**

Utility Program Cost per kWh Lifetime	**$0.0120**
Utility Program Cost per kW at Gen	**$1,038**

ELECTRIC CIP CONSERVATION TOTAL — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$32,884,358	$32,884,358	$32,884,358	$32,884,358
T & D	N/A	$20,032,519	$20,032,519	$20,032,519	$20,032,519
Marginal Energy	N/A	$115,979,357	$115,979,357	$115,979,357	$115,979,357
Environmental Externality	N/A	N/A	N/A	N/A	$39,942,445
Subtotal	N/A	$168,896,234	$168,896,234	$168,896,234	$208,838,679
Participant Benefits					
Bill Reduction - Electric	$309,614,700	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$34,460,954	N/A	N/A	$34,460,954	$34,460,954
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$38,663,305	N/A	N/A	$19,462,622	$19,462,622
Subtotal	$382,738,959	N/A	N/A	$53,923,576	$53,923,576
Total Benefits	$382,738,959	$168,896,234	$168,896,234	$222,819,809	$262,762,254
Costs					
Utility Project Costs					
Customer Services	N/A	$3,516,623	$3,516,623	$3,516,623	$3,516,623
Project Administration	N/A	$14,508,810	$14,508,810	$14,508,810	$14,508,810
Advertising & Promotion	N/A	$3,455,812	$3,455,812	$3,455,812	$3,455,812
Measurement & Verification	N/A	$1,062,690	$1,062,690	$1,062,690	$1,062,690
Rebates	N/A	$34,460,954	$34,460,954	$34,460,954	$34,460,954
Other	N/A	$1,055,968	$1,055,968	$1,055,968	$1,055,968
Subtotal	N/A	$58,060,856	$58,060,856	$58,060,856	$58,060,856
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$309,614,700	N/A	N/A
Subtotal	N/A	N/A	$309,614,700	N/A	N/A
Participant Costs					
Incremental Capital Costs	$100,399,988	N/A	N/A	$80,194,463	$80,194,463
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$100,399,988	N/A	N/A	$80,194,463	$80,194,463
Total Costs	$100,399,988	$58,060,856	$367,675,556	$138,255,318	$138,255,318
Net Benefit (Cost)	$282,338,971	$110,835,378	($198,779,322)	$84,564,491	$124,506,936
Benefit/Cost Ratio	3.81	2.91	0.46	1.61	1.90

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	12.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	36.69%
Gross Load Factor at Customer	E	28.87%
Transmission Loss Factor (Energy)	F	7.281%
Transmission Loss Factor (Demand)	G	8.232%
Societal Net Benefit (Cost)	H	$899

Program Summary per Participant		
Gross kW Saved at Customer	I	0.29 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.12 kW
Gross Annual kWh Saved at Customer	(B x E x I)	741 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	799 kWh

Program Summary All Participants		
Total Participants	J	472,830
Total Budget	K	**$58,060,855**
Gross kW Saved at Customer	(J x I)	138,549 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**55,389 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	350,440,467 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**377,960,567 kWh**
Societal Net Benefits	(J x I x H)	**$124,506,936**

Utility Program Cost per kWh Lifetime	**$0.0124**
Utility Program Cost per kW at Gen	**$1,048**

ELECTRIC CIP LOAD MANAGEMENT TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$12,379,477	$12,379,477	$12,379,477	$12,379,477
T & D	N/A	$7,474,379	$7,474,379	$7,474,379	$7,474,379
Marginal Energy	N/A	$70,597	$70,597	$70,597	$70,597
Environmental Externality	N/A	N/A	N/A	N/A	$11,968
Subtotal	N/A	$19,924,452	$19,924,452	$19,924,452	$19,936,419
Participant Benefits					
Bill Reduction - Electric	$156,590	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$156,590	N/A	N/A	$0	$0
Total Benefits	$156,590	$19,924,452	$19,924,452	$19,924,452	$19,936,419
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$7,242,118	$7,242,118	$7,242,118	$7,242,118
Advertising & Promotion	N/A	$690,508	$690,508	$690,508	$690,508
Measurement & Verification	N/A	$350,000	$350,000	$350,000	$350,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$8,282,626	$8,282,626	$8,282,626	$8,282,626
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$156,590	N/A	N/A
Subtotal	N/A	N/A	$156,590	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$8,282,626	$8,439,216	$8,282,626	$8,282,626
Net Benefit (Cost)	$156,590	$11,641,826	$11,485,236	$11,641,826	$11,653,793
Benefit/Cost Ratio	INF	2.41	2.36	2.41	2.41

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	7.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.58%
Gross Load Factor at Customer	E	0.03%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$155

Program Summary per Participant		
Gross kW Saved at Customer	I	3.58 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	1.10 kW
Gross Annual kWh Saved at Customer	(B x E x I)	10 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	10 kWh

Program Summary All Participants		
Total Participants	J	21,003
Total Budget	K	**$8,282,626**
Gross kW Saved at Customer	(J x I)	75,225 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**23,117 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	203,809 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**218,210 kWh**
Societal Net Benefits	(J x I x H)	**$11,653,793**

Utility Program Cost per kWh Lifetime	**$5.2708**
Utility Program Cost per kW at Gen	**$358**

ELECTRIC CIP LOAD MANAGEMENT TOTAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$14,031,285	$14,031,285	$14,031,285	$14,031,285
T & D	N/A	$8,531,592	$8,531,592	$8,531,592	$8,531,592
Marginal Energy	N/A	$71,142	$71,142	$71,142	$71,142
Environmental Externality	N/A	N/A	N/A	N/A	$13,983
Subtotal	N/A	$22,634,018	$22,634,018	$22,634,018	$22,648,001
Participant Benefits					
Bill Reduction - Electric	$161,671	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$161,671	N/A	N/A	$0	$0
Total Benefits	$161,671	$22,634,018	$22,634,018	$22,634,018	$22,648,001
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$7,438,674	$7,438,674	$7,438,674	$7,438,674
Advertising & Promotion	N/A	$690,508	$690,508	$690,508	$690,508
Measurement & Verification	N/A	$300,000	$300,000	$300,000	$300,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$8,429,182	$8,429,182	$8,429,182	$8,429,182
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$161,671	N/A	N/A
Subtotal	N/A	N/A	$161,671	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$8,429,182	$8,590,853	$8,429,182	$8,429,182
Net Benefit (Cost)	$161,671	$14,204,836	$14,043,165	$14,204,836	$14,218,819
Benefit/Cost Ratio	INF	2.69	2.63	2.69	2.69

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	7.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.58%
Gross Load Factor at Customer	E	0.03%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$189

Program Summary per Participant		
Gross kW Saved at Customer	I	3.58 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	1.10 kW
Gross Annual kWh Saved at Customer	(B x E x I)	10 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	10 kWh

Program Summary All Participants		
Total Participants	J	21,003
Total Budget	K	**$8,429,182**
Gross kW Saved at Customer	(J x I)	75,225 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**23,117 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	203,809 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**218,210 kWh**
Societal Net Benefits	(J x I x H)	**$14,218,819**
Utility Program Cost per kWh Lifetime		**$5.3641**
Utility Program Cost per kW at Gen		**$365**

ELECTRIC CIP LOAD MANAGEMENT TOTAL — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$14,345,194	$14,345,194	$14,345,194	$14,345,194
T & D	N/A	$8,732,938	$8,732,938	$8,732,938	$8,732,938
Marginal Energy	N/A	$71,900	$71,900	$71,900	$71,900
Environmental Externality	N/A	N/A	N/A	N/A	$16,181
Subtotal	N/A	$23,150,031	$23,150,031	$23,150,031	$23,166,213
Participant Benefits					
Bill Reduction - Electric	$166,821	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$166,821	N/A	N/A	$0	$0
Total Benefits	$166,821	$23,150,031	$23,150,031	$23,150,031	$23,166,213
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$7,639,410	$7,639,410	$7,639,410	$7,639,410
Advertising & Promotion	N/A	$690,508	$690,508	$690,508	$690,508
Measurement & Verification	N/A	$300,000	$300,000	$300,000	$300,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$8,629,918	$8,629,918	$8,629,918	$8,629,918
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$166,821	N/A	N/A
Subtotal	N/A	N/A	$166,821	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$8,629,918	$8,796,739	$8,629,918	$8,629,918
Net Benefit (Cost)	$166,821	$14,520,113	$14,353,292	$14,520,113	$14,536,295
Benefit/Cost Ratio	INF	2.68	2.63	2.68	2.68

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	7.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.58%
Gross Load Factor at Customer	E	0.03%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$193

Program Summary per Participant		
Gross kW Saved at Customer	I	3.58 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	1.10 kW
Gross Annual kWh Saved at Customer	(B x E x I)	10 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	10 kWh

Program Summary All Participants		
Total Participants	J	21,003
Total Budget	K	**$8,629,918**
Gross kW Saved at Customer	(J x I)	75,225 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**23,117 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	203,809 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**218,210 kWh**
Societal Net Benefits	(J x I x H)	**$14,536,295**
Utility Program Cost per kWh Lifetime		**$5.4918**
Utility Program Cost per kW at Gen		**$373**

BUSINESS SEGMENT TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$23,242,087	$23,242,087	$23,242,087	$23,242,087
T & D	N/A	$14,033,063	$14,033,063	$14,033,063	$14,033,063
Marginal Energy	N/A	$92,673,737	$92,673,737	$92,673,737	$92,673,737
Environmental Externality	N/A	N/A	N/A	N/A	$27,363,721
Subtotal	N/A	$129,948,888	$129,948,888	$129,948,888	$157,312,609
Participant Benefits					
Bill Reduction - Electric	$217,805,168	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$22,977,742	N/A	N/A	$22,977,742	$22,977,742
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$41,197,167	N/A	N/A	$23,000,220	$23,000,220
Subtotal	$281,980,077	N/A	N/A	$45,977,962	$45,977,962
Total Benefits	$281,980,077	$129,948,888	$129,948,888	$175,926,849	$203,290,571
Costs					
Utility Project Costs					
Customer Services	N/A	$3,367,400	$3,367,400	$3,367,400	$3,367,400
Project Administration	N/A	$10,499,878	$10,499,878	$10,499,878	$10,499,878
Advertising & Promotion	N/A	$933,692	$933,692	$933,692	$933,692
Measurement & Verification	N/A	$1,213,603	$1,213,603	$1,213,603	$1,213,603
Rebates	N/A	$22,977,742	$22,977,742	$22,977,742	$22,977,742
Other	N/A	$1,417,752	$1,417,752	$1,417,752	$1,417,752
Subtotal	N/A	$40,410,067	$40,410,067	$40,410,067	$40,410,067
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$217,805,168	N/A	N/A
Subtotal	N/A	N/A	$217,805,168	N/A	N/A
Participant Costs					
Incremental Capital Costs	$80,781,734	N/A	N/A	$61,677,820	$61,677,820
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$80,781,734	N/A	N/A	$61,677,820	$61,677,820
Total Costs	$80,781,734	$40,410,067	$258,215,235	$102,087,887	$102,087,887
Net Benefit (Cost)	$201,198,343	$89,538,821	($128,266,347)	$73,838,963	$101,202,684
Benefit/Cost Ratio	3.49	3.22	0.50	1.72	1.99

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.87%
Gross Load Factor at Customer	E	35.16%
Transmission Loss Factor (Energy)	F	6.608%
Transmission Loss Factor (Demand)	G	7.028%
Societal Net Benefit (Cost)	H	$1,393

Program Summary per Participant		
Gross kW Saved at Customer	I	0.98 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.55 kW
Gross Annual kWh Saved at Customer	(B x E x I)	3,020 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	3,234 kWh

Program Summary All Participants		
Total Participants	J	74,107
Total Budget	K	**$40,410,066**
Gross kW Saved at Customer	(J x I)	72,664 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**40,540 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	223,796,043 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**239,629,655 kWh**
Societal Net Benefits	(J x I x H)	**$101,202,684**

Utility Program Cost per kWh Lifetime	**$0.0102**
Utility Program Cost per kW at Gen	**$997**

BUSINESS SEGMENT TOTAL	2018	ELECTRIC	GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$25,986,711	$25,986,711	$25,986,711	$25,986,711
T & D	N/A	$15,817,154	$15,817,154	$15,817,154	$15,817,154
Marginal Energy	N/A	$89,507,528	$89,507,528	$89,507,528	$89,507,528
Environmental Externality	N/A	N/A	N/A	N/A	$28,530,538
Subtotal	N/A	$131,311,393	$131,311,393	$131,311,393	$159,841,930
Participant Benefits					
Bill Reduction - Electric	$216,025,360	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$22,429,813	N/A	N/A	$22,429,813	$22,429,813
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$38,615,750	N/A	N/A	$21,600,273	$21,600,273
Subtotal	$277,070,924	N/A	N/A	$44,030,086	$44,030,086
Total Benefits	$277,070,924	$131,311,393	$131,311,393	$175,341,478	$203,872,016
Costs					
Utility Project Costs					
Customer Services	N/A	$2,328,100	$2,328,100	$2,328,100	$2,328,100
Project Administration	N/A	$11,496,807	$11,496,807	$11,496,807	$11,496,807
Advertising & Promotion	N/A	$946,535	$946,535	$946,535	$946,535
Measurement & Verification	N/A	$947,147	$947,147	$947,147	$947,147
Rebates	N/A	$22,429,813	$22,429,813	$22,429,813	$22,429,813
Other	N/A	$1,069,262	$1,069,262	$1,069,262	$1,069,262
Subtotal	N/A	$39,217,664	$39,217,664	$39,217,664	$39,217,664
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$216,025,360	N/A	N/A
Subtotal	N/A	N/A	$216,025,360	N/A	N/A
Participant Costs					
Incremental Capital Costs	$78,295,027	N/A	N/A	$61,174,984	$61,174,984
	$0	N/A	N/A	$0	$0
Subtotal	$78,295,027	N/A	N/A	$61,174,984	$61,174,984
Total Costs	$78,295,027	$39,217,664	$255,243,024	$100,392,648	$100,392,648
Net Benefit (Cost)	$198,775,897	$92,093,729	($123,931,631)	$74,948,831	$103,479,369
Benefit/Cost Ratio	3.54	3.35	0.51	1.75	2.03

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.38%
Gross Load Factor at Customer	E	34.55%
Transmission Loss Factor (Energy)	F	6.611%
Transmission Loss Factor (Demand)	G	7.042%
Societal Net Benefit (Cost)	H	$1,442

Program Summary per Participant		
Gross kW Saved at Customer	I	0.89 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.49 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,682 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,872 kWh

Program Summary All Participants		
Total Participants	J	80,990
Total Budget	K	**$39,217,663**
Gross kW Saved at Customer	(J x I)	71,766 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**39,664 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	217,207,424 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**232,583,617 kWh**
Societal Net Benefits	(J x I x H)	**$103,479,369**

Utility Program Cost per kWh Lifetime	**$0.0103**
Utility Program Cost per kW at Gen	**$989**

BUSINESS SEGMENT TOTAL	2019	ELECTRIC	GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$27,424,078	$27,424,078	$27,424,078	$27,424,078
T & D	N/A	$16,712,310	$16,712,310	$16,712,310	$16,712,310
Marginal Energy	N/A	$91,481,524	$91,481,524	$91,481,524	$91,481,524
Environmental Externality	N/A	N/A	N/A	N/A	$31,460,925
Subtotal	N/A	$135,617,912	$135,617,912	$135,617,912	$167,078,837
Participant Benefits					
Bill Reduction - Electric	$226,921,164	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$23,217,196	N/A	N/A	$23,217,196	$23,217,196
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$36,624,664	N/A	N/A	$20,391,426	$20,391,426
Subtotal	$286,763,023	N/A	N/A	$43,608,621	$43,608,621
Total Benefits	$286,763,023	$135,617,912	$135,617,912	$179,226,533	$210,687,458
Costs					
Utility Project Costs					
Customer Services	N/A	$2,635,900	$2,635,900	$2,635,900	$2,635,900
Project Administration	N/A	$11,753,626	$11,753,626	$11,753,626	$11,753,626
Advertising & Promotion	N/A	$917,950	$917,950	$917,950	$917,950
Measurement & Verification	N/A	$851,772	$851,772	$851,772	$851,772
Rebates	N/A	$23,217,196	$23,217,196	$23,217,196	$23,217,196
Other	N/A	$1,052,468	$1,052,468	$1,052,468	$1,052,468
Subtotal	N/A	$40,428,911	$40,428,911	$40,428,911	$40,428,911
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$226,921,164	N/A	N/A
Subtotal	N/A	N/A	$226,921,164	N/A	N/A
Participant Costs					
Incremental Capital Costs	$80,013,657	N/A	N/A	$62,009,706	$62,009,706
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$80,013,657	N/A	N/A	$62,009,706	$62,009,706
Total Costs	$80,013,657	$40,428,911	$267,350,076	$102,438,618	$102,438,618
Net Benefit (Cost)	$206,749,366	$95,189,000	($131,732,164)	$76,787,915	$108,248,840
Benefit/Cost Ratio	3.58	3.35	0.51	1.75	2.06

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.45%
Gross Load Factor at Customer	E	34.25%
Transmission Loss Factor (Energy)	F	6.616%
Transmission Loss Factor (Demand)	G	7.061%
Societal Net Benefit (Cost)	H	$1,466

Program Summary per Participant		
Gross kW Saved at Customer	I	0.83 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.46 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,502 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,679 kWh

Program Summary All Participants		
Total Participants	J	88,537
Total Budget	K	**$40,428,912**
Gross kW Saved at Customer	(J x I)	73,827 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**40,871 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	221,480,646 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**237,171,202 kWh**
Societal Net Benefits	(J x I x H)	**$108,248,840**

Utility Program Cost per kWh Lifetime	**$0.0104**
Utility Program Cost per kW at Gen	**$989**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Business Segment w/ Indirect Participants**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$2,336,285	$2,388,198	$2,570,661
Incentive Costs =	$2,348,244	$2,379,677	$2,409,459
16) Total Utility Project Costs =	$4,684,529	$4,767,875	$4,980,120
17) Direct Participant Costs ($/Part.) =	$690	$666	$629
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$28	$28	$28
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	8.5	8.4	8.4
21) Avg. Dth/Part. Saved =	21.26	20.55	19.71
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	20,949	21,443	22,217
24) Total Annual Dth Saved =	445,391	440,748	437,834
25) Incentive/Participant =	$112.09	$110.98	$108.45

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$224	$222	$224
Cost per Participant per Dth =	$42.97	$43.24	$43.28
Lifetime Energy Reduction (Dth)	11,150,472		
Societal Cost per Dth	$3.01		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($28,085,807)	0.65
Utility Cost Test	$37,568,648	3.60
Societal Test	$58,639,149	2.75
Participant Test	$67,416,752	2.66

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Business Segment Direct Participants Only**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$2,298,873	$2,350,786	$2,533,249
Incentive Costs =	$2,348,244	$2,379,677	$2,409,459
16) Total Utility Project Costs =	$4,647,117	$4,730,463	$4,942,708
17) Direct Participant Costs ($/Part.) =	$7,416	$5,850	$4,342
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$299	$245	$195
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	8.5	8.4	8.4
21) Avg. Dth/Part. Saved =	228.50	180.44	136.09
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	1,949	2,443	3,217
24) Total Annual Dth Saved =	445,391	440,748	437,834
25) Incentive/Participant =	$1,204.72	$974.20	$748.93

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$2,384	$1,937	$1,536
Cost per Participant per Dth =	$42.89	$43.15	$43.20
Lifetime Energy Reduction (Dth)	11,150,472		
Societal Cost per Dth	$3.00		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($27,973,571)	0.65
Utility Cost Test	$37,680,884	3.63
Societal Test	$58,751,385	2.76
Participant Test	$67,416,752	2.66

BUSINESS SEGMENT ENERGY EFFICIENCY TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$19,748,226	$19,748,226	$19,748,226	$19,748,226
T & D	N/A	$11,923,647	$11,923,647	$11,923,647	$11,923,647
Marginal Energy	N/A	$92,625,056	$92,625,056	$92,625,056	$92,625,056
Environmental Externality	N/A	N/A	N/A	N/A	$27,356,068
Subtotal	N/A	$124,296,929	$124,296,929	$124,296,929	$151,652,997
Participant Benefits					
Bill Reduction - Electric	$217,701,302	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$22,977,742	N/A	N/A	$22,977,742	$22,977,742
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$41,197,167	N/A	N/A	$23,000,220	$23,000,220
Subtotal	$281,876,211	N/A	N/A	$45,977,962	$45,977,962
Total Benefits	$281,876,211	$124,296,929	$124,296,929	$170,274,891	$197,630,959
Costs					
Utility Project Costs					
Customer Services	N/A	$3,367,400	$3,367,400	$3,367,400	$3,367,400
Project Administration	N/A	$7,959,738	$7,959,738	$7,959,738	$7,959,738
Advertising & Promotion	N/A	$501,048	$501,048	$501,048	$501,048
Measurement & Verification	N/A	$1,037,553	$1,037,553	$1,037,553	$1,037,553
Rebates	N/A	$22,977,742	$22,977,742	$22,977,742	$22,977,742
Other	N/A	$1,417,752	$1,417,752	$1,417,752	$1,417,752
Subtotal	N/A	$37,261,233	$37,261,233	$37,261,233	$37,261,233
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$217,701,302	N/A	N/A
Subtotal	N/A	N/A	$217,701,302	N/A	N/A
Participant Costs					
Incremental Capital Costs	$80,781,734	N/A	N/A	$61,677,820	$61,677,820
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$80,781,734	N/A	N/A	$61,677,820	$61,677,820
Total Costs	$80,781,734	$37,261,233	$254,962,535	$98,939,053	$98,939,053
Net Benefit (Cost)	$201,094,477	$87,035,697	($130,665,606)	$71,335,839	$98,691,906
Benefit/Cost Ratio	3.49	3.34	0.49	1.72	2.00

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	65.49%
Gross Load Factor at Customer	E	55.99%
Transmission Loss Factor (Energy)	F	6.608%
Transmission Loss Factor (Demand)	G	7.045%
Societal Net Benefit (Cost)	H	$2,165

Program Summary per Participant		
Gross kW Saved at Customer	I	4.99 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	3.52 kW
Gross Annual kWh Saved at Customer	(B x E x I)	24,496 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	26,229 kWh

Program Summary All Participants		
Total Participants	J	9,129
Total Budget	K	**$37,261,232**
Gross kW Saved at Customer	(J x I)	45,593 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**32,124 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	223,628,071 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**239,449,813 kWh**
Societal Net Benefits	(J x I x H)	**$98,691,906**

Utility Program Cost per kWh Lifetime	**$0.0094**
Utility Program Cost per kW at Gen	**$1,160**

BUSINESS SEGMENT ENERGY EFFICIENCY TOTAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$22,110,459	$22,110,459	$22,110,459	$22,110,459
T & D	N/A	$13,463,109	$13,463,109	$13,463,109	$13,463,109
Marginal Energy	N/A	$89,458,398	$89,458,398	$89,458,398	$89,458,398
Environmental Externality	N/A	N/A	N/A	N/A	$28,521,228
Subtotal	N/A	$125,031,967	$125,031,967	$125,031,967	$153,553,194
Participant Benefits					
Bill Reduction - Electric	$215,918,141	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$22,429,813	N/A	N/A	$22,429,813	$22,429,813
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$38,615,750	N/A	N/A	$21,600,273	$21,600,273
Subtotal	$276,963,705	N/A	N/A	$44,030,086	$44,030,086
Total Benefits	$276,963,705	$125,031,967	$125,031,967	$169,062,052	$197,583,280
Costs					
Utility Project Costs					
Customer Services	N/A	$2,328,100	$2,328,100	$2,328,100	$2,328,100
Project Administration	N/A	$8,888,056	$8,888,056	$8,888,056	$8,888,056
Advertising & Promotion	N/A	$514,209	$514,209	$514,209	$514,209
Measurement & Verification	N/A	$797,147	$797,147	$797,147	$797,147
Rebates	N/A	$22,429,813	$22,429,813	$22,429,813	$22,429,813
Other	N/A	$1,069,262	$1,069,262	$1,069,262	$1,069,262
Subtotal	N/A	$36,026,587	$36,026,587	$36,026,587	$36,026,587
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$215,918,141	N/A	N/A
Subtotal	N/A	N/A	$215,918,141	N/A	N/A
Participant Costs					
Incremental Capital Costs	$78,295,027	N/A	N/A	$61,174,984	$61,174,984
	$0	N/A	N/A	$0	$0
Subtotal	$78,295,027	N/A	N/A	$61,174,984	$61,174,984
Total Costs	$78,295,027	$36,026,587	$251,944,728	$97,201,571	$97,201,571
Net Benefit (Cost)	$198,668,678	$89,005,380	($126,912,761)	$71,860,482	$100,381,709
Benefit/Cost Ratio	3.54	3.47	0.50	1.74	2.03

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	64.97%
Gross Load Factor at Customer	E	55.43%
Transmission Loss Factor (Energy)	F	6.611%
Transmission Loss Factor (Demand)	G	7.068%
Societal Net Benefit (Cost)	H	$2,246

Program Summary per Participant		
Gross kW Saved at Customer	I	4.06 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	2.84 kW
Gross Annual kWh Saved at Customer	(B x E x I)	19,710 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	21,105 kWh

Program Summary All Participants		
Total Participants	J	11,012
Total Budget	K	**$36,026,586**
Gross kW Saved at Customer	(J x I)	44,696 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**31,249 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	217,039,452 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**232,403,775 kWh**
Societal Net Benefits	(J x I x H)	**$100,381,709**

Utility Program Cost per kWh Lifetime	**$0.0095**
Utility Program Cost per kW at Gen	**$1,153**

BUSINESS SEGMENT ENERGY EFFICIENCY TOTAL — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$23,461,107	$23,461,107	$23,461,107	$23,461,107
T & D	N/A	$14,302,710	$14,302,710	$14,302,710	$14,302,710
Marginal Energy	N/A	$91,431,776	$91,431,776	$91,431,776	$91,431,776
Environmental Externality	N/A	N/A	N/A	N/A	$31,449,812
Subtotal	N/A	$129,195,592	$129,195,592	$129,195,592	$160,645,404
Participant Benefits					
Bill Reduction - Electric	$226,810,563	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$23,217,196	N/A	N/A	$23,217,196	$23,217,196
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$36,624,664	N/A	N/A	$20,391,426	$20,391,426
Subtotal	$286,652,422	N/A	N/A	$43,608,621	$43,608,621
Total Benefits	$286,652,422	$129,195,592	$129,195,592	$172,804,214	$204,254,026
Costs					
Utility Project Costs					
Customer Services	N/A	$2,635,900	$2,635,900	$2,635,900	$2,635,900
Project Administration	N/A	$9,073,467	$9,073,467	$9,073,467	$9,073,467
Advertising & Promotion	N/A	$489,270	$489,270	$489,270	$489,270
Measurement & Verification	N/A	$701,772	$701,772	$701,772	$701,772
Rebates	N/A	$23,217,196	$23,217,196	$23,217,196	$23,217,196
Other	N/A	$1,052,468	$1,052,468	$1,052,468	$1,052,468
Subtotal	N/A	$37,170,072	$37,170,072	$37,170,072	$37,170,072
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$226,810,563	N/A	N/A
Subtotal	N/A	N/A	$226,810,563	N/A	N/A
Participant Costs					
Incremental Capital Costs	$80,013,657	N/A	N/A	$62,009,706	$62,009,706
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$80,013,657	N/A	N/A	$62,009,706	$62,009,706
Total Costs	$80,013,657	$37,170,072	$263,980,634	$99,179,778	$99,179,778
Net Benefit (Cost)	$206,638,765	$92,025,521	($134,785,042)	$73,624,436	$105,074,248
Benefit/Cost Ratio	3.58	3.48	0.49	1.74	2.06

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	64.49%
Gross Load Factor at Customer	E	54.03%
Transmission Loss Factor (Energy)	F	6.616%
Transmission Loss Factor (Demand)	G	7.097%
Societal Net Benefit (Cost)	H	$2,247

Program Summary per Participant		
Gross kW Saved at Customer	I	3.45 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	2.39 kW
Gross Annual kWh Saved at Customer	(B x E x I)	16,323 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	17,479 kWh

Program Summary All Participants		
Total Participants	J	13,558
Total Budget	K	**$37,170,072**
Gross kW Saved at Customer	(J x I)	46,756 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**32,456 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	221,312,674 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**236,991,360 kWh**
Societal Net Benefits	(J x I x H)	**$105,074,248**

Utility Program Cost per kWh Lifetime	**$0.0096**
Utility Program Cost per kW at Gen	**$1,145**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Business Segment Energy Efficiency Total**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$2,298,873	$2,350,786	$2,533,249
Incentive Costs =	$2,348,244	$2,379,677	$2,409,459
16) Total Utility Project Costs =	$4,647,117	$4,730,463	$4,942,708
17) Direct Participant Costs ($/Part.) =	$7,416	$5,850	$4,342
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$299	$245	$195
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	8.5	8.4	8.4
21) Avg. Dth/Part. Saved =	228.50	180.44	136.09
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	1,949	2,443	3,217
24) Total Annual Dth Saved =	445,391	440,748	437,834
25) Incentive/Participant =	$1,204.72	$974.20	$748.93

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$2,384	$1,937	$1,536
Cost per Participant per Dth =	$42.89	$43.15	$43.20
Lifetime Energy Reduction (Dth)	11,150,472		
Societal Cost per Dth	$3.00		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($27,973,571)	0.65
Utility Cost Test	$37,680,884	3.63
Societal Test	$58,751,385	2.76
Participant Test	$67,416,752	2.66

BUSINESS NEW CONSTRUCTION — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,998,517	$3,998,517	$3,998,517	$3,998,517
T & D	N/A	$2,414,268	$2,414,268	$2,414,268	$2,414,268
Marginal Energy	N/A	$16,448,059	$16,448,059	$16,448,059	$16,448,059
Environmental Externality	N/A	N/A	N/A	N/A	$4,868,434
Subtotal	N/A	$22,860,844	$22,860,844	$22,860,844	$27,729,278
Participant Benefits					
Bill Reduction - Electric	$39,844,933	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$3,871,728	N/A	N/A	$3,871,728	$3,871,728
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$43,716,662	N/A	N/A	$3,871,728	$3,871,728
Total Benefits	$43,716,662	$22,860,844	$22,860,844	$26,732,573	$31,601,007
Costs					
Utility Project Costs					
Customer Services	N/A	$2,000,000	$2,000,000	$2,000,000	$2,000,000
Project Administration	N/A	$604,029	$604,029	$604,029	$604,029
Advertising & Promotion	N/A	$99,202	$99,202	$99,202	$99,202
Measurement & Verification	N/A	$695,000	$695,000	$695,000	$695,000
Rebates	N/A	$3,871,728	$3,871,728	$3,871,728	$3,871,728
Other	N/A	$331,000	$331,000	$331,000	$331,000
Subtotal	N/A	$7,600,959	$7,600,959	$7,600,959	$7,600,959
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$39,844,933	N/A	N/A
Subtotal	N/A	N/A	$39,844,933	N/A	N/A
Participant Costs					
Incremental Capital Costs	$13,660,037	N/A	N/A	$7,970,951	$7,970,951
Incremental O&M Costs	$66,809	N/A	N/A	$26,104	$26,104
Subtotal	$13,726,845	N/A	N/A	$7,997,054	$7,997,054
Total Costs	$13,726,845	$7,600,959	$47,445,893	$15,598,014	$15,598,014
Net Benefit (Cost)	$29,989,817	$15,259,885	($24,585,048)	$11,134,559	$16,002,993
Benefit/Cost Ratio	3.18	3.01	0.48	1.71	2.03

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	20.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	72.82%
Gross Load Factor at Customer	E	53.18%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,157

Program Summary per Participant		
Gross kW Saved at Customer	I	63.42 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	49.66 kW
Gross Annual kWh Saved at Customer	(B x E x I)	295,453 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	316,331 kWh

Program Summary All Participants		
Total Participants	J	117
Total Budget	K	**$7,600,959**
Gross kW Saved at Customer	(J x I)	7,420 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**5,810 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	34,567,983 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**37,010,688 kWh**
Societal Net Benefits	(J x I x H)	**$16,002,993**

Utility Program Cost per kWh Lifetime	**$0.0103**
Utility Program Cost per kW at Gen	**$1,308**

BUSINESS NEW CONSTRUCTION — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,128,802	$3,128,802	$3,128,802	$3,128,802
T & D	N/A	$1,907,534	$1,907,534	$1,907,534	$1,907,534
Marginal Energy	N/A	$10,263,299	$10,263,299	$10,263,299	$10,263,299
Environmental Externality	N/A	N/A	N/A	N/A	$3,253,144
Subtotal	N/A	$15,299,635	$15,299,635	$15,299,635	$18,552,779
Participant Benefits					
Bill Reduction - Electric	$25,583,018	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$2,510,864	N/A	N/A	$2,510,864	$2,510,864
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$28,093,882	N/A	N/A	$2,510,864	$2,510,864
Total Benefits	$28,093,882	$15,299,635	$15,299,635	$17,810,499	$21,063,643
Costs					
Utility Project Costs					
Customer Services	N/A	$750,000	$750,000	$750,000	$750,000
Project Administration	N/A	$738,711	$738,711	$738,711	$738,711
Advertising & Promotion	N/A	$94,000	$94,000	$94,000	$94,000
Measurement & Verification	N/A	$410,000	$410,000	$410,000	$410,000
Rebates	N/A	$2,510,864	$2,510,864	$2,510,864	$2,510,864
Other	N/A	$279,000	$279,000	$279,000	$279,000
Subtotal	N/A	$4,782,575	$4,782,575	$4,782,575	$4,782,575
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$25,583,018	N/A	N/A
Subtotal	N/A	N/A	$25,583,018	N/A	N/A
Participant Costs					
Incremental Capital Costs	$8,501,370	N/A	N/A	$5,040,704	$5,040,704
	$37,474	N/A	N/A	$17,645	$17,645
Subtotal	$8,538,843	N/A	N/A	$5,058,349	$5,058,349
Total Costs	$8,538,843	$4,782,575	$30,365,593	$9,840,924	$9,840,924
Net Benefit (Cost)	$19,555,039	$10,517,059	($15,065,958)	$7,969,575	$11,222,719
Benefit/Cost Ratio	3.29	3.20	0.50	1.81	2.14

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	20.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	72.72%
Gross Load Factor at Customer	E	50.06%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,289

Program Summary per Participant		
Gross kW Saved at Customer	I	54.48 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	42.60 kW
Gross Annual kWh Saved at Customer	(B x E x I)	238,872 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	255,752 kWh

Program Summary All Participants		
Total Participants	J	90
Total Budget	K	**$4,782,576**
Gross kW Saved at Customer	(J x I)	4,903 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,834 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	21,498,523 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**23,017,690 kWh**
Societal Net Benefits	(J x I x H)	**$11,222,719**

Utility Program Cost per kWh Lifetime	**$0.0104**
Utility Program Cost per kW at Gen	**$1,248**

BUSINESS NEW CONSTRUCTION — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,600,878	$3,600,878	$3,600,878	$3,600,878
T & D	N/A	$2,197,980	$2,197,980	$2,197,980	$2,197,980
Marginal Energy	N/A	$10,295,560	$10,295,560	$10,295,560	$10,295,560
Environmental Externality	N/A	N/A	N/A	N/A	$3,490,556
Subtotal	N/A	$16,094,418	$16,094,418	$16,094,418	$19,584,975
Participant Benefits					
Bill Reduction - Electric	$26,387,992	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$2,722,944	N/A	N/A	$2,722,944	$2,722,944
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$29,110,936	N/A	N/A	$2,722,944	$2,722,944
Total Benefits	$29,110,936	$16,094,418	$16,094,418	$18,817,363	$22,307,919
Costs					
Utility Project Costs					
Customer Services	N/A	$750,000	$750,000	$750,000	$750,000
Project Administration	N/A	$568,979	$568,979	$568,979	$568,979
Advertising & Promotion	N/A	$94,000	$94,000	$94,000	$94,000
Measurement & Verification	N/A	$286,000	$286,000	$286,000	$286,000
Rebates	N/A	$2,722,944	$2,722,944	$2,722,944	$2,722,944
Other	N/A	$250,000	$250,000	$250,000	$250,000
Subtotal	N/A	$4,671,923	$4,671,923	$4,671,923	$4,671,923
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$26,387,992	N/A	N/A
Subtotal	N/A	N/A	$26,387,992	N/A	N/A
Participant Costs					
Incremental Capital Costs	$8,489,292	N/A	N/A	$4,262,772	$4,262,772
Incremental O&M Costs	$51,204	N/A	N/A	$21,358	$21,358
Subtotal	$8,540,496	N/A	N/A	$4,284,129	$4,284,129
Total Costs	$8,540,496	$4,671,923	$31,059,915	$8,956,052	$8,956,052
Net Benefit (Cost)	$20,570,441	$11,422,495	($14,965,497)	$9,861,310	$13,351,866
Benefit/Cost Ratio	3.41	3.44	0.52	2.10	2.49

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	20.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	72.94%
Gross Load Factor at Customer	E	44.57%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,427

Program Summary per Participant		
Gross kW Saved at Customer	I	45.10 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	35.37 kW
Gross Annual kWh Saved at Customer	(B x E x I)	176,094 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	188,537 kWh

Program Summary All Participants		
Total Participants	J	122
Total Budget	K	**$4,671,924**
Gross kW Saved at Customer	(J x I)	5,502 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**4,316 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	21,483,430 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**23,001,531 kWh**
Societal Net Benefits	(J x I x H)	**$13,351,866**

Utility Program Cost per kWh Lifetime	**$0.0102**
Utility Program Cost per kW at Gen	**$1,083**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Business New Construction**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$343,078	$270,872	$239,064
Incentive Costs =	$180,961	$138,283	$145,441
16) Total Utility Project Costs =	$524,039	$409,155	$384,505
17) Direct Participant Costs ($/Part.) =	$73,370	$50,614	$38,363
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	20.0	20.0	20.0
21) Avg. Dth/Part. Saved =	1,605.41	1,109.14	934.41
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	19	21	25
24) Total Annual Dth Saved =	30,503	23,292	23,360
25) Incentive/Participant =	$9,524.27	$6,584.91	$5,817.66

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$27,581	$19,484	$15,380
Cost per Participant per Dth =	$62.88	$63.20	$57.52
Lifetime Energy Reduction (Dth)	1,543,099		
Societal Cost per Dth	$1.55		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($3,040,109)	0.68
Utility Cost Test	$5,242,429	4.98
Societal Test	$7,988,686	4.33
Participant Test	$8,060,252	3.61

COMMERCIAL EFFICIENCY — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,157,913	$2,157,913	$2,157,913	$2,157,913
T & D	N/A	$1,302,915	$1,302,915	$1,302,915	$1,302,915
Marginal Energy	N/A	$10,275,128	$10,275,128	$10,275,128	$10,275,128
Environmental Externality	N/A	N/A	N/A	N/A	$2,989,782
Subtotal	N/A	$13,735,957	$13,735,957	$13,735,957	$16,725,739
Participant Benefits					
Bill Reduction - Electric	$24,126,167	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$2,634,298	N/A	N/A	$2,634,298	$2,634,298
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$834,475	N/A	N/A	$459,371	$459,371
Subtotal	$27,594,940	N/A	N/A	$3,093,668	$3,093,668
Total Benefits	$27,594,940	$13,735,957	$13,735,957	$16,829,625	$19,819,407
Costs					
Utility Project Costs					
Customer Services	N/A	$75,000	$75,000	$75,000	$75,000
Project Administration	N/A	$637,811	$637,811	$637,811	$637,811
Advertising & Promotion	N/A	$25,000	$25,000	$25,000	$25,000
Measurement & Verification	N/A	$30,000	$30,000	$30,000	$30,000
Rebates	N/A	$2,634,298	$2,634,298	$2,634,298	$2,634,298
Other	N/A	$7,500	$7,500	$7,500	$7,500
Subtotal	N/A	$3,409,609	$3,409,609	$3,409,609	$3,409,609
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$24,126,167	N/A	N/A
Subtotal	N/A	N/A	$24,126,167	N/A	N/A
Participant Costs					
Incremental Capital Costs	$9,288,554	N/A	N/A	$5,376,226	$5,376,226
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$9,288,554	N/A	N/A	$5,376,226	$5,376,226
Total Costs	$9,288,554	$3,409,609	$27,535,776	$8,785,835	$8,785,835
Net Benefit (Cost)	$18,306,385	$10,326,348	($13,799,819)	$8,043,791	$11,033,573
Benefit/Cost Ratio	2.97	4.03	0.50	1.92	2.26

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	80.07%
Gross Load Factor at Customer	E	67.67%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,806

Program Summary per Participant		
Gross kW Saved at Customer	I	24.12 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	20.77 kW
Gross Annual kWh Saved at Customer	(B x E x I)	142,991 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	153,095 kWh

Program Summary All Participants		
Total Participants	J	163
Total Budget	K	**$3,409,609**
Gross kW Saved at Customer	(J x I)	3,932 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,385 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	23,307,477 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**24,954,472 kWh**
Societal Net Benefits	(J x I x H)	**$11,033,573**

Utility Program Cost per kWh Lifetime	**$0.0079**
Utility Program Cost per kW at Gen	**$1,007**

COMMERCIAL EFFICIENCY — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,722,239	$2,722,239	$2,722,239	$2,722,239
T & D	N/A	$1,657,711	$1,657,711	$1,657,711	$1,657,711
Marginal Energy	N/A	$11,176,876	$11,176,876	$11,176,876	$11,176,876
Environmental Externality	N/A	N/A	N/A	N/A	$3,497,386
Subtotal	N/A	$15,556,827	$15,556,827	$15,556,827	$19,054,213
Participant Benefits					
Bill Reduction - Electric	$27,025,570	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$2,810,970	N/A	N/A	$2,810,970	$2,810,970
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$905,378	N/A	N/A	$500,829	$500,829
Subtotal	$30,741,918	N/A	N/A	$3,311,799	$3,311,799
Total Benefits	$30,741,918	$15,556,827	$15,556,827	$18,868,626	$22,366,012
Costs					
Utility Project Costs					
Customer Services	N/A	$75,000	$75,000	$75,000	$75,000
Project Administration	N/A	$659,032	$659,032	$659,032	$659,032
Advertising & Promotion	N/A	$25,000	$25,000	$25,000	$25,000
Measurement & Verification	N/A	$30,000	$30,000	$30,000	$30,000
Rebates	N/A	$2,810,970	$2,810,970	$2,810,970	$2,810,970
Other	N/A	$7,500	$7,500	$7,500	$7,500
Subtotal	N/A	$3,607,502	$3,607,502	$3,607,502	$3,607,502
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$27,025,570	N/A	N/A
Subtotal	N/A	N/A	$27,025,570	N/A	N/A
Participant Costs					
Incremental Capital Costs	$10,028,072	N/A	N/A	$5,808,635	$5,808,635
	$0	N/A	N/A	$0	$0
Subtotal	$10,028,072	N/A	N/A	$5,808,635	$5,808,635
Total Costs	$10,028,072	$3,607,502	$30,633,072	$9,416,137	$9,416,137
Net Benefit (Cost)	$20,713,846	$11,949,325	($15,076,245)	$9,452,489	$12,949,875
Benefit/Cost Ratio	3.07	4.31	0.51	2.00	2.38

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	80.06%
Gross Load Factor at Customer	E	67.66%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$3,037

Program Summary per Participant		
Gross kW Saved at Customer	I	24.23 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	20.86 kW
Gross Annual kWh Saved at Customer	(B x E x I)	143,593 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	153,740 kWh

Program Summary All Participants		
Total Participants	J	176
Total Budget	K	**$3,607,502**
Gross kW Saved at Customer	(J x I)	4,264 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,671 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	25,272,389 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**27,058,233 kWh**
Societal Net Benefits	(J x I x H)	**$12,949,875**

Utility Program Cost per kWh Lifetime	**$0.0077**
Utility Program Cost per kW at Gen	**$983**

COMMERCIAL EFFICIENCY — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,883,585	$2,883,585	$2,883,585	$2,883,585
T & D	N/A	$1,758,073	$1,758,073	$1,758,073	$1,758,073
Marginal Energy	N/A	$11,639,935	$11,639,935	$11,639,935	$11,639,935
Environmental Externality	N/A	N/A	N/A	N/A	$3,913,553
Subtotal	N/A	$16,281,593	$16,281,593	$16,281,593	$20,195,146
Participant Benefits					
Bill Reduction - Electric	$28,906,603	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$2,892,511	N/A	N/A	$2,892,511	$2,892,511
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$938,102	N/A	N/A	$515,259	$515,259
Subtotal	$32,737,216	N/A	N/A	$3,407,771	$3,407,771
Total Benefits	$32,737,216	$16,281,593	$16,281,593	$19,689,364	$23,602,917
Costs					
Utility Project Costs					
Customer Services	N/A	$75,000	$75,000	$75,000	$75,000
Project Administration	N/A	$679,221	$679,221	$679,221	$679,221
Advertising & Promotion	N/A	$25,000	$25,000	$25,000	$25,000
Measurement & Verification	N/A	$30,000	$30,000	$30,000	$30,000
Rebates	N/A	$2,892,511	$2,892,511	$2,892,511	$2,892,511
Other	N/A	$7,500	$7,500	$7,500	$7,500
Subtotal	N/A	$3,709,232	$3,709,232	$3,709,232	$3,709,232
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$28,906,603	N/A	N/A
Subtotal	N/A	N/A	$28,906,603	N/A	N/A
Participant Costs					
Incremental Capital Costs	$10,369,388	N/A	N/A	$5,959,145	$5,959,145
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$10,369,388	N/A	N/A	$5,959,145	$5,959,145
Total Costs	$10,369,388	$3,709,232	$32,615,835	$9,668,377	$9,668,377
Net Benefit (Cost)	$22,367,829	$12,572,361	($16,334,242)	$10,020,986	$13,934,539
Benefit/Cost Ratio	3.16	4.39	0.50	2.04	2.44

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	80.06%
Gross Load Factor at Customer	E	67.65%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$3,155

Program Summary per Participant		
Gross kW Saved at Customer	I	24.27 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	20.89 kW
Gross Annual kWh Saved at Customer	(B x E x I)	143,842 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	154,007 kWh

Program Summary All Participants		
Total Participants	J	182
Total Budget	K	**$3,709,232**
Gross kW Saved at Customer	(J x I)	4,417 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,803 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	26,179,272 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**28,029,199 kWh**
Societal Net Benefits	(J x I x H)	**$13,934,539**

Utility Program Cost per kWh Lifetime	**$0.0076**
Utility Program Cost per kW at Gen	**$975**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Commercial Efficiency**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$263,738	$272,882	$282,179
Incentive Costs =	$230,703	$230,703	$230,703
16) Total Utility Project Costs =	$494,441	$503,585	$512,882
17) Direct Participant Costs ($/Part.) =	$33,219	$33,219	$33,219
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$5,288	$5,288	$5,288
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	14.9	14.9	14.9
21) Avg. Dth/Part. Saved =	895.35	895.35	895.35
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	46	46	46
24) Total Annual Dth Saved =	41,186	41,186	41,186
25) Incentive/Participant =	$5,015.29	$5,015.29	$5,015.29

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$10,749	$10,948	$11,150
Cost per Participant per Dth =	$49.11	$49.33	$49.55
Lifetime Energy Reduction (Dth)	1,838,800		
Societal Cost per Dth	$1.67		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($3,711,619)	0.69
Utility Cost Test	$6,870,922	5.55
Societal Test	$19,268,056	7.28
Participant Test	$20,660,744	6.56

COMPUTER EFFICIENCY - PC POWER MGMT — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$137,601	$137,601	$137,601	$137,601
T & D	N/A	$83,070	$83,070	$83,070	$83,070
Marginal Energy	N/A	$693,116	$693,116	$693,116	$693,116
Environmental Externality	N/A	N/A	N/A	N/A	$160,215
Subtotal	N/A	$913,786	$913,786	$913,786	$1,074,001
Participant Benefits					
Bill Reduction - Electric	$1,363,791	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$212,000	N/A	N/A	$212,000	$212,000
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$776,058	N/A	N/A	$816,708	$816,708
Subtotal	$2,351,849	N/A	N/A	$1,028,708	$1,028,708
Total Benefits	$2,351,849	$913,786	$913,786	$1,942,494	$2,102,709
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$136,850	$136,850	$136,850	$136,850
Advertising & Promotion	N/A	$1,000	$1,000	$1,000	$1,000
Measurement & Verification	N/A	$5,000	$5,000	$5,000	$5,000
Rebates	N/A	$212,000	$212,000	$212,000	$212,000
Other	N/A	$193,000	$193,000	$193,000	$193,000
Subtotal	N/A	$547,850	$547,850	$547,850	$547,850
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,363,791	N/A	N/A
Subtotal	N/A	N/A	$1,363,791	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,025,502	N/A	N/A	$1,025,502	$1,025,502
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,025,502	N/A	N/A	$1,025,502	$1,025,502
Total Costs	$1,025,502	$547,850	$1,911,641	$1,573,352	$1,573,352
Net Benefit (Cost)	$1,326,347	$365,936	($997,854)	$369,143	$529,357
Benefit/Cost Ratio	2.29	1.67	0.48	1.23	1.34

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	98.38%
Gross Load Factor at Customer	E	87.40%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,187

Program Summary per Participant		
Gross kW Saved at Customer	I	0.32 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.34 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,455 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,628 kWh

Program Summary All Participants		
Total Participants	J	1,391
Total Budget	K	**$547,850**
Gross kW Saved at Customer	(J x I)	446 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**472 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,414,552 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,655,837 kWh**
Societal Net Benefits	(J x I x H)	**$529,357**

Utility Program Cost per kWh Lifetime	**$0.0267**
Utility Program Cost per kW at Gen	**$1,161**

COMPUTER EFFICIENCY - PC POWER MGMT — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$145,514	$145,514	$145,514	$145,514
T & D	N/A	$88,119	$88,119	$88,119	$88,119
Marginal Energy	N/A	$709,715	$709,715	$709,715	$709,715
Environmental Externality	N/A	N/A	N/A	N/A	$197,129
Subtotal	N/A	$943,348	$943,348	$943,348	$1,140,478
Participant Benefits					
Bill Reduction - Electric	$1,429,447	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$214,000	N/A	N/A	$214,000	$214,000
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$769,436	N/A	N/A	$811,151	$811,151
Subtotal	$2,412,883	N/A	N/A	$1,025,151	$1,025,151
Total Benefits	$2,412,883	$943,348	$943,348	$1,968,499	$2,165,629
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$136,850	$136,850	$136,850	$136,850
Advertising & Promotion	N/A	$1,000	$1,000	$1,000	$1,000
Measurement & Verification	N/A	$5,000	$5,000	$5,000	$5,000
Rebates	N/A	$214,000	$214,000	$214,000	$214,000
Other	N/A	$193,000	$193,000	$193,000	$193,000
Subtotal	N/A	$549,850	$549,850	$549,850	$549,850
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,429,447	N/A	N/A
Subtotal	N/A	N/A	$1,429,447	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,031,358	N/A	N/A	$1,031,358	$1,031,358
	$0	N/A	N/A	$0	$0
Subtotal	$1,031,358	N/A	N/A	$1,031,358	$1,031,358
Total Costs	$1,031,358	$549,850	$1,979,297	$1,581,208	$1,581,208
Net Benefit (Cost)	$1,381,525	$393,498	($1,035,949)	$387,291	$584,421
Benefit/Cost Ratio	2.34	1.72	0.48	1.24	1.37

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	96.80%
Gross Load Factor at Customer	E	87.34%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,289

Program Summary per Participant		
Gross kW Saved at Customer	I	0.33 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.34 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,493 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,669 kWh

Program Summary All Participants		
Total Participants	J	1,391
Total Budget	K	**$549,850**
Gross kW Saved at Customer	(J x I)	453 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**472 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,467,521 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,712,549 kWh**
Societal Net Benefits	(J x I x H)	**$584,421**

Utility Program Cost per kWh Lifetime	**$0.0264**
Utility Program Cost per kW at Gen	**$1,166**

COMPUTER EFFICIENCY - PC POWER MGMT — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$148,770	$148,770	$148,770	$148,770
T & D	N/A	$90,199	$90,199	$90,199	$90,199
Marginal Energy	N/A	$718,554	$718,554	$718,554	$718,554
Environmental Externality	N/A	N/A	N/A	N/A	$234,367
Subtotal	N/A	$957,522	$957,522	$957,522	$1,191,890
Participant Benefits					
Bill Reduction - Electric	$1,474,641	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$214,000	N/A	N/A	$214,000	$214,000
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$769,436	N/A	N/A	$811,151	$811,151
Subtotal	$2,458,077	N/A	N/A	$1,025,151	$1,025,151
Total Benefits	$2,458,077	$957,522	$957,522	$1,982,673	$2,217,040
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$136,850	$136,850	$136,850	$136,850
Advertising & Promotion	N/A	$1,000	$1,000	$1,000	$1,000
Measurement & Verification	N/A	$5,000	$5,000	$5,000	$5,000
Rebates	N/A	$214,000	$214,000	$214,000	$214,000
Other	N/A	$193,000	$193,000	$193,000	$193,000
Subtotal	N/A	$549,850	$549,850	$549,850	$549,850
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,474,641	N/A	N/A
Subtotal	N/A	N/A	$1,474,641	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,031,358	N/A	N/A	$1,031,358	$1,031,358
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,031,358	N/A	N/A	$1,031,358	$1,031,358
Total Costs	$1,031,358	$549,850	$2,024,491	$1,581,208	$1,581,208
Net Benefit (Cost)	$1,426,719	$407,672	($1,066,968)	$401,465	$635,833
Benefit/Cost Ratio	2.38	1.74	0.47	1.25	1.40

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	96.80%
Gross Load Factor at Customer	E	87.34%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,403

Program Summary per Participant		
Gross kW Saved at Customer	I	0.33 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.34 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,493 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,669 kWh

Program Summary All Participants		
Total Participants	J	1,391
Total Budget	K	**$549,850**
Gross kW Saved at Customer	(J x I)	453 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**472 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,467,521 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,712,549 kWh**
Societal Net Benefits	(J x I x H)	**$635,833**

Utility Program Cost per kWh Lifetime	**$0.0264**
Utility Program Cost per kW at Gen	**$1,166**

COOLING EFFICIENCY — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,447,813	$1,447,813	$1,447,813	$1,447,813
T & D	N/A	$874,174	$874,174	$874,174	$874,174
Marginal Energy	N/A	$2,618,307	$2,618,307	$2,618,307	$2,618,307
Environmental Externality	N/A	N/A	N/A	N/A	$739,755
Subtotal	N/A	$4,940,294	$4,940,294	$4,940,294	$5,680,049
Participant Benefits					
Bill Reduction - Electric	$6,142,120	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,805,252	N/A	N/A	$1,805,252	$1,805,252
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$37,901	N/A	N/A	$9,392	$9,392
Subtotal	$7,985,273	N/A	N/A	$1,814,644	$1,814,644
Total Benefits	$7,985,273	$4,940,294	$4,940,294	$6,754,938	$7,494,693
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$429,169	$429,169	$429,169	$429,169
Advertising & Promotion	N/A	$63,261	$63,261	$63,261	$63,261
Measurement & Verification	N/A	$18,000	$18,000	$18,000	$18,000
Rebates	N/A	$1,805,252	$1,805,252	$1,805,252	$1,805,252
Other	N/A	$172,000	$172,000	$172,000	$172,000
Subtotal	N/A	$2,487,682	$2,487,682	$2,487,682	$2,487,682
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$6,142,120	N/A	N/A
Subtotal	N/A	N/A	$6,142,120	N/A	N/A
Participant Costs					
Incremental Capital Costs	$4,210,904	N/A	N/A	$3,802,482	$3,802,482
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$4,210,904	N/A	N/A	$3,802,482	$3,802,482
Total Costs	$4,210,904	$2,487,682	$8,629,802	$6,290,163	$6,290,163
Net Benefit (Cost)	$3,774,369	$2,452,612	($3,689,508)	$464,774	$1,204,529
Benefit/Cost Ratio	1.90	1.99	0.57	1.07	1.19

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	18.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	77.16%
Gross Load Factor at Customer	E	24.39%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$463

Program Summary per Participant		
Gross kW Saved at Customer	I	1.59 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	1.32 kW
Gross Annual kWh Saved at Customer	(B x E x I)	3,396 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	3,636 kWh

Program Summary All Participants		
Total Participants	J	1,638
Total Budget	K	**$2,487,682**
Gross kW Saved at Customer	(J x I)	2,603 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**2,160 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	5,563,067 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**5,956,175 kWh**
Societal Net Benefits	(J x I x H)	**$1,204,529**

Utility Program Cost per kWh Lifetime	**$0.0227**
Utility Program Cost per kW at Gen	**$1,152**

COOLING EFFICIENCY — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,800,093	$1,800,093	$1,800,093	$1,800,093
T & D	N/A	$1,097,096	$1,097,096	$1,097,096	$1,097,096
Marginal Energy	N/A	$2,738,111	$2,738,111	$2,738,111	$2,738,111
Environmental Externality	N/A	N/A	N/A	N/A	$830,792
Subtotal	N/A	$5,635,300	$5,635,300	$5,635,300	$6,466,092
Participant Benefits					
Bill Reduction - Electric	$6,611,395	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,893,126	N/A	N/A	$1,893,126	$1,893,126
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$35,532	N/A	N/A	$8,844	$8,844
Subtotal	$8,540,053	N/A	N/A	$1,901,970	$1,901,970
Total Benefits	$8,540,053	$5,635,300	$5,635,300	$7,537,271	$8,368,062
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$443,641	$443,641	$443,641	$443,641
Advertising & Promotion	N/A	$63,260	$63,260	$63,260	$63,260
Measurement & Verification	N/A	$18,000	$18,000	$18,000	$18,000
Rebates	N/A	$1,893,126	$1,893,126	$1,893,126	$1,893,126
Other	N/A	$186,000	$186,000	$186,000	$186,000
Subtotal	N/A	$2,604,027	$2,604,027	$2,604,027	$2,604,027
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$6,611,395	N/A	N/A
Subtotal	N/A	N/A	$6,611,395	N/A	N/A
Participant Costs					
Incremental Capital Costs	$4,388,143	N/A	N/A	$4,005,811	$4,005,811
	$0	N/A	N/A	$0	$0
Subtotal	$4,388,143	N/A	N/A	$4,005,811	$4,005,811
Total Costs	$4,388,143	$2,604,027	$9,215,422	$6,609,838	$6,609,838
Net Benefit (Cost)	$4,151,910	$3,031,273	($3,580,122)	$927,433	$1,758,224
Benefit/Cost Ratio	1.95	2.16	0.61	1.14	1.27

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	18.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	78.10%
Gross Load Factor at Customer	E	24.39%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$649

Program Summary per Participant		
Gross kW Saved at Customer	I	1.56 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	1.31 kW
Gross Annual kWh Saved at Customer	(B x E x I)	3,336 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	3,572 kWh

Program Summary All Participants		
Total Participants	J	1,736
Total Budget	K	**$2,604,027**
Gross kW Saved at Customer	(J x I)	2,710 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**2,276 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	5,791,353 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**6,200,592 kWh**
Societal Net Benefits	(J x I x H)	**$1,758,224**

Utility Program Cost per kWh Lifetime	**$0.0228**
Utility Program Cost per kW at Gen	**$1,144**

COOLING EFFICIENCY	2019	ELECTRIC	GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,900,830	$1,900,830	$1,900,830	$1,900,830
T & D	N/A	$1,159,883	$1,159,883	$1,159,883	$1,159,883
Marginal Energy	N/A	$2,862,893	$2,862,893	$2,862,893	$2,862,893
Environmental Externality	N/A	N/A	N/A	N/A	$931,457
Subtotal	N/A	$5,923,606	$5,923,606	$5,923,606	$6,855,063
Participant Benefits					
Bill Reduction - Electric	$7,102,498	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,940,471	N/A	N/A	$1,940,471	$1,940,471
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$35,532	N/A	N/A	$8,742	$8,742
Subtotal	$9,078,500	N/A	N/A	$1,949,213	$1,949,213
Total Benefits	$9,078,500	$5,923,606	$5,923,606	$7,872,819	$8,804,276
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$457,668	$457,668	$457,668	$457,668
Advertising & Promotion	N/A	$63,260	$63,260	$63,260	$63,260
Measurement & Verification	N/A	$18,000	$18,000	$18,000	$18,000
Rebates	N/A	$1,940,471	$1,940,471	$1,940,471	$1,940,471
Other	N/A	$197,000	$197,000	$197,000	$197,000
Subtotal	N/A	$2,676,399	$2,676,399	$2,676,399	$2,676,399
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$7,102,498	N/A	N/A
Subtotal	N/A	N/A	$7,102,498	N/A	N/A
Participant Costs					
Incremental Capital Costs	$4,505,535	N/A	N/A	$4,121,741	$4,121,741
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$4,505,535	N/A	N/A	$4,121,741	$4,121,741
Total Costs	$4,505,535	$2,676,399	$9,778,896	$6,798,139	$6,798,139
Net Benefit (Cost)	$4,572,966	$3,247,207	($3,855,290)	$1,074,679	$2,006,136
Benefit/Cost Ratio	2.01	2.21	0.61	1.16	1.30

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	18.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	78.44%
Gross Load Factor at Customer	E	24.67%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$720

Program Summary per Participant		
Gross kW Saved at Customer	I	1.54 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	1.30 kW
Gross Annual kWh Saved at Customer	(B x E x I)	3,336 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	3,572 kWh

Program Summary All Participants		
Total Participants	J	1,806
Total Budget	K	**$2,676,399**
Gross kW Saved at Customer	(J x I)	2,787 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**2,351 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,024,804 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**6,450,540 kWh**
Societal Net Benefits	(J x I x H)	**$2,006,136**

Utility Program Cost per kWh Lifetime	**$0.0225**
Utility Program Cost per kW at Gen	**$1,138**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Cooling Efficiency**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$15,000	$15,000	$15,000
Incentive Costs =	$33,579	$33,579	$33,579
16) Total Utility Project Costs =	$48,579	$48,579	$48,579
17) Direct Participant Costs ($/Part.) =	$38,413	$38,413	$38,413
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	15.0	15.0	15.0
21) Avg. Dth/Part. Saved =	1,989.31	1,989.31	1,989.31
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	3	3	3
24) Total Annual Dth Saved =	5,968	5,968	5,968
25) Incentive/Participant =	$11,192.86	$11,192.86	$11,192.86

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$16,193	$16,193	$16,193
Cost per Participant per Dth =	$27.45	$27.45	$27.45
Lifetime Energy Reduction (Dth)	268,557		
Societal Cost per Dth	$1.17		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($467,111)	0.72
Utility Cost Test	$1,078,281	8.40
Societal Test	$1,441,092	5.58
Participant Test	$1,828,749	5.90

CUSTOM EFFICIENCY — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$517,034	$517,034	$517,034	$517,034
T & D	N/A	$312,179	$312,179	$312,179	$312,179
Marginal Energy	N/A	$2,086,595	$2,086,595	$2,086,595	$2,086,595
Environmental Externality	N/A	N/A	N/A	N/A	$612,297
Subtotal	N/A	$2,915,808	$2,915,808	$2,915,808	$3,528,105
Participant Benefits					
Bill Reduction - Electric	$4,968,385	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$341,571	N/A	N/A	$341,571	$341,571
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$6,342,173	N/A	N/A	$2,446,368	$2,446,368
Subtotal	$11,652,129	N/A	N/A	$2,787,939	$2,787,939
Total Benefits	$11,652,129	$2,915,808	$2,915,808	$5,703,746	$6,316,044
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$755,658	$755,658	$755,658	$755,658
Advertising & Promotion	N/A	$27,860	$27,860	$27,860	$27,860
Measurement & Verification	N/A	$14,404	$14,404	$14,404	$14,404
Rebates	N/A	$341,571	$341,571	$341,571	$341,571
Other	N/A	$2,152	$2,152	$2,152	$2,152
Subtotal	N/A	$1,141,645	$1,141,645	$1,141,645	$1,141,645
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$4,968,385	N/A	N/A
Subtotal	N/A	N/A	$4,968,385	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,386,935	N/A	N/A	$558,410	$558,410
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,386,935	N/A	N/A	$558,410	$558,410
Total Costs	$1,386,935	$1,141,645	$6,110,030	$1,700,055	$1,700,055
Net Benefit (Cost)	$10,265,194	$1,774,163	($3,194,222)	$4,003,691	$4,615,989
Benefit/Cost Ratio	8.40	2.55	0.48	3.36	3.72

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	18.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	73.96%
Gross Load Factor at Customer	E	53.00%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$4,689

Program Summary per Participant		
Gross kW Saved at Customer	I	18.93 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	15.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	87,904 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	94,116 kWh

Program Summary All Participants		
Total Participants	J	52
Total Budget	K	**$1,141,645**
Gross kW Saved at Customer	(J x I)	984 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**783 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	4,571,010 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**4,894,015 kWh**
Societal Net Benefits	(J x I x H)	**$4,615,989**

Utility Program Cost per kWh Lifetime	**$0.0126**
Utility Program Cost per kW at Gen	**$1,458**

CUSTOM EFFICIENCY — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$606,111	$606,111	$606,111	$606,111
T & D	N/A	$369,270	$369,270	$369,270	$369,270
Marginal Energy	N/A	$2,094,712	$2,094,712	$2,094,712	$2,094,712
Environmental Externality	N/A	N/A	N/A	N/A	$658,946
Subtotal	N/A	$3,070,093	$3,070,093	$3,070,093	$3,729,039
Participant Benefits					
Bill Reduction - Electric	$5,129,748	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$341,571	N/A	N/A	$341,571	$341,571
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$6,342,173	N/A	N/A	$2,472,262	$2,472,262
Subtotal	$11,813,492	N/A	N/A	$2,813,833	$2,813,833
Total Benefits	$11,813,492	$3,070,093	$3,070,093	$5,883,925	$6,542,872
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$863,831	$863,831	$863,831	$863,831
Advertising & Promotion	N/A	$32,059	$32,059	$32,059	$32,059
Measurement & Verification	N/A	$15,124	$15,124	$15,124	$15,124
Rebates	N/A	$341,571	$341,571	$341,571	$341,571
Other	N/A	$2,260	$2,260	$2,260	$2,260
Subtotal	N/A	$1,254,844	$1,254,844	$1,254,844	$1,254,844
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,129,748	N/A	N/A
Subtotal	N/A	N/A	$5,129,748	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,386,935	N/A	N/A	$563,917	$563,917
	$0	N/A	N/A	$0	$0
Subtotal	$1,386,935	N/A	N/A	$563,917	$563,917
Total Costs	$1,386,935	$1,254,844	$6,384,592	$1,818,761	$1,818,761
Net Benefit (Cost)	$10,426,557	$1,815,248	($3,314,500)	$4,065,164	$4,724,110
Benefit/Cost Ratio	8.52	2.45	0.48	3.24	3.60

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	18.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	73.96%
Gross Load Factor at Customer	E	53.00%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$4,799

Program Summary per Participant		
Gross kW Saved at Customer	I	18.93 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	15.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	87,904 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	94,116 kWh

Program Summary All Participants		
Total Participants	J	52
Total Budget	K	**$1,254,844**
Gross kW Saved at Customer	(J x I)	984 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**783 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	4,571,010 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**4,894,015 kWh**
Societal Net Benefits	(J x I x H)	**$4,724,110**

Utility Program Cost per kWh Lifetime	**$0.0138**
Utility Program Cost per kW at Gen	**$1,603**

CUSTOM EFFICIENCY — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$619,671	$619,671	$619,671	$619,671
T & D	N/A	$377,985	$377,985	$377,985	$377,985
Marginal Energy	N/A	$2,106,677	$2,106,677	$2,106,677	$2,106,677
Environmental Externality	N/A	N/A	N/A	N/A	$709,922
Subtotal	N/A	$3,104,333	$3,104,333	$3,104,333	$3,814,255
Participant Benefits					
Bill Reduction - Electric	$5,295,401	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$341,571	N/A	N/A	$341,571	$341,571
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$6,342,173	N/A	N/A	$2,448,749	$2,448,749
Subtotal	$11,979,145	N/A	N/A	$2,790,320	$2,790,320
Total Benefits	$11,979,145	$3,104,333	$3,104,333	$5,894,652	$6,604,574
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$988,068	$988,068	$988,068	$988,068
Advertising & Promotion	N/A	$36,796	$36,796	$36,796	$36,796
Measurement & Verification	N/A	$16,491	$16,491	$16,491	$16,491
Rebates	N/A	$341,571	$341,571	$341,571	$341,571
Other	N/A	$2,464	$2,464	$2,464	$2,464
Subtotal	N/A	$1,385,389	$1,385,389	$1,385,389	$1,385,389
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,295,401	N/A	N/A
Subtotal	N/A	N/A	$5,295,401	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,386,935	N/A	N/A	$558,917	$558,917
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,386,935	N/A	N/A	$558,917	$558,917
Total Costs	$1,386,935	$1,385,389	$6,680,790	$1,944,306	$1,944,306
Net Benefit (Cost)	$10,592,209	$1,718,944	($3,576,457)	$3,950,346	$4,660,269
Benefit/Cost Ratio	8.64	2.24	0.46	3.03	3.40

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	18.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	73.96%
Gross Load Factor at Customer	E	53.00%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$4,734

Program Summary per Participant		
Gross kW Saved at Customer	I	18.93 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	15.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	87,904 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	94,116 kWh

Program Summary All Participants		
Total Participants	J	52
Total Budget	K	**$1,385,389**
Gross kW Saved at Customer	(J x I)	984 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**783 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	4,571,010 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**4,894,015 kWh**
Societal Net Benefits	(J x I x H)	**$4,660,269**

Utility Program Cost per kWh Lifetime	**$0.0152**
Utility Program Cost per kW at Gen	**$1,770**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Custom Efficiency**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$89,905	$98,980	$122,199
Incentive Costs =	$98,883	$103,360	$103,360
16) Total Utility Project Costs =	$188,789	$202,340	$225,559
17) Direct Participant Costs ($/Part.) =	$64,533	$64,744	$64,744
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$2,599	$2,613	$2,613
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	19.5	19.5	19.5
21) Avg. Dth/Part. Saved =	805.79	810.05	810.05
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	20	21	21
24) Total Annual Dth Saved =	16,116	17,011	17,011
25) Incentive/Participant =	$4,944.16	$4,921.90	$4,921.90

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$9,439	$9,635	$10,741
Cost per Participant per Dth =	$91.80	$91.82	$93.18
Lifetime Energy Reduction (Dth)	975,993		
Societal Cost per Dth	$2.94		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,718,443)	0.71
Utility Cost Test	$3,579,561	6.80
Societal Test	$6,645,465	3.32
Participant Test	$7,013,178	3.11

DATA CENTER EFFICIENCY — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$426,124	$426,124	$426,124	$426,124
T & D	N/A	$257,280	$257,280	$257,280	$257,280
Marginal Energy	N/A	$2,456,182	$2,456,182	$2,456,182	$2,456,182
Environmental Externality	N/A	N/A	N/A	N/A	$763,912
Subtotal	N/A	$3,139,586	$3,139,586	$3,139,586	$3,903,497
Participant Benefits					
Bill Reduction - Electric	$5,499,795	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$610,432	N/A	N/A	$610,432	$610,432
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$255,445	N/A	N/A	$255,445	$255,445
Subtotal	$6,365,672	N/A	N/A	$865,877	$865,877
Total Benefits	$6,365,672	$3,139,586	$3,139,586	$4,005,463	$4,769,375
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$387,797	$387,797	$387,797	$387,797
Advertising & Promotion	N/A	$26,603	$26,603	$26,603	$26,603
Measurement & Verification	N/A	$36,860	$36,860	$36,860	$36,860
Rebates	N/A	$610,432	$610,432	$610,432	$610,432
Other	N/A	$48,400	$48,400	$48,400	$48,400
Subtotal	N/A	$1,110,092	$1,110,092	$1,110,092	$1,110,092
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,499,795	N/A	N/A
Subtotal	N/A	N/A	$5,499,795	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,907,033	N/A	N/A	$1,907,033	$1,907,033
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,907,033	N/A	N/A	$1,907,033	$1,907,033
Total Costs	$1,907,033	$1,110,092	$6,609,887	$3,017,125	$3,017,125
Net Benefit (Cost)	$4,458,639	$2,029,494	($3,470,301)	$988,338	$1,752,249
Benefit/Cost Ratio	3.34	2.83	0.47	1.33	1.58

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.7 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	75.24%
Gross Load Factor at Customer	E	86.99%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,670

Program Summary per Participant		
Gross kW Saved at Customer	I	14.99 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	12.13 kW
Gross Annual kWh Saved at Customer	(B x E x I)	114,214 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	122,284 kWh

Program Summary All Participants		
Total Participants	J	70
Total Budget	K	**$1,110,092**
Gross kW Saved at Customer	(J x I)	1,049 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**849 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	7,994,959 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**8,559,913 kWh**
Societal Net Benefits	(J x I x H)	**$1,752,249**

Utility Program Cost per kWh Lifetime	**$0.0111**
Utility Program Cost per kW at Gen	**$1,308**

DATA CENTER EFFICIENCY — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$503,456	$503,456	$503,456	$503,456
T & D	N/A	$305,791	$305,791	$305,791	$305,791
Marginal Energy	N/A	$2,565,991	$2,565,991	$2,565,991	$2,565,991
Environmental Externality	N/A	N/A	N/A	N/A	$875,877
Subtotal	N/A	$3,375,239	$3,375,239	$3,375,239	$4,251,116
Participant Benefits					
Bill Reduction - Electric	$5,890,538	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$643,513	N/A	N/A	$643,513	$643,513
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$209,000	N/A	N/A	$209,000	$209,000
Subtotal	$6,743,052	N/A	N/A	$852,514	$852,514
Total Benefits	$6,743,052	$3,375,239	$3,375,239	$4,227,753	$5,103,629
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$517,720	$517,720	$517,720	$517,720
Advertising & Promotion	N/A	$26,603	$26,603	$26,603	$26,603
Measurement & Verification	N/A	$65,720	$65,720	$65,720	$65,720
Rebates	N/A	$643,513	$643,513	$643,513	$643,513
Other	N/A	$71,800	$71,800	$71,800	$71,800
Subtotal	N/A	$1,325,356	$1,325,356	$1,325,356	$1,325,356
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,890,538	N/A	N/A
Subtotal	N/A	N/A	$5,890,538	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,970,391	N/A	N/A	$1,970,391	$1,970,391
	$0	N/A	N/A	$0	$0
Subtotal	$1,970,391	N/A	N/A	$1,970,391	$1,970,391
Total Costs	$1,970,391	$1,325,356	$7,215,894	$3,295,747	$3,295,747
Net Benefit (Cost)	$4,772,661	$2,049,882	($3,840,656)	$932,005	$1,807,882
Benefit/Cost Ratio	3.42	2.55	0.47	1.28	1.55

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	79.11%
Gross Load Factor at Customer	E	89.35%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,698

Program Summary per Participant		
Gross kW Saved at Customer	I	15.89 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	13.52 kW
Gross Annual kWh Saved at Customer	(B x E x I)	124,360 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	133,148 kWh

Program Summary All Participants		
Total Participants	J	67
Total Budget	K	**$1,325,356**
Gross kW Saved at Customer	(J x I)	1,065 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**906 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	8,332,109 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**8,920,888 kWh**
Societal Net Benefits	(J x I x H)	**$1,807,882**

Utility Program Cost per kWh Lifetime	**$0.0128**
Utility Program Cost per kW at Gen	**$1,464**

DATA CENTER EFFICIENCY — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$540,455	$540,455	$540,455	$540,455
T & D	N/A	$328,642	$328,642	$328,642	$328,642
Marginal Energy	N/A	$2,730,196	$2,730,196	$2,730,196	$2,730,196
Environmental Externality	N/A	N/A	N/A	N/A	$1,023,215
Subtotal	N/A	$3,599,293	$3,599,293	$3,599,293	$4,622,508
Participant Benefits					
Bill Reduction - Electric	$6,419,116	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$662,124	N/A	N/A	$662,124	$662,124
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$232,223	N/A	N/A	$232,223	$232,223
Subtotal	$7,313,463	N/A	N/A	$894,347	$894,347
Total Benefits	$7,313,463	$3,599,293	$3,599,293	$4,493,640	$5,516,855
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$525,563	$525,563	$525,563	$525,563
Advertising & Promotion	N/A	$26,603	$26,603	$26,603	$26,603
Measurement & Verification	N/A	$65,720	$65,720	$65,720	$65,720
Rebates	N/A	$662,124	$662,124	$662,124	$662,124
Other	N/A	$71,800	$71,800	$71,800	$71,800
Subtotal	N/A	$1,351,810	$1,351,810	$1,351,810	$1,351,810
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$6,419,116	N/A	N/A
Subtotal	N/A	N/A	$6,419,116	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,063,482	N/A	N/A	$2,063,482	$2,063,482
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$2,063,482	N/A	N/A	$2,063,482	$2,063,482
Total Costs	$2,063,482	$1,351,810	$7,770,926	$3,415,292	$3,415,292
Net Benefit (Cost)	$5,249,980	$2,247,483	($4,171,633)	$1,078,348	$2,101,563
Benefit/Cost Ratio	3.54	2.66	0.46	1.32	1.62

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.6 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	78.35%
Gross Load Factor at Customer	E	88.94%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,854

Program Summary per Participant		
Gross kW Saved at Customer	I	16.91 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	14.25 kW
Gross Annual kWh Saved at Customer	(B x E x I)	131,782 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	141,095 kWh

Program Summary All Participants		
Total Participants	J	67
Total Budget	K	**$1,351,810**
Gross kW Saved at Customer	(J x I)	1,133 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**955 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	8,829,425 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**9,453,345 kWh**
Societal Net Benefits	(J x I x H)	**$2,101,563**

Utility Program Cost per kWh Lifetime	**$0.0124**
Utility Program Cost per kW at Gen	**$1,416**

EFFICIENCY CONTROLS — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$136,460	$136,460	$136,460	$136,460
T & D	N/A	$82,392	$82,392	$82,392	$82,392
Marginal Energy	N/A	$2,429,972	$2,429,972	$2,429,972	$2,429,972
Environmental Externality	N/A	N/A	N/A	N/A	$828,717
Subtotal	N/A	$2,648,824	$2,648,824	$2,648,824	$3,477,541
Participant Benefits					
Bill Reduction - Electric	$5,273,693	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$655,024	N/A	N/A	$655,024	$655,024
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$635,529	N/A	N/A	$245,461	$245,461
Subtotal	$6,564,246	N/A	N/A	$900,484	$900,484
Total Benefits	$6,564,246	$2,648,824	$2,648,824	$3,549,308	$4,378,025
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$339,241	$339,241	$339,241	$339,241
Advertising & Promotion	N/A	$58,652	$58,652	$58,652	$58,652
Measurement & Verification	N/A	$5,000	$5,000	$5,000	$5,000
Rebates	N/A	$655,024	$655,024	$655,024	$655,024
Other	N/A	$18,000	$18,000	$18,000	$18,000
Subtotal	N/A	$1,075,917	$1,075,917	$1,075,917	$1,075,917
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,273,693	N/A	N/A
Subtotal	N/A	N/A	$5,273,693	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,511,426	N/A	N/A	$977,052	$977,052
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$2,511,426	N/A	N/A	$977,052	$977,052
Total Costs	$2,511,426	$1,075,917	$6,349,610	$2,052,969	$2,052,969
Net Benefit (Cost)	$4,052,819	$1,572,907	($3,700,786)	$1,496,339	$2,325,056
Benefit/Cost Ratio	2.61	2.46	0.42	1.73	2.13

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	21.05%
Gross Load Factor at Customer	E	78.78%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,286

Program Summary per Participant		
Gross kW Saved at Customer	I	17.54 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	3.97 kW
Gross Annual kWh Saved at Customer	(B x E x I)	121,030 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	129,582 kWh

Program Summary All Participants		
Total Participants	J	58
Total Budget	K	**$1,075,917**
Gross kW Saved at Customer	(J x I)	1,017 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**230 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	7,019,714 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**7,515,754 kWh**
Societal Net Benefits	(J x I x H)	**$2,325,056**

Utility Program Cost per kWh Lifetime	**$0.0095**
Utility Program Cost per kW at Gen	**$4,673**

EFFICIENCY CONTROLS — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$178,640	$178,640	$178,640	$178,640
T & D	N/A	$108,671	$108,671	$108,671	$108,671
Marginal Energy	N/A	$2,795,725	$2,795,725	$2,795,725	$2,795,725
Environmental Externality	N/A	N/A	N/A	N/A	$1,028,191
Subtotal	N/A	$3,083,036	$3,083,036	$3,083,036	$4,111,227
Participant Benefits					
Bill Reduction - Electric	$6,238,816	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$749,204	N/A	N/A	$749,204	$749,204
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$727,969	N/A	N/A	$280,033	$280,033
Subtotal	$7,715,990	N/A	N/A	$1,029,237	$1,029,237
Total Benefits	$7,715,990	$3,083,036	$3,083,036	$4,112,273	$5,140,464
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$346,024	$346,024	$346,024	$346,024
Advertising & Promotion	N/A	$58,652	$58,652	$58,652	$58,652
Measurement & Verification	N/A	$6,000	$6,000	$6,000	$6,000
Rebates	N/A	$749,204	$749,204	$749,204	$749,204
Other	N/A	$19,000	$19,000	$19,000	$19,000
Subtotal	N/A	$1,178,880	$1,178,880	$1,178,880	$1,178,880
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$6,238,816	N/A	N/A
Subtotal	N/A	N/A	$6,238,816	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,875,051	N/A	N/A	$1,113,048	$1,113,048
	$0	N/A	N/A	$0	$0
Subtotal	$2,875,051	N/A	N/A	$1,113,048	$1,113,048
Total Costs	$2,875,051	$1,178,880	$7,417,696	$2,291,928	$2,291,928
Net Benefit (Cost)	$4,840,939	$1,904,156	($4,334,661)	$1,820,345	$2,848,537
Benefit/Cost Ratio	2.68	2.62	0.42	1.79	2.24

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	21.05%
Gross Load Factor at Customer	E	78.78%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,445

Program Summary per Participant		
Gross kW Saved at Customer	I	17.65 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	4.00 kW
Gross Annual kWh Saved at Customer	(B x E x I)	121,830 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	130,439 kWh

Program Summary All Participants		
Total Participants	J	66
Total Budget	K	**$1,178,880**
Gross kW Saved at Customer	(J x I)	1,165 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**264 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	8,040,764 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**8,608,955 kWh**
Societal Net Benefits	(J x I x H)	**$2,848,537**

Utility Program Cost per kWh Lifetime	**$0.0091**
Utility Program Cost per kW at Gen	**$4,470**

EFFICIENCY CONTROLS — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$194,232	$194,232	$194,232	$194,232
T & D	N/A	$118,298	$118,298	$118,298	$118,298
Marginal Energy	N/A	$2,992,147	$2,992,147	$2,992,147	$2,992,147
Environmental Externality	N/A	N/A	N/A	N/A	$1,186,181
Subtotal	N/A	$3,304,677	$3,304,677	$3,304,677	$4,490,858
Participant Benefits					
Bill Reduction - Electric	$6,850,276	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$796,294	N/A	N/A	$796,294	$796,294
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$774,189	N/A	N/A	$295,726	$295,726
Subtotal	$8,420,760	N/A	N/A	$1,092,020	$1,092,020
Total Benefits	$8,420,760	$3,304,677	$3,304,677	$4,396,698	$5,582,879
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$352,119	$352,119	$352,119	$352,119
Advertising & Promotion	N/A	$58,652	$58,652	$58,652	$58,652
Measurement & Verification	N/A	$5,000	$5,000	$5,000	$5,000
Rebates	N/A	$796,294	$796,294	$796,294	$796,294
Other	N/A	$20,000	$20,000	$20,000	$20,000
Subtotal	N/A	$1,232,065	$1,232,065	$1,232,065	$1,232,065
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$6,850,276	N/A	N/A
Subtotal	N/A	N/A	$6,850,276	N/A	N/A
Participant Costs					
Incremental Capital Costs	$3,056,863	N/A	N/A	$1,174,777	$1,174,777
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$3,056,863	N/A	N/A	$1,174,777	$1,174,777
Total Costs	$3,056,863	$1,232,065	$8,082,342	$2,406,842	$2,406,842
Net Benefit (Cost)	$5,363,897	$2,072,612	($4,777,664)	$1,989,855	$3,176,037
Benefit/Cost Ratio	2.75	2.68	0.41	1.83	2.32

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	21.05%
Gross Load Factor at Customer	E	78.78%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,563

Program Summary per Participant		
Gross kW Saved at Customer	I	17.70 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	4.01 kW
Gross Annual kWh Saved at Customer	(B x E x I)	122,161 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	130,794 kWh

Program Summary All Participants		
Total Participants	J	70
Total Budget	K	**$1,232,065**
Gross kW Saved at Customer	(J x I)	1,239 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**280 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	8,551,289 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**9,155,555 kWh**
Societal Net Benefits	(J x I x H)	**$3,176,037**
Utility Program Cost per kWh Lifetime		**$0.0090**
Utility Program Cost per kW at Gen		**$4,393**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Efficiency Controls**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$45,300	$47,300	$49,300
Incentive Costs =	$131,011	$134,729	$134,729
16) Total Utility Project Costs =	$176,311	$182,029	$184,029
17) Direct Participant Costs ($/Part.) =	$62,372	$59,037	$59,037
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$1,665	$1,567	$1,567
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	15.0	15.0	15.0
21) Avg. Dth/Part. Saved =	1,003.85	944.80	944.80
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	16	17	17
24) Total Annual Dth Saved =	16,062	16,062	16,062
25) Incentive/Participant =	$8,188.20	$7,925.25	$7,925.25

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$11,019	$10,708	$10,825
Cost per Participant per Dth =	$73.11	$73.82	$73.94
Lifetime Energy Reduction (Dth)	722,772		
Societal Cost per Dth	$2.83		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,407,291)	0.70
Utility Cost Test	$2,751,853	6.07
Societal Test	$3,830,734	2.87
Participant Test	$4,110,564	2.68

FLUID SYSTEMS OPTIMIZATION — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,063,411	$1,063,411	$1,063,411	$1,063,411
T & D	N/A	$642,069	$642,069	$642,069	$642,069
Marginal Energy	N/A	$4,643,176	$4,643,176	$4,643,176	$4,643,176
Environmental Externality	N/A	N/A	N/A	N/A	$1,498,065
Subtotal	N/A	$6,348,657	$6,348,657	$6,348,657	$7,846,722
Participant Benefits					
Bill Reduction - Electric	$11,291,404	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,056,032	N/A	N/A	$1,056,032	$1,056,032
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$23,052	N/A	N/A	$23,052	$23,052
Subtotal	$12,370,488	N/A	N/A	$1,079,084	$1,079,084
Total Benefits	$12,370,488	$6,348,657	$6,348,657	$7,427,741	$8,925,806
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$386,870	$386,870	$386,870	$386,870
Advertising & Promotion	N/A	$20,000	$20,000	$20,000	$20,000
Measurement & Verification	N/A	$20,000	$20,000	$20,000	$20,000
Rebates	N/A	$1,056,032	$1,056,032	$1,056,032	$1,056,032
Other	N/A	$26,000	$26,000	$26,000	$26,000
Subtotal	N/A	$1,508,902	$1,508,902	$1,508,902	$1,508,902
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$11,291,404	N/A	N/A
Subtotal	N/A	N/A	$11,291,404	N/A	N/A
Participant Costs					
Incremental Capital Costs	$3,037,872	N/A	N/A	$3,037,872	$3,037,872
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$3,037,872	N/A	N/A	$3,037,872	$3,037,872
Total Costs	$3,037,872	$1,508,902	$12,800,306	$4,546,774	$4,546,774
Net Benefit (Cost)	$9,332,617	$4,839,754	($6,451,650)	$2,880,967	$4,379,032
Benefit/Cost Ratio	4.07	4.21	0.50	1.63	1.96

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	77.71%
Gross Load Factor at Customer	E	67.31%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,098

Program Summary per Participant		
Gross kW Saved at Customer	I	6.90 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	5.76 kW
Gross Annual kWh Saved at Customer	(B x E x I)	40,675 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	43,550 kWh

Program Summary All Participants		
Total Participants	J	303
Total Budget	K	**$1,508,902**
Gross kW Saved at Customer	(J x I)	2,087 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,744 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	12,306,346 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**13,175,959 kWh**
Societal Net Benefits	(J x I x H)	**$4,379,032**

Utility Program Cost per kWh Lifetime	**$0.0067**
Utility Program Cost per kW at Gen	**$865**

FLUID SYSTEMS OPTIMIZATION — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,328,918	$1,328,918	$1,328,918	$1,328,918
T & D	N/A	$809,727	$809,727	$809,727	$809,727
Marginal Energy	N/A	$4,852,788	$4,852,788	$4,852,788	$4,852,788
Environmental Externality	N/A	N/A	N/A	N/A	$1,692,643
Subtotal	N/A	$6,991,433	$6,991,433	$6,991,433	$8,684,076
Participant Benefits					
Bill Reduction - Electric	$12,135,362	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,109,184	N/A	N/A	$1,109,184	$1,109,184
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$26,894	N/A	N/A	$26,894	$26,894
Subtotal	$13,271,440	N/A	N/A	$1,136,078	$1,136,078
Total Benefits	$13,271,440	$6,991,433	$6,991,433	$8,127,511	$9,820,154
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$399,477	$399,477	$399,477	$399,477
Advertising & Promotion	N/A	$31,243	$31,243	$31,243	$31,243
Measurement & Verification	N/A	$20,000	$20,000	$20,000	$20,000
Rebates	N/A	$1,109,184	$1,109,184	$1,109,184	$1,109,184
Other	N/A	$26,000	$26,000	$26,000	$26,000
Subtotal	N/A	$1,585,904	$1,585,904	$1,585,904	$1,585,904
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$12,135,362	N/A	N/A
Subtotal	N/A	N/A	$12,135,362	N/A	N/A
Participant Costs					
Incremental Capital Costs	$3,179,465	N/A	N/A	$3,179,465	$3,179,465
	$0	N/A	N/A	$0	$0
Subtotal	$3,179,465	N/A	N/A	$3,179,465	$3,179,465
Total Costs	$3,179,465	$1,585,904	$13,721,266	$4,765,370	$4,765,370
Net Benefit (Cost)	$10,091,975	$5,405,529	($6,729,833)	$3,362,142	$5,054,785
Benefit/Cost Ratio	4.17	4.41	0.51	1.71	2.06

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	78.38%
Gross Load Factor at Customer	E	66.53%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,306

Program Summary per Participant		
Gross kW Saved at Customer	I	6.67 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	5.62 kW
Gross Annual kWh Saved at Customer	(B x E x I)	38,891 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	41,639 kWh

Program Summary All Participants		
Total Participants	J	329
Total Budget	K	**$1,585,904**
Gross kW Saved at Customer	(J x I)	2,192 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,848 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	12,777,606 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**13,680,520 kWh**
Societal Net Benefits	(J x I x H)	**$5,054,785**
Utility Program Cost per kWh Lifetime		**$0.0068**
Utility Program Cost per kW at Gen		**$858**

FLUID SYSTEMS OPTIMIZATION — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,424,067	$1,424,067	$1,424,067	$1,424,067
T & D	N/A	$868,746	$868,746	$868,746	$868,746
Marginal Energy	N/A	$5,041,633	$5,041,633	$5,041,633	$5,041,633
Environmental Externality	N/A	N/A	N/A	N/A	$1,896,396
Subtotal	N/A	$7,334,446	$7,334,446	$7,334,446	$9,230,842
Participant Benefits					
Bill Reduction - Electric	$12,950,723	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,155,973	N/A	N/A	$1,155,973	$1,155,973
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$30,736	N/A	N/A	$30,736	$30,736
Subtotal	$14,137,432	N/A	N/A	$1,186,709	$1,186,709
Total Benefits	$14,137,432	$7,334,446	$7,334,446	$8,521,154	$10,417,551
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$411,552	$411,552	$411,552	$411,552
Advertising & Promotion	N/A	$20,000	$20,000	$20,000	$20,000
Measurement & Verification	N/A	$31,243	$31,243	$31,243	$31,243
Rebates	N/A	$1,155,973	$1,155,973	$1,155,973	$1,155,973
Other	N/A	$26,000	$26,000	$26,000	$26,000
Subtotal	N/A	$1,644,768	$1,644,768	$1,644,768	$1,644,768
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$12,950,723	N/A	N/A
Subtotal	N/A	N/A	$12,950,723	N/A	N/A
Participant Costs					
Incremental Capital Costs	$3,314,169	N/A	N/A	$3,314,169	$3,314,169
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$3,314,169	N/A	N/A	$3,314,169	$3,314,169
Total Costs	$3,314,169	$1,644,768	$14,595,490	$4,958,937	$4,958,937
Net Benefit (Cost)	$10,823,263	$5,689,678	($7,261,045)	$3,562,218	$5,458,614
Benefit/Cost Ratio	4.27	4.46	0.50	1.72	2.10

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	78.91%
Gross Load Factor at Customer	E	66.17%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,399

Program Summary per Participant		
Gross kW Saved at Customer	I	6.56 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	5.57 kW
Gross Annual kWh Saved at Customer	(B x E x I)	38,050 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	40,738 kWh

Program Summary All Participants		
Total Participants	J	347
Total Budget	K	**$1,644,768**
Gross kW Saved at Customer	(J x I)	2,275 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,930 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	13,186,040 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**14,117,816 kWh**
Societal Net Benefits	(J x I x H)	**$5,458,614**

Utility Program Cost per kWh Lifetime	**$0.0068**
Utility Program Cost per kW at Gen	**$852**

FOODSERVICE EQUIPMENT — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$36,628	$36,628	$36,628	$36,628
T & D	N/A	$22,116	$22,116	$22,116	$22,116
Marginal Energy	N/A	$143,387	$143,387	$143,387	$143,387
Environmental Externality	N/A	N/A	N/A	N/A	$47,157
Subtotal	N/A	$202,131	$202,131	$202,131	$249,288
Participant Benefits					
Bill Reduction - Electric	$345,783	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$21,132	N/A	N/A	$21,132	$21,132
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$255,435	N/A	N/A	$13,346	$13,346
Subtotal	$622,350	N/A	N/A	$34,479	$34,479
Total Benefits	$622,350	$202,131	$202,131	$236,610	$283,766
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$11,766	$11,766	$11,766	$11,766
Advertising & Promotion	N/A	$7,886	$7,886	$7,886	$7,886
Measurement & Verification	N/A	$5,000	$5,000	$5,000	$5,000
Rebates	N/A	$21,132	$21,132	$21,132	$21,132
Other	N/A	$1,000	$1,000	$1,000	$1,000
Subtotal	N/A	$46,784	$46,784	$46,784	$46,784
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$345,783	N/A	N/A
Subtotal	N/A	N/A	$345,783	N/A	N/A
Participant Costs					
Incremental Capital Costs	$179,286	N/A	N/A	$87,053	$87,053
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$179,286	N/A	N/A	$87,053	$87,053
Total Costs	$179,286	$46,784	$392,567	$133,837	$133,837
Net Benefit (Cost)	$443,064	$155,347	($190,436)	$102,773	$149,929
Benefit/Cost Ratio	3.47	4.32	0.51	1.77	2.12

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	60.39%
Gross Load Factor at Customer	E	47.55%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,669

Program Summary per Participant		
Gross kW Saved at Customer	I	1.76 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	1.14 kW
Gross Annual kWh Saved at Customer	(B x E x I)	7,338 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	7,857 kWh

Program Summary All Participants		
Total Participants	J	51
Total Budget	K	**$46,784**
Gross kW Saved at Customer	(J x I)	90 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**58 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	374,242 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**400,687 kWh**
Societal Net Benefits	(J x I x H)	**$149,929**

Utility Program Cost per kWh Lifetime	**$0.0069**
Utility Program Cost per kW at Gen	**$802**

FOODSERVICE EQUIPMENT — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$46,777	$46,777	$46,777	$46,777
T & D	N/A	$28,482	$28,482	$28,482	$28,482
Marginal Energy	N/A	$158,915	$158,915	$158,915	$158,915
Environmental Externality	N/A	N/A	N/A	N/A	$56,154
Subtotal	N/A	$234,174	$234,174	$234,174	$290,328
Participant Benefits					
Bill Reduction - Electric	$391,789	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$26,314	N/A	N/A	$26,314	$26,314
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$259,213	N/A	N/A	$16,106	$16,106
Subtotal	$677,316	N/A	N/A	$42,420	$42,420
Total Benefits	$677,316	$234,174	$234,174	$276,594	$332,748
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$11,923	$11,923	$11,923	$11,923
Advertising & Promotion	N/A	$7,886	$7,886	$7,886	$7,886
Measurement & Verification	N/A	$5,000	$5,000	$5,000	$5,000
Rebates	N/A	$26,314	$26,314	$26,314	$26,314
Other	N/A	$1,000	$1,000	$1,000	$1,000
Subtotal	N/A	$52,123	$52,123	$52,123	$52,123
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$391,789	N/A	N/A
Subtotal	N/A	N/A	$391,789	N/A	N/A
Participant Costs					
Incremental Capital Costs	$197,184	N/A	N/A	$105,327	$105,327
	$0	N/A	N/A	$0	$0
Subtotal	$197,184	N/A	N/A	$105,327	$105,327
Total Costs	$197,184	$52,123	$443,912	$157,450	$157,450
Net Benefit (Cost)	$480,132	$182,051	($209,738)	$119,143	$175,298
Benefit/Cost Ratio	3.43	4.49	0.53	1.76	2.11

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	62.38%
Gross Load Factor at Customer	E	49.23%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,797

Program Summary per Participant		
Gross kW Saved at Customer	I	1.46 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.98 kW
Gross Annual kWh Saved at Customer	(B x E x I)	6,280 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	6,724 kWh

Program Summary All Participants		
Total Participants	J	67
Total Budget	K	**$52,123**
Gross kW Saved at Customer	(J x I)	98 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**65 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	420,745 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**450,476 kWh**
Societal Net Benefits	(J x I x H)	**$175,298**
Utility Program Cost per kWh Lifetime		**$0.0070**
Utility Program Cost per kW at Gen		**$797**

FOODSERVICE EQUIPMENT — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$53,323	$53,323	$53,323	$53,323
T & D	N/A	$32,507	$32,507	$32,507	$32,507
Marginal Energy	N/A	$178,027	$178,027	$178,027	$178,027
Environmental Externality	N/A	N/A	N/A	N/A	$67,790
Subtotal	N/A	$263,857	$263,857	$263,857	$331,647
Participant Benefits					
Bill Reduction - Electric	$451,144	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$28,781	N/A	N/A	$28,781	$28,781
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$291,447	N/A	N/A	$17,925	$17,925
Subtotal	$771,372	N/A	N/A	$46,706	$46,706
Total Benefits	$771,372	$263,857	$263,857	$310,563	$378,353
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$12,087	$12,087	$12,087	$12,087
Advertising & Promotion	N/A	$7,885	$7,885	$7,885	$7,885
Measurement & Verification	N/A	$5,000	$5,000	$5,000	$5,000
Rebates	N/A	$28,781	$28,781	$28,781	$28,781
Other	N/A	$1,000	$1,000	$1,000	$1,000
Subtotal	N/A	$54,753	$54,753	$54,753	$54,753
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$451,144	N/A	N/A
Subtotal	N/A	N/A	$451,144	N/A	N/A
Participant Costs					
Incremental Capital Costs	$218,783	N/A	N/A	$114,970	$114,970
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$218,783	N/A	N/A	$114,970	$114,970
Total Costs	$218,783	$54,753	$505,898	$169,724	$169,724
Net Benefit (Cost)	$552,589	$209,103	($242,041)	$140,839	$208,629
Benefit/Cost Ratio	3.53	4.82	0.52	1.83	2.23

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	62.19%
Gross Load Factor at Customer	E	49.09%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,917

Program Summary per Participant		
Gross kW Saved at Customer	I	1.49 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	1.00 kW
Gross Annual kWh Saved at Customer	(B x E x I)	6,412 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	6,865 kWh

Program Summary All Participants		
Total Participants	J	73
Total Budget	K	**$54,753**
Gross kW Saved at Customer	(J x I)	109 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**73 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	468,058 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**501,133 kWh**
Societal Net Benefits	(J x I x H)	**$208,629**
Utility Program Cost per kWh Lifetime		**$0.0066**
Utility Program Cost per kW at Gen		**$752**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Foodservice Equipment**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$63,194	$64,916	$66,245
Incentive Costs =	$30,183	$30,183	$30,183
16) Total Utility Project Costs =	$93,377	$95,099	$96,428
17) Direct Participant Costs ($/Part.) =	$2,753	$2,753	$2,753
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$23	$23	$23
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	12.3	12.3	12.3
21) Avg. Dth/Part. Saved =	89.43	89.43	89.43
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	67	67	67
24) Total Annual Dth Saved =	5,992	5,992	5,992
25) Incentive/Participant =	$450.50	$450.50	$450.50

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$1,394	$1,419	$1,439
Cost per Participant per Dth =	$46.37	$46.66	$46.88
Lifetime Energy Reduction (Dth)	220,928		
Societal Cost per Dth	$3.35		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($556,820)	0.65
Utility Cost Test	$750,739	3.64
Societal Test	$768,824	2.04
Participant Test	$1,426,371	2.35

HEATING EFFICIENCY — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$19,065	$19,065	$19,065	$19,065
T & D	N/A	$11,511	$11,511	$11,511	$11,511
Marginal Energy	N/A	$54,788	$54,788	$54,788	$54,788
Environmental Externality	N/A	N/A	N/A	N/A	$17,958
Subtotal	N/A	$85,364	$85,364	$85,364	$103,322
Participant Benefits					
Bill Reduction - Electric	$216,085	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$7,780	N/A	N/A	$7,780	$7,780
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$223,865	N/A	N/A	$7,780	$7,780
Total Benefits	$223,865	$85,364	$85,364	$93,144	$111,102
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$0	$0	$0	$0
Advertising & Promotion	N/A	$25	$25	$25	$25
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$7,780	$7,780	$7,780	$7,780
Other	N/A	$25	$25	$25	$25
Subtotal	N/A	$7,830	$7,830	$7,830	$7,830
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$216,085	N/A	N/A
Subtotal	N/A	N/A	$216,085	N/A	N/A
Participant Costs					
Incremental Capital Costs	$16,675	N/A	N/A	$15,578	$15,578
Incremental O&M Costs	$7,033	N/A	N/A	$0	$0
Subtotal	$23,708	N/A	N/A	$15,578	$15,578
Total Costs	$23,708	$7,830	$223,915	$23,409	$23,409
Net Benefit (Cost)	$200,157	$77,533	($138,551)	$69,736	$87,694
Benefit/Cost Ratio	9.44	10.90	0.38	3.98	4.75

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	71.65%
Gross Load Factor at Customer	E	40.69%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$2,183

Program Summary per Participant		
Gross kW Saved at Customer	I	0.63 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.49 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,238 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,443 kWh

Program Summary All Participants		
Total Participants	J	64
Total Budget	K	**$7,830**
Gross kW Saved at Customer	(J x I)	40 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**32 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	143,217 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**156,350 kWh**
Societal Net Benefits	(J x I x H)	**$87,694**

Utility Program Cost per kWh Lifetime	**$0.0031**
Utility Program Cost per kW at Gen	**$248**

HEATING EFFICIENCY — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$21,988	$21,988	$21,988	$21,988
T & D	N/A	$13,383	$13,383	$13,383	$13,383
Marginal Energy	N/A	$55,009	$55,009	$55,009	$55,009
Environmental Externality	N/A	N/A	N/A	N/A	$19,433
Subtotal	N/A	$90,381	$90,381	$90,381	$109,814
Participant Benefits					
Bill Reduction - Electric	$223,108	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$7,780	N/A	N/A	$7,780	$7,780
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$230,889	N/A	N/A	$7,780	$7,780
Total Benefits	$230,889	$90,381	$90,381	$98,161	$117,594
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$0	$0	$0	$0
Advertising & Promotion	N/A	$25	$25	$25	$25
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$7,780	$7,780	$7,780	$7,780
Other	N/A	$25	$25	$25	$25
Subtotal	N/A	$7,830	$7,830	$7,830	$7,830
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$223,108	N/A	N/A
Subtotal	N/A	N/A	$223,108	N/A	N/A
Participant Costs					
Incremental Capital Costs	$16,675	N/A	N/A	$15,599	$15,599
	$7,033	N/A	N/A	$0	$0
Subtotal	$23,708	N/A	N/A	$15,599	$15,599
Total Costs	$23,708	$7,830	$230,939	$23,429	$23,429
Net Benefit (Cost)	$207,181	$82,550	($140,558)	$74,732	$94,165
Benefit/Cost Ratio	9.74	11.54	0.39	4.19	5.02

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	71.65%
Gross Load Factor at Customer	E	40.69%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$2,344

Program Summary per Participant		
Gross kW Saved at Customer	I	0.63 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.49 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,238 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,443 kWh

Program Summary All Participants		
Total Participants	J	64
Total Budget	K	**$7,830**
Gross kW Saved at Customer	(J x I)	40 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**32 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	143,217 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**156,350 kWh**
Societal Net Benefits	(J x I x H)	**$94,165**
Utility Program Cost per kWh Lifetime		**$0.0031**
Utility Program Cost per kW at Gen		**$248**

HEATING EFFICIENCY — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$22,480	$22,480	$22,480	$22,480
T & D	N/A	$13,699	$13,699	$13,699	$13,699
Marginal Energy	N/A	$55,376	$55,376	$55,376	$55,376
Environmental Externality	N/A	N/A	N/A	N/A	$21,035
Subtotal	N/A	$91,555	$91,555	$91,555	$112,590
Participant Benefits					
Bill Reduction - Electric	$230,317	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$7,780	N/A	N/A	$7,780	$7,780
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$238,097	N/A	N/A	$7,780	$7,780
Total Benefits	$238,097	$91,555	$91,555	$99,336	$120,370
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$0	$0	$0	$0
Advertising & Promotion	N/A	$25	$25	$25	$25
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$7,780	$7,780	$7,780	$7,780
Other	N/A	$25	$25	$25	$25
Subtotal	N/A	$7,830	$7,830	$7,830	$7,830
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$230,317	N/A	N/A
Subtotal	N/A	N/A	$230,317	N/A	N/A
Participant Costs					
Incremental Capital Costs	$16,675	N/A	N/A	$15,593	$15,593
Incremental O&M Costs	$7,033	N/A	N/A	$0	$0
Subtotal	$23,708	N/A	N/A	$15,593	$15,593
Total Costs	$23,708	$7,830	$238,147	$23,423	$23,423
Net Benefit (Cost)	$214,389	$83,725	($146,592)	$75,912	$96,947
Benefit/Cost Ratio	10.04	11.69	0.38	4.24	5.14

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	71.65%
Gross Load Factor at Customer	E	40.69%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$2,413

Program Summary per Participant		
Gross kW Saved at Customer	I	0.63 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.49 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,238 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,443 kWh

Program Summary All Participants		
Total Participants	J	64
Total Budget	K	**$7,830**
Gross kW Saved at Customer	(J x I)	40 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**32 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	143,217 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**156,350 kWh**
Societal Net Benefits	(J x I x H)	**$96,947**
Utility Program Cost per kWh Lifetime		**$0.0031**
Utility Program Cost per kW at Gen		**$248**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Heating Efficiency**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$686,323	$686,628	$716,628
Incentive Costs =	$622,885	$635,751	$635,751
16) Total Utility Project Costs =	$1,309,208	$1,322,379	$1,352,379
17) Direct Participant Costs ($/Part.) =	$3,441	$3,612	$3,612
18) Participant Non-Energy Costs (Annual $/Part.) =	$30	$31	$31
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	7.5	7.6	7.6
21) Avg. Dth/Part. Saved =	194.47	203.52	203.52
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	576	558	558
24) Total Annual Dth Saved =	112,002	113,549	113,549
25) Incentive/Participant =	$1,081.52	$1,139.47	$1,139.47

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$2,273	$2,370	$2,424
Cost per Participant per Dth =	$29.54	$29.55	$29.81
Lifetime Energy Reduction (Dth)	2,553,006		
Societal Cost per Dth	$3.68		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($7,082,971)	0.62
Utility Cost Test	$7,819,195	2.96
Societal Test	$7,723,385	1.82
Participant Test	$14,804,611	2.10

LIGHTING EFFICIENCY — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,588,882	$3,588,882	$3,588,882	$3,588,882
T & D	N/A	$2,166,890	$2,166,890	$2,166,890	$2,166,890
Marginal Energy	N/A	$18,176,469	$18,176,469	$18,176,469	$18,176,469
Environmental Externality	N/A	N/A	N/A	N/A	$5,371,149
Subtotal	N/A	$23,932,242	$23,932,242	$23,932,242	$29,303,390
Participant Benefits					
Bill Reduction - Electric	$42,275,420	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$3,807,406	N/A	N/A	$3,807,406	$3,807,406
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$5,951	$5,951
Subtotal	$46,082,826	N/A	N/A	$3,813,357	$3,813,357
Total Benefits	$46,082,826	$23,932,242	$23,932,242	$27,745,599	$33,116,747
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$1,860,253	$1,860,253	$1,860,253	$1,860,253
Advertising & Promotion	N/A	$65,002	$65,002	$65,002	$65,002
Measurement & Verification	N/A	$75,000	$75,000	$75,000	$75,000
Rebates	N/A	$3,807,406	$3,807,406	$3,807,406	$3,807,406
Other	N/A	$100,000	$100,000	$100,000	$100,000
Subtotal	N/A	$5,907,661	$5,907,661	$5,907,661	$5,907,661
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$42,275,420	N/A	N/A
Subtotal	N/A	N/A	$42,275,420	N/A	N/A
Participant Costs					
Incremental Capital Costs	$14,640,474	N/A	N/A	$14,640,474	$14,640,474
Incremental O&M Costs	$1,206,899	N/A	N/A	$0	$0
Subtotal	$15,847,373	N/A	N/A	$14,640,474	$14,640,474
Total Costs	$15,847,373	$5,907,661	$48,183,081	$20,548,135	$20,548,135
Net Benefit (Cost)	$30,235,453	$18,024,580	($24,250,839)	$7,197,463	$12,568,612
Benefit/Cost Ratio	2.91	4.05	0.50	1.35	1.61

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	65.15%
Gross Load Factor at Customer	E	57.55%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,413

Program Summary per Participant		
Gross kW Saved at Customer	I	7.16 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	5.02 kW
Gross Annual kWh Saved at Customer	(B x E x I)	36,097 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	38,648 kWh

Program Summary All Participants		
Total Participants	J	1,242
Total Budget	K	**$5,907,661**
Gross kW Saved at Customer	(J x I)	8,893 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**6,230 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	44,832,186 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**48,000,199 kWh**
Societal Net Benefits	(J x I x H)	**$12,568,612**

Utility Program Cost per kWh Lifetime	**$0.0075**
Utility Program Cost per kW at Gen	**$948**

LIGHTING EFFICIENCY — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$4,377,807	$4,377,807	$4,377,807	$4,377,807
T & D	N/A	$2,664,869	$2,664,869	$2,664,869	$2,664,869
Marginal Energy	N/A	$19,568,023	$19,568,023	$19,568,023	$19,568,023
Environmental Externality	N/A	N/A	N/A	N/A	$6,248,843
Subtotal	N/A	$26,610,699	$26,610,699	$26,610,699	$32,859,542
Participant Benefits					
Bill Reduction - Electric	$46,833,006	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,145,354	N/A	N/A	$4,145,354	$4,145,354
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$5,951	$5,951
Subtotal	$50,978,360	N/A	N/A	$4,151,305	$4,151,305
Total Benefits	$50,978,360	$26,610,699	$26,610,699	$30,762,004	$37,010,847
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$1,912,444	$1,912,444	$1,912,444	$1,912,444
Advertising & Promotion	N/A	$65,002	$65,002	$65,002	$65,002
Measurement & Verification	N/A	$75,000	$75,000	$75,000	$75,000
Rebates	N/A	$4,145,354	$4,145,354	$4,145,354	$4,145,354
Other	N/A	$100,000	$100,000	$100,000	$100,000
Subtotal	N/A	$6,297,800	$6,297,800	$6,297,800	$6,297,800
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$46,833,006	N/A	N/A
Subtotal	N/A	N/A	$46,833,006	N/A	N/A
Participant Costs					
Incremental Capital Costs	$16,351,771	N/A	N/A	$16,351,771	$16,351,771
	$1,399,296	N/A	N/A	$0	$0
Subtotal	$17,751,066	N/A	N/A	$16,351,771	$16,351,771
Total Costs	$17,751,066	$6,297,800	$53,130,806	$22,649,571	$22,649,571
Net Benefit (Cost)	$33,227,294	$20,312,899	($26,520,107)	$8,112,434	$14,361,277
Benefit/Cost Ratio	2.87	4.23	0.50	1.36	1.63

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	65.37%
Gross Load Factor at Customer	E	58.32%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,525

Program Summary per Participant		
Gross kW Saved at Customer	I	6.87 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	4.83 kW
Gross Annual kWh Saved at Customer	(B x E x I)	35,085 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	37,564 kWh

Program Summary All Participants		
Total Participants	J	1,371
Total Budget	K	**$6,297,800**
Gross kW Saved at Customer	(J x I)	9,415 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**6,618 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	48,101,097 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**51,500,104 kWh**
Societal Net Benefits	(J x I x H)	**$14,361,277**
Utility Program Cost per kWh Lifetime		**$0.0075**
Utility Program Cost per kW at Gen		**$952**

LIGHTING EFFICIENCY — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$4,543,913	$4,543,913	$4,543,913	$4,543,913
T & D	N/A	$2,769,137	$2,769,137	$2,769,137	$2,769,137
Marginal Energy	N/A	$20,196,053	$20,196,053	$20,196,053	$20,196,053
Environmental Externality	N/A	N/A	N/A	N/A	$6,962,786
Subtotal	N/A	$27,509,103	$27,509,103	$27,509,103	$34,471,889
Participant Benefits					
Bill Reduction - Electric	$49,618,100	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,421,832	N/A	N/A	$4,421,832	$4,421,832
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$5,951	$5,951
Subtotal	$54,039,932	N/A	N/A	$4,427,782	$4,427,782
Total Benefits	$54,039,932	$27,509,103	$27,509,103	$31,936,885	$38,899,672
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$1,966,570	$1,966,570	$1,966,570	$1,966,570
Advertising & Promotion	N/A	$65,002	$65,002	$65,002	$65,002
Measurement & Verification	N/A	$75,000	$75,000	$75,000	$75,000
Rebates	N/A	$4,421,832	$4,421,832	$4,421,832	$4,421,832
Other	N/A	$100,000	$100,000	$100,000	$100,000
Subtotal	N/A	$6,628,404	$6,628,404	$6,628,404	$6,628,404
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$49,618,100	N/A	N/A
Subtotal	N/A	N/A	$49,618,100	N/A	N/A
Participant Costs					
Incremental Capital Costs	$17,642,043	N/A	N/A	$17,642,043	$17,642,043
Incremental O&M Costs	$1,454,278	N/A	N/A	$0	$0
Subtotal	$19,096,321	N/A	N/A	$17,642,043	$17,642,043
Total Costs	$19,096,321	$6,628,404	$56,246,504	$24,270,447	$24,270,447
Net Benefit (Cost)	$34,943,610	$20,880,699	($28,737,401)	$7,666,439	$14,629,225
Benefit/Cost Ratio	2.83	4.15	0.49	1.32	1.60

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	65.49%
Gross Load Factor at Customer	E	58.75%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,518

Program Summary per Participant		
Gross kW Saved at Customer	I	6.64 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	4.67 kW
Gross Annual kWh Saved at Customer	(B x E x I)	34,157 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	36,570 kWh

Program Summary All Participants		
Total Participants	J	1,452
Total Budget	K	**$6,628,404**
Gross kW Saved at Customer	(J x I)	9,637 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**6,786 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	49,595,423 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**53,100,025 kWh**
Societal Net Benefits	(J x I x H)	**$14,629,225**

Utility Program Cost per kWh Lifetime	**$0.0077**
Utility Program Cost per kW at Gen	**$977**

MOTOR EFFICIENCY — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,072,406	$2,072,406	$2,072,406	$2,072,406
T & D	N/A	$1,251,279	$1,251,279	$1,251,279	$1,251,279
Marginal Energy	N/A	$8,077,242	$8,077,242	$8,077,242	$8,077,242
Environmental Externality	N/A	N/A	N/A	N/A	$2,320,074
Subtotal	N/A	$11,400,926	$11,400,926	$11,400,926	$13,721,000
Participant Benefits					
Bill Reduction - Electric	$18,840,515	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,792,530	N/A	N/A	$1,792,530	$1,792,530
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$78,396	N/A	N/A	$78,396	$78,396
Subtotal	$20,711,441	N/A	N/A	$1,870,926	$1,870,926
Total Benefits	$20,711,441	$11,400,926	$11,400,926	$13,271,852	$15,591,926
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$634,900	$634,900	$634,900	$634,900
Advertising & Promotion	N/A	$35,000	$35,000	$35,000	$35,000
Measurement & Verification	N/A	$20,000	$20,000	$20,000	$20,000
Rebates	N/A	$1,792,530	$1,792,530	$1,792,530	$1,792,530
Other	N/A	$75,632	$75,632	$75,632	$75,632
Subtotal	N/A	$2,558,062	$2,558,062	$2,558,062	$2,558,062
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$18,840,515	N/A	N/A
Subtotal	N/A	N/A	$18,840,515	N/A	N/A
Participant Costs					
Incremental Capital Costs	$6,262,180	N/A	N/A	$6,262,180	$6,262,180
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$6,262,180	N/A	N/A	$6,262,180	$6,262,180
Total Costs	$6,262,180	$2,558,062	$21,398,577	$8,820,242	$8,820,242
Net Benefit (Cost)	$14,449,260	$8,842,865	($9,997,650)	$4,451,610	$6,771,683
Benefit/Cost Ratio	3.31	4.46	0.53	1.50	1.77

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	76.29%
Gross Load Factor at Customer	E	52.59%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,590

Program Summary per Participant		
Gross kW Saved at Customer	I	11.93 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	9.78 kW
Gross Annual kWh Saved at Customer	(B x E x I)	54,943 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	58,825 kWh

Program Summary All Participants		
Total Participants	J	357
Total Budget	K	**$2,558,062**
Gross kW Saved at Customer	(J x I)	4,258 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,493 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	19,614,553 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**21,000,592 kWh**
Societal Net Benefits	(J x I x H)	**$6,771,683**

Utility Program Cost per kWh Lifetime	**$0.0081**
Utility Program Cost per kW at Gen	**$732**

MOTOR EFFICIENCY — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,426,737	$2,426,737	$2,426,737	$2,426,737
T & D	N/A	$1,476,272	$1,476,272	$1,476,272	$1,476,272
Marginal Energy	N/A	$8,307,690	$8,307,690	$8,307,690	$8,307,690
Environmental Externality	N/A	N/A	N/A	N/A	$2,573,234
Subtotal	N/A	$12,210,698	$12,210,698	$12,210,698	$14,783,933
Participant Benefits					
Bill Reduction - Electric	$19,927,157	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,845,141	N/A	N/A	$1,845,141	$1,845,141
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$78,396	N/A	N/A	$78,396	$78,396
Subtotal	$21,850,693	N/A	N/A	$1,923,537	$1,923,537
Total Benefits	$21,850,693	$12,210,698	$12,210,698	$14,134,235	$16,707,469
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$634,900	$634,900	$634,900	$634,900
Advertising & Promotion	N/A	$35,200	$35,200	$35,200	$35,200
Measurement & Verification	N/A	$20,000	$20,000	$20,000	$20,000
Rebates	N/A	$1,845,141	$1,845,141	$1,845,141	$1,845,141
Other	N/A	$75,632	$75,632	$75,632	$75,632
Subtotal	N/A	$2,610,873	$2,610,873	$2,610,873	$2,610,873
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$19,927,157	N/A	N/A
Subtotal	N/A	N/A	$19,927,157	N/A	N/A
Participant Costs					
Incremental Capital Costs	$6,434,952	N/A	N/A	$6,434,952	$6,434,952
	$0	N/A	N/A	$0	$0
Subtotal	$6,434,952	N/A	N/A	$6,434,952	$6,434,952
Total Costs	$6,434,952	$2,610,873	$22,538,029	$9,045,825	$9,045,825
Net Benefit (Cost)	$15,415,741	$9,599,826	($10,327,331)	$5,088,410	$7,661,644
Benefit/Cost Ratio	3.40	4.68	0.54	1.56	1.85

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	76.33%
Gross Load Factor at Customer	E	52.60%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,758

Program Summary per Participant		
Gross kW Saved at Customer	I	9.60 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	7.88 kW
Gross Annual kWh Saved at Customer	(B x E x I)	44,232 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	47,357 kWh

Program Summary All Participants		
Total Participants	J	454
Total Budget	K	**$2,610,873**
Gross kW Saved at Customer	(J x I)	4,358 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,577 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	20,081,198 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**21,500,212 kWh**
Societal Net Benefits	(J x I x H)	**$7,661,644**

Utility Program Cost per kWh Lifetime	**$0.0081**
Utility Program Cost per kW at Gen	**$730**

MOTOR EFFICIENCY — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,539,363	$2,539,363	$2,539,363	$2,539,363
T & D	N/A	$1,546,640	$1,546,640	$1,546,640	$1,546,640
Marginal Energy	N/A	$8,553,750	$8,553,750	$8,553,750	$8,553,750
Environmental Externality	N/A	N/A	N/A	N/A	$2,855,673
Subtotal	N/A	$12,639,754	$12,639,754	$12,639,754	$15,495,426
Participant Benefits					
Bill Reduction - Electric	$21,050,328	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,884,666	N/A	N/A	$1,884,666	$1,884,666
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$78,396	N/A	N/A	$78,396	$78,396
Subtotal	$23,013,390	N/A	N/A	$1,963,062	$1,963,062
Total Benefits	$23,013,390	$12,639,754	$12,639,754	$14,602,816	$17,458,489
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$634,900	$634,900	$634,900	$634,900
Advertising & Promotion	N/A	$35,500	$35,500	$35,500	$35,500
Measurement & Verification	N/A	$20,000	$20,000	$20,000	$20,000
Rebates	N/A	$1,884,666	$1,884,666	$1,884,666	$1,884,666
Other	N/A	$75,632	$75,632	$75,632	$75,632
Subtotal	N/A	$2,650,698	$2,650,698	$2,650,698	$2,650,698
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$21,050,328	N/A	N/A
Subtotal	N/A	N/A	$21,050,328	N/A	N/A
Participant Costs					
Incremental Capital Costs	$6,576,028	N/A	N/A	$6,576,028	$6,576,028
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$6,576,028	N/A	N/A	$6,576,028	$6,576,028
Total Costs	$6,576,028	$2,650,698	$23,701,026	$9,226,727	$9,226,727
Net Benefit (Cost)	$16,437,362	$9,989,055	($11,061,273)	$5,376,089	$8,231,762
Benefit/Cost Ratio	3.50	4.77	0.53	1.58	1.89

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	76.37%
Gross Load Factor at Customer	E	52.61%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,846

Program Summary per Participant		
Gross kW Saved at Customer	I	9.59 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	7.87 kW
Gross Annual kWh Saved at Customer	(B x E x I)	44,189 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	47,312 kWh

Program Summary All Participants		
Total Participants	J	465
Total Budget	K	**$2,650,698**
Gross kW Saved at Customer	(J x I)	4,458 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,661 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	20,548,023 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**22,000,025 kWh**
Societal Net Benefits	(J x I x H)	**$8,231,762**

Utility Program Cost per kWh Lifetime	**$0.0080**
Utility Program Cost per kW at Gen	**$724**

MULTI-FAMILY BUILDING EFFICIENCY — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$115,728	$115,728	$115,728	$115,728
T & D	N/A	$69,874	$69,874	$69,874	$69,874
Marginal Energy	N/A	$548,804	$548,804	$548,804	$548,804
Environmental Externality	N/A	N/A	N/A	N/A	$168,970
Subtotal	N/A	$734,406	$734,406	$734,406	$903,376
Participant Benefits					
Bill Reduction - Electric	$1,684,023	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$112,106	N/A	N/A	$112,106	$112,106
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$45,048	N/A	N/A	$45,048	$45,048
Subtotal	$1,841,177	N/A	N/A	$157,153	$157,153
Total Benefits	$1,841,177	$734,406	$734,406	$891,559	$1,060,529
Costs					
Utility Project Costs					
Customer Services	N/A	$405,000	$405,000	$405,000	$405,000
Project Administration	N/A	$116,000	$116,000	$116,000	$116,000
Advertising & Promotion	N/A	$3,500	$3,500	$3,500	$3,500
Measurement & Verification	N/A	$20,000	$20,000	$20,000	$20,000
Rebates	N/A	$112,106	$112,106	$112,106	$112,106
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$656,606	$656,606	$656,606	$656,606
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,684,023	N/A	N/A
Subtotal	N/A	N/A	$1,684,023	N/A	N/A
Participant Costs					
Incremental Capital Costs	$106,471	N/A	N/A	$37,245	$37,245
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$106,471	N/A	N/A	$37,245	$37,245
Total Costs	$106,471	$656,606	$2,340,629	$693,851	$693,851
Net Benefit (Cost)	$1,734,706	$77,800	($1,606,224)	$197,708	$366,678
Benefit/Cost Ratio	17.29	1.12	0.31	1.28	1.53

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	14.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	16.64%
Gross Load Factor at Customer	E	14.68%
Transmission Loss Factor (Energy)	F	7.512%
Transmission Loss Factor (Demand)	G	8.611%
Societal Net Benefit (Cost)	H	$305

Program Summary per Participant		
Gross kW Saved at Customer	I	0.40 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.07 kW
Gross Annual kWh Saved at Customer	(B x E x I)	509 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	550 kWh

Program Summary All Participants		
Total Participants	J	3,038
Total Budget	K	**$656,606**
Gross kW Saved at Customer	(J x I)	1,201 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**219 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,544,701 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,670,172 kWh**
Societal Net Benefits	(J x I x H)	**$366,678**

Utility Program Cost per kWh Lifetime	**$0.0273**
Utility Program Cost per kW at Gen	**$3,001**

MULTI-FAMILY BUILDING EFFICIENCY — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$197,841	$197,841	$197,841	$197,841
T & D	N/A	$120,355	$120,355	$120,355	$120,355
Marginal Energy	N/A	$825,259	$825,259	$825,259	$825,259
Environmental Externality	N/A	N/A	N/A	N/A	$276,302
Subtotal	N/A	$1,143,455	$1,143,455	$1,143,455	$1,419,757
Participant Benefits					
Bill Reduction - Electric	$2,603,122	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$166,913	N/A	N/A	$166,913	$166,913
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$67,571	N/A	N/A	$67,571	$67,571
Subtotal	$2,837,607	N/A	N/A	$234,484	$234,484
Total Benefits	$2,837,607	$1,143,455	$1,143,455	$1,377,939	$1,654,241
Costs					
Utility Project Costs					
Customer Services	N/A	$610,000	$610,000	$610,000	$610,000
Project Administration	N/A	$176,000	$176,000	$176,000	$176,000
Advertising & Promotion	N/A	$6,200	$6,200	$6,200	$6,200
Measurement & Verification	N/A	$33,000	$33,000	$33,000	$33,000
Rebates	N/A	$166,913	$166,913	$166,913	$166,913
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$992,113	$992,113	$992,113	$992,113
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,603,122	N/A	N/A
Subtotal	N/A	N/A	$2,603,122	N/A	N/A
Participant Costs					
Incremental Capital Costs	$158,523	N/A	N/A	$55,976	$55,976
	$0	N/A	N/A	$0	$0
Subtotal	$158,523	N/A	N/A	$55,976	$55,976
Total Costs	$158,523	$992,113	$3,595,235	$1,048,089	$1,048,089
Net Benefit (Cost)	$2,679,083	$151,342	($2,451,780)	$329,850	$606,153
Benefit/Cost Ratio	17.90	1.15	0.32	1.31	1.58

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	14.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	16.62%
Gross Load Factor at Customer	E	14.65%
Transmission Loss Factor (Energy)	F	7.514%
Transmission Loss Factor (Demand)	G	8.611%
Societal Net Benefit (Cost)	H	$336

Program Summary per Participant		
Gross kW Saved at Customer	I	0.40 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.07 kW
Gross Annual kWh Saved at Customer	(B x E x I)	508 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	549 kWh

Program Summary All Participants		
Total Participants	J	4,556
Total Budget	K	**$992,113**
Gross kW Saved at Customer	(J x I)	1,801 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**328 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	2,312,308 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**2,500,180 kWh**
Societal Net Benefits	(J x I x H)	**$606,153**

Utility Program Cost per kWh Lifetime	**$0.0276**
Utility Program Cost per kW at Gen	**$3,028**

MULTI-FAMILY BUILDING EFFICIENCY — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$304,800	$304,800	$304,800	$304,800
T & D	N/A	$185,647	$185,647	$185,647	$185,647
Marginal Energy	N/A	$1,251,886	$1,251,886	$1,251,886	$1,251,886
Environmental Externality	N/A	N/A	N/A	N/A	$454,914
Subtotal	N/A	$1,742,333	$1,742,333	$1,742,333	$2,197,247
Participant Benefits					
Bill Reduction - Electric	$4,049,245	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$251,615	N/A	N/A	$251,615	$251,615
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$101,807	N/A	N/A	$101,807	$101,807
Subtotal	$4,402,668	N/A	N/A	$353,423	$353,423
Total Benefits	$4,402,668	$1,742,333	$1,742,333	$2,095,756	$2,550,670
Costs					
Utility Project Costs					
Customer Services	N/A	$920,000	$920,000	$920,000	$920,000
Project Administration	N/A	$259,000	$259,000	$259,000	$259,000
Advertising & Promotion	N/A	$10,000	$10,000	$10,000	$10,000
Measurement & Verification	N/A	$49,000	$49,000	$49,000	$49,000
Rebates	N/A	$251,615	$251,615	$251,615	$251,615
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$1,489,615	$1,489,615	$1,489,615	$1,489,615
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$4,049,245	N/A	N/A
Subtotal	N/A	N/A	$4,049,245	N/A	N/A
Participant Costs					
Incremental Capital Costs	$238,968	N/A	N/A	$83,508	$83,508
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$238,968	N/A	N/A	$83,508	$83,508
Total Costs	$238,968	$1,489,615	$5,538,860	$1,573,123	$1,573,123
Net Benefit (Cost)	$4,163,700	$252,718	($3,796,527)	$522,632	$977,547
Benefit/Cost Ratio	18.42	1.17	0.31	1.33	1.62

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	14.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	16.62%
Gross Load Factor at Customer	E	14.65%
Transmission Loss Factor (Energy)	F	7.514%
Transmission Loss Factor (Demand)	G	8.611%
Societal Net Benefit (Cost)	H	$360

Program Summary per Participant		
Gross kW Saved at Customer	I	0.40 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.07 kW
Gross Annual kWh Saved at Customer	(B x E x I)	508 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	549 kWh

Program Summary All Participants		
Total Participants	J	6,865
Total Budget	K	**$1,489,615**
Gross kW Saved at Customer	(J x I)	2,714 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**494 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,484,383 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,767,479 kWh**
Societal Net Benefits	(J x I x H)	**$977,547**

Utility Program Cost per kWh Lifetime	**$0.0275**
Utility Program Cost per kW at Gen	**$3,018**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Multi-Family Building Efficiency**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$186,200	$284,000	$419,000
Incentive Costs =	$94,540	$129,993	$200,898
16) Total Utility Project Costs =	$280,740	$413,993	$619,898
17) Direct Participant Costs ($/Part.) =	$89	$81	$83
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$39	$39	$39
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	13.6	13.4	13.5
21) Avg. Dth/Part. Saved =	4.13	4.00	4.04
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	1,013	1,519	2,288
24) Total Annual Dth Saved =	4,177	6,075	9,234
25) Incentive/Participant =	$93.37	$85.59	$87.80

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$277	$273	$271
Cost per Participant per Dth =	$88.71	$88.47	$87.79
Lifetime Energy Reduction (Dth)	262,768		
Societal Cost per Dth	$4.50		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,632,440)	0.43
Utility Cost Test	($104,194)	0.92
Societal Test	$2,393,855	3.02
Participant Test	$3,891,947	3.49

PROCESS EFFICIENCY — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,393,597	$3,393,597	$3,393,597	$3,393,597
T & D	N/A	$2,049,005	$2,049,005	$2,049,005	$2,049,005
Marginal Energy	N/A	$20,218,098	$20,218,098	$20,218,098	$20,218,098
Environmental Externality	N/A	N/A	N/A	N/A	$5,930,575
Subtotal	N/A	$25,660,700	$25,660,700	$25,660,700	$31,591,275
Participant Benefits					
Bill Reduction - Electric	$47,764,497	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,665,842	N/A	N/A	$4,665,842	$4,665,842
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$32,946,749	N/A	N/A	$18,494,221	$18,494,221
Subtotal	$85,377,088	N/A	N/A	$23,160,063	$23,160,063
Total Benefits	$85,377,088	$25,660,700	$25,660,700	$48,820,763	$54,751,338
Costs					
Utility Project Costs					
Customer Services	N/A	$675,000	$675,000	$675,000	$675,000
Project Administration	N/A	$1,107,688	$1,107,688	$1,107,688	$1,107,688
Advertising & Promotion	N/A	$29,335	$29,335	$29,335	$29,335
Measurement & Verification	N/A	$85,000	$85,000	$85,000	$85,000
Rebates	N/A	$4,665,842	$4,665,842	$4,665,842	$4,665,842
Other	N/A	$383,000	$383,000	$383,000	$383,000
Subtotal	N/A	$6,945,865	$6,945,865	$6,945,865	$6,945,865
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$47,764,497	N/A	N/A
Subtotal	N/A	N/A	$47,764,497	N/A	N/A
Participant Costs					
Incremental Capital Costs	$19,627,357	N/A	N/A	$14,213,546	$14,213,546
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$19,627,357	N/A	N/A	$14,213,546	$14,213,546
Total Costs	$19,627,357	$6,945,865	$54,710,362	$21,159,411	$21,159,411
Net Benefit (Cost)	$65,749,731	$18,714,835	($29,049,661)	$27,661,352	$33,591,927
Benefit/Cost Ratio	4.35	3.69	0.47	2.31	2.59

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	53.66%
Gross Load Factor at Customer	E	57.04%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$3,626

Program Summary per Participant		
Gross kW Saved at Customer	I	37.20 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	21.47 kW
Gross Annual kWh Saved at Customer	(B x E x I)	185,899 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	199,036 kWh

Program Summary All Participants		
Total Participants	J	249
Total Budget	K	**$6,945,865**
Gross kW Saved at Customer	(J x I)	9,263 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**5,345 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	46,288,902 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**49,559,852 kWh**
Societal Net Benefits	(J x I x H)	**$33,591,927**

Utility Program Cost per kWh Lifetime	**$0.0080**
Utility Program Cost per kW at Gen	**$1,299**

PROCESS EFFICIENCY | **2018** | **ELECTRIC** | **GOAL**

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,891,342	$3,891,342	$3,891,342	$3,891,342
T & D	N/A	$2,369,537	$2,369,537	$2,369,537	$2,369,537
Marginal Energy	N/A	$19,502,552	$19,502,552	$19,502,552	$19,502,552
Environmental Externality	N/A	N/A	N/A	N/A	$6,144,830
Subtotal	N/A	$25,763,431	$25,763,431	$25,763,431	$31,908,261
Participant Benefits					
Bill Reduction - Electric	$47,368,284	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,551,519	N/A	N/A	$4,551,519	$4,551,519
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$30,432,927	N/A	N/A	$17,028,681	$17,028,681
Subtotal	$82,352,730	N/A	N/A	$21,580,200	$21,580,200
Total Benefits	$82,352,730	$25,763,431	$25,763,431	$47,343,631	$53,488,461
Costs					
Utility Project Costs					
Customer Services	N/A	$675,000	$675,000	$675,000	$675,000
Project Administration	N/A	$1,484,430	$1,484,430	$1,484,430	$1,484,430
Advertising & Promotion	N/A	$29,335	$29,335	$29,335	$29,335
Measurement & Verification	N/A	$86,000	$86,000	$86,000	$86,000
Rebates	N/A	$4,551,519	$4,551,519	$4,551,519	$4,551,519
Other	N/A	$33,000	$33,000	$33,000	$33,000
Subtotal	N/A	$6,859,284	$6,859,284	$6,859,284	$6,859,284
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$47,368,284	N/A	N/A
Subtotal	N/A	N/A	$47,368,284	N/A	N/A
Participant Costs					
Incremental Capital Costs	$18,781,208	N/A	N/A	$13,725,301	$13,725,301
	$0	N/A	N/A	$0	$0
Subtotal	$18,781,208	N/A	N/A	$13,725,301	$13,725,301
Total Costs	$18,781,208	$6,859,284	$54,227,568	$20,584,584	$20,584,584
Net Benefit (Cost)	$63,571,522	$18,904,147	($28,464,137)	$26,759,046	$32,903,877
Benefit/Cost Ratio	4.38	3.76	0.48	2.30	2.60

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	54.69%
Gross Load Factor at Customer	E	56.67%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$3,666

Program Summary per Participant		
Gross kW Saved at Customer	I	36.93 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	21.72 kW
Gross Annual kWh Saved at Customer	(B x E x I)	183,335 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	196,290 kWh

Program Summary All Participants		
Total Participants	J	243
Total Budget	K	**$6,859,284**
Gross kW Saved at Customer	(J x I)	8,974 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**5,278 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	44,550,302 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**47,698,396 kWh**
Societal Net Benefits	(J x I x H)	**$32,903,877**

Utility Program Cost per kWh Lifetime	**$0.0083**
Utility Program Cost per kW at Gen	**$1,300**

PROCESS EFFICIENCY	2019	ELECTRIC	GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,934,121	$3,934,121	$3,934,121	$3,934,121
T & D	N/A	$2,398,449	$2,398,449	$2,398,449	$2,398,449
Marginal Energy	N/A	$18,941,771	$18,941,771	$18,941,771	$18,941,771
Environmental Externality	N/A	N/A	N/A	N/A	$6,410,919
Subtotal	N/A	$25,274,341	$25,274,341	$25,274,341	$31,685,260
Participant Benefits					
Bill Reduction - Electric	$47,221,399	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,456,249	N/A	N/A	$4,456,249	$4,456,249
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$28,338,075	N/A	N/A	$15,753,688	$15,753,688
Subtotal	$80,015,723	N/A	N/A	$20,209,937	$20,209,937
Total Benefits	$80,015,723	$25,274,341	$25,274,341	$45,484,278	$51,895,197
Costs					
Utility Project Costs					
Customer Services	N/A	$675,000	$675,000	$675,000	$675,000
Project Administration	N/A	$1,506,202	$1,506,202	$1,506,202	$1,506,202
Advertising & Promotion	N/A	$6,835	$6,835	$6,835	$6,835
Measurement & Verification	N/A	$87,000	$87,000	$87,000	$87,000
Rebates	N/A	$4,456,249	$4,456,249	$4,456,249	$4,456,249
Other	N/A	$33,000	$33,000	$33,000	$33,000
Subtotal	N/A	$6,764,286	$6,764,286	$6,764,286	$6,764,286
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$47,221,399	N/A	N/A
Subtotal	N/A	N/A	$47,221,399	N/A	N/A
Participant Costs					
Incremental Capital Costs	$18,076,083	N/A	N/A	$13,291,640	$13,291,640
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$18,076,083	N/A	N/A	$13,291,640	$13,291,640
Total Costs	$18,076,083	$6,764,286	$53,985,685	$20,055,926	$20,055,926
Net Benefit (Cost)	$61,939,640	$18,510,055	($28,711,344)	$25,428,352	$31,839,270
Benefit/Cost Ratio	4.43	3.74	0.47	2.27	2.59

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	55.61%
Gross Load Factor at Customer	E	56.34%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$3,645

Program Summary per Participant		
Gross kW Saved at Customer	I	36.70 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	21.94 kW
Gross Annual kWh Saved at Customer	(B x E x I)	181,099 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	193,896 kWh

Program Summary All Participants		
Total Participants	J	238
Total Budget	K	**$6,764,286**
Gross kW Saved at Customer	(J x I)	8,734 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**5,222 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	43,101,469 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**46,147,183 kWh**
Societal Net Benefits	(J x I x H)	**$31,839,270**

Utility Program Cost per kWh Lifetime	**$0.0085**
Utility Program Cost per kW at Gen	**$1,295**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Process Efficiency**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$446,470	$446,819	$458,152
Incentive Costs =	$658,293	$648,019	$630,171
16) Total Utility Project Costs =	$1,104,763	$1,094,838	$1,088,323
17) Direct Participant Costs ($/Part.) =	$85,992	$90,086	$81,097
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$2,428	$2,315	$2,199
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	3.9	3.9	3.9
21) Avg. Dth/Part. Saved =	2,560.37	2,627.53	2,402.13
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	74	70	75
24) Total Annual Dth Saved =	188,853	183,927	180,160
25) Incentive/Participant =	$8,924.79	$9,257.42	$8,402.29

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$14,978	$15,641	$14,511
Cost per Participant per Dth =	$39.44	$40.24	$39.80
Lifetime Energy Reduction (Dth)	2,158,041		
Societal Cost per Dth	$4.64		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($6,247,878)	0.64
Utility Cost Test	$7,985,633	3.43
Societal Test	$5,315,078	1.53
Participant Test	$674,797	1.09

RECOMMISSIONING — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$225,900	$225,900	$225,900	$225,900
T & D	N/A	$136,382	$136,382	$136,382	$136,382
Marginal Energy	N/A	$1,446,167	$1,446,167	$1,446,167	$1,446,167
Environmental Externality	N/A	N/A	N/A	N/A	$426,396
Subtotal	N/A	$1,808,449	$1,808,449	$1,808,449	$2,234,844
Participant Benefits					
Bill Reduction - Electric	$2,819,310	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$512,081	N/A	N/A	$512,081	$512,081
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$276,127	N/A	N/A	$145,653	$145,653
Subtotal	$3,607,518	N/A	N/A	$657,734	$657,734
Total Benefits	$3,607,518	$1,808,449	$1,808,449	$2,466,182	$2,892,578
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$295,605	$295,605	$295,605	$295,605
Advertising & Promotion	N/A	$12,000	$12,000	$12,000	$12,000
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$512,081	$512,081	$512,081	$512,081
Other	N/A	$50,000	$50,000	$50,000	$50,000
Subtotal	N/A	$869,686	$869,686	$869,686	$869,686
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,819,310	N/A	N/A
Subtotal	N/A	N/A	$2,819,310	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,030,048	N/A	N/A	$806,585	$806,585
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,030,048	N/A	N/A	$806,585	$806,585
Total Costs	$1,030,048	$869,686	$3,688,996	$1,676,271	$1,676,271
Net Benefit (Cost)	$2,577,470	$938,763	($1,880,548)	$789,911	$1,216,307
Benefit/Cost Ratio	3.50	2.08	0.49	1.47	1.73

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.9 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.08%
Gross Load Factor at Customer	E	68.88%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,028

Program Summary per Participant		
Gross kW Saved at Customer	I	11.95 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	6.56 kW
Gross Annual kWh Saved at Customer	(B x E x I)	72,116 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	77,212 kWh

Program Summary All Participants		
Total Participants	J	99
Total Budget	K	**$869,686**
Gross kW Saved at Customer	(J x I)	1,183 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**650 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	7,139,477 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**7,643,979 kWh**
Societal Net Benefits	(J x I x H)	**$1,216,307**

Utility Program Cost per kWh Lifetime	**$0.0166**
Utility Program Cost per kW at Gen	**$1,338**

RECOMMISSIONING	2018	ELECTRIC	GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$207,730	$207,730	$207,730	$207,730
T & D	N/A	$125,857	$125,857	$125,857	$125,857
Marginal Energy	N/A	$1,268,331	$1,268,331	$1,268,331	$1,268,331
Environmental Externality	N/A	N/A	N/A	N/A	$432,695
Subtotal	N/A	$1,601,918	$1,601,918	$1,601,918	$2,034,613
Participant Benefits					
Bill Reduction - Electric	$2,514,690	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$451,293	N/A	N/A	$451,293	$451,293
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$236,680	N/A	N/A	$125,667	$125,667
Subtotal	$3,202,662	N/A	N/A	$576,960	$576,960
Total Benefits	$3,202,662	$1,601,918	$1,601,918	$2,178,878	$2,611,573
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$295,605	$295,605	$295,605	$295,605
Advertising & Promotion	N/A	$12,000	$12,000	$12,000	$12,000
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$451,293	$451,293	$451,293	$451,293
Other	N/A	$50,000	$50,000	$50,000	$50,000
Subtotal	N/A	$808,898	$808,898	$808,898	$808,898
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,514,690	N/A	N/A
Subtotal	N/A	N/A	$2,514,690	N/A	N/A
Participant Costs					
Incremental Capital Costs	$901,948	N/A	N/A	$711,816	$711,816
	$0	N/A	N/A	$0	$0
Subtotal	$901,948	N/A	N/A	$711,816	$711,816
Total Costs	$901,948	$808,898	$3,323,587	$1,520,714	$1,520,714
Net Benefit (Cost)	$2,300,714	$793,020	($1,721,669)	$658,164	$1,090,859
Benefit/Cost Ratio	3.55	1.98	0.48	1.43	1.72

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.08%
Gross Load Factor at Customer	E	69.12%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,067

Program Summary per Participant		
Gross kW Saved at Customer	I	11.48 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	6.31 kW
Gross Annual kWh Saved at Customer	(B x E x I)	69,537 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	74,450 kWh

Program Summary All Participants		
Total Participants	J	89
Total Budget	K	**$808,898**
Gross kW Saved at Customer	(J x I)	1,022 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**561 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,188,761 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**6,626,083 kWh**
Societal Net Benefits	(J x I x H)	**$1,090,859**

Utility Program Cost per kWh Lifetime	**$0.0178**
Utility Program Cost per kW at Gen	**$1,441**

RECOMMISSIONING | **2019 ELECTRIC** | **GOAL**

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$212,377	$212,377	$212,377	$212,377
T & D	N/A	$128,828	$128,828	$128,828	$128,828
Marginal Energy	N/A	$1,281,979	$1,281,979	$1,281,979	$1,281,979
Environmental Externality	N/A	N/A	N/A	N/A	$495,897
Subtotal	N/A	$1,623,183	$1,623,183	$1,623,183	$2,119,080
Participant Benefits					
Bill Reduction - Electric	$2,594,604	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$451,293	N/A	N/A	$451,293	$451,293
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$236,680	N/A	N/A	$125,768	$125,768
Subtotal	$3,282,577	N/A	N/A	$577,060	$577,060
Total Benefits	$3,282,577	$1,623,183	$1,623,183	$2,200,244	$2,696,141
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$295,605	$295,605	$295,605	$295,605
Advertising & Promotion	N/A	$12,000	$12,000	$12,000	$12,000
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$451,293	$451,293	$451,293	$451,293
Other	N/A	$50,000	$50,000	$50,000	$50,000
Subtotal	N/A	$808,898	$808,898	$808,898	$808,898
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,594,604	N/A	N/A
Subtotal	N/A	N/A	$2,594,604	N/A	N/A
Participant Costs					
Incremental Capital Costs	$901,948	N/A	N/A	$711,988	$711,988
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$901,948	N/A	N/A	$711,988	$711,988
Total Costs	$901,948	$808,898	$3,403,502	$1,520,886	$1,520,886
Net Benefit (Cost)	$2,380,629	$814,286	($1,780,319)	$679,358	$1,175,255
Benefit/Cost Ratio	3.64	2.01	0.48	1.45	1.77

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.08%
Gross Load Factor at Customer	E	69.12%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,150

Program Summary per Participant		
Gross kW Saved at Customer	I	11.48 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	6.31 kW
Gross Annual kWh Saved at Customer	(B x E x I)	69,537 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	74,450 kWh

Program Summary All Participants		
Total Participants	J	89
Total Budget	K	**$808,898**
Gross kW Saved at Customer	(J x I)	1,022 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**561 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,188,761 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**6,626,083 kWh**
Societal Net Benefits	(J x I x H)	**$1,175,255**

Utility Program Cost per kWh Lifetime	**$0.0178**
Utility Program Cost per kW at Gen	**$1,441**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Recommissioning**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$52,576	$52,576	$52,576
Incentive Costs =	$142,117	$158,990	$150,553
16) Total Utility Project Costs =	$194,693	$211,566	$203,129
17) Direct Participant Costs ($/Part.) =	$6,883	$7,135	$7,014
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$1,252	$1,332	$1,294
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	6.7	6.8	6.7
21) Avg. Dth/Part. Saved =	420.17	438.59	429.76
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	47	51	49
24) Total Annual Dth Saved =	19,748	22,368	21,058
25) Incentive/Participant =	$3,023.77	$3,117.44	$3,072.52

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$4,142	$4,148	$4,145
Cost per Participant per Dth =	$26.24	$25.73	$25.97
Lifetime Energy Reduction (Dth)	425,918		
Societal Cost per Dth	$2.36		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,179,881)	0.65
Utility Cost Test	$1,563,444	3.57
Societal Test	$2,953,472	3.94
Participant Test	$3,823,431	4.25

SELF-DIRECT **2017 ELECTRIC** **GOAL**

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$0	$0	$0	$0
T & D	N/A	$0	$0	$0	$0
Marginal Energy	N/A	$0	$0	$0	$0
Environmental Externality	N/A	N/A	N/A	N/A	$0
Subtotal	N/A	$0	$0	$0	$0
Participant Benefits					
Bill Reduction - Electric	$0	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Benefits	$0	$0	$0	$0	$0
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$25,005	$25,005	$25,005	$25,005
Advertising & Promotion	N/A	$452	$452	$452	$452
Measurement & Verification	N/A	$289	$289	$289	$289
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$43	$43	$43	$43
Subtotal	N/A	$25,789	$25,789	$25,789	$25,789
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$0	N/A	N/A
Subtotal	N/A	N/A	$0	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$25,789	$25,789	$25,789	$25,789
Net Benefit (Cost)	$0	($25,789)	($25,789)	($25,789)	($25,789)
Benefit/Cost Ratio	INF	-	-	-	-

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	0.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	0.00%
Gross Load Factor at Customer	E	#DIV/0!
Transmission Loss Factor (Energy)	F	0.000%
Transmission Loss Factor (Demand)	G	0.000%
Societal Net Benefit (Cost)	H	#DIV/0!

Program Summary per Participant		
Gross kW Saved at Customer	I	#DIV/0!
Net coincident kW Saved at Generator	(I x D) / (1 - G)	#DIV/0!
Gross Annual kWh Saved at Customer	(B x E x I)	#DIV/0!
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	#DIV/0!

Program Summary All Participants		
Total Participants	J	0
Total Budget	K	**$25,789**
Gross kW Saved at Customer	(J x I)	#DIV/0!
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**#DIV/0!**
Gross Annual kWh Saved at Customer	(B x E x I) x J	#DIV/0!
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**#DIV/0!**
Societal Net Benefits	(J x I x H)	**#DIV/0!**

Utility Program Cost per kWh Lifetime	**#DIV/0!**
Utility Program Cost per kW at Gen	**#DIV/0!**

SELF-DIRECT | **2018 ELECTRIC** | **GOAL**

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$0	$0	$0	$0
T & D	N/A	$0	$0	$0	$0
Marginal Energy	N/A	$0	$0	$0	$0
Environmental Externality	N/A	N/A	N/A	N/A	$0
Subtotal	N/A	$0	$0	$0	$0
Participant Benefits					
Bill Reduction - Electric	$0	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Benefits	$0	$0	$0	$0	$0
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$26,256	$26,256	$26,256	$26,256
Advertising & Promotion	N/A	$474	$474	$474	$474
Measurement & Verification	N/A	$303	$303	$303	$303
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$45	$45	$45	$45
Subtotal	N/A	$27,078	$27,078	$27,078	$27,078
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$0	N/A	N/A
Subtotal	N/A	N/A	$0	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$27,078	$27,078	$27,078	$27,078
Net Benefit (Cost)	$0	($27,078)	($27,078)	($27,078)	($27,078)
Benefit/Cost Ratio	INF	-	-	-	-

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	0.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	0.00%
Gross Load Factor at Customer	E	#DIV/0!
Transmission Loss Factor (Energy)	F	0.000%
Transmission Loss Factor (Demand)	G	0.000%
Societal Net Benefit (Cost)	H	#DIV/0!

Program Summary per Participant		
Gross kW Saved at Customer	I	#DIV/0!
Net coincident kW Saved at Generator	(I x D) / (1 - G)	#DIV/0!
Gross Annual kWh Saved at Customer	(B x E x I)	#DIV/0!
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	#DIV/0!

Program Summary All Participants		
Total Participants	J	0
Total Budget	K	**$27,078**
Gross kW Saved at Customer	(J x I)	#DIV/0!
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**#DIV/0!**
Gross Annual kWh Saved at Customer	(B x E x I) x J	#DIV/0!
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**#DIV/0!**
Societal Net Benefits	(J x I x H)	**#DIV/0!**

Utility Program Cost per kWh Lifetime	**#DIV/0!**
Utility Program Cost per kW at Gen	**#DIV/0!**

SELF-DIRECT **2019 ELECTRIC** **GOAL**

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$0	$0	$0	$0
T & D	N/A	$0	$0	$0	$0
Marginal Energy	N/A	$0	$0	$0	$0
Environmental Externality	N/A	N/A	N/A	N/A	$0
Subtotal	N/A	$0	$0	$0	$0
Participant Benefits					
Bill Reduction - Electric	$0	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Benefits	$0	$0	$0	$0	$0
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$27,505	$27,505	$27,505	$27,505
Advertising & Promotion	N/A	$442	$442	$442	$442
Measurement & Verification	N/A	$318	$318	$318	$318
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$47	$47	$47	$47
Subtotal	N/A	$28,312	$28,312	$28,312	$28,312
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$0	N/A	N/A
Subtotal	N/A	N/A	$0	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$28,312	$28,312	$28,312	$28,312
Net Benefit (Cost)	$0	($28,312)	($28,312)	($28,312)	($28,312)
Benefit/Cost Ratio	INF	-	-	-	-

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	0.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	0.00%
Gross Load Factor at Customer	E	#DIV/0!
Transmission Loss Factor (Energy)	F	0.000%
Transmission Loss Factor (Demand)	G	0.000%
Societal Net Benefit (Cost)	H	#DIV/0!

Program Summary per Participant		
Gross kW Saved at Customer	I	#DIV/0!
Net coincident kW Saved at Generator	(I x D) / (1 - G)	#DIV/0!
Gross Annual kWh Saved at Customer	(B x E x I)	#DIV/0!
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	#DIV/0!

Program Summary All Participants		
Total Participants	J	0
Total Budget	K	**$28,312**
Gross kW Saved at Customer	(J x I)	#DIV/0!
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**#DIV/0!**
Gross Annual kWh Saved at Customer	(B x E x I) x J	#DIV/0!
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**#DIV/0!**
Societal Net Benefits	(J x I x H)	**#DIV/0!**

Utility Program Cost per kWh Lifetime	**#DIV/0!**
Utility Program Cost per kW at Gen	**#DIV/0!**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Self-Direct**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$8,401	$8,820	$9,243
Incentive Costs =	$0	$0	$0
16) Total Utility Project Costs =	$8,401	$8,820	$9,243
17) Direct Participant Costs ($/Part.) =	$0	$0	$0
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	0.0	0.0	0.0
21) Avg. Dth/Part. Saved =	-	-	-
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	-	-	-
24) Total Annual Dth Saved =	0	0	0
25) Incentive/Participant =	$0.00	$0.00	$0.00

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	#DIV/0!	#DIV/0!	#DIV/0!
Cost per Participant per Dth =	#DIV/0!	#DIV/0!	#DIV/0!
Lifetime Energy Reduction (Dth)	-		
Societal Cost per Dth	#DIV/0!		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($26,464)	-
Utility Cost Test	($26,464)	-
Societal Test	($26,464)	-
Participant Test	$0	#DIV/0!

TURN KEY **2017 ELECTRIC** **GOAL**

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$411,147	$411,147	$411,147	$411,147
T & D	N/A	$248,244	$248,244	$248,244	$248,244
Marginal Energy	N/A	$2,309,566	$2,309,566	$2,309,566	$2,309,566
Environmental Externality	N/A	N/A	N/A	N/A	$612,613
Subtotal	N/A	$2,968,957	$2,968,957	$2,968,957	$3,581,570
Participant Benefits					
Bill Reduction - Electric	$5,245,380	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$872,527	N/A	N/A	$872,527	$872,527
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$6,117,907	N/A	N/A	$872,527	$872,527
Total Benefits	$6,117,907	$2,968,957	$2,968,957	$3,841,484	$4,454,097
Costs					
Utility Project Costs					
Customer Services	N/A	$212,400	$212,400	$212,400	$212,400
Project Administration	N/A	$231,096	$231,096	$231,096	$231,096
Advertising & Promotion	N/A	$26,270	$26,270	$26,270	$26,270
Measurement & Verification	N/A	$8,000	$8,000	$8,000	$8,000
Rebates	N/A	$872,527	$872,527	$872,527	$872,527
Other	N/A	$10,000	$10,000	$10,000	$10,000
Subtotal	N/A	$1,360,293	$1,360,293	$1,360,293	$1,360,293
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,245,380	N/A	N/A
Subtotal	N/A	N/A	$5,245,380	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,890,980	N/A	N/A	$959,632	$959,632
Incremental O&M Costs	$28,480	N/A	N/A	$12,086	$12,086
Subtotal	$1,919,459	N/A	N/A	$971,718	$971,718
Total Costs	$1,919,459	$1,360,293	$6,605,673	$2,332,011	$2,332,011
Net Benefit (Cost)	$4,198,448	$1,608,663	($3,636,717)	$1,509,473	$2,122,086
Benefit/Cost Ratio	3.19	2.18	0.45	1.65	1.91

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	54.93%
Gross Load Factor at Customer	E	50.15%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$1,885

Program Summary per Participant		
Gross kW Saved at Customer	I	4.73 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	2.79 kW
Gross Annual kWh Saved at Customer	(B x E x I)	20,780 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	22,249 kWh

Program Summary All Participants		
Total Participants	J	238
Total Budget	K	**$1,360,293**
Gross kW Saved at Customer	(J x I)	1,126 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**665 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	4,945,685 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**5,295,166 kWh**
Societal Net Benefits	(J x I x H)	**$2,122,086**

Utility Program Cost per kWh Lifetime	**$0.0157**
Utility Program Cost per kW at Gen	**$2,045**

TURN KEY | **2018 ELECTRIC** | **GOAL**

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$526,464	$526,464	$526,464	$526,464
T & D	N/A	$320,435	$320,435	$320,435	$320,435
Marginal Energy	N/A	$2,575,401	$2,575,401	$2,575,401	$2,575,401
Environmental Externality	N/A	N/A	N/A	N/A	$735,627
Subtotal	N/A	$3,422,300	$3,422,300	$3,422,300	$4,157,927
Participant Benefits					
Bill Reduction - Electric	$6,013,091	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$963,066	N/A	N/A	$963,066	$963,066
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$6,976,157	N/A	N/A	$963,066	$963,066
Total Benefits	$6,976,157	$3,422,300	$3,422,300	$4,385,366	$5,120,993
Costs					
Utility Project Costs					
Customer Services	N/A	$218,100	$218,100	$218,100	$218,100
Project Administration	N/A	$241,212	$241,212	$241,212	$241,212
Advertising & Promotion	N/A	$26,270	$26,270	$26,270	$26,270
Measurement & Verification	N/A	$8,000	$8,000	$8,000	$8,000
Rebates	N/A	$963,066	$963,066	$963,066	$963,066
Other	N/A	$25,000	$25,000	$25,000	$25,000
Subtotal	N/A	$1,481,648	$1,481,648	$1,481,648	$1,481,648
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$6,013,091	N/A	N/A
Subtotal	N/A	N/A	$6,013,091	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,091,982	N/A	N/A	$1,060,913	$1,060,913
	$31,617	N/A	N/A	$13,468	$13,468
Subtotal	$2,123,599	N/A	N/A	$1,074,382	$1,074,382
Total Costs	$2,123,599	$1,481,648	$7,494,739	$2,556,030	$2,556,030
Net Benefit (Cost)	$4,852,558	$1,940,652	($4,072,439)	$1,829,336	$2,564,963
Benefit/Cost Ratio	3.29	2.31	0.46	1.72	2.00

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	54.93%
Gross Load Factor at Customer	E	50.15%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,052

Program Summary per Participant		
Gross kW Saved at Customer	I	4.79 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	2.83 kW
Gross Annual kWh Saved at Customer	(B x E x I)	21,037 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	22,523 kWh

Program Summary All Participants		
Total Participants	J	261
Total Budget	K	**$1,481,648**
Gross kW Saved at Customer	(J x I)	1,250 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**738 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	5,490,549 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**5,878,532 kWh**
Societal Net Benefits	(J x I x H)	**$2,564,963**

Utility Program Cost per kWh Lifetime	**$0.0154**
Utility Program Cost per kW at Gen	**$2,007**

TURN KEY	2019	ELECTRIC	GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$538,242	$538,242	$538,242	$538,242
T & D	N/A	$327,997	$327,997	$327,997	$327,997
Marginal Energy	N/A	$2,585,338	$2,585,338	$2,585,338	$2,585,338
Environmental Externality	N/A	N/A	N/A	N/A	$795,150
Subtotal	N/A	$3,451,578	$3,451,578	$3,451,578	$4,246,728
Participant Benefits					
Bill Reduction - Electric	$6,208,175	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$989,091	N/A	N/A	$989,091	$989,091
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$7,197,266	N/A	N/A	$989,091	$989,091
Total Benefits	$7,197,266	$3,451,578	$3,451,578	$4,440,669	$5,235,819
Costs					
Utility Project Costs					
Customer Services	N/A	$215,900	$215,900	$215,900	$215,900
Project Administration	N/A	$251,578	$251,578	$251,578	$251,578
Advertising & Promotion	N/A	$26,270	$26,270	$26,270	$26,270
Measurement & Verification	N/A	$8,000	$8,000	$8,000	$8,000
Rebates	N/A	$989,091	$989,091	$989,091	$989,091
Other	N/A	$25,000	$25,000	$25,000	$25,000
Subtotal	N/A	$1,515,839	$1,515,839	$1,515,839	$1,515,839
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$6,208,175	N/A	N/A
Subtotal	N/A	N/A	$6,208,175	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,126,107	N/A	N/A	$1,087,575	$1,087,575
Incremental O&M Costs	$31,617	N/A	N/A	$13,337	$13,337
Subtotal	$2,157,724	N/A	N/A	$1,100,912	$1,100,912
Total Costs	$2,157,724	$1,515,839	$7,724,014	$2,616,751	$2,616,751
Net Benefit (Cost)	$5,039,542	$1,935,739	($4,272,436)	$1,823,918	$2,619,068
Benefit/Cost Ratio	3.34	2.28	0.45	1.70	2.00

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	16.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	54.93%
Gross Load Factor at Customer	E	50.15%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$2,095

Program Summary per Participant		
Gross kW Saved at Customer	I	4.53 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	2.68 kW
Gross Annual kWh Saved at Customer	(B x E x I)	19,893 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	21,299 kWh

Program Summary All Participants		
Total Participants	J	276
Total Budget	K	**$1,515,839**
Gross kW Saved at Customer	(J x I)	1,250 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**738 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	5,490,549 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**5,878,532 kWh**
Societal Net Benefits	(J x I x H)	**$2,619,068**

Utility Program Cost per kWh Lifetime	**$0.0157**
Utility Program Cost per kW at Gen	**$2,053**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Turn Key**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$98,688	$101,993	$103,663
Incentive Costs =	$125,088	$136,087	$114,089
16) Total Utility Project Costs =	$223,776	$238,080	$217,752
17) Direct Participant Costs ($/Part.) =	$3,002	$3,235	$2,762
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	12.6	12.6	12.6
21) Avg. Dth/Part. Saved =	69.36	75.96	62.56
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	69	70	68
24) Total Annual Dth Saved =	4,786	5,317	4,254
25) Incentive/Participant =	$1,812.87	$1,944.09	$1,677.78

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$3,243	$3,401	$3,202
Cost per Participant per Dth =	$90.04	$87.36	$95.34
Lifetime Energy Reduction (Dth)	180,592		
Societal Cost per Dth	$3.85		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($902,543)	0.48
Utility Cost Test	$169,484	1.25
Societal Test	$449,203	1.65
Participant Test	$1,122,107	1.81

BUSINESS SEGMENT LOAD MANAGEMENT TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,493,861	$3,493,861	$3,493,861	$3,493,861
T & D	N/A	$2,109,416	$2,109,416	$2,109,416	$2,109,416
Marginal Energy	N/A	$48,681	$48,681	$48,681	$48,681
Environmental Externality	N/A	N/A	N/A	N/A	$7,654
Subtotal	N/A	$5,651,958	$5,651,958	$5,651,958	$5,659,612
Participant Benefits					
Bill Reduction - Electric	$103,866	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$103,866	N/A	N/A	$0	$0
Total Benefits	$103,866	$5,651,958	$5,651,958	$5,651,958	$5,659,612
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,456,868	$2,456,868	$2,456,868	$2,456,868
Advertising & Promotion	N/A	$215,508	$215,508	$215,508	$215,508
Measurement & Verification	N/A	$175,000	$175,000	$175,000	$175,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,847,376	$2,847,376	$2,847,376	$2,847,376
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$103,866	N/A	N/A
Subtotal	N/A	N/A	$103,866	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,847,376	$2,951,242	$2,847,376	$2,847,376
Net Benefit (Cost)	$103,866	$2,804,582	$2,700,716	$2,804,582	$2,812,236
Benefit/Cost Ratio	INF	1.98	1.92	1.98	1.99

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.91%
Gross Load Factor at Customer	E	0.07%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$104

Program Summary per Participant		
Gross kW Saved at Customer	I	27.67 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	8.60 kW
Gross Annual kWh Saved at Customer	(B x E x I)	172 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	184 kWh

Program Summary All Participants		
Total Participants	J	978
Total Budget	K	**$2,847,376**
Gross kW Saved at Customer	(J x I)	27,071 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**8,415 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	167,973 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**179,842 kWh**
Societal Net Benefits	(J x I x H)	**$2,812,236**

Utility Program Cost per kWh Lifetime	**$2.8591**
Utility Program Cost per kW at Gen	**$338**

BUSINESS SEGMENT LOAD MANAGEMENT TOTAL — 2018 — ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,876,252	$3,876,252	$3,876,252	$3,876,252
T & D	N/A	$2,354,045	$2,354,045	$2,354,045	$2,354,045
Marginal Energy	N/A	$49,130	$49,130	$49,130	$49,130
Environmental Externality	N/A	N/A	N/A	N/A	$9,310
Subtotal	N/A	$6,279,426	$6,279,426	$6,279,426	$6,288,736
Participant Benefits					
Bill Reduction - Electric	$107,219	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$107,219	N/A	N/A	$0	$0
Total Benefits	$107,219	$6,279,426	$6,279,426	$6,279,426	$6,288,736
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,519,774	$2,519,774	$2,519,774	$2,519,774
Advertising & Promotion	N/A	$215,508	$215,508	$215,508	$215,508
Measurement & Verification	N/A	$150,000	$150,000	$150,000	$150,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,885,282	$2,885,282	$2,885,282	$2,885,282
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$107,219	N/A	N/A
Subtotal	N/A	N/A	$107,219	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,885,282	$2,992,501	$2,885,282	$2,885,282
Net Benefit (Cost)	$107,219	$3,394,144	$3,286,925	$3,394,144	$3,403,454
Benefit/Cost Ratio	INF	2.18	2.10	2.18	2.18

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.91%
Gross Load Factor at Customer	E	0.07%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$126

Program Summary per Participant		
Gross kW Saved at Customer	I	27.67 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	8.60 kW
Gross Annual kWh Saved at Customer	(B x E x I)	172 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	184 kWh

Program Summary All Participants		
Total Participants	J	978
Total Budget	K	**$2,885,282**
Gross kW Saved at Customer	(J x I)	27,071 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**8,415 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	167,973 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**179,842 kWh**
Societal Net Benefits	(J x I x H)	**$3,403,454**

Utility Program Cost per kWh Lifetime	**$2.8972**
Utility Program Cost per kW at Gen	**$343**

BUSINESS SEGMENT LOAD MANAGEMENT TOTAL — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,962,971	$3,962,971	$3,962,971	$3,962,971
T & D	N/A	$2,409,600	$2,409,600	$2,409,600	$2,409,600
Marginal Energy	N/A	$49,748	$49,748	$49,748	$49,748
Environmental Externality	N/A	N/A	N/A	N/A	$11,113
Subtotal	N/A	$6,422,319	$6,422,319	$6,422,319	$6,433,432
Participant Benefits					
Bill Reduction - Electric	$110,601	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$110,601	N/A	N/A	$0	$0
Total Benefits	$110,601	$6,422,319	$6,422,319	$6,422,319	$6,433,432
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,582,850	$2,582,850	$2,582,850	$2,582,850
Advertising & Promotion	N/A	$215,508	$215,508	$215,508	$215,508
Measurement & Verification	N/A	$150,000	$150,000	$150,000	$150,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,948,358	$2,948,358	$2,948,358	$2,948,358
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$110,601	N/A	N/A
Subtotal	N/A	N/A	$110,601	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,948,358	$3,058,960	$2,948,358	$2,948,358
Net Benefit (Cost)	$110,601	$3,473,961	$3,363,360	$3,473,961	$3,485,074
Benefit/Cost Ratio	INF	2.18	2.10	2.18	2.18

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.91%
Gross Load Factor at Customer	E	0.07%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$129

Program Summary per Participant		
Gross kW Saved at Customer	I	27.67 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	8.60 kW
Gross Annual kWh Saved at Customer	(B x E x I)	172 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	184 kWh

Program Summary All Participants		
Total Participants	J	978
Total Budget	K	**$2,948,358**
Gross kW Saved at Customer	(J x I)	27,071 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**8,415 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	167,973 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**179,842 kWh**
Societal Net Benefits	(J x I x H)	**$3,485,074**

Utility Program Cost per kWh Lifetime	**$2.9605**
Utility Program Cost per kW at Gen	**$350**

ELECTRIC RATE SAVINGS — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,228,308	$1,228,308	$1,228,308	$1,228,308
T & D	N/A	$741,519	$741,519	$741,519	$741,519
Marginal Energy	N/A	$43,265	$43,265	$43,265	$43,265
Environmental Externality	N/A	N/A	N/A	N/A	$6,588
Subtotal	N/A	$2,013,092	$2,013,092	$2,013,092	$2,019,680
Participant Benefits					
Bill Reduction - Electric	$90,836	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$90,836	N/A	N/A	$0	$0
Total Benefits	$90,836	$2,013,092	$2,013,092	$2,013,092	$2,019,680
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$524,618	$524,618	$524,618	$524,618
Advertising & Promotion	N/A	$15,508	$15,508	$15,508	$15,508
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$540,126	$540,126	$540,126	$540,126
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$90,836	N/A	N/A
Subtotal	N/A	N/A	$90,836	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$540,126	$630,962	$540,126	$540,126
Net Benefit (Cost)	$90,836	$1,472,966	$1,382,130	$1,472,966	$1,479,554
Benefit/Cost Ratio	INF	3.73	3.19	3.73	3.74

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	47.46%
Gross Load Factor at Customer	E	0.20%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$164

Program Summary per Participant		
Gross kW Saved at Customer	I	200.00 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	102.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	3,532 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	3,782 kWh

Program Summary All Participants		
Total Participants	J	45
Total Budget	K	**$540,126**
Gross kW Saved at Customer	(J x I)	9,000 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**4,593 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	158,942 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**170,174 kWh**
Societal Net Benefits	(J x I x H)	**$1,479,554**

Utility Program Cost per kWh Lifetime	**$0.6348**
Utility Program Cost per kW at Gen	**$118**

ELECTRIC RATE SAVINGS — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,287,037	$1,287,037	$1,287,037	$1,287,037
T & D	N/A	$778,964	$778,964	$778,964	$778,964
Marginal Energy	N/A	$43,690	$43,690	$43,690	$43,690
Environmental Externality	N/A	N/A	N/A	N/A	$8,155
Subtotal	N/A	$2,109,691	$2,109,691	$2,109,691	$2,117,846
Participant Benefits					
Bill Reduction - Electric	$93,762	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$93,762	N/A	N/A	$0	$0
Total Benefits	$93,762	$2,109,691	$2,109,691	$2,109,691	$2,117,846
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$535,114	$535,114	$535,114	$535,114
Advertising & Promotion	N/A	$15,508	$15,508	$15,508	$15,508
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$550,622	$550,622	$550,622	$550,622
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$93,762	N/A	N/A
Subtotal	N/A	N/A	$93,762	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$550,622	$644,384	$550,622	$550,622
Net Benefit (Cost)	$93,762	$1,559,069	$1,465,307	$1,559,069	$1,567,224
Benefit/Cost Ratio	INF	3.83	3.27	3.83	3.85

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	47.46%
Gross Load Factor at Customer	E	0.20%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$174

Program Summary per Participant		
Gross kW Saved at Customer	I	200.00 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	102.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	3,532 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	3,782 kWh

Program Summary All Participants		
Total Participants	J	45
Total Budget	K	**$550,622**
Gross kW Saved at Customer	(J x I)	9,000 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**4,593 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	158,942 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**170,174 kWh**
Societal Net Benefits	(J x I x H)	**$1,567,224**

Utility Program Cost per kWh Lifetime	**$0.6471**
Utility Program Cost per kW at Gen	**$120**

ELECTRIC RATE SAVINGS — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,315,831	$1,315,831	$1,315,831	$1,315,831
T & D	N/A	$797,348	$797,348	$797,348	$797,348
Marginal Energy	N/A	$44,273	$44,273	$44,273	$44,273
Environmental Externality	N/A	N/A	N/A	N/A	$9,860
Subtotal	N/A	$2,157,451	$2,157,451	$2,157,451	$2,167,312
Participant Benefits					
Bill Reduction - Electric	$96,708	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$96,708	N/A	N/A	$0	$0
Total Benefits	$96,708	$2,157,451	$2,157,451	$2,157,451	$2,167,312
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$544,208	$544,208	$544,208	$544,208
Advertising & Promotion	N/A	$15,508	$15,508	$15,508	$15,508
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$559,716	$559,716	$559,716	$559,716
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$96,708	N/A	N/A
Subtotal	N/A	N/A	$96,708	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$559,716	$656,424	$559,716	$559,716
Net Benefit (Cost)	$96,708	$1,597,735	$1,501,028	$1,597,735	$1,607,596
Benefit/Cost Ratio	INF	3.85	3.29	3.85	3.87

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	47.46%
Gross Load Factor at Customer	E	0.20%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$179

Program Summary per Participant		
Gross kW Saved at Customer	I	200.00 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	102.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	3,532 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	3,782 kWh

Program Summary All Participants		
Total Participants	J	45
Total Budget	K	**$559,716**
Gross kW Saved at Customer	(J x I)	9,000 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**4,593 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	158,942 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**170,174 kWh**
Societal Net Benefits	(J x I x H)	**$1,607,596**

Utility Program Cost per kWh Lifetime	**$0.6578**
Utility Program Cost per kW at Gen	**$122**

SAVER'S SWITCH FOR BUSINESS — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,265,553	$2,265,553	$2,265,553	$2,265,553
T & D	N/A	$1,367,897	$1,367,897	$1,367,897	$1,367,897
Marginal Energy	N/A	$5,416	$5,416	$5,416	$5,416
Environmental Externality	N/A	N/A	N/A	N/A	$1,066
Subtotal	N/A	$3,638,866	$3,638,866	$3,638,866	$3,639,932
Participant Benefits					
Bill Reduction - Electric	$13,030	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$13,030	N/A	N/A	$0	$0
Total Benefits	$13,030	$3,638,866	$3,638,866	$3,638,866	$3,639,932
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$1,932,250	$1,932,250	$1,932,250	$1,932,250
Advertising & Promotion	N/A	$200,000	$200,000	$200,000	$200,000
Measurement & Verification	N/A	$175,000	$175,000	$175,000	$175,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,307,250	$2,307,250	$2,307,250	$2,307,250
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$13,030	N/A	N/A
Subtotal	N/A	N/A	$13,030	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,307,250	$2,320,280	$2,307,250	$2,307,250
Net Benefit (Cost)	$13,030	$1,331,616	$1,318,586	$1,331,616	$1,332,682
Benefit/Cost Ratio	INF	1.58	1.57	1.58	1.58

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	19.67%
Gross Load Factor at Customer	E	0.01%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$74

Program Summary per Participant		
Gross kW Saved at Customer	I	19.36 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	4.10 kW
Gross Annual kWh Saved at Customer	(B x E x I)	10 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	10 kWh

Program Summary All Participants		
Total Participants	J	933
Total Budget	K	**$2,307,250**
Gross kW Saved at Customer	(J x I)	18,071 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,823 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	9,030 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**9,668 kWh**
Societal Net Benefits	(J x I x H)	**$1,332,682**

Utility Program Cost per kWh Lifetime	**$15.9091**
Utility Program Cost per kW at Gen	**$604**

SAVER'S SWITCH FOR BUSINESS — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,589,215	$2,589,215	$2,589,215	$2,589,215
T & D	N/A	$1,575,081	$1,575,081	$1,575,081	$1,575,081
Marginal Energy	N/A	$5,440	$5,440	$5,440	$5,440
Environmental Externality	N/A	N/A	N/A	N/A	$1,155
Subtotal	N/A	$4,169,735	$4,169,735	$4,169,735	$4,170,890
Participant Benefits					
Bill Reduction - Electric	$13,457	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$13,457	N/A	N/A	$0	$0
Total Benefits	$13,457	$4,169,735	$4,169,735	$4,169,735	$4,170,890
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$1,984,660	$1,984,660	$1,984,660	$1,984,660
Advertising & Promotion	N/A	$200,000	$200,000	$200,000	$200,000
Measurement & Verification	N/A	$150,000	$150,000	$150,000	$150,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,334,660	$2,334,660	$2,334,660	$2,334,660
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$13,457	N/A	N/A
Subtotal	N/A	N/A	$13,457	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,334,660	$2,348,117	$2,334,660	$2,334,660
Net Benefit (Cost)	$13,457	$1,835,075	$1,821,618	$1,835,075	$1,836,230
Benefit/Cost Ratio	INF	1.79	1.78	1.79	1.79

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	19.67%
Gross Load Factor at Customer	E	0.01%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$102

Program Summary per Participant		
Gross kW Saved at Customer	I	19.36 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	4.10 kW
Gross Annual kWh Saved at Customer	(B x E x I)	10 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	10 kWh

Program Summary All Participants		
Total Participants	J	933
Total Budget	K	**$2,334,660**
Gross kW Saved at Customer	(J x I)	18,071 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,823 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	9,030 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**9,668 kWh**
Societal Net Benefits	(J x I x H)	**$1,836,230**

Utility Program Cost per kWh Lifetime	**$16.0981**
Utility Program Cost per kW at Gen	**$611**

SAVER'S SWITCH FOR BUSINESS — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,647,141	$2,647,141	$2,647,141	$2,647,141
T & D	N/A	$1,612,253	$1,612,253	$1,612,253	$1,612,253
Marginal Energy	N/A	$5,475	$5,475	$5,475	$5,475
Environmental Externality	N/A	N/A	N/A	N/A	$1,253
Subtotal	N/A	$4,264,868	$4,264,868	$4,264,868	$4,266,121
Participant Benefits					
Bill Reduction - Electric	$13,894	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$13,894	N/A	N/A	$0	$0
Total Benefits	$13,894	$4,264,868	$4,264,868	$4,264,868	$4,266,121
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,038,642	$2,038,642	$2,038,642	$2,038,642
Advertising & Promotion	N/A	$200,000	$200,000	$200,000	$200,000
Measurement & Verification	N/A	$150,000	$150,000	$150,000	$150,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,388,642	$2,388,642	$2,388,642	$2,388,642
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$13,894	N/A	N/A
Subtotal	N/A	N/A	$13,894	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,388,642	$2,402,536	$2,388,642	$2,388,642
Net Benefit (Cost)	$13,894	$1,876,226	$1,862,332	$1,876,226	$1,877,478
Benefit/Cost Ratio	INF	1.79	1.78	1.79	1.79

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	19.67%
Gross Load Factor at Customer	E	0.01%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$104

Program Summary per Participant		
Gross kW Saved at Customer	I	19.36 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	4.10 kW
Gross Annual kWh Saved at Customer	(B x E x I)	10 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	10 kWh

Program Summary All Participants		
Total Participants	J	933
Total Budget	K	**$2,388,642**
Gross kW Saved at Customer	(J x I)	18,071 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,823 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	9,030 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**9,668 kWh**
Societal Net Benefits	(J x I x H)	**$1,877,478**

Utility Program Cost per kWh Lifetime	**$16.4703**
Utility Program Cost per kW at Gen	**$625**

RESIDENTIAL SEGMENT TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$17,635,504	$17,635,504	$17,635,504	$17,635,504
T & D	N/A	$10,647,328	$10,647,328	$10,647,328	$10,647,328
Marginal Energy	N/A	$26,685,829	$26,685,829	$26,685,829	$26,685,829
Environmental Externality	N/A	N/A	N/A	N/A	$6,803,236
Subtotal	N/A	$54,968,661	$54,968,661	$54,968,661	$61,771,897
Participant Benefits					
Bill Reduction - Electric	$88,382,309	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$10,121,988	N/A	N/A	$10,121,988	$10,121,988
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,064,933	N/A	N/A	$0	$0
Subtotal	$100,569,229	N/A	N/A	$10,121,988	$10,121,988
Total Benefits	$100,569,229	$54,968,661	$54,968,661	$65,090,649	$71,893,885
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$11,348,697	$11,348,697	$11,348,697	$11,348,697
Advertising & Promotion	N/A	$3,729,565	$3,729,565	$3,729,565	$3,729,565
Measurement & Verification	N/A	$515,911	$515,911	$515,911	$515,911
Rebates	N/A	$10,121,988	$10,121,988	$10,121,988	$10,121,988
Other	N/A	$2,500	$2,500	$2,500	$2,500
Subtotal	N/A	$26,140,470	$26,140,470	$26,140,470	$26,140,470
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$88,382,309	N/A	N/A
Subtotal	N/A	N/A	$88,382,309	N/A	N/A
Participant Costs					
Incremental Capital Costs	$21,413,078	N/A	N/A	$19,266,619	$19,266,619
Incremental O&M Costs	$0	N/A	N/A	$904,797	$904,797
Subtotal	$21,413,078	N/A	N/A	$20,171,416	$20,171,416
Total Costs	$21,413,078	$26,140,470	$114,522,778	$46,311,886	$46,311,886
Net Benefit (Cost)	$79,156,151	$28,828,192	($59,554,117)	$18,778,763	$25,581,999
Benefit/Cost Ratio	4.70	2.10	0.48	1.41	1.55

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	24.49%
Gross Load Factor at Customer	E	10.38%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.188%
Societal Net Benefit (Cost)	H	$183

Program Summary per Participant		
Gross kW Saved at Customer	I	0.11 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.03 kW
Gross Annual kWh Saved at Customer	(B x E x I)	105 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	114 kWh

Program Summary All Participants		
Total Participants	J	1,216,581
Total Budget	K	**$26,140,470**
Gross kW Saved at Customer	(J x I)	139,824 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**37,293 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	127,173,300 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**138,834,726 kWh**
Societal Net Benefits	(J x I x H)	**$25,581,999**

Utility Program Cost per kWh Lifetime	**$0.0278**
Utility Program Cost per kW at Gen	**$701**

RESIDENTIAL SEGMENT TOTAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$19,615,132	$19,615,132	$19,615,132	$19,615,132
T & D	N/A	$11,922,431	$11,922,431	$11,922,431	$11,922,431
Marginal Energy	N/A	$25,991,430	$25,991,430	$25,991,430	$25,991,430
Environmental Externality	N/A	N/A	N/A	N/A	$7,438,188
Subtotal	N/A	$57,528,993	$57,528,993	$57,528,993	$64,967,181
Participant Benefits					
Bill Reduction - Electric	$87,174,616	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$10,150,685	N/A	N/A	$10,150,685	$10,150,685
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,047,882	N/A	N/A	$0	$0
Subtotal	$99,373,184	N/A	N/A	$10,150,685	$10,150,685
Total Benefits	$99,373,184	$57,528,993	$57,528,993	$67,679,678	$75,117,866
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$10,995,312	$10,995,312	$10,995,312	$10,995,312
Advertising & Promotion	N/A	$3,735,717	$3,735,717	$3,735,717	$3,735,717
Measurement & Verification	N/A	$492,094	$492,094	$492,094	$492,094
Rebates	N/A	$10,150,685	$10,150,685	$10,150,685	$10,150,685
Other	N/A	$3,200	$3,200	$3,200	$3,200
Subtotal	N/A	$25,798,817	$25,798,817	$25,798,817	$25,798,817
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$87,174,616	N/A	N/A
Subtotal	N/A	N/A	$87,174,616	N/A	N/A
Participant Costs					
Incremental Capital Costs	$20,222,842	N/A	N/A	$18,091,050	$18,091,050
	$0	N/A	N/A	$907,726	$907,726
Subtotal	$20,222,842	N/A	N/A	$18,998,775	$18,998,775
Total Costs	$20,222,842	$25,798,817	$112,973,434	$44,797,593	$44,797,593
Net Benefit (Cost)	$79,150,342	$31,730,176	($55,444,440)	$22,882,086	$30,320,274
Benefit/Cost Ratio	4.91	2.23	0.51	1.51	1.68

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	24.31%
Gross Load Factor at Customer	E	10.56%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.201%
Societal Net Benefit (Cost)	H	$212

Program Summary per Participant		
Gross kW Saved at Customer	I	0.12 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.03 kW
Gross Annual kWh Saved at Customer	(B x E x I)	107 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	117 kWh

Program Summary All Participants		
Total Participants	J	1,237,798
Total Budget	K	**$25,798,817**
Gross kW Saved at Customer	(J x I)	142,869 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**37,832 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	132,188,848 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**144,310,216 kWh**
Societal Net Benefits	(J x I x H)	**$30,320,274**

Utility Program Cost per kWh Lifetime	**$0.0288**
Utility Program Cost per kW at Gen	**$682**

RESIDENTIAL SEGMENT TOTAL — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$19,632,123	$19,632,123	$19,632,123	$19,632,123
T & D	N/A	$11,947,683	$11,947,683	$11,947,683	$11,947,683
Marginal Energy	N/A	$23,805,769	$23,805,769	$23,805,769	$23,805,769
Environmental Externality	N/A	N/A	N/A	N/A	$8,219,596
Subtotal	N/A	$55,385,575	$55,385,575	$55,385,575	$63,605,172
Participant Benefits					
Bill Reduction - Electric	$79,954,444	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$9,875,698	N/A	N/A	$9,875,698	$9,875,698
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,056,654	N/A	N/A	$0	$0
Subtotal	$91,886,796	N/A	N/A	$9,875,698	$9,875,698
Total Benefits	$91,886,796	$55,385,575	$55,385,575	$65,261,274	$73,480,870
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$11,484,950	$11,484,950	$11,484,950	$11,484,950
Advertising & Promotion	N/A	$3,877,411	$3,877,411	$3,877,411	$3,877,411
Measurement & Verification	N/A	$493,004	$493,004	$493,004	$493,004
Rebates	N/A	$9,875,698	$9,875,698	$9,875,698	$9,875,698
Other	N/A	$3,500	$3,500	$3,500	$3,500
Subtotal	N/A	$26,156,373	$26,156,373	$26,156,373	$26,156,373
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$79,954,444	N/A	N/A
Subtotal	N/A	N/A	$79,954,444	N/A	N/A
Participant Costs					
Incremental Capital Costs	$19,018,271	N/A	N/A	$16,828,407	$16,828,407
Incremental O&M Costs	$0	N/A	N/A	$910,791	$910,791
Subtotal	$19,018,271	N/A	N/A	$17,739,199	$17,739,199
Total Costs	$19,018,271	$26,156,373	$106,110,817	$43,895,571	$43,895,571
Net Benefit (Cost)	$72,868,525	$29,229,203	($50,725,241)	$21,365,702	$29,585,299
Benefit/Cost Ratio	4.83	2.12	0.52	1.49	1.67

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	24.82%
Gross Load Factor at Customer	E	10.46%
Transmission Loss Factor (Energy)	F	8.399%
Transmission Loss Factor (Demand)	G	8.179%
Societal Net Benefit (Cost)	H	$215

Program Summary per Participant		
Gross kW Saved at Customer	I	0.11 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.03 kW
Gross Annual kWh Saved at Customer	(B x E x I)	102 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	112 kWh

Program Summary All Participants		
Total Participants	J	1,236,685
Total Budget	K	**$26,156,372**
Gross kW Saved at Customer	(J x I)	137,887 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**37,277 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	126,357,037 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**137,943,610 kWh**
Societal Net Benefits	(J x I x H)	**$29,585,299**

Utility Program Cost per kWh Lifetime	**$0.0328**
Utility Program Cost per kW at Gen	**$702**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Residential Segment with Indirect Participants**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$4,896,139	$4,927,388	$5,000,583
Incentive Costs =	$3,202,614	$3,256,789	$3,275,439
16) Total Utility Project Costs =	$8,098,753	$8,184,177	$8,276,022
17) Direct Participant Costs ($/Part.) =	$20	$20	$20
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$1	$1	$1
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	15.0	14.9	14.9
21) Avg. Dth/Part. Saved =	0.43	0.44	0.44
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	601,911	602,070	602,166
24) Total Annual Dth Saved =	258,192	263,277	263,907
25) Incentive/Participant =	$5.32	$5.41	$5.44

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$13	$14	$14
Cost per Participant per Dth =	$77.50	$77.31	$77.87
Lifetime Energy Reduction (Dth)	11,727,395		
Societal Cost per Dth	$4.39		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($38,284,267)	0.58
Utility Cost Test	$27,716,551	2.13
Societal Test	$47,532,404	1.92
Participant Test	$86,211,508	2.20

Conservation Improvement Program (CIP) BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Residential Segment Direct Participants Only**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 First Year	2018 Second Year	2019 Third Year
Administrative & Operating Costs =	$3,824,036	$3,840,306	$3,898,073
Incentive Costs =	$3,202,614	$3,256,789	$3,275,439
16) Total Utility Project Costs =	$7,026,650	$7,097,095	$7,173,512
17) Direct Participant Costs ($/Part.) =	$55	$56	$57
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$3	$3	$3
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	15.0	14.9	14.9
21) Avg. Dth/Part. Saved =	1.19	1.22	1.22
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	216,199	216,358	216,454
24) Total Annual Dth Saved =	258,192	263,277	263,907
25) Incentive/Participant =	$14.81	$15.05	$15.13

Cost Summary	1st Yr	2nd Yr	3rd Yr
Utility Cost per Participant =	$33	$33	$33
Cost per Participant per Dth =	$73.35	$73.18	$73.70
Lifetime Energy Reduction (Dth)	11,727,395		
Societal Cost per Dth	$4.09		

Test Results	Triennial NPV	Triennial B/C
Ratepayer Impact Measure Test	($35,022,572)	0.60
Utility Cost Test	$30,978,246	2.45
Societal Test	$50,794,099	2.06
Participant Test	$86,211,508	2.34

RESIDENTIAL SEGMENT ENERGY EFFICIENCY TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$8,749,889	$8,749,889	$8,749,889	$8,749,889
T & D	N/A	$5,282,365	$5,282,365	$5,282,365	$5,282,365
Marginal Energy	N/A	$26,663,914	$26,663,914	$26,663,914	$26,663,914
Environmental Externality	N/A	N/A	N/A	N/A	$6,798,922
Subtotal	N/A	$40,696,168	$40,696,168	$40,696,168	$47,495,090
Participant Benefits					
Bill Reduction - Electric	$88,329,585	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$10,121,988	N/A	N/A	$10,121,988	$10,121,988
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,064,933	N/A	N/A	$0	$0
Subtotal	$100,516,505	N/A	N/A	$10,121,988	$10,121,988
Total Benefits	$100,516,505	$40,696,168	$40,696,168	$50,818,155	$57,617,078
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$5,390,476	$5,390,476	$5,390,476	$5,390,476
Advertising & Promotion	N/A	$2,666,137	$2,666,137	$2,666,137	$2,666,137
Measurement & Verification	N/A	$340,911	$340,911	$340,911	$340,911
Rebates	N/A	$10,121,988	$10,121,988	$10,121,988	$10,121,988
Other	N/A	$2,500	$2,500	$2,500	$2,500
Subtotal	N/A	$18,943,821	$18,943,821	$18,943,821	$18,943,821
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$88,329,585	N/A	N/A
Subtotal	N/A	N/A	$88,329,585	N/A	N/A
Participant Costs					
Incremental Capital Costs	$21,413,078	N/A	N/A	$19,266,619	$19,266,619
Incremental O&M Costs	$0	N/A	N/A	$904,797	$904,797
Subtotal	$21,413,078	N/A	N/A	$20,171,416	$20,171,416
Total Costs	$21,413,078	$18,943,821	$107,273,405	$39,115,237	$39,115,237
Net Benefit (Cost)	$79,103,427	$21,752,347	($66,577,238)	$11,702,918	$18,501,841
Benefit/Cost Ratio	4.69	2.15	0.38	1.30	1.47

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	22.48%
Gross Load Factor at Customer	E	15.83%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$202

Program Summary per Participant		
Gross kW Saved at Customer	I	0.20 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.05 kW
Gross Annual kWh Saved at Customer	(B x E x I)	277 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	302 kWh

Program Summary All Participants		
Total Participants	J	459,202
Total Budget	K	**$18,943,821**
Gross kW Saved at Customer	(J x I)	91,669 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**22,591 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	127,137,464 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**138,796,358 kWh**
Societal Net Benefits	(J x I x H)	**$18,501,841**

Utility Program Cost per kWh Lifetime	**$0.0201**
Utility Program Cost per kW at Gen	**$839**

RESIDENTIAL SEGMENT ENERGY EFFICIENCY TOTAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$9,460,099	$9,460,099	$9,460,099	$9,460,099
T & D	N/A	$5,744,884	$5,744,884	$5,744,884	$5,744,884
Marginal Energy	N/A	$25,969,418	$25,969,418	$25,969,418	$25,969,418
Environmental Externality	N/A	N/A	N/A	N/A	$7,433,515
Subtotal	N/A	$41,174,401	$41,174,401	$41,174,401	$48,607,916
Participant Benefits					
Bill Reduction - Electric	$87,120,164	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$10,150,685	N/A	N/A	$10,150,685	$10,150,685
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,047,882	N/A	N/A	$0	$0
Subtotal	$99,318,731	N/A	N/A	$10,150,685	$10,150,685
Total Benefits	$99,318,731	$41,174,401	$41,174,401	$51,325,086	$58,758,601
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$4,797,734	$4,797,734	$4,797,734	$4,797,734
Advertising & Promotion	N/A	$2,673,532	$2,673,532	$2,673,532	$2,673,532
Measurement & Verification	N/A	$342,094	$342,094	$342,094	$342,094
Rebates	N/A	$10,150,685	$10,150,685	$10,150,685	$10,150,685
Other	N/A	$3,200	$3,200	$3,200	$3,200
Subtotal	N/A	$18,389,054	$18,389,054	$18,389,054	$18,389,054
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$87,120,164	N/A	N/A
Subtotal	N/A	N/A	$87,120,164	N/A	N/A
Participant Costs					
Incremental Capital Costs	$20,222,842	N/A	N/A	$18,091,050	$18,091,050
	$0	N/A	N/A	$907,726	$907,726
Subtotal	$20,222,842	N/A	N/A	$18,998,775	$18,998,775
Total Costs	$20,222,842	$18,389,054	$105,509,218	$37,387,830	$37,387,830
Net Benefit (Cost)	$79,095,889	$22,785,347	($64,334,817)	$13,937,256	$21,370,772
Benefit/Cost Ratio	4.91	2.24	0.39	1.37	1.57

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	22.27%
Gross Load Factor at Customer	E	15.93%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$226

Program Summary per Participant		
Gross kW Saved at Customer	I	0.20 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.05 kW
Gross Annual kWh Saved at Customer	(B x E x I)	284 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	310 kWh

Program Summary All Participants		
Total Participants	J	465,419
Total Budget	K	**$18,389,054**
Gross kW Saved at Customer	(J x I)	94,714 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**23,130 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	132,153,012 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**144,271,848 kWh**
Societal Net Benefits	(J x I x H)	**$21,370,772**

Utility Program Cost per kWh Lifetime	**$0.0206**
Utility Program Cost per kW at Gen	**$795**

RESIDENTIAL SEGMENT ENERGY EFFICIENCY TOTAL — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$9,249,901	$9,249,901	$9,249,901	$9,249,901
T & D	N/A	$5,624,345	$5,624,345	$5,624,345	$5,624,345
Marginal Energy	N/A	$23,783,617	$23,783,617	$23,783,617	$23,783,617
Environmental Externality	N/A	N/A	N/A	N/A	$8,214,528
Subtotal	N/A	$38,657,864	$38,657,864	$38,657,864	$46,872,391
Participant Benefits					
Bill Reduction - Electric	$79,898,224	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$9,875,698	N/A	N/A	$9,875,698	$9,875,698
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,056,654	N/A	N/A	$0	$0
Subtotal	$91,830,576	N/A	N/A	$9,875,698	$9,875,698
Total Benefits	$91,830,576	$38,657,864	$38,657,864	$48,533,562	$56,748,090
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$5,043,384	$5,043,384	$5,043,384	$5,043,384
Advertising & Promotion	N/A	$2,816,491	$2,816,491	$2,816,491	$2,816,491
Measurement & Verification	N/A	$343,004	$343,004	$343,004	$343,004
Rebates	N/A	$9,875,698	$9,875,698	$9,875,698	$9,875,698
Other	N/A	$3,500	$3,500	$3,500	$3,500
Subtotal	N/A	$18,503,886	$18,503,886	$18,503,886	$18,503,886
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$79,898,224	N/A	N/A
Subtotal	N/A	N/A	$79,898,224	N/A	N/A
Participant Costs					
Incremental Capital Costs	$19,018,271	N/A	N/A	$16,828,407	$16,828,407
Incremental O&M Costs	$0	N/A	N/A	$910,791	$910,791
Subtotal	$19,018,271	N/A	N/A	$17,739,199	$17,739,199
Total Costs	$19,018,271	$18,503,886	$98,402,110	$36,243,085	$36,243,085
Net Benefit (Cost)	$72,812,306	$20,153,977	($59,744,247)	$12,290,477	$20,505,005
Benefit/Cost Ratio	4.83	2.09	0.39	1.34	1.57

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	22.94%
Gross Load Factor at Customer	E	16.07%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$229

Program Summary per Participant		
Gross kW Saved at Customer	I	0.20 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.05 kW
Gross Annual kWh Saved at Customer	(B x E x I)	278 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	304 kWh

Program Summary All Participants		
Total Participants	J	454,306
Total Budget	K	**$18,503,886**
Gross kW Saved at Customer	(J x I)	89,732 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**22,575 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	126,321,201 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**137,905,241 kWh**
Societal Net Benefits	(J x I x H)	**$20,505,005**

Utility Program Cost per kWh Lifetime	**$0.0232**
Utility Program Cost per kW at Gen	**$820**

Conservation Improvement Program (CIP) BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Residential Segment Energy Efficiency Total**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$3,824,036	$3,840,306	$3,898,073
Incentive Costs =	$3,202,614	$3,256,789	$3,275,439
16) Total Utility Project Costs =	$7,026,650	$7,097,095	$7,173,512
17) Direct Participant Costs ($/Part.) =	$55	$56	$57
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$3	$3	$3
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	15.0	14.9	14.9
21) Avg. Dth/Part. Saved =	1.19	1.22	1.22
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	216,199	216,358	216,454
24) Total Annual Dth Saved =	258,192	263,277	263,907
25) Incentive/Participant =	$14.81	$15.05	$15.13

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$33	$33	$33
Cost per Participant per Dth =	$73.35	$73.18	$73.70
Lifetime Energy Reduction (Dth)	11,727,395		
Societal Cost per Dth	$4.09		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($35,022,572)	0.60
Utility Cost Test	$30,978,246	2.45
Societal Test	$50,794,099	2.06
Participant Test	$86,211,508	2.34

EFFICIENT NEW HOME CONSTRUCTION — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$669,761	$669,761	$669,761	$669,761
T & D	N/A	$404,396	$404,396	$404,396	$404,396
Marginal Energy	N/A	$399,208	$399,208	$399,208	$399,208
Environmental Externality	N/A	N/A	N/A	N/A	$124,276
Subtotal	N/A	$1,473,364	$1,473,364	$1,473,364	$1,597,641
Participant Benefits					
Bill Reduction - Electric	$1,525,612	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$429,912	N/A	N/A	$429,912	$429,912
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$1,874,112	N/A	N/A	$35,152	$35,152
Subtotal	$3,829,636	N/A	N/A	$465,063	$465,063
Total Benefits	$3,829,636	$1,473,364	$1,473,364	$1,938,428	$2,062,704
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$21,775	$21,775	$21,775	$21,775
Advertising & Promotion	N/A	$50,605	$50,605	$50,605	$50,605
Measurement & Verification	N/A	$250,000	$250,000	$250,000	$250,000
Rebates	N/A	$429,912	$429,912	$429,912	$429,912
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$752,292	$752,292	$752,292	$752,292
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,525,612	N/A	N/A
Subtotal	N/A	N/A	$1,525,612	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,733,444	N/A	N/A	$618,363	$618,363
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,733,444	N/A	N/A	$618,363	$618,363
Total Costs	$1,733,444	$752,292	$2,277,904	$1,370,655	$1,370,655
Net Benefit (Cost)	$2,096,193	$721,073	($804,540)	$567,773	$692,049
Benefit/Cost Ratio	2.21	1.96	0.65	1.41	1.50

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	19.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	79.31%
Gross Load Factor at Customer	E	8.89%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$618

Program Summary per Participant		
Gross kW Saved at Customer	I	0.55 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.48 kW
Gross Annual kWh Saved at Customer	(B x E x I)	431 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	470 kWh

Program Summary All Participants		
Total Participants	J	2,024
Total Budget	K	**$752,292**
Gross kW Saved at Customer	(J x I)	1,120 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**974 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	872,150 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**952,129 kWh**
Societal Net Benefits	(J x I x H)	**$692,049**

Utility Program Cost per kWh Lifetime	**$0.0400**
Utility Program Cost per kW at Gen	**$772**

EFFICIENT NEW HOME CONSTRUCTION — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$794,151	$794,151	$794,151	$794,151
T & D	N/A	$484,165	$484,165	$484,165	$484,165
Marginal Energy	N/A	$400,541	$400,541	$400,541	$400,541
Environmental Externality	N/A	N/A	N/A	N/A	$133,577
Subtotal	N/A	$1,678,857	$1,678,857	$1,678,857	$1,812,434
Participant Benefits					
Bill Reduction - Electric	$1,575,038	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$429,912	N/A	N/A	$429,912	$429,912
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$1,874,112	N/A	N/A	$35,170	$35,170
Subtotal	$3,879,062	N/A	N/A	$465,081	$465,081
Total Benefits	$3,879,062	$1,678,857	$1,678,857	$2,143,938	$2,277,515
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$21,805	$21,805	$21,805	$21,805
Advertising & Promotion	N/A	$50,605	$50,605	$50,605	$50,605
Measurement & Verification	N/A	$250,000	$250,000	$250,000	$250,000
Rebates	N/A	$429,912	$429,912	$429,912	$429,912
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$752,322	$752,322	$752,322	$752,322
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,575,038	N/A	N/A
Subtotal	N/A	N/A	$1,575,038	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,733,444	N/A	N/A	$633,585	$633,585
	$0	N/A	N/A	$0	$0
Subtotal	$1,733,444	N/A	N/A	$633,585	$633,585
Total Costs	$1,733,444	$752,322	$2,327,359	$1,385,907	$1,385,907
Net Benefit (Cost)	$2,145,618	$926,535	($648,503)	$758,031	$891,608
Benefit/Cost Ratio	2.24	2.23	0.72	1.55	1.64

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	19.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	79.31%
Gross Load Factor at Customer	E	8.89%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$796

Program Summary per Participant		
Gross kW Saved at Customer	I	0.55 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.48 kW
Gross Annual kWh Saved at Customer	(B x E x I)	431 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	470 kWh

Program Summary All Participants		
Total Participants	J	2,024
Total Budget	K	**$752,322**
Gross kW Saved at Customer	(J x I)	1,120 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**974 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	872,150 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**952,129 kWh**
Societal Net Benefits	(J x I x H)	**$891,608**

Utility Program Cost per kWh Lifetime	**$0.0400**
Utility Program Cost per kW at Gen	**$772**

EFFICIENT NEW HOME CONSTRUCTION — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$811,918	$811,918	$811,918	$811,918
T & D	N/A	$495,591	$495,591	$495,591	$495,591
Marginal Energy	N/A	$402,140	$402,140	$402,140	$402,140
Environmental Externality	N/A	N/A	N/A	N/A	$143,497
Subtotal	N/A	$1,709,649	$1,709,649	$1,709,649	$1,853,146
Participant Benefits					
Bill Reduction - Electric	$1,625,753	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$429,912	N/A	N/A	$429,912	$429,912
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$1,874,112	N/A	N/A	$35,128	$35,128
Subtotal	$3,929,777	N/A	N/A	$465,040	$465,040
Total Benefits	$3,929,777	$1,709,649	$1,709,649	$2,174,689	$2,318,186
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$21,835	$21,835	$21,835	$21,835
Advertising & Promotion	N/A	$50,605	$50,605	$50,605	$50,605
Measurement & Verification	N/A	$250,000	$250,000	$250,000	$250,000
Rebates	N/A	$429,912	$429,912	$429,912	$429,912
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$752,352	$752,352	$752,352	$752,352
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,625,753	N/A	N/A
Subtotal	N/A	N/A	$1,625,753	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,733,444	N/A	N/A	$630,777	$630,777
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,733,444	N/A	N/A	$630,777	$630,777
Total Costs	$1,733,444	$752,352	$2,378,105	$1,383,129	$1,383,129
Net Benefit (Cost)	$2,196,333	$957,297	($668,456)	$791,560	$935,056
Benefit/Cost Ratio	2.27	2.27	0.72	1.57	1.68

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	19.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	79.31%
Gross Load Factor at Customer	E	8.89%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$835

Program Summary per Participant		
Gross kW Saved at Customer	I	0.55 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.48 kW
Gross Annual kWh Saved at Customer	(B x E x I)	431 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	470 kWh

Program Summary All Participants		
Total Participants	J	2,024
Total Budget	K	**$752,352**
Gross kW Saved at Customer	(J x I)	1,120 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**974 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	872,150 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**952,129 kWh**
Societal Net Benefits	(J x I x H)	**$935,056**

Utility Program Cost per kWh Lifetime	**$0.0400**
Utility Program Cost per kW at Gen	**$773**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Efficient New Home Construction**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$1,050,374	$1,050,488	$1,050,624
Incentive Costs =	$522,937	$522,937	$522,937
16) Total Utility Project Costs =	$1,573,311	$1,573,425	$1,573,561
17) Direct Participant Costs ($/Part.) =	$2,258	$2,258	$2,258
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$3	$3	$3
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	20.0	20.0	20.0
21) Avg. Dth/Part. Saved =	31.79	31.79	31.79
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	960	960	960
24) Total Annual Dth Saved =	30,514	30,514	30,514
25) Incentive/Participant =	$544.73	$544.73	$544.73

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$1,639	$1,639	$1,639
Cost per Participant per Dth =	$122.59	$122.60	$122.60
Lifetime Energy Reduction (Dth)	1,829,807		
Societal Cost per Dth	$5.26		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($6,770,299)	0.54
Utility Cost Test	$3,087,526	1.65
Societal Test	$3,706,238	1.38
Participant Test	$10,284,235	1.58

ENERGY EFFICIENT SHOWERHEAD — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$39,892	$39,892	$39,892	$39,892
T & D	N/A	$24,085	$24,085	$24,085	$24,085
Marginal Energy	N/A	$300,244	$300,244	$300,244	$300,244
Environmental Externality	N/A	N/A	N/A	N/A	$84,851
Subtotal	N/A	$364,221	$364,221	$364,221	$449,072
Participant Benefits					
Bill Reduction - Electric	$1,004,777	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$14,909	N/A	N/A	$14,909	$14,909
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$483,920	N/A	N/A	$483,920	$483,920
Subtotal	$1,503,605	N/A	N/A	$498,828	$498,828
Total Benefits	$1,503,605	$364,221	$364,221	$863,050	$947,901
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$21,890	$21,890	$21,890	$21,890
Advertising & Promotion	N/A	$4,953	$4,953	$4,953	$4,953
Measurement & Verification	N/A	$500	$500	$500	$500
Rebates	N/A	$14,909	$14,909	$14,909	$14,909
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$42,252	$42,252	$42,252	$42,252
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,004,777	N/A	N/A
Subtotal	N/A	N/A	$1,004,777	N/A	N/A
Participant Costs					
Incremental Capital Costs	$14,909	N/A	N/A	$14,909	$14,909
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$14,909	N/A	N/A	$14,909	$14,909
Total Costs	$14,909	$42,252	$1,047,029	$57,161	$57,161
Net Benefit (Cost)	$1,488,696	$321,970	($682,807)	$805,889	$890,740
Benefit/Cost Ratio	100.85	8.62	0.35	15.10	16.58

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	10.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	71.87%
Gross Load Factor at Customer	E	100.00%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$8,056

Program Summary per Participant		
Gross kW Saved at Customer	I	0.06 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.05 kW
Gross Annual kWh Saved at Customer	(B x E x I)	504 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	551 kWh

Program Summary All Participants		
Total Participants	J	1,920
Total Budget	K	**$42,252**
Gross kW Saved at Customer	(J x I)	111 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**87 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	968,581 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,057,403 kWh**
Societal Net Benefits	(J x I x H)	**$890,740**

Utility Program Cost per kWh Lifetime	**$0.0040**
Utility Program Cost per kW at Gen	**$485**

ENERGY EFFICIENT SHOWERHEAD — 2018 — ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$43,736	$43,736	$43,736	$43,736
T & D	N/A	$26,541	$26,541	$26,541	$26,541
Marginal Energy	N/A	$302,323	$302,323	$302,323	$302,323
Environmental Externality	N/A	N/A	N/A	N/A	$94,520
Subtotal	N/A	$372,600	$372,600	$372,600	$467,120
Participant Benefits					
Bill Reduction - Electric	$1,037,235	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$15,528	N/A	N/A	$15,528	$15,528
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$483,920	N/A	N/A	$483,920	$483,920
Subtotal	$1,536,682	N/A	N/A	$499,448	$499,448
Total Benefits	$1,536,682	$372,600	$372,600	$872,047	$966,567
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$19,570	$19,570	$19,570	$19,570
Advertising & Promotion	N/A	$4,995	$4,995	$4,995	$4,995
Measurement & Verification	N/A	$500	$500	$500	$500
Rebates	N/A	$15,528	$15,528	$15,528	$15,528
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$40,593	$40,593	$40,593	$40,593
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,037,235	N/A	N/A
Subtotal	N/A	N/A	$1,037,235	N/A	N/A
Participant Costs					
Incremental Capital Costs	$15,528	N/A	N/A	$15,528	$15,528
	$0	N/A	N/A	$0	$0
Subtotal	$15,528	N/A	N/A	$15,528	$15,528
Total Costs	$15,528	$40,593	$1,077,828	$56,121	$56,121
Net Benefit (Cost)	$1,521,154	$332,007	($705,228)	$815,926	$910,446
Benefit/Cost Ratio	98.96	9.18	0.35	15.54	17.22

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	10.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	71.87%
Gross Load Factor at Customer	E	100.00%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$8,234

Program Summary per Participant		
Gross kW Saved at Customer	I	0.06 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.05 kW
Gross Annual kWh Saved at Customer	(B x E x I)	504 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	551 kWh

Program Summary All Participants		
Total Participants	J	1,920
Total Budget	K	**$40,593**
Gross kW Saved at Customer	(J x I)	111 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**87 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	968,581 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,057,403 kWh**
Societal Net Benefits	(J x I x H)	**$910,446**
Utility Program Cost per kWh Lifetime		**$0.0038**
Utility Program Cost per kW at Gen		**$466**

ENERGY EFFICIENT SHOWERHEAD — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$44,714	$44,714	$44,714	$44,714
T & D	N/A	$27,167	$27,167	$27,167	$27,167
Marginal Energy	N/A	$304,727	$304,727	$304,727	$304,727
Environmental Externality	N/A	N/A	N/A	N/A	$105,100
Subtotal	N/A	$376,609	$376,609	$376,609	$481,709
Participant Benefits					
Bill Reduction - Electric	$1,070,844	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$16,094	N/A	N/A	$16,094	$16,094
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$483,920	N/A	N/A	$483,920	$483,920
Subtotal	$1,570,858	N/A	N/A	$500,014	$500,014
Total Benefits	$1,570,858	$376,609	$376,609	$876,623	$981,723
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$20,169	$20,169	$20,169	$20,169
Advertising & Promotion	N/A	$5,038	$5,038	$5,038	$5,038
Measurement & Verification	N/A	$500	$500	$500	$500
Rebates	N/A	$16,094	$16,094	$16,094	$16,094
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$41,801	$41,801	$41,801	$41,801
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,070,844	N/A	N/A
Subtotal	N/A	N/A	$1,070,844	N/A	N/A
Participant Costs					
Incremental Capital Costs	$16,094	N/A	N/A	$16,094	$16,094
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$16,094	N/A	N/A	$16,094	$16,094
Total Costs	$16,094	$41,801	$1,112,645	$57,896	$57,896
Net Benefit (Cost)	$1,554,764	$334,807	($736,037)	$818,727	$923,827
Benefit/Cost Ratio	97.60	9.01	0.34	15.14	16.96

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	10.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	71.87%
Gross Load Factor at Customer	E	100.00%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$8,355

Program Summary per Participant		
Gross kW Saved at Customer	I	0.06 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.05 kW
Gross Annual kWh Saved at Customer	(B x E x I)	504 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	551 kWh

Program Summary All Participants		
Total Participants	J	1,920
Total Budget	K	**$41,801**
Gross kW Saved at Customer	(J x I)	111 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**87 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	968,581 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,057,403 kWh**
Societal Net Benefits	(J x I x H)	**$923,827**

Utility Program Cost per kWh Lifetime	**$0.0040**
Utility Program Cost per kW at Gen	**$480**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Energy Efficient Showerhead**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$177,577	$143,645	$146,942
Incentive Costs =	$109,331	$113,872	$118,026
16) Total Utility Project Costs =	$286,908	$257,517	$264,968
17) Direct Participant Costs ($/Part.) =	$8	$8	$8
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$33	$33	$33
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	10.0	10.0	10.0
21) Avg. Dth/Part. Saved =	2.15	2.15	2.15
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	14,080	14,080	14,080
24) Total Annual Dth Saved =	30,294	30,294	30,294
25) Incentive/Participant =	$7.77	$8.09	$8.38

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$20	$18	$19
Cost per Participant per Dth =	$13.08	$12.26	$12.64
Lifetime Energy Reduction (Dth)	908,820		
Societal Cost per Dth	$0.92		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,973,149)	0.69
Utility Cost Test	$3,622,999	5.48
Societal Test	$18,240,586	22.73
Participant Test	$20,103,189	30.36

ENERGY FEEDBACK RESIDENTIAL — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$636,841	$636,841	$636,841	$636,841
T & D	N/A	$384,098	$384,098	$384,098	$384,098
Marginal Energy	N/A	$1,849,120	$1,849,120	$1,849,120	$1,849,120
Environmental Externality	N/A	N/A	N/A	N/A	$152,431
Subtotal	N/A	$2,870,058	$2,870,058	$2,870,058	$3,022,490
Participant Benefits					
Bill Reduction - Electric	$4,691,957	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$4,691,957	N/A	N/A	$0	$0
Total Benefits	$4,691,957	$2,870,058	$2,870,058	$2,870,058	$3,022,490
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,564,175	$2,564,175	$2,564,175	$2,564,175
Advertising & Promotion	N/A	$8,645	$8,645	$8,645	$8,645
Measurement & Verification	N/A	$25,000	$25,000	$25,000	$25,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,597,820	$2,597,820	$2,597,820	$2,597,820
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$4,691,957	N/A	N/A
Subtotal	N/A	N/A	$4,691,957	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,597,820	$7,289,777	$2,597,820	$2,597,820
Net Benefit (Cost)	$4,691,957	$272,238	($4,419,719)	$272,238	$424,670
Benefit/Cost Ratio	INF	1.10	0.39	1.10	1.16

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	3.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	96.38%
Gross Load Factor at Customer	E	46.88%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$127

Program Summary per Participant		
Gross kW Saved at Customer	I	0.01 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.01 kW
Gross Annual kWh Saved at Customer	(B x E x I)	54 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	58 kWh

Program Summary All Participants		
Total Participants	J	256,320
Total Budget	K	**$2,597,820**
Gross kW Saved at Customer	(J x I)	3,344 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,534 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	13,731,121 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**14,990,307 kWh**
Societal Net Benefits	(J x I x H)	**$424,670**

Utility Program Cost per kWh Lifetime	**$0.0578**
Utility Program Cost per kW at Gen	**$735**

ENERGY FEEDBACK RESIDENTIAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$717,791	$717,791	$717,791	$717,791
T & D	N/A	$433,441	$433,441	$433,441	$433,441
Marginal Energy	N/A	$2,023,395	$2,023,395	$2,023,395	$2,023,395
Environmental Externality	N/A	N/A	N/A	N/A	$168,053
Subtotal	N/A	$3,174,627	$3,174,627	$3,174,627	$3,342,680
Participant Benefits					
Bill Reduction - Electric	$5,358,979	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$5,358,979	N/A	N/A	$0	$0
Total Benefits	$5,358,979	$3,174,627	$3,174,627	$3,174,627	$3,342,680
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,085,220	$2,085,220	$2,085,220	$2,085,220
Advertising & Promotion	N/A	$8,645	$8,645	$8,645	$8,645
Measurement & Verification	N/A	$25,000	$25,000	$25,000	$25,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,118,865	$2,118,865	$2,118,865	$2,118,865
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,358,979	N/A	N/A
Subtotal	N/A	N/A	$5,358,979	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,118,865	$7,477,844	$2,118,865	$2,118,865
Net Benefit (Cost)	$5,358,979	$1,055,762	($4,303,217)	$1,055,762	$1,223,815
Benefit/Cost Ratio	INF	1.50	0.42	1.50	1.58

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	3.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	96.39%
Gross Load Factor at Customer	E	46.96%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$332

Program Summary per Participant		
Gross kW Saved at Customer	I	0.01 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.02 kW
Gross Annual kWh Saved at Customer	(B x E x I)	59 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	65 kWh

Program Summary All Participants		
Total Participants	J	256,120
Total Budget	K	**$2,118,865**
Gross kW Saved at Customer	(J x I)	3,686 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,896 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	15,164,454 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**16,555,081 kWh**
Societal Net Benefits	(J x I x H)	**$1,223,815**

Utility Program Cost per kWh Lifetime	**$0.0427**
Utility Program Cost per kW at Gen	**$544**

ENERGY FEEDBACK RESIDENTIAL — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$740,224	$740,224	$740,224	$740,224
T & D	N/A	$447,524	$447,524	$447,524	$447,524
Marginal Energy	N/A	$2,228,866	$2,228,866	$2,228,866	$2,228,866
Environmental Externality	N/A	N/A	N/A	N/A	$672,533
Subtotal	N/A	$3,416,614	$3,416,614	$3,416,614	$4,089,147
Participant Benefits					
Bill Reduction - Electric	$5,568,055	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$5,568,055	N/A	N/A	$0	$0
Total Benefits	$5,568,055	$3,416,614	$3,416,614	$3,416,614	$4,089,147
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,146,030	$2,146,030	$2,146,030	$2,146,030
Advertising & Promotion	N/A	$8,645	$8,645	$8,645	$8,645
Measurement & Verification	N/A	$25,000	$25,000	$25,000	$25,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,179,675	$2,179,675	$2,179,675	$2,179,675
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,568,055	N/A	N/A
Subtotal	N/A	N/A	$5,568,055	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$2,179,675	$7,747,730	$2,179,675	$2,179,675
Net Benefit (Cost)	$5,568,055	$1,236,939	($4,331,115)	$1,236,939	$1,909,472
Benefit/Cost Ratio	INF	1.57	0.44	1.57	1.88

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	3.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	96.39%
Gross Load Factor at Customer	E	47.03%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$514

Program Summary per Participant		
Gross kW Saved at Customer	I	0.01 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.02 kW
Gross Annual kWh Saved at Customer	(B x E x I)	60 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	65 kWh

Program Summary All Participants		
Total Participants	J	256,320
Total Budget	K	**$2,179,675**
Gross kW Saved at Customer	(J x I)	3,718 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**3,930 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	15,317,788 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**16,722,476 kWh**
Societal Net Benefits	(J x I x H)	**$1,909,472**

Utility Program Cost per kWh Lifetime	**$0.0434**
Utility Program Cost per kW at Gen	**$555**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Energy Feedback Residential**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$312,982	$321,772	$330,672
Incentive Costs =	$0	$0	$0
16) Total Utility Project Costs =	$312,982	$321,772	$330,672
17) Direct Participant Costs ($/Part.) =	$0	$0	$0
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	3.0	3.0	3.0
21) Avg. Dth/Part. Saved =	0.14	0.15	0.14
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	170,998	170,898	170,898
24) Total Annual Dth Saved =	23,786	25,309	24,762
25) Incentive/Participant =	$0.00	$0.00	$0.00

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$2	$2	$2
Cost per Participant per Dth =	$13.16	$12.71	$13.35
Lifetime Energy Reduction (Dth)	221,571		
Societal Cost per Dth	$4.77		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,287,489)	0.49
Utility Cost Test	$261,212	1.27
Societal Test	$349,124	1.33
Participant Test	$1,548,701	1.57

HOME ENERGY SQUAD — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$155,079	$155,079	$155,079	$155,079
T & D	N/A	$93,626	$93,626	$93,626	$93,626
Marginal Energy	N/A	$894,130	$894,130	$894,130	$894,130
Environmental Externality	N/A	N/A	N/A	N/A	$235,102
Subtotal	N/A	$1,142,834	$1,142,834	$1,142,834	$1,377,936
Participant Benefits					
Bill Reduction - Electric	$2,900,247	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$307,528	N/A	N/A	$25,647	$25,647
Subtotal	$3,207,775	N/A	N/A	$25,647	$25,647
Total Benefits	$3,207,775	$1,142,834	$1,142,834	$1,168,480	$1,403,582
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$171,850	$171,850	$171,850	$171,850
Advertising & Promotion	N/A	$269,420	$269,420	$269,420	$269,420
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$863,079	$863,079	$863,079	$863,079
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,900,247	N/A	N/A
Subtotal	N/A	N/A	$2,900,247	N/A	N/A
Participant Costs					
Incremental Capital Costs	$174,236	N/A	N/A	$39,716	$39,716
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$174,236	N/A	N/A	$39,716	$39,716
Total Costs	$174,236	$863,079	$3,763,326	$902,795	$902,795
Net Benefit (Cost)	$3,033,540	$279,755	($2,620,492)	$265,685	$500,787
Benefit/Cost Ratio	18.41	1.32	0.30	1.29	1.55

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	7.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.27%
Gross Load Factor at Customer	E	11.00%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$129

Program Summary per Participant		
Gross kW Saved at Customer	I	0.83 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.09 kW
Gross Annual kWh Saved at Customer	(B x E x I)	798 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	871 kWh

Program Summary All Participants		
Total Participants	J	4,700
Total Budget	K	**$863,079**
Gross kW Saved at Customer	(J x I)	3,894 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**438 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,751,611 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**4,095,645 kWh**
Societal Net Benefits	(J x I x H)	**$500,787**

Utility Program Cost per kWh Lifetime	**$0.0291**
Utility Program Cost per kW at Gen	**$1,969**

HOME ENERGY SQUAD — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$146,138	$146,138	$146,138	$146,138
T & D	N/A	$88,504	$88,504	$88,504	$88,504
Marginal Energy	N/A	$805,715	$805,715	$805,715	$805,715
Environmental Externality	N/A	N/A	N/A	N/A	$239,159
Subtotal	N/A	$1,040,357	$1,040,357	$1,040,357	$1,279,515
Participant Benefits					
Bill Reduction - Electric	$2,635,662	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$272,411	N/A	N/A	$22,700	$22,700
Subtotal	$2,908,073	N/A	N/A	$22,700	$22,700
Total Benefits	$2,908,073	$1,040,357	$1,040,357	$1,063,057	$1,302,215
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$176,120	$176,120	$176,120	$176,120
Advertising & Promotion	N/A	$269,920	$269,920	$269,920	$269,920
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$867,849	$867,849	$867,849	$867,849
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,635,662	N/A	N/A
Subtotal	N/A	N/A	$2,635,662	N/A	N/A
Participant Costs					
Incremental Capital Costs	$171,401	N/A	N/A	$34,913	$34,913
	$0	N/A	N/A	$0	$0
Subtotal	$171,401	N/A	N/A	$34,913	$34,913
Total Costs	$171,401	$867,849	$3,503,511	$902,762	$902,762
Net Benefit (Cost)	$2,736,672	$172,508	($2,463,154)	$160,294	$399,453
Benefit/Cost Ratio	16.97	1.20	0.30	1.18	1.44

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.24%
Gross Load Factor at Customer	E	11.00%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$103

Program Summary per Participant		
Gross kW Saved at Customer	I	0.83 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.09 kW
Gross Annual kWh Saved at Customer	(B x E x I)	798 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	871 kWh

Program Summary All Participants		
Total Participants	J	4,700
Total Budget	K	**$867,849**
Gross kW Saved at Customer	(J x I)	3,894 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**437 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,751,611 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**4,095,645 kWh**
Societal Net Benefits	(J x I x H)	**$399,453**

Utility Program Cost per kWh Lifetime	**$0.0336**
Utility Program Cost per kW at Gen	**$1,985**

HOME ENERGY SQUAD — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$129,123	$129,123	$129,123	$129,123
T & D	N/A	$78,254	$78,254	$78,254	$78,254
Marginal Energy	N/A	$712,870	$712,870	$712,870	$712,870
Environmental Externality	N/A	N/A	N/A	N/A	$243,683
Subtotal	N/A	$920,247	$920,247	$920,247	$1,163,930
Participant Benefits					
Bill Reduction - Electric	$2,336,838	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$235,573	N/A	N/A	$19,676	$19,676
Subtotal	$2,572,411	N/A	N/A	$19,676	$19,676
Total Benefits	$2,572,411	$920,247	$920,247	$939,924	$1,183,607
Costs					
Utility Project Costs					
Customer Services	N/A	$421,809	$421,809	$421,809	$421,809
Project Administration	N/A	$180,544	$180,544	$180,544	$180,544
Advertising & Promotion	N/A	$270,420	$270,420	$270,420	$270,420
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$872,773	$872,773	$872,773	$872,773
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,336,838	N/A	N/A
Subtotal	N/A	N/A	$2,336,838	N/A	N/A
Participant Costs					
Incremental Capital Costs	$169,546	N/A	N/A	$30,945	$30,945
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$169,546	N/A	N/A	$30,945	$30,945
Total Costs	$169,546	$872,773	$3,209,611	$903,718	$903,718
Net Benefit (Cost)	$2,402,866	$47,474	($2,289,364)	$36,205	$279,888
Benefit/Cost Ratio	15.17	1.05	0.29	1.04	1.31

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.4 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.24%
Gross Load Factor at Customer	E	11.00%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$72

Program Summary per Participant		
Gross kW Saved at Customer	I	0.83 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.09 kW
Gross Annual kWh Saved at Customer	(B x E x I)	798 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	871 kWh

Program Summary All Participants		
Total Participants	J	4,700
Total Budget	K	**$872,773**
Gross kW Saved at Customer	(J x I)	3,894 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**437 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,751,611 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**4,095,645 kWh**
Societal Net Benefits	(J x I x H)	**$279,888**

Utility Program Cost per kWh Lifetime	**$0.0398**
Utility Program Cost per kW at Gen	**$1,997**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Home Energy Squad**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$1,290,788	$1,296,594	$1,306,189
Incentive Costs =	$0	$0	$0
16) Total Utility Project Costs =	$1,290,788	$1,296,594	$1,306,189
17) Direct Participant Costs ($/Part.) =	$70	$70	$70
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$22	$22	$22
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	9.7	9.7	9.7
21) Avg. Dth/Part. Saved =	7.87	7.87	7.87
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	2,200	2,200	2,200
24) Total Annual Dth Saved =	17,305	17,305	17,305
25) Incentive/Participant =	$0.00	$0.00	$0.00

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$587	$589	$594
Cost per Participant per Dth =	$83.55	$83.88	$84.44
Lifetime Energy Reduction (Dth)	503,259		
Societal Cost per Dth	$13.47		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($4,540,716)	0.35
Utility Cost Test	($1,428,795)	0.63
Societal Test	$196,564	1.03
Participant Test	$4,839,412	1.08

HOME LIGHTING — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,543,236	$2,543,236	$2,543,236	$2,543,236
T & D	N/A	$1,535,332	$1,535,332	$1,535,332	$1,535,332
Marginal Energy	N/A	$16,128,645	$16,128,645	$16,128,645	$16,128,645
Environmental Externality	N/A	N/A	N/A	N/A	$4,155,445
Subtotal	N/A	$20,207,213	$20,207,213	$20,207,213	$24,362,658
Participant Benefits					
Bill Reduction - Electric	$53,996,645	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,364,445	N/A	N/A	$4,364,445	$4,364,445
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$58,361,090	N/A	N/A	$4,364,445	$4,364,445
Total Benefits	$58,361,090	$20,207,213	$20,207,213	$24,571,658	$28,727,103
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$1,401,196	$1,401,196	$1,401,196	$1,401,196
Advertising & Promotion	N/A	$1,758,910	$1,758,910	$1,758,910	$1,758,910
Measurement & Verification	N/A	$10,000	$10,000	$10,000	$10,000
Rebates	N/A	$4,364,445	$4,364,445	$4,364,445	$4,364,445
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$7,534,551	$7,534,551	$7,534,551	$7,534,551
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$53,996,645	N/A	N/A
Subtotal	N/A	N/A	$53,996,645	N/A	N/A
Participant Costs					
Incremental Capital Costs	$9,827,259	N/A	N/A	$9,827,259	$9,827,259
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$9,827,259	N/A	N/A	$9,827,259	$9,827,259
Total Costs	$9,827,259	$7,534,551	$61,531,196	$17,361,810	$17,361,810
Net Benefit (Cost)	$48,533,831	$12,672,662	($41,323,983)	$7,209,848	$11,365,293
Benefit/Cost Ratio	5.94	2.68	0.33	1.42	1.65

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.7 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	11.90%
Gross Load Factor at Customer	E	13.95%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$157

Program Summary per Participant		
Gross kW Saved at Customer	I	0.48 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	585 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	639 kWh

Program Summary All Participants		
Total Participants	J	151,040
Total Budget	K	**$7,534,551**
Gross kW Saved at Customer	(J x I)	72,323 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**9,437 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	88,411,269 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**96,518,853 kWh**
Societal Net Benefits	(J x I x H)	**$11,365,293**

Utility Program Cost per kWh Lifetime	**$0.0136**
Utility Program Cost per kW at Gen	**$798**

HOME LIGHTING — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,502,531	$2,502,531	$2,502,531	$2,502,531
T & D	N/A	$1,514,821	$1,514,821	$1,514,821	$1,514,821
Marginal Energy	N/A	$15,251,688	$15,251,688	$15,251,688	$15,251,688
Environmental Externality	N/A	N/A	N/A	N/A	$4,539,445
Subtotal	N/A	$19,269,040	$19,269,040	$19,269,040	$23,808,485
Participant Benefits					
Bill Reduction - Electric	$51,335,409	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,513,647	N/A	N/A	$4,513,647	$4,513,647
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$55,849,056	N/A	N/A	$4,513,647	$4,513,647
Total Benefits	$55,849,056	$19,269,040	$19,269,040	$23,782,687	$28,322,132
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$1,252,004	$1,252,004	$1,252,004	$1,252,004
Advertising & Promotion	N/A	$1,758,950	$1,758,950	$1,758,950	$1,758,950
Measurement & Verification	N/A	$10,000	$10,000	$10,000	$10,000
Rebates	N/A	$4,513,647	$4,513,647	$4,513,647	$4,513,647
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$7,534,601	$7,534,601	$7,534,601	$7,534,601
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$51,335,409	N/A	N/A
Subtotal	N/A	N/A	$51,335,409	N/A	N/A
Participant Costs					
Incremental Capital Costs	$8,783,751	N/A	N/A	$8,783,751	$8,783,751
	$0	N/A	N/A	$0	$0
Subtotal	$8,783,751	N/A	N/A	$8,783,751	$8,783,751
Total Costs	$8,783,751	$7,534,601	$58,870,010	$16,318,352	$16,318,352
Net Benefit (Cost)	$47,065,306	$11,734,439	($39,600,970)	$7,464,336	$12,003,781
Benefit/Cost Ratio	6.36	2.56	0.33	1.46	1.74

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	11.90%
Gross Load Factor at Customer	E	13.97%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$160

Program Summary per Participant		
Gross kW Saved at Customer	I	0.48 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	582 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	635 kWh

Program Summary All Participants		
Total Participants	J	157,787
Total Budget	K	**$7,534,601**
Gross kW Saved at Customer	(J x I)	75,049 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**9,793 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	91,810,122 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**100,229,391 kWh**
Societal Net Benefits	(J x I x H)	**$12,003,781**

Utility Program Cost per kWh Lifetime	**$0.0150**
Utility Program Cost per kW at Gen	**$769**

HOME LIGHTING — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$2,085,312	$2,085,312	$2,085,312	$2,085,312
T & D	N/A	$1,263,185	$1,263,185	$1,263,185	$1,263,185
Marginal Energy	N/A	$12,700,091	$12,700,091	$12,700,091	$12,700,091
Environmental Externality	N/A	N/A	N/A	N/A	$4,511,551
Subtotal	N/A	$16,048,588	$16,048,588	$16,048,588	$20,560,139
Participant Benefits					
Bill Reduction - Electric	$42,674,873	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$4,166,400	N/A	N/A	$4,166,400	$4,166,400
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$46,841,273	N/A	N/A	$4,166,400	$4,166,400
Total Benefits	$46,841,273	$16,048,588	$16,048,588	$20,214,988	$24,726,539
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$1,401,206	$1,401,206	$1,401,206	$1,401,206
Advertising & Promotion	N/A	$1,894,040	$1,894,040	$1,894,040	$1,894,040
Measurement & Verification	N/A	$10,000	$10,000	$10,000	$10,000
Rebates	N/A	$4,166,400	$4,166,400	$4,166,400	$4,166,400
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$7,471,646	$7,471,646	$7,471,646	$7,471,646
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$42,674,873	N/A	N/A
Subtotal	N/A	N/A	$42,674,873	N/A	N/A
Participant Costs					
Incremental Capital Costs	$7,351,126	N/A	N/A	$7,351,126	$7,351,126
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$7,351,126	N/A	N/A	$7,351,126	$7,351,126
Total Costs	$7,351,126	$7,471,646	$50,146,519	$14,822,772	$14,822,772
Net Benefit (Cost)	$39,490,147	$8,576,942	($34,097,932)	$5,392,216	$9,903,767
Benefit/Cost Ratio	6.37	2.15	0.32	1.36	1.67

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	4.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	11.90%
Gross Load Factor at Customer	E	13.97%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$142

Program Summary per Participant		
Gross kW Saved at Customer	I	0.48 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	584 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	637 kWh

Program Summary All Participants		
Total Participants	J	146,067
Total Budget	K	**$7,471,646**
Gross kW Saved at Customer	(J x I)	69,710 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**9,096 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	85,279,003 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**93,099,348 kWh**
Societal Net Benefits	(J x I x H)	**$9,903,767**

Utility Program Cost per kWh Lifetime	**$0.0186**
Utility Program Cost per kW at Gen	**$821**

INSULATION REBATE — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$81,582	$81,582	$81,582	$81,582
T & D	N/A	$49,258	$49,258	$49,258	$49,258
Marginal Energy	N/A	$521,556	$521,556	$521,556	$521,556
Environmental Externality	N/A	N/A	N/A	N/A	$141,532
Subtotal	N/A	$652,395	$652,395	$652,395	$793,927
Participant Benefits					
Bill Reduction - Electric	$1,613,001	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$180,026	N/A	N/A	$180,026	$180,026
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$848,689	N/A	N/A	$0	$0
Subtotal	$2,641,716	N/A	N/A	$180,026	$180,026
Total Benefits	$2,641,716	$652,395	$652,395	$832,421	$973,952
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$24,500	$24,500	$24,500	$24,500
Advertising & Promotion	N/A	$6,500	$6,500	$6,500	$6,500
Measurement & Verification	N/A	$3,500	$3,500	$3,500	$3,500
Rebates	N/A	$180,026	$180,026	$180,026	$180,026
Other	N/A	$2,500	$2,500	$2,500	$2,500
Subtotal	N/A	$217,026	$217,026	$217,026	$217,026
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,613,001	N/A	N/A
Subtotal	N/A	N/A	$1,613,001	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,353,765	N/A	N/A	$519,178	$519,178
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,353,765	N/A	N/A	$519,178	$519,178
Total Costs	$1,353,765	$217,026	$1,830,027	$736,204	$736,204
Net Benefit (Cost)	$1,287,951	$435,369	($1,177,632)	$96,217	$237,749
Benefit/Cost Ratio	1.95	3.01	0.36	1.13	1.32

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	19.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	14.55%
Gross Load Factor at Customer	E	14.25%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$291

Program Summary per Participant		
Gross kW Saved at Customer	I	1.66 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.27 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,076 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,266 kWh

Program Summary All Participants		
Total Participants	J	491
Total Budget	K	**$217,026**
Gross kW Saved at Customer	(J x I)	816 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**130 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,019,351 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,112,829 kWh**
Societal Net Benefits	(J x I x H)	**$237,749**

Utility Program Cost per kWh Lifetime	**$0.0102**
Utility Program Cost per kW at Gen	**$1,666**

INSULATION REBATE — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$106,667	$106,667	$106,667	$106,667
T & D	N/A	$64,979	$64,979	$64,979	$64,979
Marginal Energy	N/A	$659,188	$659,188	$659,188	$659,188
Environmental Externality	N/A	N/A	N/A	N/A	$191,861
Subtotal	N/A	$830,834	$830,834	$830,834	$1,022,694
Participant Benefits					
Bill Reduction - Electric	$2,096,472	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$188,604	N/A	N/A	$188,604	$188,604
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$866,755	N/A	N/A	$0	$0
Subtotal	$3,151,831	N/A	N/A	$188,604	$188,604
Total Benefits	$3,151,831	$830,834	$830,834	$1,019,438	$1,211,298
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$25,500	$25,500	$25,500	$25,500
Advertising & Promotion	N/A	$8,000	$8,000	$8,000	$8,000
Measurement & Verification	N/A	$3,900	$3,900	$3,900	$3,900
Rebates	N/A	$188,604	$188,604	$188,604	$188,604
Other	N/A	$3,200	$3,200	$3,200	$3,200
Subtotal	N/A	$229,204	$229,204	$229,204	$229,204
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,096,472	N/A	N/A
Subtotal	N/A	N/A	$2,096,472	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,422,467	N/A	N/A	$587,619	$587,619
	$0	N/A	N/A	$0	$0
Subtotal	$1,422,467	N/A	N/A	$587,619	$587,619
Total Costs	$1,422,467	$229,204	$2,325,676	$816,823	$816,823
Net Benefit (Cost)	$1,729,364	$601,630	($1,494,842)	$202,615	$394,476
Benefit/Cost Ratio	2.22	3.62	0.36	1.25	1.48

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	19.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	13.40%
Gross Load Factor at Customer	E	14.89%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$400

Program Summary per Participant		
Gross kW Saved at Customer	I	1.83 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.27 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,390 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,609 kWh

Program Summary All Participants		
Total Participants	J	538
Total Budget	K	**$229,204**
Gross kW Saved at Customer	(J x I)	986 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**145 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,285,689 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,403,591 kWh**
Societal Net Benefits	(J x I x H)	**$394,476**
Utility Program Cost per kWh Lifetime		**$0.0085**
Utility Program Cost per kW at Gen		**$1,583**

INSULATION REBATE — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$120,222	$120,222	$120,222	$120,222
T & D	N/A	$73,328	$73,328	$73,328	$73,328
Marginal Energy	N/A	$818,011	$818,011	$818,011	$818,011
Environmental Externality	N/A	N/A	N/A	N/A	$255,065
Subtotal	N/A	$1,011,562	$1,011,562	$1,011,562	$1,266,627
Participant Benefits					
Bill Reduction - Electric	$2,671,746	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$206,142	N/A	N/A	$206,142	$206,142
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$912,365	N/A	N/A	$0	$0
Subtotal	$3,790,253	N/A	N/A	$206,142	$206,142
Total Benefits	$3,790,253	$1,011,562	$1,011,562	$1,217,704	$1,472,769
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$26,400	$26,400	$26,400	$26,400
Advertising & Promotion	N/A	$9,800	$9,800	$9,800	$9,800
Measurement & Verification	N/A	$4,000	$4,000	$4,000	$4,000
Rebates	N/A	$206,142	$206,142	$206,142	$206,142
Other	N/A	$3,500	$3,500	$3,500	$3,500
Subtotal	N/A	$249,842	$249,842	$249,842	$249,842
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,671,746	N/A	N/A
Subtotal	N/A	N/A	$2,671,746	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,576,053	N/A	N/A	$688,207	$688,207
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$1,576,053	N/A	N/A	$688,207	$688,207
Total Costs	$1,576,053	$249,842	$2,921,588	$938,049	$938,049
Net Benefit (Cost)	$2,214,200	$761,720	($1,910,027)	$279,655	$534,720
Benefit/Cost Ratio	2.40	4.05	0.35	1.30	1.57

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	19.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	12.02%
Gross Load Factor at Customer	E	15.11%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$444

Program Summary per Participant		
Gross kW Saved at Customer	I	2.03 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.27 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2,689 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2,936 kWh

Program Summary All Participants		
Total Participants	J	593
Total Budget	K	**$249,842**
Gross kW Saved at Customer	(J x I)	1,205 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**159 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,594,677 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,740,914 kWh**
Societal Net Benefits	(J x I x H)	**$534,720**
Utility Program Cost per kWh Lifetime		**$0.0076**
Utility Program Cost per kW at Gen		**$1,573**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Insulation Rebate**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$86,400	$93,860	$100,625
Incentive Costs =	$188,866	$214,517	$229,810
16) Total Utility Project Costs =	$275,266	$308,377	$330,435
17) Direct Participant Costs ($/Part.) =	$2,123	$2,207	$2,150
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	18.7	18.2	18.0
21) Avg. Dth/Part. Saved =	21.49	23.77	23.27
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	641	704	773
24) Total Annual Dth Saved =	13,776	16,731	17,985
25) Incentive/Participant =	$294.64	$304.71	$297.30

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$429	$438	$427
Cost per Participant per Dth =	$118.75	$111.28	$110.77
Lifetime Energy Reduction (Dth)	885,581		
Societal Cost per Dth	$6.17		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,922,684)	0.67
Utility Cost Test	$2,927,394	4.20
Societal Test	$1,462,210	1.27
Participant Test	$3,535,873	1.41

REFRIGERATOR RECYCLING — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$314,720	$314,720	$314,720	$314,720
T & D	N/A	$190,010	$190,010	$190,010	$190,010
Marginal Energy	N/A	$1,602,424	$1,602,424	$1,602,424	$1,602,424
Environmental Externality	N/A	N/A	N/A	N/A	$460,614
Subtotal	N/A	$2,107,155	$2,107,155	$2,107,155	$2,567,768
Participant Benefits					
Bill Reduction - Electric	$5,508,953	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$232,750	N/A	N/A	$232,750	$232,750
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$5,741,703	N/A	N/A	$232,750	$232,750
Total Benefits	$5,741,703	$2,107,155	$2,107,155	$2,339,905	$2,800,518
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$499,970	$499,970	$499,970	$499,970
Advertising & Promotion	N/A	$206,944	$206,944	$206,944	$206,944
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$232,750	$232,750	$232,750	$232,750
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$939,664	$939,664	$939,664	$939,664
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,508,953	N/A	N/A
Subtotal	N/A	N/A	$5,508,953	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$939,664	$6,448,617	$939,664	$939,664
Net Benefit (Cost)	$5,741,703	$1,167,491	($4,341,462)	$1,400,241	$1,860,854
Benefit/Cost Ratio	INF	2.24	0.33	2.49	2.98

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	8.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	63.84%
Gross Load Factor at Customer	E	63.84%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$1,597

Program Summary per Participant		
Gross kW Saved at Customer	I	0.18 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.12 kW
Gross Annual kWh Saved at Customer	(B x E x I)	980 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	1,070 kWh

Program Summary All Participants		
Total Participants	J	6,650
Total Budget	K	**$939,664**
Gross kW Saved at Customer	(J x I)	1,165 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**816 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,516,544 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**7,114,131 kWh**
Societal Net Benefits	(J x I x H)	**$1,860,854**

Utility Program Cost per kWh Lifetime	**$0.0162**
Utility Program Cost per kW at Gen	**$1,152**

REFRIGERATOR RECYCLING — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$341,591	$341,591	$341,591	$341,591
T & D	N/A	$207,082	$207,082	$207,082	$207,082
Marginal Energy	N/A	$1,627,135	$1,627,135	$1,627,135	$1,627,135
Environmental Externality	N/A	N/A	N/A	N/A	$529,063
Subtotal	N/A	$2,175,807	$2,175,807	$2,175,807	$2,704,870
Participant Benefits					
Bill Reduction - Electric	$5,729,454	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$234,500	N/A	N/A	$234,500	$234,500
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$5,963,954	N/A	N/A	$234,500	$234,500
Total Benefits	$5,963,954	$2,175,807	$2,175,807	$2,410,307	$2,939,370
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$509,470	$509,470	$509,470	$509,470
Advertising & Promotion	N/A	$206,944	$206,944	$206,944	$206,944
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$234,500	$234,500	$234,500	$234,500
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$950,914	$950,914	$950,914	$950,914
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,729,454	N/A	N/A
Subtotal	N/A	N/A	$5,729,454	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$950,914	$6,680,368	$950,914	$950,914
Net Benefit (Cost)	$5,963,954	$1,224,893	($4,504,562)	$1,459,393	$1,988,456
Benefit/Cost Ratio	INF	2.29	0.33	2.53	3.09

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	8.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	63.84%
Gross Load Factor at Customer	E	63.84%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$1,694

Program Summary per Participant		
Gross kW Saved at Customer	I	0.18 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.12 kW
Gross Annual kWh Saved at Customer	(B x E x I)	980 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	1,070 kWh

Program Summary All Participants		
Total Participants	J	6,700
Total Budget	K	**$950,914**
Gross kW Saved at Customer	(J x I)	1,174 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**822 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,564,173 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**7,166,128 kWh**
Societal Net Benefits	(J x I x H)	**$1,988,456**

Utility Program Cost per kWh Lifetime	**$0.0163**
Utility Program Cost per kW at Gen	**$1,157**

REFRIGERATOR RECYCLING — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$359,767	$359,767	$359,767	$359,767
T & D	N/A	$218,364	$218,364	$218,364	$218,364
Marginal Energy	N/A	$1,694,541	$1,694,541	$1,694,541	$1,694,541
Environmental Externality	N/A	N/A	N/A	N/A	$619,038
Subtotal	N/A	$2,272,672	$2,272,672	$2,272,672	$2,891,711
Participant Benefits					
Bill Reduction - Electric	$6,091,235	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$241,500	N/A	N/A	$241,500	$241,500
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$6,332,735	N/A	N/A	$241,500	$241,500
Total Benefits	$6,332,735	$2,272,672	$2,272,672	$2,514,172	$3,133,211
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$517,490	$517,490	$517,490	$517,490
Advertising & Promotion	N/A	$206,944	$206,944	$206,944	$206,944
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$241,500	$241,500	$241,500	$241,500
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$965,934	$965,934	$965,934	$965,934
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$6,091,235	N/A	N/A
Subtotal	N/A	N/A	$6,091,235	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$965,934	$7,057,169	$965,934	$965,934
Net Benefit (Cost)	$6,332,735	$1,306,738	($4,784,497)	$1,548,238	$2,167,277
Benefit/Cost Ratio	INF	2.35	0.32	2.60	3.24

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	8.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	63.84%
Gross Load Factor at Customer	E	63.84%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$1,794

Program Summary per Participant		
Gross kW Saved at Customer	I	0.18 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.12 kW
Gross Annual kWh Saved at Customer	(B x E x I)	979 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	1,069 kWh

Program Summary All Participants		
Total Participants	J	6,900
Total Budget	K	**$965,934**
Gross kW Saved at Customer	(J x I)	1,208 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**845 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,754,692 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**7,374,117 kWh**
Societal Net Benefits	(J x I x H)	**$2,167,277**

Utility Program Cost per kWh Lifetime	**$0.0161**
Utility Program Cost per kW at Gen	**$1,142**

RESIDENTIAL COOLING — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,285,741	$3,285,741	$3,285,741	$3,285,741
T & D	N/A	$1,983,868	$1,983,868	$1,983,868	$1,983,868
Marginal Energy	N/A	$1,682,832	$1,682,832	$1,682,832	$1,682,832
Environmental Externality	N/A	N/A	N/A	N/A	$446,106
Subtotal	N/A	$6,952,441	$6,952,441	$6,952,441	$7,398,546
Participant Benefits					
Bill Reduction - Electric	$4,950,592	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$3,637,250	N/A	N/A	$3,637,250	$3,637,250
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$8,587,842	N/A	N/A	$3,637,250	$3,637,250
Total Benefits	$8,587,842	$6,952,441	$6,952,441	$10,589,691	$11,035,796
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$340,341	$340,341	$340,341	$340,341
Advertising & Promotion	N/A	$212,074	$212,074	$212,074	$212,074
Measurement & Verification	N/A	$9,395	$9,395	$9,395	$9,395
Rebates	N/A	$3,637,250	$3,637,250	$3,637,250	$3,637,250
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$4,199,060	$4,199,060	$4,199,060	$4,199,060
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$4,950,592	N/A	N/A
Subtotal	N/A	N/A	$4,950,592	N/A	N/A
Participant Costs					
Incremental Capital Costs	$5,855,710	N/A	N/A	$5,855,710	$5,855,710
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$5,855,710	N/A	N/A	$5,855,710	$5,855,710
Total Costs	$5,855,710	$4,199,060	$9,149,652	$10,054,770	$10,054,770
Net Benefit (Cost)	$2,732,131	$2,753,381	($2,197,211)	$534,920	$981,026
Benefit/Cost Ratio	1.47	1.66	0.76	1.05	1.10

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	90.00%
Gross Load Factor at Customer	E	7.51%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$175

Program Summary per Participant		
Gross kW Saved at Customer	I	0.47 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.47 kW
Gross Annual kWh Saved at Customer	(B x E x I)	311 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	340 kWh

Program Summary All Participants		
Total Participants	J	11,857
Total Budget	K	**$4,199,060**
Gross kW Saved at Customer	(J x I)	5,604 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**5,530 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,687,798 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**4,025,981 kWh**
Societal Net Benefits	(J x I x H)	**$981,026**

Utility Program Cost per kWh Lifetime	**$0.0690**
Utility Program Cost per kW at Gen	**$759**

RESIDENTIAL COOLING — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,623,101	$3,623,101	$3,623,101	$3,623,101
T & D	N/A	$2,204,104	$2,204,104	$2,204,104	$2,204,104
Marginal Energy	N/A	$1,630,476	$1,630,476	$1,630,476	$1,630,476
Environmental Externality	N/A	N/A	N/A	N/A	$466,010
Subtotal	N/A	$7,457,681	$7,457,681	$7,457,681	$7,923,691
Participant Benefits					
Bill Reduction - Electric	$4,932,378	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$3,505,550	N/A	N/A	$3,505,550	$3,505,550
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$8,437,928	N/A	N/A	$3,505,550	$3,505,550
Total Benefits	$8,437,928	$7,457,681	$7,457,681	$10,963,231	$11,429,241
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$353,395	$353,395	$353,395	$353,395
Advertising & Promotion	N/A	$212,074	$212,074	$212,074	$212,074
Measurement & Verification	N/A	$9,677	$9,677	$9,677	$9,677
Rebates	N/A	$3,505,550	$3,505,550	$3,505,550	$3,505,550
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$4,080,696	$4,080,696	$4,080,696	$4,080,696
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$4,932,378	N/A	N/A
Subtotal	N/A	N/A	$4,932,378	N/A	N/A
Participant Costs					
Incremental Capital Costs	$5,642,249	N/A	N/A	$5,642,249	$5,642,249
	$0	N/A	N/A	$0	$0
Subtotal	$5,642,249	N/A	N/A	$5,642,249	$5,642,249
Total Costs	$5,642,249	$4,080,696	$9,013,074	$9,722,945	$9,722,945
Net Benefit (Cost)	$2,795,680	$3,376,985	($1,555,393)	$1,240,286	$1,706,296
Benefit/Cost Ratio	1.50	1.83	0.83	1.13	1.18

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	90.00%
Gross Load Factor at Customer	E	7.52%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$316

Program Summary per Participant		
Gross kW Saved at Customer	I	0.47 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.47 kW
Gross Annual kWh Saved at Customer	(B x E x I)	311 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	340 kWh

Program Summary All Participants		
Total Participants	J	11,430
Total Budget	K	**$4,080,696**
Gross kW Saved at Customer	(J x I)	5,403 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**5,332 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,557,193 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,883,398 kWh**
Societal Net Benefits	(J x I x H)	**$1,706,296**

Utility Program Cost per kWh Lifetime	**$0.0695**
Utility Program Cost per kW at Gen	**$765**

RESIDENTIAL COOLING — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$3,753,086	$3,753,086	$3,753,086	$3,753,086
T & D	N/A	$2,285,922	$2,285,922	$2,285,922	$2,285,922
Marginal Energy	N/A	$1,662,194	$1,662,194	$1,662,194	$1,662,194
Environmental Externality	N/A	N/A	N/A	N/A	$511,952
Subtotal	N/A	$7,701,202	$7,701,202	$7,701,202	$8,213,155
Participant Benefits					
Bill Reduction - Electric	$5,158,706	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$3,552,450	N/A	N/A	$3,552,450	$3,552,450
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$8,711,156	N/A	N/A	$3,552,450	$3,552,450
Total Benefits	$8,711,156	$7,701,202	$7,701,202	$11,253,652	$11,765,605
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$364,869	$364,869	$364,869	$364,869
Advertising & Promotion	N/A	$212,074	$212,074	$212,074	$212,074
Measurement & Verification	N/A	$9,967	$9,967	$9,967	$9,967
Rebates	N/A	$3,552,450	$3,552,450	$3,552,450	$3,552,450
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$4,139,360	$4,139,360	$4,139,360	$4,139,360
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$5,158,706	N/A	N/A
Subtotal	N/A	N/A	$5,158,706	N/A	N/A
Participant Costs					
Incremental Capital Costs	$5,717,748	N/A	N/A	$5,717,748	$5,717,748
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$5,717,748	N/A	N/A	$5,717,748	$5,717,748
Total Costs	$5,717,748	$4,139,360	$9,298,066	$9,857,108	$9,857,108
Net Benefit (Cost)	$2,993,408	$3,561,842	($1,596,864)	$1,396,544	$1,908,496
Benefit/Cost Ratio	1.52	1.86	0.83	1.14	1.19

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	90.00%
Gross Load Factor at Customer	E	7.51%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$349

Program Summary per Participant		
Gross kW Saved at Customer	I	0.47 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.47 kW
Gross Annual kWh Saved at Customer	(B x E x I)	311 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	340 kWh

Program Summary All Participants		
Total Participants	J	11,582
Total Budget	K	**$4,139,360**
Gross kW Saved at Customer	(J x I)	5,474 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**5,402 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,603,662 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,934,128 kWh**
Societal Net Benefits	(J x I x H)	**$1,908,496**

Utility Program Cost per kWh Lifetime	**$0.0696**
Utility Program Cost per kW at Gen	**$766**

RESIDENTIAL HEATING — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$899,226	$899,226	$899,226	$899,226
T & D	N/A	$542,941	$542,941	$542,941	$542,941
Marginal Energy	N/A	$2,884,451	$2,884,451	$2,884,451	$2,884,451
Environmental Externality	N/A	N/A	N/A	N/A	$886,706
Subtotal	N/A	$4,326,618	$4,326,618	$4,326,618	$5,213,324
Participant Benefits					
Bill Reduction - Electric	$10,783,218	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,000,000	N/A	N/A	$1,000,000	$1,000,000
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$11,783,218	N/A	N/A	$1,000,000	$1,000,000
Total Benefits	$11,783,218	$4,326,618	$4,326,618	$5,326,618	$6,213,324
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$72,554	$72,554	$72,554	$72,554
Advertising & Promotion	N/A	$131,000	$131,000	$131,000	$131,000
Measurement & Verification	N/A	$12,516	$12,516	$12,516	$12,516
Rebates	N/A	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$1,216,070	$1,216,070	$1,216,070	$1,216,070
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$10,783,218	N/A	N/A
Subtotal	N/A	N/A	$10,783,218	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,120,000	N/A	N/A	$2,120,000	$2,120,000
Incremental O&M Costs	$1,626,612	N/A	N/A	$1,626,612	$1,626,612
Subtotal	$3,746,612	N/A	N/A	$3,746,612	$3,746,612
Total Costs	$3,746,612	$1,216,070	$11,999,288	$4,962,682	$4,962,682
Net Benefit (Cost)	$8,036,605	$3,110,548	($7,672,669)	$363,936	$1,250,642
Benefit/Cost Ratio	3.15	3.56	0.36	1.07	1.25

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.9 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	66.03%
Gross Load Factor at Customer	E	39.50%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$656

Program Summary per Participant		
Gross kW Saved at Customer	I	0.19 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.14 kW
Gross Annual kWh Saved at Customer	(B x E x I)	659 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	720 kWh

Program Summary All Participants		
Total Participants	J	10,000
Total Budget	K	**$1,216,070**
Gross kW Saved at Customer	(J x I)	1,906 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,380 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,594,400 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**7,199,127 kWh**
Societal Net Benefits	(J x I x H)	**$1,250,642**

Utility Program Cost per kWh Lifetime	**$0.0094**
Utility Program Cost per kW at Gen	**$881**

RESIDENTIAL HEATING — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,050,950	$1,050,950	$1,050,950	$1,050,950
T & D	N/A	$640,170	$640,170	$640,170	$640,170
Marginal Energy	N/A	$2,893,779	$2,893,779	$2,893,779	$2,893,779
Environmental Externality	N/A	N/A	N/A	N/A	$954,757
Subtotal	N/A	$4,584,898	$4,584,898	$4,584,898	$5,539,656
Participant Benefits					
Bill Reduction - Electric	$11,133,582	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,000,000	N/A	N/A	$1,000,000	$1,000,000
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$12,133,582	N/A	N/A	$1,000,000	$1,000,000
Total Benefits	$12,133,582	$4,584,898	$4,584,898	$5,584,898	$6,539,656
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$75,456	$75,456	$75,456	$75,456
Advertising & Promotion	N/A	$136,240	$136,240	$136,240	$136,240
Measurement & Verification	N/A	$13,017	$13,017	$13,017	$13,017
Rebates	N/A	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$1,224,713	$1,224,713	$1,224,713	$1,224,713
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$11,133,582	N/A	N/A
Subtotal	N/A	N/A	$11,133,582	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,120,000	N/A	N/A	$2,120,000	$2,120,000
	$1,626,612	N/A	N/A	$1,626,612	$1,626,612
Subtotal	$3,746,612	N/A	N/A	$3,746,612	$3,746,612
Total Costs	$3,746,612	$1,224,713	$12,358,295	$4,971,325	$4,971,325
Net Benefit (Cost)	$8,386,969	$3,360,185	($7,773,397)	$613,573	$1,568,330
Benefit/Cost Ratio	3.24	3.74	0.37	1.12	1.32

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.9 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	66.03%
Gross Load Factor at Customer	E	39.50%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$823

Program Summary per Participant		
Gross kW Saved at Customer	I	0.19 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.14 kW
Gross Annual kWh Saved at Customer	(B x E x I)	659 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	720 kWh

Program Summary All Participants		
Total Participants	J	10,000
Total Budget	K	**$1,224,713**
Gross kW Saved at Customer	(J x I)	1,906 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,380 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,594,400 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**7,199,127 kWh**
Societal Net Benefits	(J x I x H)	**$1,568,330**

Utility Program Cost per kWh Lifetime	**$0.0095**
Utility Program Cost per kW at Gen	**$888**

RESIDENTIAL HEATING — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$1,074,462	$1,074,462	$1,074,462	$1,074,462
T & D	N/A	$655,278	$655,278	$655,278	$655,278
Marginal Energy	N/A	$2,912,469	$2,912,469	$2,912,469	$2,912,469
Environmental Externality	N/A	N/A	N/A	N/A	$1,029,364
Subtotal	N/A	$4,642,209	$4,642,209	$4,642,209	$5,671,572
Participant Benefits					
Bill Reduction - Electric	$11,493,342	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,000,000	N/A	N/A	$1,000,000	$1,000,000
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$12,493,342	N/A	N/A	$1,000,000	$1,000,000
Total Benefits	$12,493,342	$4,642,209	$4,642,209	$5,642,209	$6,671,572
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$78,475	$78,475	$78,475	$78,475
Advertising & Promotion	N/A	$141,690	$141,690	$141,690	$141,690
Measurement & Verification	N/A	$13,537	$13,537	$13,537	$13,537
Rebates	N/A	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$1,233,702	$1,233,702	$1,233,702	$1,233,702
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$11,493,342	N/A	N/A
Subtotal	N/A	N/A	$11,493,342	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,120,000	N/A	N/A	$2,120,000	$2,120,000
Incremental O&M Costs	$1,626,612	N/A	N/A	$1,626,612	$1,626,612
Subtotal	$3,746,612	N/A	N/A	$3,746,612	$3,746,612
Total Costs	$3,746,612	$1,233,702	$12,727,044	$4,980,314	$4,980,314
Net Benefit (Cost)	$8,746,730	$3,408,507	($8,084,836)	$661,894	$1,691,258
Benefit/Cost Ratio	3.33	3.76	0.36	1.13	1.34

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.9 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	66.03%
Gross Load Factor at Customer	E	39.50%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$887

Program Summary per Participant		
Gross kW Saved at Customer	I	0.19 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.14 kW
Gross Annual kWh Saved at Customer	(B x E x I)	659 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	720 kWh

Program Summary All Participants		
Total Participants	J	10,000
Total Budget	K	**$1,233,702**
Gross kW Saved at Customer	(J x I)	1,906 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,380 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,594,400 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**7,199,127 kWh**
Societal Net Benefits	(J x I x H)	**$1,691,258**

Utility Program Cost per kWh Lifetime	**$0.0096**
Utility Program Cost per kW at Gen	**$894**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Residential Heating**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$357,538	$371,840	$386,713
Incentive Costs =	$2,130,700	$2,130,700	$2,130,700
16) Total Utility Project Costs =	$2,488,238	$2,502,540	$2,517,413
17) Direct Participant Costs ($/Part.) =	$594	$592	$590
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	18.1	18.1	18.1
21) Avg. Dth/Part. Saved =	9.86	9.82	9.78
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	12,172	12,222	12,272
24) Total Annual Dth Saved =	120,000	120,000	120,000
25) Incentive/Participant =	$175.05	$174.33	$173.62

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$204	$205	$205
Cost per Participant per Dth =	$81.03	$81.15	$81.27
Lifetime Energy Reduction (Dth)	6,514,824		
Societal Cost per Dth	$3.70		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($14,989,720)	0.66
Utility Cost Test	$20,986,658	3.80
Societal Test	$20,438,359	1.85
Participant Test	$36,145,997	2.07

SCHOOL EDUCATION KITS — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$51,180	$51,180	$51,180	$51,180
T & D	N/A	$30,900	$30,900	$30,900	$30,900
Marginal Energy	N/A	$348,012	$348,012	$348,012	$348,012
Environmental Externality	N/A	N/A	N/A	N/A	$97,129
Subtotal	N/A	$430,092	$430,092	$430,092	$527,221
Participant Benefits					
Bill Reduction - Electric	$1,180,606	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$232,271	N/A	N/A	$232,271	$232,271
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$180,882	N/A	N/A	$180,882	$180,882
Subtotal	$1,593,760	N/A	N/A	$413,154	$413,154
Total Benefits	$1,593,760	$430,092	$430,092	$843,246	$940,375
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$226,500	$226,500	$226,500	$226,500
Advertising & Promotion	N/A	$2,671	$2,671	$2,671	$2,671
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$232,271	$232,271	$232,271	$232,271
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$461,442	$461,442	$461,442	$461,442
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,180,606	N/A	N/A
Subtotal	N/A	N/A	$1,180,606	N/A	N/A
Participant Costs					
Incremental Capital Costs	$232,271	N/A	N/A	$232,271	$232,271
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$232,271	N/A	N/A	$232,271	$232,271
Total Costs	$232,271	$461,442	$1,642,049	$693,714	$693,714
Net Benefit (Cost)	$1,361,489	($31,350)	($1,211,956)	$149,532	$246,661
Benefit/Cost Ratio	6.86	0.93	0.26	1.22	1.36

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	7.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.27%
Gross Load Factor at Customer	E	13.45%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$204

Program Summary per Participant		
Gross kW Saved at Customer	I	0.09 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.01 kW
Gross Annual kWh Saved at Customer	(B x E x I)	102 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	111 kWh

Program Summary All Participants		
Total Participants	J	14,000
Total Budget	K	**$461,442**
Gross kW Saved at Customer	(J x I)	1,212 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**136 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,428,101 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,559,062 kWh**
Societal Net Benefits	(J x I x H)	**$246,661**

Utility Program Cost per kWh Lifetime	**$0.0378**
Utility Program Cost per kW at Gen	**$3,381**

SCHOOL EDUCATION KITS — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$50,252	$50,252	$50,252	$50,252
T & D	N/A	$30,451	$30,451	$30,451	$30,451
Marginal Energy	N/A	$322,843	$322,843	$322,843	$322,843
Environmental Externality	N/A	N/A	N/A	N/A	$101,204
Subtotal	N/A	$403,546	$403,546	$403,546	$504,749
Participant Benefits					
Bill Reduction - Electric	$1,111,251	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$232,519	N/A	N/A	$232,519	$232,519
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$180,882	N/A	N/A	$180,882	$180,882
Subtotal	$1,524,652	N/A	N/A	$413,402	$413,402
Total Benefits	$1,524,652	$403,546	$403,546	$816,948	$918,151
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$233,354	$233,354	$233,354	$233,354
Advertising & Promotion	N/A	$2,744	$2,744	$2,744	$2,744
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$232,519	$232,519	$232,519	$232,519
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$468,617	$468,617	$468,617	$468,617
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,111,251	N/A	N/A
Subtotal	N/A	N/A	$1,111,251	N/A	N/A
Participant Costs					
Incremental Capital Costs	$232,519	N/A	N/A	$232,519	$232,519
	$0	N/A	N/A	$0	$0
Subtotal	$232,519	N/A	N/A	$232,519	$232,519
Total Costs	$232,519	$468,617	$1,579,868	$701,137	$701,137
Net Benefit (Cost)	$1,292,133	($65,072)	($1,176,322)	$115,811	$217,014
Benefit/Cost Ratio	6.56	0.86	0.26	1.17	1.31

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	7.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.27%
Gross Load Factor at Customer	E	13.45%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$179

Program Summary per Participant		
Gross kW Saved at Customer	I	0.09 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.01 kW
Gross Annual kWh Saved at Customer	(B x E x I)	102 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	111 kWh

Program Summary All Participants		
Total Participants	J	14,000
Total Budget	K	**$468,617**
Gross kW Saved at Customer	(J x I)	1,212 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**136 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,428,101 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,559,062 kWh**
Societal Net Benefits	(J x I x H)	**$217,014**
Utility Program Cost per kWh Lifetime		**$0.0424**
Utility Program Cost per kW at Gen		**$3,434**

SCHOOL EDUCATION KITS — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$46,252	$46,252	$46,252	$46,252
T & D	N/A	$28,054	$28,054	$28,054	$28,054
Marginal Energy	N/A	$296,336	$296,336	$296,336	$296,336
Environmental Externality	N/A	N/A	N/A	N/A	$105,660
Subtotal	N/A	$370,642	$370,642	$370,642	$476,301
Participant Benefits					
Bill Reduction - Electric	$1,031,754	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$232,775	N/A	N/A	$232,775	$232,775
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$180,882	N/A	N/A	$180,882	$180,882
Subtotal	$1,445,411	N/A	N/A	$413,657	$413,657
Total Benefits	$1,445,411	$370,642	$370,642	$784,299	$889,959
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$240,416	$240,416	$240,416	$240,416
Advertising & Promotion	N/A	$2,820	$2,820	$2,820	$2,820
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$232,775	$232,775	$232,775	$232,775
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$476,011	$476,011	$476,011	$476,011
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,031,754	N/A	N/A
Subtotal	N/A	N/A	$1,031,754	N/A	N/A
Participant Costs					
Incremental Capital Costs	$232,775	N/A	N/A	$232,775	$232,775
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$232,775	N/A	N/A	$232,775	$232,775
Total Costs	$232,775	$476,011	$1,507,765	$708,786	$708,786
Net Benefit (Cost)	$1,212,636	($105,369)	($1,137,123)	$75,513	$181,173
Benefit/Cost Ratio	6.21	0.78	0.25	1.11	1.26

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.27%
Gross Load Factor at Customer	E	13.45%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$149

Program Summary per Participant		
Gross kW Saved at Customer	I	0.09 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.01 kW
Gross Annual kWh Saved at Customer	(B x E x I)	102 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	111 kWh

Program Summary All Participants		
Total Participants	J	14,000
Total Budget	K	**$476,011**
Gross kW Saved at Customer	(J x I)	1,212 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**136 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,428,101 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,559,062 kWh**
Societal Net Benefits	(J x I x H)	**$181,173**

Utility Program Cost per kWh Lifetime	**$0.0481**
Utility Program Cost per kW at Gen	**$3,488**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **School Education Kits**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$246,678	$254,230	$262,015
Incentive Costs =	$60,656	$62,476	$64,350
16) Total Utility Project Costs =	$307,334	$316,706	$326,365
17) Direct Participant Costs ($/Part.) =	$4	$4	$5
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$12	$12	$12
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	10.0	10.0	10.0
21) Avg. Dth/Part. Saved =	0.81	0.81	0.81
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	14,000	14,000	14,000
24) Total Annual Dth Saved =	11,391	11,391	11,391
25) Incentive/Participant =	$4.33	$4.46	$4.60

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$22	$23	$23
Cost per Participant per Dth =	$32.30	$33.29	$34.30
Lifetime Energy Reduction (Dth)	341,736		
Societal Cost per Dth	$2.74		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,388,003)	0.55
Utility Cost Test	$716,269	1.75
Societal Test	$6,182,986	7.60
Participant Test	$7,529,421	9.90

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Water Heater Rebate**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$101,196	$104,043	$106,994
Incentive Costs =	$102,774	$124,938	$122,268
16) Total Utility Project Costs =	$203,970	$228,981	$229,262
17) Direct Participant Costs ($/Part.) =	$300	$314	$314
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	14.3	14.5	14.5
21) Avg. Dth/Part. Saved =	3.22	3.34	3.34
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	948	1,094	1,071
24) Total Annual Dth Saved =	3,053	3,659	3,581
25) Incentive/Participant =	$108.36	$114.20	$114.18

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$215	$209	$214
Cost per Participant per Dth =	$160.06	$156.34	$157.79
Lifetime Energy Reduction (Dth)	148,534		
Societal Cost per Dth	$7.74		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($840,591)	0.45
Utility Cost Test	$17,174	1.03
Societal Test	($307,795)	0.73
Participant Test	$536,055	0.65

WHOLE HOME EFFICIENCY — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$72,631	$72,631	$72,631	$72,631
T & D	N/A	$43,853	$43,853	$43,853	$43,853
Marginal Energy	N/A	$53,292	$53,292	$53,292	$53,292
Environmental Externality	N/A	N/A	N/A	N/A	$14,731
Subtotal	N/A	$169,776	$169,776	$169,776	$184,507
Participant Benefits					
Bill Reduction - Electric	$173,977	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$30,425	N/A	N/A	$30,425	$30,425
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$204,402	N/A	N/A	$30,425	$30,425
Total Benefits	$204,402	$169,776	$169,776	$200,201	$214,932
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$45,725	$45,725	$45,725	$45,725
Advertising & Promotion	N/A	$14,415	$14,415	$14,415	$14,415
Measurement & Verification	N/A	$30,000	$30,000	$30,000	$30,000
Rebates	N/A	$30,425	$30,425	$30,425	$30,425
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$120,565	$120,565	$120,565	$120,565
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$173,977	N/A	N/A
Subtotal	N/A	N/A	$173,977	N/A	N/A
Participant Costs					
Incremental Capital Costs	$101,484	N/A	N/A	$39,212	$39,212
Incremental O&M Costs	$3,586	N/A	N/A	$3,785	$3,785
Subtotal	$105,071	N/A	N/A	$42,997	$42,997
Total Costs	$105,071	$120,565	$294,542	$163,562	$163,562
Net Benefit (Cost)	$99,332	$49,211	($124,766)	$36,639	$51,370
Benefit/Cost Ratio	1.95	1.41	0.58	1.22	1.31

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	67.20%
Gross Load Factor at Customer	E	10.26%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$295

Program Summary per Participant		
Gross kW Saved at Customer	I	0.87 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.64 kW
Gross Annual kWh Saved at Customer	(B x E x I)	783 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	854 kWh

Program Summary All Participants		
Total Participants	J	200
Total Budget	K	**$120,565**
Gross kW Saved at Customer	(J x I)	174 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**128 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	156,537 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**170,892 kWh**
Societal Net Benefits	(J x I x H)	**$51,370**

Utility Program Cost per kWh Lifetime	**$0.0597**
Utility Program Cost per kW at Gen	**$940**

WHOLE HOME EFFICIENCY — 2018 — ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$83,193	$83,193	$83,193	$83,193
T & D	N/A	$50,626	$50,626	$50,626	$50,626
Marginal Energy	N/A	$52,336	$52,336	$52,336	$52,336
Environmental Externality	N/A	N/A	N/A	N/A	$15,867
Subtotal	N/A	$186,154	$186,154	$186,154	$202,022
Participant Benefits					
Bill Reduction - Electric	$174,705	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$30,425	N/A	N/A	$30,425	$30,425
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$205,130	N/A	N/A	$30,425	$30,425
Total Benefits	$205,130	$186,154	$186,154	$216,579	$232,447
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$45,840	$45,840	$45,840	$45,840
Advertising & Promotion	N/A	$14,415	$14,415	$14,415	$14,415
Measurement & Verification	N/A	$30,000	$30,000	$30,000	$30,000
Rebates	N/A	$30,425	$30,425	$30,425	$30,425
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$120,680	$120,680	$120,680	$120,680
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$174,705	N/A	N/A
Subtotal	N/A	N/A	$174,705	N/A	N/A
Participant Costs					
Incremental Capital Costs	$101,484	N/A	N/A	$40,886	$40,886
	$3,586	N/A	N/A	$3,785	$3,785
Subtotal	$105,071	N/A	N/A	$44,670	$44,670
Total Costs	$105,071	$120,680	$295,385	$165,350	$165,350
Net Benefit (Cost)	$100,059	$65,474	($109,231)	$51,229	$67,096
Benefit/Cost Ratio	1.95	1.54	0.63	1.31	1.41

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	67.20%
Gross Load Factor at Customer	E	10.26%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$385

Program Summary per Participant		
Gross kW Saved at Customer	I	0.87 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.64 kW
Gross Annual kWh Saved at Customer	(B x E x I)	783 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	854 kWh

Program Summary All Participants		
Total Participants	J	200
Total Budget	K	**$120,680**
Gross kW Saved at Customer	(J x I)	174 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**128 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	156,537 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**170,892 kWh**
Societal Net Benefits	(J x I x H)	**$67,096**
Utility Program Cost per kWh Lifetime		**$0.0613**
Utility Program Cost per kW at Gen		**$940**

WHOLE HOME EFFICIENCY — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$84,820	$84,820	$84,820	$84,820
T & D	N/A	$51,679	$51,679	$51,679	$51,679
Marginal Energy	N/A	$51,371	$51,371	$51,371	$51,371
Environmental Externality	N/A	N/A	N/A	N/A	$17,085
Subtotal	N/A	$187,870	$187,870	$187,870	$204,955
Participant Benefits					
Bill Reduction - Electric	$175,077	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$30,425	N/A	N/A	$30,425	$30,425
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$205,502	N/A	N/A	$30,425	$30,425
Total Benefits	$205,502	$187,870	$187,870	$218,295	$235,380
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$45,950	$45,950	$45,950	$45,950
Advertising & Promotion	N/A	$14,415	$14,415	$14,415	$14,415
Measurement & Verification	N/A	$30,000	$30,000	$30,000	$30,000
Rebates	N/A	$30,425	$30,425	$30,425	$30,425
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$120,790	$120,790	$120,790	$120,790
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$175,077	N/A	N/A
Subtotal	N/A	N/A	$175,077	N/A	N/A
Participant Costs					
Incremental Capital Costs	$101,484	N/A	N/A	$40,734	$40,734
Incremental O&M Costs	$3,586	N/A	N/A	$3,785	$3,785
Subtotal	$105,071	N/A	N/A	$44,519	$44,519
Total Costs	$105,071	$120,790	$295,867	$165,309	$165,309
Net Benefit (Cost)	$100,432	$67,080	($107,997)	$52,986	$70,071
Benefit/Cost Ratio	1.96	1.56	0.63	1.32	1.42

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	67.20%
Gross Load Factor at Customer	E	10.26%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$402

Program Summary per Participant		
Gross kW Saved at Customer	I	0.87 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.64 kW
Gross Annual kWh Saved at Customer	(B x E x I)	783 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	854 kWh

Program Summary All Participants		
Total Participants	J	200
Total Budget	K	**$120,790**
Gross kW Saved at Customer	(J x I)	174 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**128 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	156,537 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**170,892 kWh**
Societal Net Benefits	(J x I x H)	**$70,071**
Utility Program Cost per kWh Lifetime		**$0.0631**
Utility Program Cost per kW at Gen		**$941**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Whole Home Efficiency**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$200,503	$203,834	$207,299
Incentive Costs =	$87,349	$87,349	$87,349
16) Total Utility Project Costs =	$287,852	$291,183	$294,648
17) Direct Participant Costs ($/Part.) =	$2,691	$2,691	$2,691
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$20	$20	$20
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	15.4	15.4	15.4
21) Avg. Dth/Part. Saved =	40.37	40.37	40.37
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	200	200	200
24) Total Annual Dth Saved =	8,074	8,074	8,074
25) Incentive/Participant =	$436.74	$436.74	$436.74

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$1,439	$1,456	$1,473
Cost per Participant per Dth =	$102.31	$102.72	$103.15
Lifetime Energy Reduction (Dth)	373,262		
Societal Cost per Dth	$6.23		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,309,919)	0.56
Utility Cost Test	$787,809	1.90
Societal Test	$525,828	1.23
Participant Test	$1,688,623	1.36

RESIDENTIAL SAVER'S SWITCH — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$8,885,616	$8,885,616	$8,885,616	$8,885,616
T & D	N/A	$5,364,963	$5,364,963	$5,364,963	$5,364,963
Marginal Energy	N/A	$21,915	$21,915	$21,915	$21,915
Environmental Externality	N/A	N/A	N/A	N/A	$4,314
Subtotal	N/A	$14,272,494	$14,272,494	$14,272,494	$14,276,807
Participant Benefits					
Bill Reduction - Electric	$52,724	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$52,724	N/A	N/A	$0	$0
Total Benefits	$52,724	$14,272,494	$14,272,494	$14,272,494	$14,276,807
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$4,785,250	$4,785,250	$4,785,250	$4,785,250
Advertising & Promotion	N/A	$475,000	$475,000	$475,000	$475,000
Measurement & Verification	N/A	$175,000	$175,000	$175,000	$175,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$5,435,250	$5,435,250	$5,435,250	$5,435,250
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$52,724	N/A	N/A
Subtotal	N/A	N/A	$52,724	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$5,435,250	$5,487,974	$5,435,250	$5,435,250
Net Benefit (Cost)	$52,724	$8,837,244	$8,784,519	$8,837,244	$8,841,557
Benefit/Cost Ratio	INF	2.63	2.60	2.63	2.63

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.39%
Gross Load Factor at Customer	E	0.01%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$184

Program Summary per Participant		
Gross kW Saved at Customer	I	2.40 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.73 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2 kWh

Program Summary All Participants		
Total Participants	J	20,025
Total Budget	K	**$5,435,250**
Gross kW Saved at Customer	(J x I)	48,155 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**14,702 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	35,836 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**38,368 kWh**
Societal Net Benefits	(J x I x H)	**$8,841,557**

Utility Program Cost per kWh Lifetime	**$9.4440**
Utility Program Cost per kW at Gen	**$370**

RESIDENTIAL SAVER'S SWITCH — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$10,155,033	$10,155,033	$10,155,033	$10,155,033
T & D	N/A	$6,177,547	$6,177,547	$6,177,547	$6,177,547
Marginal Energy	N/A	$22,012	$22,012	$22,012	$22,012
Environmental Externality	N/A	N/A	N/A	N/A	$4,672
Subtotal	N/A	$16,354,592	$16,354,592	$16,354,592	$16,359,265
Participant Benefits					
Bill Reduction - Electric	$54,453	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$54,453	N/A	N/A	$0	$0
Total Benefits	$54,453	$16,354,592	$16,354,592	$16,354,592	$16,359,265
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$4,918,900	$4,918,900	$4,918,900	$4,918,900
Advertising & Promotion	N/A	$475,000	$475,000	$475,000	$475,000
Measurement & Verification	N/A	$150,000	$150,000	$150,000	$150,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$5,543,900	$5,543,900	$5,543,900	$5,543,900
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$54,453	N/A	N/A
Subtotal	N/A	N/A	$54,453	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$5,543,900	$5,598,353	$5,543,900	$5,543,900
Net Benefit (Cost)	$54,453	$10,810,692	$10,756,240	$10,810,692	$10,815,365
Benefit/Cost Ratio	INF	2.95	2.92	2.95	2.95

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.39%
Gross Load Factor at Customer	E	0.01%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$225

Program Summary per Participant		
Gross kW Saved at Customer	I	2.40 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.73 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2 kWh

Program Summary All Participants		
Total Participants	J	20,025
Total Budget	K	**$5,543,900**
Gross kW Saved at Customer	(J x I)	48,155 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**14,702 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	35,836 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**38,368 kWh**
Societal Net Benefits	(J x I x H)	**$10,815,365**
Utility Program Cost per kWh Lifetime		**$9.6328**
Utility Program Cost per kW at Gen		**$377**

RESIDENTIAL SAVER'S SWITCH — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$10,382,222	$10,382,222	$10,382,222	$10,382,222
T & D	N/A	$6,323,337	$6,323,337	$6,323,337	$6,323,337
Marginal Energy	N/A	$22,152	$22,152	$22,152	$22,152
Environmental Externality	N/A	N/A	N/A	N/A	$5,069
Subtotal	N/A	$16,727,712	$16,727,712	$16,727,712	$16,732,780
Participant Benefits					
Bill Reduction - Electric	$56,220	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$56,220	N/A	N/A	$0	$0
Total Benefits	$56,220	$16,727,712	$16,727,712	$16,727,712	$16,732,780
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$5,056,560	$5,056,560	$5,056,560	$5,056,560
Advertising & Promotion	N/A	$475,000	$475,000	$475,000	$475,000
Measurement & Verification	N/A	$150,000	$150,000	$150,000	$150,000
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$5,681,560	$5,681,560	$5,681,560	$5,681,560
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$56,220	N/A	N/A
Subtotal	N/A	N/A	$56,220	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$5,681,560	$5,737,779	$5,681,560	$5,681,560
Net Benefit (Cost)	$56,220	$11,046,152	$10,989,932	$11,046,152	$11,051,221
Benefit/Cost Ratio	INF	2.94	2.92	2.94	2.95

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	15.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	28.39%
Gross Load Factor at Customer	E	0.01%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$229

Program Summary per Participant		
Gross kW Saved at Customer	I	2.40 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.73 kW
Gross Annual kWh Saved at Customer	(B x E x I)	2 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	2 kWh

Program Summary All Participants		
Total Participants	J	20,025
Total Budget	K	**$5,681,560**
Gross kW Saved at Customer	(J x I)	48,155 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**14,702 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	35,836 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**38,368 kWh**
Societal Net Benefits	(J x I x H)	**$11,051,221**
Utility Program Cost per kWh Lifetime		**$9.8720**
Utility Program Cost per kW at Gen		**$386**

LOW INCOME SEGMENT TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$167,302	$167,302	$167,302	$167,302
T & D	N/A	$101,011	$101,011	$101,011	$101,011
Marginal Energy	N/A	$844,131	$844,131	$844,131	$844,131
Environmental Externality	N/A	N/A	N/A	N/A	$251,493
Subtotal	N/A	$1,112,444	$1,112,444	$1,112,444	$1,363,937
Participant Benefits					
Bill Reduction - Electric	$3,055,881	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,368,060	N/A	N/A	$1,368,060	$1,368,060
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$4,423,941	N/A	N/A	$1,368,060	$1,368,060
Total Benefits	$4,423,941	$1,112,444	$1,112,444	$2,480,503	$2,731,997
Costs					
Utility Project Costs					
Customer Services	N/A	$455,714	$455,714	$455,714	$455,714
Project Administration	N/A	$379,027	$379,027	$379,027	$379,027
Advertising & Promotion	N/A	$143,382	$143,382	$143,382	$143,382
Measurement & Verification	N/A	$16,688	$16,688	$16,688	$16,688
Rebates	N/A	$1,368,060	$1,368,060	$1,368,060	$1,368,060
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,362,871	$2,362,871	$2,362,871	$2,362,871
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$3,055,881	N/A	N/A
Subtotal	N/A	N/A	$3,055,881	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,368,060	N/A	N/A	$1,356,300	$1,356,300
Incremental O&M Costs	$18,013	N/A	N/A	$18,013	$18,013
Subtotal	$1,386,072	N/A	N/A	$1,374,312	$1,374,312
Total Costs	$1,386,072	$2,362,871	$5,418,752	$3,737,183	$3,737,183
Net Benefit (Cost)	$3,037,869	($1,250,427)	($4,306,308)	($1,256,679)	($1,005,186)
Benefit/Cost Ratio	3.19	0.47	0.21	0.66	0.73

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	15.84%
Gross Load Factor at Customer	E	15.55%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($488)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.43 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.08 kW
Gross Annual kWh Saved at Customer	(B x E x I)	589 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	643 kWh

Program Summary All Participants		
Total Participants	J	4,766
Total Budget	K	**$2,362,870**
Gross kW Saved at Customer	(J x I)	2,060 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**358 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	2,806,592 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,063,965 kWh**
Societal Net Benefits	(J x I x H)	**($1,005,186)**

Utility Program Cost per kWh Lifetime	**$0.0684**
Utility Program Cost per kW at Gen	**$6,604**

LOW INCOME SEGMENT TOTAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$178,731	$178,731	$178,731	$178,731
T & D	N/A	$108,606	$108,606	$108,606	$108,606
Marginal Energy	N/A	$804,437	$804,437	$804,437	$804,437
Environmental Externality	N/A	N/A	N/A	N/A	$264,183
Subtotal	N/A	$1,091,774	$1,091,774	$1,091,774	$1,355,957
Participant Benefits					
Bill Reduction - Electric	$2,988,224	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,368,060	N/A	N/A	$1,368,060	$1,368,060
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$4,356,284	N/A	N/A	$1,368,060	$1,368,060
Total Benefits	$4,356,284	$1,091,774	$1,091,774	$2,459,834	$2,724,016
Costs					
Utility Project Costs					
Customer Services	N/A	$457,314	$457,314	$457,314	$457,314
Project Administration	N/A	$385,962	$385,962	$385,962	$385,962
Advertising & Promotion	N/A	$146,673	$146,673	$146,673	$146,673
Measurement & Verification	N/A	$17,289	$17,289	$17,289	$17,289
Rebates	N/A	$1,368,060	$1,368,060	$1,368,060	$1,368,060
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,375,298	$2,375,298	$2,375,298	$2,375,298
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,988,224	N/A	N/A
Subtotal	N/A	N/A	$2,988,224	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,368,060	N/A	N/A	$1,356,369	$1,356,369
	$18,013	N/A	N/A	$18,013	$18,013
Subtotal	$1,386,072	N/A	N/A	$1,374,381	$1,374,381
Total Costs	$1,386,072	$2,375,298	$5,363,522	$3,749,679	$3,749,679
Net Benefit (Cost)	$2,970,212	($1,283,523)	($4,271,748)	($1,289,845)	($1,025,662)
Benefit/Cost Ratio	3.14	0.46	0.20	0.66	0.73

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	10.7 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	15.84%
Gross Load Factor at Customer	E	15.55%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($498)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.41 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.07 kW
Gross Annual kWh Saved at Customer	(B x E x I)	565 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	617 kWh

Program Summary All Participants		
Total Participants	J	4,966
Total Budget	K	**$2,375,297**
Gross kW Saved at Customer	(J x I)	2,060 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**358 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	2,806,592 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,063,965 kWh**
Societal Net Benefits	(J x I x H)	**($1,025,662)**
Utility Program Cost per kWh Lifetime		**$0.0726**
Utility Program Cost per kW at Gen		**$6,639**

LOW INCOME SEGMENT TOTAL — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$173,350	$173,350	$173,350	$173,350
T & D	N/A	$105,464	$105,464	$105,464	$105,464
Marginal Energy	N/A	$763,964	$763,964	$763,964	$763,964
Environmental Externality	N/A	N/A	N/A	N/A	$278,105
Subtotal	N/A	$1,042,778	$1,042,778	$1,042,778	$1,320,883
Participant Benefits					
Bill Reduction - Electric	$2,905,913	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$1,368,060	N/A	N/A	$1,368,060	$1,368,060
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$4,273,973	N/A	N/A	$1,368,060	$1,368,060
Total Benefits	$4,273,973	$1,042,778	$1,042,778	$2,410,837	$2,688,942
Costs					
Utility Project Costs					
Customer Services	N/A	$458,914	$458,914	$458,914	$458,914
Project Administration	N/A	$391,959	$391,959	$391,959	$391,959
Advertising & Promotion	N/A	$150,051	$150,051	$150,051	$150,051
Measurement & Verification	N/A	$17,914	$17,914	$17,914	$17,914
Rebates	N/A	$1,368,060	$1,368,060	$1,368,060	$1,368,060
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$2,386,898	$2,386,898	$2,386,898	$2,386,898
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,905,913	N/A	N/A
Subtotal	N/A	N/A	$2,905,913	N/A	N/A
Participant Costs					
Incremental Capital Costs	$1,368,060	N/A	N/A	$1,356,349	$1,356,349
Incremental O&M Costs	$18,013	N/A	N/A	$18,013	$18,013
Subtotal	$1,386,072	N/A	N/A	$1,374,361	$1,374,361
Total Costs	$1,386,072	$2,386,898	$5,292,811	$3,761,259	$3,761,259
Net Benefit (Cost)	$2,887,901	($1,344,120)	($4,250,033)	($1,350,422)	($1,072,317)
Benefit/Cost Ratio	3.08	0.44	0.20	0.64	0.71

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	10.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	15.84%
Gross Load Factor at Customer	E	15.55%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($521)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.41 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.07 kW
Gross Annual kWh Saved at Customer	(B x E x I)	565 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	617 kWh

Program Summary All Participants		
Total Participants	J	4,966
Total Budget	K	**$2,386,897**
Gross kW Saved at Customer	(J x I)	2,060 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**358 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	2,806,592 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,063,965 kWh**
Societal Net Benefits	(J x I x H)	**($1,072,317)**

Utility Program Cost per kWh Lifetime	**$0.0772**
Utility Program Cost per kW at Gen	**$6,671**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Low Income Segment Total**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$645,802	$654,868	$664,663
Incentive Costs =	$972,716	$972,716	$972,716
16) Total Utility Project Costs =	$1,618,518	$1,627,584	$1,637,379
17) Direct Participant Costs ($/Part.) =	$512	$512	$512
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$23	$23	$23
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	11.3	11.3	11.3
21) Avg. Dth/Part. Saved =	7.05	7.05	7.05
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	1,900	1,900	1,900
24) Total Annual Dth Saved =	13,390	13,390	13,390
25) Incentive/Participant =	$511.96	$511.96	$511.96

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$852	$857	$862
Cost per Participant per Dth =	$193.52	$194.20	$194.93
Lifetime Energy Reduction (Dth)	455,748		
Societal Cost per Dth	$9.77		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($5,448,978)	0.28
Utility Cost Test	($2,729,678)	0.44
Societal Test	($681,477)	0.85
Participant Test	$4,681,337	0.80

HOME ENERGY SAVINGS PROGRAM — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$59,787	$59,787	$59,787	$59,787
T & D	N/A	$36,098	$36,098	$36,098	$36,098
Marginal Energy	N/A	$263,226	$263,226	$263,226	$263,226
Environmental Externality	N/A	N/A	N/A	N/A	$86,590
Subtotal	N/A	$359,111	$359,111	$359,111	$445,701
Participant Benefits					
Bill Reduction - Electric	$1,044,675	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$763,971	N/A	N/A	$763,971	$763,971
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$1,808,646	N/A	N/A	$763,971	$763,971
Total Benefits	$1,808,646	$359,111	$359,111	$1,123,082	$1,209,672
Costs					
Utility Project Costs					
Customer Services	N/A	$158,400	$158,400	$158,400	$158,400
Project Administration	N/A	$157,866	$157,866	$157,866	$157,866
Advertising & Promotion	N/A	$139,982	$139,982	$139,982	$139,982
Measurement & Verification	N/A	$9,329	$9,329	$9,329	$9,329
Rebates	N/A	$763,971	$763,971	$763,971	$763,971
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$1,229,548	$1,229,548	$1,229,548	$1,229,548
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,044,675	N/A	N/A
Subtotal	N/A	N/A	$1,044,675	N/A	N/A
Participant Costs					
Incremental Capital Costs	$763,971	N/A	N/A	$752,211	$752,211
Incremental O&M Costs	$18,013	N/A	N/A	$18,013	$18,013
Subtotal	$781,984	N/A	N/A	$770,224	$770,224
Total Costs	$781,984	$1,229,548	$2,274,223	$1,999,772	$1,999,772
Net Benefit (Cost)	$1,026,662	($870,437)	($1,915,112)	($876,690)	($790,100)
Benefit/Cost Ratio	2.31	0.29	0.16	0.56	0.60

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.7 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	49.74%
Gross Load Factor at Customer	E	40.93%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($4,352)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.17 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.09 kW
Gross Annual kWh Saved at Customer	(B x E x I)	592 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	646 kWh

Program Summary All Participants		
Total Participants	J	1,100
Total Budget	K	**$1,229,548**
Gross kW Saved at Customer	(J x I)	182 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**99 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	650,859 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**710,544 kWh**
Societal Net Benefits	(J x I x H)	**($790,100)**

Utility Program Cost per kWh Lifetime	**$0.0977**
Utility Program Cost per kW at Gen	**$12,419**

HOME ENERGY SAVINGS PROGRAM — 2018 — ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$69,149	$69,149	$69,149	$69,149
T & D	N/A	$42,096	$42,096	$42,096	$42,096
Marginal Energy	N/A	$264,099	$264,099	$264,099	$264,099
Environmental Externality	N/A	N/A	N/A	N/A	$93,310
Subtotal	N/A	$375,344	$375,344	$375,344	$468,654
Participant Benefits					
Bill Reduction - Electric	$1,078,608	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$763,971	N/A	N/A	$763,971	$763,971
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$1,842,579	N/A	N/A	$763,971	$763,971
Total Benefits	$1,842,579	$375,344	$375,344	$1,139,315	$1,232,625
Costs					
Utility Project Costs					
Customer Services	N/A	$160,000	$160,000	$160,000	$160,000
Project Administration	N/A	$160,762	$160,762	$160,762	$160,762
Advertising & Promotion	N/A	$143,257	$143,257	$143,257	$143,257
Measurement & Verification	N/A	$9,562	$9,562	$9,562	$9,562
Rebates	N/A	$763,971	$763,971	$763,971	$763,971
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$1,237,552	$1,237,552	$1,237,552	$1,237,552
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,078,608	N/A	N/A
Subtotal	N/A	N/A	$1,078,608	N/A	N/A
Participant Costs					
Incremental Capital Costs	$763,971	N/A	N/A	$752,280	$752,280
	$18,013	N/A	N/A	$18,013	$18,013
Subtotal	$781,984	N/A	N/A	$770,293	$770,293
Total Costs	$781,984	$1,237,552	$2,316,160	$2,007,845	$2,007,845
Net Benefit (Cost)	$1,060,596	($862,208)	($1,940,816)	($868,530)	($775,220)
Benefit/Cost Ratio	2.36	0.30	0.16	0.57	0.61

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.7 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	49.74%
Gross Load Factor at Customer	E	40.93%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($4,270)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.14 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.08 kW
Gross Annual kWh Saved at Customer	(B x E x I)	501 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	547 kWh

Program Summary All Participants		
Total Participants	J	1,300
Total Budget	K	**$1,237,552**
Gross kW Saved at Customer	(J x I)	182 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**99 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	650,859 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**710,544 kWh**
Societal Net Benefits	(J x I x H)	**($775,220)**
Utility Program Cost per kWh Lifetime		**$0.0983**
Utility Program Cost per kW at Gen		**$12,500**

HOME ENERGY SAVINGS PROGRAM — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$70,696	$70,696	$70,696	$70,696
T & D	N/A	$43,089	$43,089	$43,089	$43,089
Marginal Energy	N/A	$265,780	$265,780	$265,780	$265,780
Environmental Externality	N/A	N/A	N/A	N/A	$100,668
Subtotal	N/A	$379,566	$379,566	$379,566	$480,233
Participant Benefits					
Bill Reduction - Electric	$1,113,451	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$763,971	N/A	N/A	$763,971	$763,971
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$1,877,422	N/A	N/A	$763,971	$763,971
Total Benefits	$1,877,422	$379,566	$379,566	$1,143,537	$1,244,205
Costs					
Utility Project Costs					
Customer Services	N/A	$161,600	$161,600	$161,600	$161,600
Project Administration	N/A	$163,718	$163,718	$163,718	$163,718
Advertising & Promotion	N/A	$146,614	$146,614	$146,614	$146,614
Measurement & Verification	N/A	$9,801	$9,801	$9,801	$9,801
Rebates	N/A	$763,971	$763,971	$763,971	$763,971
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$1,245,704	$1,245,704	$1,245,704	$1,245,704
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,113,451	N/A	N/A
Subtotal	N/A	N/A	$1,113,451	N/A	N/A
Participant Costs					
Incremental Capital Costs	$763,971	N/A	N/A	$752,260	$752,260
Incremental O&M Costs	$18,013	N/A	N/A	$18,013	$18,013
Subtotal	$781,984	N/A	N/A	$770,273	$770,273
Total Costs	$781,984	$1,245,704	$2,359,155	$2,015,977	$2,015,977
Net Benefit (Cost)	$1,095,438	($866,139)	($1,979,589)	($872,440)	($771,773)
Benefit/Cost Ratio	2.40	0.30	0.16	0.57	0.62

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	17.7 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	49.74%
Gross Load Factor at Customer	E	40.93%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($4,251)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.14 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.08 kW
Gross Annual kWh Saved at Customer	(B x E x I)	501 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	547 kWh

Program Summary All Participants		
Total Participants	J	1,300
Total Budget	K	**$1,245,704**
Gross kW Saved at Customer	(J x I)	182 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**99 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	650,859 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**710,544 kWh**
Societal Net Benefits	(J x I x H)	**($771,773)**

Utility Program Cost per kWh Lifetime	**$0.0989**
Utility Program Cost per kW at Gen	**$12,582**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Home Energy Savings Program**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$236,194	$243,951	$251,686
Incentive Costs =	$972,716	$972,716	$972,716
16) Total Utility Project Costs =	$1,208,910	$1,216,667	$1,224,402
17) Direct Participant Costs ($/Part.) =	$2,432	$2,432	$2,432
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	15.8	15.8	15.8
21) Avg. Dth/Part. Saved =	9.03	9.03	9.03
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	400	400	400
24) Total Annual Dth Saved =	3,612	3,612	3,612
25) Incentive/Participant =	$2,431.79	$2,431.79	$2,431.79

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$3,022	$3,042	$3,061
Cost per Participant per Dth =	$603.95	$606.10	$608.24
Lifetime Energy Reduction (Dth)	170,854		
Societal Cost per Dth	$20.79		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($3,849,224)	0.16
Utility Cost Test	($2,891,115)	0.21
Societal Test	($2,459,623)	0.31
Participant Test	$1,340,503	(2.66)

LI HOME ENERGY SQUAD — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$53,459	$53,459	$53,459	$53,459
T & D	N/A	$32,275	$32,275	$32,275	$32,275
Marginal Energy	N/A	$298,704	$298,704	$298,704	$298,704
Environmental Externality	N/A	N/A	N/A	N/A	$78,374
Subtotal	N/A	$384,437	$384,437	$384,437	$462,811
Participant Benefits					
Bill Reduction - Electric	$963,802	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$963,802	N/A	N/A	$0	$0
Total Benefits	$963,802	$384,437	$384,437	$384,437	$462,811
Costs					
Utility Project Costs					
Customer Services	N/A	$247,314	$247,314	$247,314	$247,314
Project Administration	N/A	$77,362	$77,362	$77,362	$77,362
Advertising & Promotion	N/A	$3,000	$3,000	$3,000	$3,000
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$327,676	$327,676	$327,676	$327,676
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$963,802	N/A	N/A
Subtotal	N/A	N/A	$963,802	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$327,676	$1,291,478	$327,676	$327,676
Net Benefit (Cost)	$963,802	$56,761	($907,041)	$56,761	$135,135
Benefit/Cost Ratio	INF	1.17	0.30	1.17	1.41

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	7.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.63%
Gross Load Factor at Customer	E	11.02%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$104

Program Summary per Participant		
Gross kW Saved at Customer	I	0.69 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.08 kW
Gross Annual kWh Saved at Customer	(B x E x I)	663 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	724 kWh

Program Summary All Participants		
Total Participants	J	1,900
Total Budget	K	**$327,676**
Gross kW Saved at Customer	(J x I)	1,305 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**152 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,259,447 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,374,942 kWh**
Societal Net Benefits	(J x I x H)	**$135,135**

Utility Program Cost per kWh Lifetime	**$0.0331**
Utility Program Cost per kW at Gen	**$2,154**

LI HOME ENERGY SQUAD — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$50,246	$50,246	$50,246	$50,246
T & D	N/A	$30,428	$30,428	$30,428	$30,428
Marginal Energy	N/A	$268,136	$268,136	$268,136	$268,136
Environmental Externality	N/A	N/A	N/A	N/A	$79,427
Subtotal	N/A	$348,810	$348,810	$348,810	$428,237
Participant Benefits					
Bill Reduction - Electric	$872,317	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$872,317	N/A	N/A	$0	$0
Total Benefits	$872,317	$348,810	$348,810	$348,810	$428,237
Costs					
Utility Project Costs					
Customer Services	N/A	$247,314	$247,314	$247,314	$247,314
Project Administration	N/A	$77,361	$77,361	$77,361	$77,361
Advertising & Promotion	N/A	$3,000	$3,000	$3,000	$3,000
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$327,675	$327,675	$327,675	$327,675
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$872,317	N/A	N/A
Subtotal	N/A	N/A	$872,317	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$327,675	$1,199,992	$327,675	$327,675
Net Benefit (Cost)	$872,317	$21,135	($851,181)	$21,135	$100,562
Benefit/Cost Ratio	INF	1.06	0.29	1.06	1.31

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	6.2 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.63%
Gross Load Factor at Customer	E	11.02%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$77

Program Summary per Participant		
Gross kW Saved at Customer	I	0.69 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.08 kW
Gross Annual kWh Saved at Customer	(B x E x I)	663 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	724 kWh

Program Summary All Participants		
Total Participants	J	1,900
Total Budget	K	**$327,675**
Gross kW Saved at Customer	(J x I)	1,305 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**152 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,259,447 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,374,942 kWh**
Societal Net Benefits	(J x I x H)	**$100,562**

Utility Program Cost per kWh Lifetime	**$0.0382**
Utility Program Cost per kW at Gen	**$2,154**

LI HOME ENERGY SQUAD — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$44,090	$44,090	$44,090	$44,090
T & D	N/A	$26,718	$26,718	$26,718	$26,718
Marginal Energy	N/A	$235,964	$235,964	$235,964	$235,964
Environmental Externality	N/A	N/A	N/A	N/A	$80,595
Subtotal	N/A	$306,773	$306,773	$306,773	$387,367
Participant Benefits					
Bill Reduction - Electric	$768,981	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$0	N/A	N/A	$0	$0
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$768,981	N/A	N/A	$0	$0
Total Benefits	$768,981	$306,773	$306,773	$306,773	$387,367
Costs					
Utility Project Costs					
Customer Services	N/A	$247,314	$247,314	$247,314	$247,314
Project Administration	N/A	$77,361	$77,361	$77,361	$77,361
Advertising & Promotion	N/A	$3,000	$3,000	$3,000	$3,000
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$0	$0	$0	$0
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$327,675	$327,675	$327,675	$327,675
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$768,981	N/A	N/A
Subtotal	N/A	N/A	$768,981	N/A	N/A
Participant Costs					
Incremental Capital Costs	$0	N/A	N/A	$0	$0
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$0	N/A	N/A	$0	$0
Total Costs	$0	$327,675	$1,096,656	$327,675	$327,675
Net Benefit (Cost)	$768,981	($20,902)	($789,884)	($20,902)	$59,692
Benefit/Cost Ratio	INF	0.94	0.28	0.94	1.18

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	10.63%
Gross Load Factor at Customer	E	11.02%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	$46

Program Summary per Participant		
Gross kW Saved at Customer	I	0.69 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.08 kW
Gross Annual kWh Saved at Customer	(B x E x I)	663 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	724 kWh

Program Summary All Participants		
Total Participants	J	1,900
Total Budget	K	**$327,675**
Gross kW Saved at Customer	(J x I)	1,305 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**152 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,259,447 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,374,942 kWh**
Societal Net Benefits	(J x I x H)	**$59,692**

Utility Program Cost per kWh Lifetime	**$0.0452**
Utility Program Cost per kW at Gen	**$2,154**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **LI Home Energy Squad**

Input Data	
1) Retail Rate ($/Dth) =	$7.08
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$409,608	$410,917	$412,977
Incentive Costs =	$0	$0	$0
16) Total Utility Project Costs =	$409,608	$410,917	$412,977
17) Direct Participant Costs ($/Part.) =	$0	$0	$0
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$29	$29	$29
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	9.7	9.7	9.7
21) Avg. Dth/Part. Saved =	6.52	6.52	6.52
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	1,500	1,500	1,500
24) Total Annual Dth Saved =	9,777	9,777	9,777
25) Incentive/Participant =	$0.00	$0.00	$0.00

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$273	$274	$275
Cost per Participant per Dth =	$41.89	$42.03	$42.24
Lifetime Energy Reduction (Dth)	284,893		
Societal Cost per Dth	$4.42		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($1,599,753)	0.47
Utility Cost Test	$161,438	1.13
Societal Test	$1,778,146	2.41
Participant Test	$3,340,833	3.17

MULTI-FAMILY ENERGY SAVINGS PROGRAM — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$54,057	$54,057	$54,057	$54,057
T & D	N/A	$32,638	$32,638	$32,638	$32,638
Marginal Energy	N/A	$282,201	$282,201	$282,201	$282,201
Environmental Externality	N/A	N/A	N/A	N/A	$86,529
Subtotal	N/A	$368,895	$368,895	$368,895	$455,425
Participant Benefits					
Bill Reduction - Electric	$1,047,405	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$604,088	N/A	N/A	$604,088	$604,088
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$1,651,493	N/A	N/A	$604,088	$604,088
Total Benefits	$1,651,493	$368,895	$368,895	$972,984	$1,059,513
Costs					
Utility Project Costs					
Customer Services	N/A	$50,000	$50,000	$50,000	$50,000
Project Administration	N/A	$143,799	$143,799	$143,799	$143,799
Advertising & Promotion	N/A	$400	$400	$400	$400
Measurement & Verification	N/A	$7,359	$7,359	$7,359	$7,359
Rebates	N/A	$604,088	$604,088	$604,088	$604,088
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$805,646	$805,646	$805,646	$805,646
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,047,405	N/A	N/A
Subtotal	N/A	N/A	$1,047,405	N/A	N/A
Participant Costs					
Incremental Capital Costs	$604,088	N/A	N/A	$604,088	$604,088
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$604,088	N/A	N/A	$604,088	$604,088
Total Costs	$604,088	$805,646	$1,853,051	$1,409,735	$1,409,735
Net Benefit (Cost)	$1,047,405	($436,751)	($1,484,156)	($436,751)	($350,222)
Benefit/Cost Ratio	2.73	0.46	0.20	0.69	0.75

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	12.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	16.95%
Gross Load Factor at Customer	E	17.83%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($610)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.32 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	508 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	554 kWh

Program Summary All Participants		
Total Participants	J	1,766
Total Budget	K	**$805,646**
Gross kW Saved at Customer	(J x I)	574 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**107 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	896,287 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**978,479 kWh**
Societal Net Benefits	(J x I x H)	**($350,222)**

Utility Program Cost per kWh Lifetime	**$0.0669**
Utility Program Cost per kW at Gen	**$7,552**

MULTI-FAMILY ENERGY SAVINGS PROGRAM — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$59,337	$59,337	$59,337	$59,337
T & D	N/A	$36,082	$36,082	$36,082	$36,082
Marginal Energy	N/A	$272,201	$272,201	$272,201	$272,201
Environmental Externality	N/A	N/A	N/A	N/A	$91,446
Subtotal	N/A	$367,620	$367,620	$367,620	$459,066
Participant Benefits					
Bill Reduction - Electric	$1,037,300	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$604,088	N/A	N/A	$604,088	$604,088
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$1,641,388	N/A	N/A	$604,088	$604,088
Total Benefits	$1,641,388	$367,620	$367,620	$971,709	$1,063,155
Costs					
Utility Project Costs					
Customer Services	N/A	$50,000	$50,000	$50,000	$50,000
Project Administration	N/A	$147,839	$147,839	$147,839	$147,839
Advertising & Promotion	N/A	$416	$416	$416	$416
Measurement & Verification	N/A	$7,727	$7,727	$7,727	$7,727
Rebates	N/A	$604,088	$604,088	$604,088	$604,088
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$810,070	$810,070	$810,070	$810,070
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,037,300	N/A	N/A
Subtotal	N/A	N/A	$1,037,300	N/A	N/A
Participant Costs					
Incremental Capital Costs	$604,088	N/A	N/A	$604,088	$604,088
	$0	N/A	N/A	$0	$0
Subtotal	$604,088	N/A	N/A	$604,088	$604,088
Total Costs	$604,088	$810,070	$1,847,370	$1,414,159	$1,414,159
Net Benefit (Cost)	$1,037,300	($442,450)	($1,479,750)	($442,450)	($351,004)
Benefit/Cost Ratio	2.72	0.45	0.20	0.69	0.75

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.8 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	16.95%
Gross Load Factor at Customer	E	17.83%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($612)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.32 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	508 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	554 kWh

Program Summary All Participants		
Total Participants	J	1,766
Total Budget	K	**$810,070**
Gross kW Saved at Customer	(J x I)	574 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**107 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	896,287 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**978,479 kWh**
Societal Net Benefits	(J x I x H)	**($351,004)**
Utility Program Cost per kWh Lifetime		**$0.0701**
Utility Program Cost per kW at Gen		**$7,594**

MULTI-FAMILY ENERGY SAVINGS PROGRAM — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$58,564	$58,564	$58,564	$58,564
T & D	N/A	$35,656	$35,656	$35,656	$35,656
Marginal Energy	N/A	$262,220	$262,220	$262,220	$262,220
Environmental Externality	N/A	N/A	N/A	N/A	$96,842
Subtotal	N/A	$356,440	$356,440	$356,440	$453,282
Participant Benefits					
Bill Reduction - Electric	$1,023,481	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$604,088	N/A	N/A	$604,088	$604,088
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$1,627,570	N/A	N/A	$604,088	$604,088
Total Benefits	$1,627,570	$356,440	$356,440	$960,528	$1,057,370
Costs					
Utility Project Costs					
Customer Services	N/A	$50,000	$50,000	$50,000	$50,000
Project Administration	N/A	$150,880	$150,880	$150,880	$150,880
Advertising & Promotion	N/A	$437	$437	$437	$437
Measurement & Verification	N/A	$8,113	$8,113	$8,113	$8,113
Rebates	N/A	$604,088	$604,088	$604,088	$604,088
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$813,518	$813,518	$813,518	$813,518
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,023,481	N/A	N/A
Subtotal	N/A	N/A	$1,023,481	N/A	N/A
Participant Costs					
Incremental Capital Costs	$604,088	N/A	N/A	$604,088	$604,088
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$604,088	N/A	N/A	$604,088	$604,088
Total Costs	$604,088	$813,518	$1,837,000	$1,417,607	$1,417,607
Net Benefit (Cost)	$1,023,481	($457,079)	($1,480,560)	($457,079)	($360,237)
Benefit/Cost Ratio	2.69	0.44	0.19	0.68	0.75

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	11.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	16.95%
Gross Load Factor at Customer	E	17.83%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($628)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.32 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.06 kW
Gross Annual kWh Saved at Customer	(B x E x I)	508 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	554 kWh

Program Summary All Participants		
Total Participants	J	1,766
Total Budget	K	**$813,518**
Gross kW Saved at Customer	(J x I)	574 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**107 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	896,287 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**978,479 kWh**
Societal Net Benefits	(J x I x H)	**($360,237)**

Utility Program Cost per kWh Lifetime	**$0.0734**
Utility Program Cost per kW at Gen	**$7,626**

RESEARCH, EVALUATIONS & PILOTS SEGMENT TOTAL — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$355,771	$355,771	$355,771	$355,771
T & D	N/A	$214,796	$214,796	$214,796	$214,796
Marginal Energy	N/A	$928,677	$928,677	$928,677	$928,677
Environmental Externality	N/A	N/A	N/A	N/A	$252,742
Subtotal	N/A	$1,499,245	$1,499,245	$1,499,245	$1,751,987
Participant Benefits					
Bill Reduction - Electric	$2,513,381	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$524,661	N/A	N/A	$524,661	$524,661
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,518,049	N/A	N/A	$0	$0
Subtotal	$5,556,091	N/A	N/A	$524,661	$524,661
Total Benefits	$5,556,091	$1,499,245	$1,499,245	$2,023,905	$2,276,648
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$3,406,013	$3,406,013	$3,406,013	$3,406,013
Advertising & Promotion	N/A	$27,072	$27,072	$27,072	$27,072
Measurement & Verification	N/A	$5,414	$5,414	$5,414	$5,414
Rebates	N/A	$524,661	$524,661	$524,661	$524,661
Other	N/A	$390,152	$390,152	$390,152	$390,152
Subtotal	N/A	$4,353,313	$4,353,313	$4,353,313	$4,353,313
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,513,381	N/A	N/A
Subtotal	N/A	N/A	$2,513,381	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,324,611	N/A	N/A	$2,309,870	$2,309,870
Incremental O&M Costs	$0	N/A	N/A	$2,642	$2,642
Subtotal	$2,324,611	N/A	N/A	$2,312,511	$2,312,511
Total Costs	$2,324,611	$4,353,313	$6,866,694	$6,665,824	$6,665,824
Net Benefit (Cost)	$3,231,480	($2,854,068)	($5,367,449)	($4,641,918)	($4,389,176)
Benefit/Cost Ratio	2.39	0.34	0.22	0.30	0.34

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	8.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	21.09%
Gross Load Factor at Customer	E	11.12%
Transmission Loss Factor (Energy)	F	7.516%
Transmission Loss Factor (Demand)	G	8.665%
Societal Net Benefit (Cost)	H	($1,160)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.20 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.05 kW
Gross Annual kWh Saved at Customer	(B x E x I)	193 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	208 kWh

Program Summary All Participants		
Total Participants	J	19,127
Total Budget	K	**$4,353,312**
Gross kW Saved at Customer	(J x I)	3,783 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**873 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,685,604 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,985,111 kWh**
Societal Net Benefits	(J x I x H)	**($4,389,176)**

Utility Program Cost per kWh Lifetime	**$0.1368**
Utility Program Cost per kW at Gen	**$4,985**

RESEARCH, EVALUATIONS & PILOTS SEGMENT TOTAL — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$563,429	$563,429	$563,429	$563,429
T & D	N/A	$341,731	$341,731	$341,731	$341,731
Marginal Energy	N/A	$1,310,335	$1,310,335	$1,310,335	$1,310,335
Environmental Externality	N/A	N/A	N/A	N/A	$398,119
Subtotal	N/A	$2,215,495	$2,215,495	$2,215,495	$2,613,613
Participant Benefits					
Bill Reduction - Electric	$3,702,827	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$754,798	N/A	N/A	$754,798	$754,798
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,971,078	N/A	N/A	$0	$0
Subtotal	$7,428,704	N/A	N/A	$754,798	$754,798
Total Benefits	$7,428,704	$2,215,495	$2,215,495	$2,970,293	$3,368,411
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,502,106	$2,502,106	$2,502,106	$2,502,106
Advertising & Promotion	N/A	$27,072	$27,072	$27,072	$27,072
Measurement & Verification	N/A	$162,414	$162,414	$162,414	$162,414
Rebates	N/A	$754,798	$754,798	$754,798	$754,798
Other	N/A	$406,569	$406,569	$406,569	$406,569
Subtotal	N/A	$3,852,959	$3,852,959	$3,852,959	$3,852,959
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$3,702,827	N/A	N/A
Subtotal	N/A	N/A	$3,702,827	N/A	N/A
Participant Costs					
Incremental Capital Costs	$3,395,894	N/A	N/A	$3,378,566	$3,378,566
	$0	N/A	N/A	$13,704	$13,704
Subtotal	$3,395,894	N/A	N/A	$3,392,270	$3,392,270
Total Costs	$3,395,894	$3,852,959	$7,555,787	$7,245,229	$7,245,229
Net Benefit (Cost)	$4,032,809	($1,637,464)	($5,340,292)	($4,274,936)	($3,876,818)
Benefit/Cost Ratio	2.19	0.58	0.29	0.41	0.46

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	8.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	20.68%
Gross Load Factor at Customer	E	10.35%
Transmission Loss Factor (Energy)	F	7.597%
Transmission Loss Factor (Demand)	G	8.688%
Societal Net Benefit (Cost)	H	($693)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.20 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.04 kW
Gross Annual kWh Saved at Customer	(B x E x I)	177 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	191 kWh

Program Summary All Participants		
Total Participants	J	28,688
Total Budget	K	**$3,852,959**
Gross kW Saved at Customer	(J x I)	5,596 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,267 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	5,072,024 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**5,489,034 kWh**
Societal Net Benefits	(J x I x H)	**($3,876,818)**
Utility Program Cost per kWh Lifetime		**$0.0870**
Utility Program Cost per kW at Gen		**$3,040**

RESEARCH, EVALUATIONS & PILOTS SEGMENT TOTAL — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$688,802	$688,802	$688,802	$688,802
T & D	N/A	$418,275	$418,275	$418,275	$418,275
Marginal Energy	N/A	$1,574,295	$1,574,295	$1,574,295	$1,574,295
Environmental Externality	N/A	N/A	N/A	N/A	$537,669
Subtotal	N/A	$2,681,372	$2,681,372	$2,681,372	$3,219,041
Participant Benefits					
Bill Reduction - Electric	$4,558,718	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$898,224	N/A	N/A	$898,224	$898,224
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$3,424,108	N/A	N/A	$0	$0
Subtotal	$8,881,049	N/A	N/A	$898,224	$898,224
Total Benefits	$8,881,049	$2,681,372	$2,681,372	$3,579,596	$4,117,265
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$2,639,495	$2,639,495	$2,639,495	$2,639,495
Advertising & Promotion	N/A	$27,072	$27,072	$27,072	$27,072
Measurement & Verification	N/A	$5,414	$5,414	$5,414	$5,414
Rebates	N/A	$898,224	$898,224	$898,224	$898,224
Other	N/A	$418,522	$418,522	$418,522	$418,522
Subtotal	N/A	$3,988,727	$3,988,727	$3,988,727	$3,988,727
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$4,558,718	N/A	N/A
Subtotal	N/A	N/A	$4,558,718	N/A	N/A
Participant Costs					
Incremental Capital Costs	$4,041,007	N/A	N/A	$4,021,001	$4,021,001
Incremental O&M Costs	$0	N/A	N/A	$24,939	$24,939
Subtotal	$4,041,007	N/A	N/A	$4,045,940	$4,045,940
Total Costs	$4,041,007	$3,988,727	$8,547,445	$8,034,667	$8,034,667
Net Benefit (Cost)	$4,840,042	($1,307,355)	($5,866,073)	($4,455,071)	($3,917,402)
Benefit/Cost Ratio	2.20	0.67	0.31	0.45	0.51

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	8.0 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	20.66%
Gross Load Factor at Customer	E	10.35%
Transmission Loss Factor (Energy)	F	7.597%
Transmission Loss Factor (Demand)	G	8.689%
Societal Net Benefit (Cost)	H	($584)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.19 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.04 kW
Gross Annual kWh Saved at Customer	(B x E x I)	177 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	191 kWh

Program Summary All Participants		
Total Participants	J	34,428
Total Budget	K	**$3,988,727**
Gross kW Saved at Customer	(J x I)	6,712 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,519 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	6,087,030 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**6,587,483 kWh**
Societal Net Benefits	(J x I x H)	**($3,917,402)**

Utility Program Cost per kWh Lifetime	**$0.0757**
Utility Program Cost per kW at Gen	**$2,627**

Conservation Improvement Program (CIP) BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Research, Evaluations & Pilots Segment Total**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 First Year	2018 Second Year	2019 Third Year
Administrative & Operating Costs =	$498,133	$534,345	$566,169
Incentive Costs =	$37,893	$64,981	$78,391
16) Total Utility Project Costs =	$536,026	$599,326	$644,561
17) Direct Participant Costs ($/Part.) =	$276	$284	$282
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$62	$76	$69
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	7.6	7.3	7.2
21) Avg. Dth/Part. Saved =	4.07	5.12	4.80
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	586	881	1,061
24) Total Annual Dth Saved =	2,387	4,514	5,092
25) Incentive/Participant =	$64.66	$73.76	$73.88

Cost Summary	1st Yr	2nd Yr	3rd Yr
Utility Cost per Participant =	$915	$680	$608
Cost per Participant per Dth =	$292.20	$188.16	$185.35
Lifetime Energy Reduction (Dth)	87,861		
Societal Cost per Dth	$18.81		

Test Results	Triennial NPV	Triennial B/C
Ratepayer Impact Measure Test	($1,896,859)	0.19
Utility Cost Test	($1,334,502)	0.25
Societal Test	($500,104)	0.70
Participant Test	$4,373,533	0.84

ENERGY STAR RETAIL PRODUCTS — 2017 — ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$307,038	$307,038	$307,038	$307,038
T & D	N/A	$185,375	$185,375	$185,375	$185,375
Marginal Energy	N/A	$618,065	$618,065	$618,065	$618,065
Environmental Externality	N/A	N/A	N/A	N/A	$163,122
Subtotal	N/A	$1,110,478	$1,110,478	$1,110,478	$1,273,600
Participant Benefits					
Bill Reduction - Electric	$1,907,898	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$433,597	N/A	N/A	$433,597	$433,597
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$2,341,495	N/A	N/A	$433,597	$433,597
Total Benefits	$2,341,495	$1,110,478	$1,110,478	$1,544,076	$1,707,197
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$130,926	$130,926	$130,926	$130,926
Advertising & Promotion	N/A	$27,072	$27,072	$27,072	$27,072
Measurement & Verification	N/A	$5,414	$5,414	$5,414	$5,414
Rebates	N/A	$433,597	$433,597	$433,597	$433,597
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$597,010	$597,010	$597,010	$597,010
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$1,907,898	N/A	N/A
Subtotal	N/A	N/A	$1,907,898	N/A	N/A
Participant Costs					
Incremental Capital Costs	$2,131,414	N/A	N/A	$2,131,414	$2,131,414
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$2,131,414	N/A	N/A	$2,131,414	$2,131,414
Total Costs	$2,131,414	$597,010	$2,504,908	$2,728,424	$2,728,424
Net Benefit (Cost)	$210,081	$513,468	($1,394,430)	($1,184,348)	($1,021,227)
Benefit/Cost Ratio	1.10	1.86	0.44	0.57	0.63

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	10.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	18.66%
Gross Load Factor at Customer	E	6.07%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($292)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.18 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.04 kW
Gross Annual kWh Saved at Customer	(B x E x I)	97 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	106 kWh

Program Summary All Participants		
Total Participants	J	19,102
Total Budget	K	**$597,010**
Gross kW Saved at Customer	(J x I)	3,494 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**715 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,856,910 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**2,027,194 kWh**
Societal Net Benefits	(J x I x H)	**($1,021,227)**

Utility Program Cost per kWh Lifetime	**$0.0290**
Utility Program Cost per kW at Gen	**$835**

ENERGY STAR RETAIL PRODUCTS — 2018 ELECTRIC — GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$501,447	$501,447	$501,447	$501,447
T & D	N/A	$304,181	$304,181	$304,181	$304,181
Marginal Energy	N/A	$933,402	$933,402	$933,402	$933,402
Environmental Externality	N/A	N/A	N/A	N/A	$273,683
Subtotal	N/A	$1,739,031	$1,739,031	$1,739,031	$2,012,714
Participant Benefits					
Bill Reduction - Electric	$2,954,909	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$650,381	N/A	N/A	$650,381	$650,381
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$3,605,290	N/A	N/A	$650,381	$650,381
Total Benefits	$3,605,290	$1,739,031	$1,739,031	$2,389,412	$2,663,095
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$131,266	$131,266	$131,266	$131,266
Advertising & Promotion	N/A	$27,072	$27,072	$27,072	$27,072
Measurement & Verification	N/A	$5,414	$5,414	$5,414	$5,414
Rebates	N/A	$650,381	$650,381	$650,381	$650,381
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$814,133	$814,133	$814,133	$814,133
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$2,954,909	N/A	N/A
Subtotal	N/A	N/A	$2,954,909	N/A	N/A
Participant Costs					
Incremental Capital Costs	$3,196,951	N/A	N/A	$3,196,951	$3,196,951
	$0	N/A	N/A	$0	$0
Subtotal	$3,196,951	N/A	N/A	$3,196,951	$3,196,951
Total Costs	$3,196,951	$814,133	$3,769,042	$4,011,084	$4,011,084
Net Benefit (Cost)	$408,339	$924,897	($2,030,012)	($1,621,672)	($1,347,989)
Benefit/Cost Ratio	1.13	2.14	0.46	0.60	0.66

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	10.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	18.66%
Gross Load Factor at Customer	E	6.07%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($257)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.18 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.04 kW
Gross Annual kWh Saved at Customer	(B x E x I)	97 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	106 kWh

Program Summary All Participants		
Total Participants	J	28,653
Total Budget	K	**$814,133**
Gross kW Saved at Customer	(J x I)	5,241 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,072 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	2,785,326 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,040,749 kWh**
Societal Net Benefits	(J x I x H)	**($1,347,989)**

Utility Program Cost per kWh Lifetime	**$0.0264**
Utility Program Cost per kW at Gen	**$759**

ENERGY STAR RETAIL PRODUCTS — 2019 — ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$615,175	$615,175	$615,175	$615,175
T & D	N/A	$373,617	$373,617	$373,617	$373,617
Marginal Energy	N/A	$1,128,533	$1,128,533	$1,128,533	$1,128,533
Environmental Externality	N/A	N/A	N/A	N/A	$365,165
Subtotal	N/A	$2,117,325	$2,117,325	$2,117,325	$2,482,491
Participant Benefits					
Bill Reduction - Electric	$3,660,135	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$780,453	N/A	N/A	$780,453	$780,453
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$0	N/A	N/A	$0	$0
Subtotal	$4,440,588	N/A	N/A	$780,453	$780,453
Total Benefits	$4,440,588	$2,117,325	$2,117,325	$2,897,778	$3,262,944
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$131,605	$131,605	$131,605	$131,605
Advertising & Promotion	N/A	$27,072	$27,072	$27,072	$27,072
Measurement & Verification	N/A	$5,414	$5,414	$5,414	$5,414
Rebates	N/A	$780,453	$780,453	$780,453	$780,453
Other	N/A	$0	$0	$0	$0
Subtotal	N/A	$944,545	$944,545	$944,545	$944,545
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$3,660,135	N/A	N/A
Subtotal	N/A	N/A	$3,660,135	N/A	N/A
Participant Costs					
Incremental Capital Costs	$3,836,316	N/A	N/A	$3,836,316	$3,836,316
Incremental O&M Costs	$0	N/A	N/A	$0	$0
Subtotal	$3,836,316	N/A	N/A	$3,836,316	$3,836,316
Total Costs	$3,836,316	$944,545	$4,604,680	$4,780,861	$4,780,861
Net Benefit (Cost)	$604,272	$1,172,781	($2,487,355)	($1,883,083)	($1,517,917)
Benefit/Cost Ratio	1.16	2.24	0.46	0.61	0.68

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	10.1 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	18.66%
Gross Load Factor at Customer	E	6.07%
Transmission Loss Factor (Energy)	F	8.400%
Transmission Loss Factor (Demand)	G	8.800%
Societal Net Benefit (Cost)	H	($241)

Program Summary per Participant		
Gross kW Saved at Customer	I	0.18 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	0.04 kW
Gross Annual kWh Saved at Customer	(B x E x I)	97 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	106 kWh

Program Summary All Participants		
Total Participants	J	34,383
Total Budget	K	**$944,545**
Gross kW Saved at Customer	(J x I)	6,289 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**1,286 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	3,342,328 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**3,648,829 kWh**
Societal Net Benefits	(J x I x H)	**($1,517,917)**

Utility Program Cost per kWh Lifetime	**$0.0255**
Utility Program Cost per kW at Gen	**$734**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Energy Star Retail Products**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$907	$909	$911
Incentive Costs =	$26,333	$39,499	$47,417
16) Total Utility Project Costs =	$27,240	$40,408	$48,328
17) Direct Participant Costs ($/Part.) =	$244	$244	$244
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	12.0	12.0	12.0
21) Avg. Dth/Part. Saved =	0.50	0.50	0.50
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	582	873	1,048
24) Total Annual Dth Saved =	291	437	524
25) Incentive/Participant =	$45.25	$45.25	$45.25

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$47	$46	$46
Cost per Participant per Dth =	$582.33	$581.30	$580.95
Lifetime Energy Reduction (Dth)	15,023		
Societal Cost per Dth	$40.66		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($134,832)	0.35
Utility Cost Test	($44,158)	0.62
Societal Test	($518,208)	0.15
Participant Test	($384,313)	0.22

ENERGY INFORMATION SYSTEMS — 2017 ELECTRIC — GOAL

2017 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$48,733	$48,733	$48,733	$48,733
T & D	N/A	$29,421	$29,421	$29,421	$29,421
Marginal Energy	N/A	$310,613	$310,613	$310,613	$310,613
Environmental Externality	N/A	N/A	N/A	N/A	$89,621
Subtotal	N/A	$388,767	$388,767	$388,767	$478,387
Participant Benefits					
Bill Reduction - Electric	$605,484	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$91,063	N/A	N/A	$91,063	$91,063
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,518,049	N/A	N/A	$0	$0
Subtotal	$3,214,596	N/A	N/A	$91,063	$91,063
Total Benefits	$3,214,596	$388,767	$388,767	$479,830	$569,451
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$148,093	$148,093	$148,093	$148,093
Advertising & Promotion	N/A	$0	$0	$0	$0
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$91,063	$91,063	$91,063	$91,063
Other	N/A	$16,560	$16,560	$16,560	$16,560
Subtotal	N/A	$255,716	$255,716	$255,716	$255,716
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$605,484	N/A	N/A
Subtotal	N/A	N/A	$605,484	N/A	N/A
Participant Costs					
Incremental Capital Costs	$193,197	N/A	N/A	$178,456	$178,456
Incremental O&M Costs	$0	N/A	N/A	$2,642	$2,642
Subtotal	$193,197	N/A	N/A	$181,098	$181,098
Total Costs	$193,197	$255,716	$861,200	$436,814	$436,814
Net Benefit (Cost)	$3,021,399	$133,051	($472,433)	$43,016	$132,637
Benefit/Cost Ratio	16.64	1.52	0.45	1.10	1.30

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.7 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.08%
Gross Load Factor at Customer	E	72.31%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$459

Program Summary per Participant		
Gross kW Saved at Customer	I	11.55 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	6.34 kW
Gross Annual kWh Saved at Customer	(B x E x I)	73,148 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	78,317 kWh

Program Summary All Participants		
Total Participants	J	25
Total Budget	K	**$255,716**
Gross kW Saved at Customer	(J x I)	289 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**159 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	1,828,694 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**1,957,917 kWh**
Societal Net Benefits	(J x I x H)	**$132,637**

Utility Program Cost per kWh Lifetime	**$0.0227**
Utility Program Cost per kW at Gen	**$1,613**

ENERGY INFORMATION SYSTEMS	2018	ELECTRIC	GOAL

2018 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$61,981	$61,981	$61,981	$61,981
T & D	N/A	$37,550	$37,550	$37,550	$37,550
Marginal Energy	N/A	$376,934	$376,934	$376,934	$376,934
Environmental Externality	N/A	N/A	N/A	N/A	$124,436
Subtotal	N/A	$476,464	$476,464	$476,464	$600,900
Participant Benefits					
Bill Reduction - Electric	$747,919	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$104,417	N/A	N/A	$104,417	$104,417
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$2,971,078	N/A	N/A	$0	$0
Subtotal	$3,823,414	N/A	N/A	$104,417	$104,417
Total Benefits	$3,823,414	$476,464	$476,464	$580,881	$705,317
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$178,256	$178,256	$178,256	$178,256
Advertising & Promotion	N/A	$0	$0	$0	$0
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$104,417	$104,417	$104,417	$104,417
Other	N/A	$16,560	$16,560	$16,560	$16,560
Subtotal	N/A	$299,233	$299,233	$299,233	$299,233
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$747,919	N/A	N/A
Subtotal	N/A	N/A	$747,919	N/A	N/A
Participant Costs					
Incremental Capital Costs	$198,944	N/A	N/A	$181,616	$181,616
	$0	N/A	N/A	$13,704	$13,704
Subtotal	$198,944	N/A	N/A	$195,319	$195,319
Total Costs	$198,944	$299,233	$1,047,151	$494,552	$494,552
Net Benefit (Cost)	$3,624,470	$177,231	($570,687)	$86,329	$210,765
Benefit/Cost Ratio	19.22	1.59	0.46	1.17	1.43

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.5 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.08%
Gross Load Factor at Customer	E	73.38%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$593

Program Summary per Participant		
Gross kW Saved at Customer	I	10.16 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	5.58 kW
Gross Annual kWh Saved at Customer	(B x E x I)	65,334 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	69,951 kWh

Program Summary All Participants		
Total Participants	J	35
Total Budget	K	**$299,233**
Gross kW Saved at Customer	(J x I)	356 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**195 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	2,286,698 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**2,448,285 kWh**
Societal Net Benefits	(J x I x H)	**$210,765**
Utility Program Cost per kWh Lifetime		**$0.0223**
Utility Program Cost per kW at Gen		**$1,532**

ENERGY INFORMATION SYSTEMS — 2019 ELECTRIC — GOAL

2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test ($Total)	Utility Test ($Total)	Rate Impact Test ($Total)	Total Resource Test ($Total)	Societal Test ($Total)
Benefits					
Avoided Revenue Requirements					
Generation	N/A	$73,628	$73,628	$73,628	$73,628
T & D	N/A	$44,658	$44,658	$44,658	$44,658
Marginal Energy	N/A	$445,761	$445,761	$445,761	$445,761
Environmental Externality	N/A	N/A	N/A	N/A	$172,504
Subtotal	N/A	$564,047	$564,047	$564,047	$736,551
Participant Benefits					
Bill Reduction - Electric	$898,583	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	$117,770	N/A	N/A	$117,770	$117,770
Incremental Capital Savings	$0	N/A	N/A	$0	$0
Incremental O&M Savings	$3,424,108	N/A	N/A	$0	$0
Subtotal	$4,440,461	N/A	N/A	$117,770	$117,770
Total Benefits	$4,440,461	$564,047	$564,047	$681,817	$854,321
Costs					
Utility Project Costs					
Customer Services	N/A	$0	$0	$0	$0
Project Administration	N/A	$192,250	$192,250	$192,250	$192,250
Advertising & Promotion	N/A	$0	$0	$0	$0
Measurement & Verification	N/A	$0	$0	$0	$0
Rebates	N/A	$117,770	$117,770	$117,770	$117,770
Other	N/A	$16,560	$16,560	$16,560	$16,560
Subtotal	N/A	$326,580	$326,580	$326,580	$326,580
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	$898,583	N/A	N/A
Subtotal	N/A	N/A	$898,583	N/A	N/A
Participant Costs					
Incremental Capital Costs	$204,691	N/A	N/A	$184,685	$184,685
Incremental O&M Costs	$0	N/A	N/A	$24,939	$24,939
Subtotal	$204,691	N/A	N/A	$209,624	$209,624
Total Costs	$204,691	$326,580	$1,225,163	$536,204	$536,204
Net Benefit (Cost)	$4,235,770	$237,466	($661,116)	$145,613	$318,117
Benefit/Cost Ratio	21.69	1.73	0.46	1.27	1.59

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Input Summary and Totals

Program "Inputs" per Customer kW		
Lifetime (Weighted on Generator kWh)	A	5.3 years
Annual Hours	B	8760
Gross Customer kW	C	1 kW
Generator Peak Coincidence Factor	D	51.08%
Gross Load Factor at Customer	E	74.12%
Transmission Loss Factor (Energy)	F	6.600%
Transmission Loss Factor (Demand)	G	7.000%
Societal Net Benefit (Cost)	H	$753

Program Summary per Participant		
Gross kW Saved at Customer	I	9.39 kW
Net coincident kW Saved at Generator	(I x D) / (1 - G)	5.16 kW
Gross Annual kWh Saved at Customer	(B x E x I)	60,993 kWh
Net Annual kWh Saved at Generator	(B x E x I) / (1 - F)	65,303 kWh

Program Summary All Participants		
Total Participants	J	45
Total Budget	K	**$326,580**
Gross kW Saved at Customer	(J x I)	423 kW
Net coincident kW Saved at Generator	**(I x D) / (1 - G) x J**	**232 kW**
Gross Annual kWh Saved at Customer	(B x E x I) x J	2,744,702 kWh
Net Annual kWh Saved at Generator	**((B x E x I) / (1 - F)) x J**	**2,938,653 kWh**
Societal Net Benefits	(J x I x H)	**$318,117**
Utility Program Cost per kWh Lifetime		**$0.0209**
Utility Program Cost per kW at Gen		**$1,407**

Conservation Improvement Program (CIP)

BENEFIT COST FOR GAS CIPS-- Cost-Effectiveness Analysis

Company: **Xcel Energy**
Project: **Energy Information Systems**

Input Data	
1) Retail Rate ($/Dth) =	$6.46
Escalation Rate =	4.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.000
Escalation Rate =	3.22%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	kWh
3) Commodity Cost ($/Dth) =	$4.27
Escalation Rate =	4.00%
4) Demand Cost ($/Unit/Yr) =	$80.24
Escalation Rate =	4.00%
5) Peak Reduction Factor =	1.00%
6) Variable O&M ($/Dth) =	$0.0408
Escalation Rate =	4.00%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.02153
Escalation Rate =	3.22%
8) Non-Gas Fuel Loss Factor	5.28%
9) Gas Environmental Damage Factor =	$0.3800
Escalation Rate =	2.16%
10) Non Gas Fuel Enviro. Damage Factor ($/Unit) =	$0.0232
Escalation Rate =	2.16%
11) Participant Discount Rate =	2.55%
12) Utility Discount Rate =	7.04%
13) Societal Discount Rate =	2.55%
14) General Input Data Year =	2016
15a) Project Analysis Year 1 =	2017
15b) Project Analysis Year 2 =	2018
15c) Project Analysis Year 3 =	2019

	2017 **First Year**	2018 **Second Year**	2019 **Third Year**
Administrative & Operating Costs =	$67,132	$86,497	$86,600
Incentive Costs =	$11,560	$25,482	$30,975
16) Total Utility Project Costs =	$78,692	$111,979	$117,575
17) Direct Participant Costs ($/Part.) =	$4,810	$4,565	$3,312
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0	$0
Escalation Rate =	1.73%	1.73%	1.73%
19) Participant Non-Energy Savings (Annual $/Part) =	$9,056	$8,340	$5,593
Escalation Rate =	1.73%	1.73%	1.73%
20) Project Life (Years) =	7.0	6.8	6.7
21) Avg. Dth/Part. Saved =	524.02	509.62	351.38
22) Avg Non-Gas Fuel Units/Part. Saved =	0 kWh	0 kWh	0 kWh
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0 kWh	0 kWh	0 kWh
23) Number of Participants =	4	8	13
24) Total Annual Dth Saved =	2,096	4,077	4,568
25) Incentive/Participant =	$2,890.10	$3,185.26	$2,382.67

Cost Summary	**1st Yr**	**2nd Yr**	**3rd Yr**
Utility Cost per Participant =	$19,673	$13,997	$9,044
Cost per Participant per Dth =	$46.72	$36.42	$35.16
Lifetime Energy Reduction (Dth)	72,837		
Societal Cost per Dth	$5.10		

Test Results	**Triennial NPV**	**Triennial B/C**
Ratepayer Impact Measure Test	($406,336)	0.48
Utility Cost Test	$65,347	1.21
Societal Test	$1,373,795	4.70
Participant Test	$4,757,846	6.79

➢ Technical Assumptions

This section contains the forecast planning and deemed savings technical assumptions for the proposed programs:

- **Forecast Planning Assumptions** - These assumptions describe the predicted participation, savings, and costs of the measures proposed in the Plan. They represent an average of the values for the expected product mix that we anticipate customers will implement. These assumptions are used to estimate the energy consumption impacts and other measure-specific factors in order to calculate the benefit-cost analyses. The forecasted impacts are derived by applying the anticipated participation for each measure to the Deemed Savings technical assumptions for that measure. The impacts from each of the measures are aggregated and inputted into the benefit-cost model for the program level analysis.

- **Deemed Savings Technical Assumptions** - These assumptions describe how actual energy savings, cost, and other values will be calculated for each measure that is implemented. For **prescriptive** DSM measures, the deemed savings technical assumptions contain the algorithms that will be used to calculate energy and demand savings, as well as all assumed or customer-provided values to be used as inputs to these algorithms. Additionally, the Deemed Savings technical assumptions describe how incremental capital and incremental operation and maintenance costs will be determined for each implemented measure, and detail the values which will be used for the measure life. For **custom** products, the Deemed Savings technical assumptions describe the methodology to be used to calculate project specific savings, as well as any values to be used for all implemented projects under a specific DSM product.

Technical Reference Manual Compliance

On January 14, 2016 the DER issued the 2017-2019 MN Technical Resource Manual (TRM). Within the final order, E,G999/CIP-15-896, the DER stated "If a utility wants to use a method that deviates from the TRM measure, they must provide justification with the filing detailing the reasoning for the deviation as well as providing any calculations, methodologies and assumptions used in the alternative calculation."

Throughout our 2017-2019 plan we have not followed the 2017-2019 MN TRM across all programs. The calculations and methodologies for energy and demand savings are very similar to those in the TRM but may vary on a program by program basis. The calculations and methodologies in our 2017-2019 CIP Triennial Plan are largely a continuation of our 2013-2015 CIP Triennial Plan along with our 2016 Extension Plan. Assumptions have been updated throughout all programs to reflect the most recent market information we have received through program participants combined with market feedback for how we believe pricing may change throughout the next three years. The deemed savings within this Plan define the calculations, methodologies, assumptions, and sources for all programs.

Examples of the differences between our deemed savings and the MN TRM are shown below for Business Lighting, Residential Lighting, and Residential Cooling.

Business Lighting: Follows the TRM for savings calculations/algorithms, lighting hours and coincidence factor. Lifetimes vary slightly due to a difference in LED lifetime hours and interactive factors have more categories in our triennial.

Residential Lighting: Calculations, lighting hours, and coincidence factor are different from the MN TRM. Our deemed savings in this Plan are more conservative. For example, MN TRM hours are 938 compared to our assumption at 909. Overall, the lifetime is shorter than the TRM due to the expected code change in 2022. The TRM shows a lifetime of 9.4 years for CFLs compared to 7 years in this Plan. We only include CFLs in 2017 program year where the MN TRM allows CFLs for all three years. Our LED lifetime is 7.1, 6.1, and 5.2 for 2017, 2018, and 2019, respectively.

Residential Cooling: The methodology for savings is the same with equipment savings and quality install savings being the two parts to the program. This Plan differs from the TRM in the savings attributed to each portion of an A/C install. The net effect of these differences results in our Plan claiming fewer savings per unit compared to the MN TRM.

The following table describes each column in the Forecasted Technical Assumptions:

Column Label	Column Description
Electric Measure Description	Program name and individual measures
Efficienct Product Description/Rating	High efficiency product description
Efficient Product Consumption (watts)	Consumption of high efficiency product in either watts (electric) or Dth/yr (gas)
Efficient Hours of Operation (hrs/yr)	High efficiency product hours of operation
Baseline Product Description/Rating	Baseline product description
Baseline Product Consumption (watts)	Consumption of baseline product in either watts (electric) or Dth/yr (gas)
Baseline Hours of Operation (hrs/yr)	Baseline equipment hours of operation
Measure Lifetime (years)	High efficiency product lifetime
Rebate Amount	Average dollar amount of rebate given to participants
Average Baseline Product Cost ($)	The average cost of a baseline product in dollars
Incremental Cost of Efficient Product ($)	Difference in efficient and baseline product
Assumed Energy Cost ($/kWh)	Unit cost
Rebate as a % of Incremental Cost	Percent of incremental cost that is equal to the rebate amount
Incremental Cost Payback Period w/o Rebate (yrs)	Payback period expressed in years after a participant acquires the high efficiency product using the incremental cost of the product
Incremental Cost Payback Period w/ Rebate (yrs)	Payback period expressed in years after a participant acquires the high efficiency product with the incremental cost reduced by the rebate amount
Annual Customer kWh/Dth Savings	Annual kWh or Dth savings customer realizes after implementing high efficiency product
Rebated Cost per Annual Cust kWh/Dth Saved	Rebate cost per annual kWh or Dth saved by the high efficiency product at the customer meter
Rebated Lifetime Cost per Cust kWh/Dth Saved	Rebate cost per kWh or Dth saved by the high efficiency product over the lifetime of the product at the customer meter
Customer kW Savings (Electric Only)	Consumption savings in kW customer realizes after implementing high efficiency product
Generator Peak kW Savings (Electric Only)	Annual kW savings utility realizes on annual peak day after customer implements high efficiency product
Non-Energy O&M Savings ($)	Non energy savings related to O&M
Energy O&M Savings ($)	Energy savings related to O&M
Coincidence Factor	Percent of peak customer kW that coincides with system peak
Participants	Individual premises that participate in programs
Generator Peak kW Savings (Electric Only)	Annual kW savings utility realizes on annual peak day after customer implements high efficiency product
# Units Rebated in Rpt. Yr.	Total # of actual Units rebated – populated only for Status Reports
Total kWh/Dth Saved All Units Rpt. Yr.	Total annual kWh or Dth saved by the actual units rebated – populated only for Status Reports
Part. Test	Benefit-Cost analysis results for the Participant Test
Utility Test	Benefit-Cost analysis results for the Utility Test
Rate Impact Test	Benefit-Cost analysis results for the Rate Impact Test
Soc. Test	Benefit-Cost analysis results for the Societal Test
Installation Rate	Metric for tracking installations
Realization Rate	Calculated metric that compares verified savings with reported savings.

Electric Measure Description	Efficient Product Description / Rating	Efficient Product Consumption (watts)	Efficient Hours of Operation (hrs/yr)	Baseline Product Description / Rating	Baseline Product Consumption (watts)	Baseline Hours of Operation (hrs/yr)	Measure Lifetime (years)	Rebate Amount ($)	Average Baseline Product Cost ($)	Incremental Cost of Efficient Product ($)	Assumed Energy Cost ($/kWh)	Rebate as a % of Incremental Cost (%)	Incremt'l Cost Payback Period w/o Rebate (yrs)	Incremt'l Cost Payback Period w/ Rebate (yrs)
Business														
Business New Construction														
Average EDA Project - 2017	More Efficient than Code Building	258,206	4,892	Code-Compliant Building	368,866	4,892	20	$58,722	$0	$214,836	$0.06	27%	6.7	4.9
Average EDA Project - 2018	More Efficient than Code Building	187,640	4,555	Code-Compliant Building	268,057	4,555	20	$41,710	$0	$145,391	$0.06	29%	6.7	4.8
Average EDA Project - 2019	More Efficient than Code Building	152,055	4,086	Code-Compliant Building	217,222	4,086	20	$32,709	$0	$105,670	$0.06	31%	6.7	4.6
Average EEB Project - 2017	More Efficient than Code Building	43,253	3,338	Code-Compliant Building	61,790	3,338	20	$8,743	$0	$23,574	$0.06	37%	6.6	4.2
Average EEB Project - 2018	More Efficient than Code Building	40,411	3,250	Code-Compliant Building	57,730	3,250	20	$8,115	$0	$21,505	$0.06	38%	6.6	4.1
Average EEB Project - 2019	More Efficient than Code Building	42,216	3,025	Code-Compliant Building	60,308	3,025	20	$8,333	$0	$21,008	$0.06	40%	6.7	4.0
Commercial Efficiency														
Average project results from 2015 history	0	1,691,153	5,913	New updated systems	1,716,714	5,913	17	$13,590	$0	$56,886	$0.07	24%	4.9	3.7
Study Cost Allocations	0	0	0	0	0	0	0	$138,750	$0	$138,750	$0.07	100%	#DIV/0!	#DIV/0!
Phase 2 Customer Contribution	0	0	0	0	0	0	0	$0	$0	$7,500	$0.07	0%	#DIV/0!	#DIV/0!
Behavioral Changes	Behavior changes that reduce energy use	2,962,572	8,760	No change in behavior	3,024,892	8,760	1	$0	$0	$0	$0.06	#DIV/0!	0.0	0.0
Behavioral Changes	Behavior changes that reduce energy use	-1,975,048	8,760	No change in behavior	-2,016,594	8,760	0	$0	$0	$0	$0.06	#DIV/0!	0.0	0.0
Computer Efficiency														
Upstream Power Supply - Bronze	desktop computer meeting ENERGY STAR version 6.0 spec with an 80 Plus Bronze level power supply	24	7,311	Baseline desktop computer with a standard efficiency power supply	31	7,311	5		$600	$9	$0.08	0%	2.5	2.5
Upstream Power Supply - Silver	desktop computer meeting ENERGY STAR version 6.0 spec with an 80 Plus Silver level power supply	24	7,311	desktop computer meeting ENERGY STAR version 6.0 spec with an 80 Plus Bronze level power supply	31	7,311	5		$609	$14	$0.08	0%	3.5	3.5
Upstream Power Supply - Gold	desktop computer meeting ENERGY STAR version 6.0 spec with an 80 Plus Gold level power supply	23	7,311	desktop computer meeting ENERGY STAR version 6.0 spec with an 80 Plus Bronze level power supply	31	7,311	5		$609	$16	$0.08	0%	3.7	3.7
Upstream Power Supply - Platinum	desktop computer meeting ENERGY STAR version 6.0 spec with an 80 Plus Platinum level power supply	23	7,311	desktop computer meeting ENERGY STAR version 6.0 spec with an 80 Plus Bronze level power supply	31	7,311	5		$609	$22	$0.08	0%	4.8	4.8
Zero & Thin Client Installations	Server & software at data center along with thin-client or zero-client device replaces desktop CPU (VM Ware w/ Wyse thin-client system, Pano-Logic zero-client system); meeting Energy Star 6.0 specification	13	7,311	Desktop computers meeting ENERGY STAR 3.0 specifications	29	7,311	10	$60	$600	$117	$0.08	51%	3.0	1.5
Network Based PC Power Management	Desktop Computer with network controlled software installed	11	7,311	Desktop Computer with no network controlled software	29	7,311	6	$5	$0	$15	$0.07	34%	2.6	1.7
Computer Server; with <400W Units with Gold Rated Power Supply	Gold Power Supply	107	8,760	Silver Power Supply	112	8,736	5		$60	$12	$0.07	0%	4.1	4.1
Computer Server; with 400-600W Units with Gold Rated Power Supply	Gold Power Supply	178	8,760	Silver Power Supply	187	8,736	5		$80	$14	$0.07	0%	2.9	2.9
Computer Server; with 600-1000W Units with Gold Rated Power Supply	Gold Power Supply	267	8,760	Silver Power Supply	280	8,736	5		$100	$16	$0.07	0%	2.2	2.2
Computer Server; with >1000W Units with Gold Rated Power Supply	Gold Power Supply	498	8,760	Silver Power Supply	522	8,736	5		$130	$18	$0.07	0%	1.4	1.4
Computer Server; with <400W Units with Platinum Rated Power Supply	Platinum Power Supply	103	8,760	Silver Power Supply	113	8,713	5		$60	$31	$0.07	0%	5.6	5.6
Computer Server; with 400-600W Units with Platinum Rated Power Supply	Platinum Power Supply	172	8,760	Silver Power Supply	188	8,713	5		$80	$37	$0.07	0%	4.0	4.0
Computer Server; with 600-1000W Units with Platinum Rated Power Supply	Platinum Power Supply	257	8,760	Silver Power Supply	283	8,713	5		$100	$43	$0.07	0%	3.1	3.1
Computer Server; with >1000W Units with Platinum Rated Power Supply	Platinum Power Supply	481	8,760	Silver Power Supply	528	8,713	5		$130	$49	$0.07	0%	1.9	1.9
Computer Server; with <400W Units with Titanium Rated Power Supply	Titanium Power Supply	100	8,760	Silver Power Supply	114	8,695	5		$60	$58	$0.07	0%	7.5	7.5
Computer Server; with 400-600W Units with Titanium Rated Power Supply	Titanium Power Supply	166	8,760	Silver Power Supply	190	8,695	5		$80	$69	$0.07	0%	5.4	5.4
Computer Server; with 600-1000W Units with Titanium Rated Power Supply	Titanium Power Supply	250	8,760	Silver Power Supply	285	8,695	5		$100	$81	$0.07	0%	4.1	4.1
Computer Server; with >1000W Units with Titanium Rated Power Supply	Titanium Power Supply	466	8,760	Silver Power Supply	532	8,695	5		$130	$92	$0.07	0%	2.5	2.5
Cooling Efficiency														
DX Units	DX unit size 8.20 tons, 12.60 EER. 15.06 SEER	8,108	1,529	DX unit size 8.20 tons, 10.90 EER. 12.00 SEER	9,285	1,529	20	$1,133	$7,847	$2,137	$0.07	53%	17.8	8.3
RTU Economizer Control with Demand Control Ventilation	RTU with Demand Control	1,207	498	RTU with Standard Economizer	2,414	498	15	$310	$0	$1,500	$0.07	21%	37.3	29.6
Water-source Heat Pumps	WSHP unit size 1.94 tons, 13.91 EER. 15.45 SEER	1,678	921	WSHP unit size 1.94 tons, 12.00 EER. 13.33 SEER	1,944	921	20	$145	$2,010	$497	$0.07	29%	30.2	21.4
PTAC Units	PTAC unit size 0.74 tons, 11.78 EER. 13.86 SEER	752	1,013	PTAC unit size 0.74 tons, 11.14 EER. 13.11 SEER	796	1,013	20	$34	$1,232	$185	$0.07	19%	63.0	51.3
Scroll/Screw Chiller	Chiller size 109 tons, 0.71 FLV kW/ton. 0.53 IPLV	75,933	1,092	Chiller size 109 tons, 0.77 FLV kW/ton. 0.62 IPLV	81,797	1,092	20	$1,545	$41,416	$12,692	$0.07	12%	29.6	26.0
Centrifugal Chiller	Chiller size 341.04 tons, 0.58 FLV kW/ton. 0.42 IPLV	192,860	5,978	Chiller size 341.04 tons, 0.62 FLV kW/ton. 0.58 IPLV	211,153	5,978	20	$8,249	$144,784	$13,330	$0.07	62%	1.8	0.7
Air Cooled Chillers	Chiller size 124.73 tons, 10.43 EER. 16.04 IPLV	142,617	2,422	Chiller size 124.73 tons, 9.56 EER. 12.58 IPLV	156,528	2,422	20	$4,143	$66,720	$24,698	$0.07	17%	11.0	9.1
Cooling Studies	Customer has Study			No Study				$10,000	$0	$14,501	$0.07	69%		
Recommissioning Studies	Efficient equipment as identified in a recommissioning study			Existing equipment				$10,081	$0	$12,526	$0.07	80%		
Chiller VFD Retrofit	VFD Chiller size 855 tons, 0.63 FLV kW/ton, 0.38 IPLV	326,610	1,021	Const Speed Chiller size 855 tons, 0.62 FLV kW/ton, 0.57 IPLV	485,070	1,021	15	$23,769	$138,359	$61,460	$0.07	39%	5.7	3.5
Custom Cooling Projects	New Equipment	89,775	3,722	Existing or New Inefficient	112,638	3,722	18	$9,034	$7,961	$33,935	$0.07	27%	5.8	4.2
ERV Install on RTU/AHU for reduced cooling load	73.5% Sensible Effectiveness Heat Recovery on 11193 CFM OA (Cooling Mode)	9,608	338	No heat recovery on 11193 CFM OA	27,679	338	15	$11,193	$0	$3,732	$0.07	300%	9.1	-18.3
Mini-Split Heat Pump	MSHP size 1.2 tons, 21.27 SEER. 10.50 HSPF	1,088	1,265	MSHP size 1.2 tons, 14 SEER, 8.2 HSPF	1,647	1,265	18	$227	$3,440	$512	$0.07	44%	10.8	6.0
Mini-Split AC - Data Center	MSHP size 1.2 tons, 21.27 SEER	1,088	5,236	MSHP size 1.2 tons, 14 SEER	1,647	5,236	18	$108	$3,440	$512	$0.07	21%	2.6	2.1
ECM Motors - Medium Temp Display Case	ECM Motor	24	8,672	Shaded Pole Motor	72	8,672	15	$40	$0	$141	$0.07	28%	5.1	3.6
ECM Motors - Low Temp Display Case	ECM Motor	28	8,672	Shaded Pole Motor	84	8,672	15	$40	$0	$141	$0.07	28%	4.3	3.1
ECM Motors - Medium Temp Walk-in, Evap fan <= 15" Diameter	ECM Motor	44	8,585	Shaded Pole Motor	137	8,585	15	$70	$0	$269	$0.07	26%	5.1	3.7
ECM Motors - Low Temp Walk-in, Evap fan <= 15" Diameter	ECM Motor	52	8,585	Shaded Pole Motor	161	8,585	15	$70	$0	$269	$0.07	26%	4.3	3.2
ECM Motors - Medium Temp Walk-in, Evap fan > 15" Diameter	ECM Motor	68	8,585	Shaded Pole Motor	138	8,585	15	$70	$0	$269	$0.07	26%	6.6	4.9
ECM Motors - Low Temp Walk-in, Evap fan > 15" Diameter	ECM Motor	80	8,585	Shaded Pole Motor	163	8,585	15	$70	$0	$269	$0.07	26%	5.6	4.2
Anti-Sweat Heater Controls	Anti-Sweat Heater Controls	18	8,760	Anti-Sweat Heaters running constantly	179	8,760	12	$60	$0	$300	$0.07	20%	3.2	2.5
Energy Efficient Case Doors	No heat Case Doors	0	8,760	Anti-Sweat Heaters running constantly	179	8,760	10	$125	$0	$538	$0.07	23%	5.1	3.9
Advanced Digital Economizer Control (per ton) - Placeholder	0	0	0	0	0	0	0	$0	$0	$0	$0.07	#DIV/0!	#DIV/0!	#DIV/0!
Demand Control Ventilation (per ton) - Placeholder	0	0	0	0	0	0	0	$0	$0	$0	$0.07	#DIV/0!	#DIV/0!	#DIV/0!
Custom Efficiency														
Custom Efficiency Electric	High Efficiency Product/system	38,087	4,643	Less Efficient Product/Systems	57,777	4,643	19	$6,439	$49,905	$26,976	$0.07	24%	1.5	1.2
Custom Studies Electric	0	0	0	0	0	0	0	$9,808	$0	$19,069	$0.07	51%	#DIV/0!	#DIV/0!
Data Center Efficiency														
Data Center Efficiency Study	0	0	0	0	0	0	0	$16,301	$0	$21,735	$0.07	75%	#DIV/0!	#DIV/0!
Data Center Measures	Historical Averages from past custom projects	385,537	7,312	Historical Averages from past custom projects	421,973	7,312	11	$12,105	$255,991	$53,346	$0.07	23%	2.8	2.1
Retrofit - EC Plug Fans In-Unit	EC Plug Fan	2,151	8,760	Forward-curved Centrifugal Fan with AC motor	2,711	8,662	10	$1,200	$0	$2,787	$0.07	43%	9.0	5.1
Retrofit - EC Plug Fans Below-Floor	EC Plug Fan	1,867	8,760	Forward-curved Centrifugal Fan with AC motor	2,794	8,603	10	$1,200	$0	$2,787	$0.07	43%	5.4	3.1
New- EC Plug Fans In-Unit	EC Plug Fan	2,151	8,760	Forward-curved Centrifugal Fan with AC motor	2,675	8,705	20	$700	$0	$1,700	$0.07	41%	5.7	3.4
New - EC Plug Fans Below-Floor	EC Plug Fan	1,867	8,760	Forward-curved Centrifugal Fan with AC motor	2,735	8,671	20	$700	$0	$1,700	$0.07	41%	3.5	2.0
New Construction - Whole Facility	Highly efficient data center	3,944,444	8,700	Standard efficiency new data center	4,000,000	8,700	11	$29,034	$0	$96,780	$0.07	30%	3.0	2.1
Chilled Water Systems Waterside Economizer	Chilled water system with waterside economizer	32,412	8,760	Chilled water system without economizer	53,000	8,760	20	$21,200	$0	$65,571	$0.07	32%	5.0	3.4
Efficiency Controls														
Efficiency Controls - Electric	New Digital Controls System	27,741	6,901	Non Digital or Obsolete Digital System	46,236	6,901	15	$11,773	$0	$45,453	$0.06	26%	5.2	3.9
Efficiency Controls - Study Allocation	Study Allocation	0	0	0	0	0	0	$2,511	$0	$3,835	$0.06	65%	#DIV/0!	#DIV/0!
Fluid System Optimization														
Non-Custom Opportunities identified in an FSO study. i.e. recommissioning type adjustments, leaks, waste and demand reduction. study driven credit and revisits	Optimized System	141,503	7,779	Non-Optimized System	148,339	7,779	5	$0	$0	$1,163	$0.07	0%	0.3	0.3
Compressed Air Efficiency Study	Leaks & Waste Found and Repaired	142,361	7,189	Existing System with Leaks & Waste that have not been repaired	148,339	7,189	5	$4,460	$0	$9,395	$0.07	47%	3.2	1.7
Custom compressed air, pump, fan, blower, vacuum and hydraulic opportunities	New Equipment	113,561	6,257	Old or less efficient systems or equipment	148,339	6,257	20	$11,928	$0	$47,846	$0.07	25%	3.2	2.4
Cycling Dryers	New Cycling Dryer	2,359	7,188	New Non-Cycling Dryer	3,435	7,188	20	$745	$7,374	$1,332	$0.07	56%	2.5	1.1
Dewpoint Controls	Purge Control for Heatless Dessicant Dryers	72,549	7,123	No Purge Control for Heatless Dessicant Dryers	83,087	7,123	15	$1,000	$0	$3,474	$0.07	29%	0.7	0.5
Mist Eliminators	New Mist Eliminator Filter	81,776	7,321	New General Purpose Filter	83,126	7,321	20	$2,100	$1,351	$4,479	$0.07	47%	6.1	3.3
No Air Loss Drain	New No-Air Loss Drains	0	6,996	New Electronic Solenoid/Timed Drains	517	6,996	13	$200	$125	$448	$0.07	45%	1.8	1.0
VFD Air Compressor New	New VFD Compressor	14,011	2,999	New Modulation or load no-load with less than or equal to 2gal of storage per CFM of Capacity	20,064	2,999	20	$2,622	$10,768	$5,334	$0.07	49%	4.3	2.2
VFD Air Compressor Upgrade	New VFD Compressor	14,181	3,039	Existing Modulation or load no-load with less than or equal to 2gal of storage per CFM of Capacity	20,666	3,039	20	$5,655	$0	$18,009	$0.07	31%	13.5	9.3
VFD Compressor HP Reduction	New VFD Compressor of lesser HP than Baseline Unit	22,490	3,528	Existing Modulation or load no-load with less than or equal to 2gal of storage per CFM of Capacity	36,691	3,528	20	$6,500	$0	$21,666	$0.07	30%	6.4	4.5
Demand-side compressed air, pump, fan, blower, vacuum and hydraulic studies.	Study Completed	148,277	0	No Study Completed	148,339	0	5	$9,089	$0	$9,089	$0.07	100%	#DIV/0!	#DIV/0!
Constant Speed Motor Controller	Motor with Voltage Controller	4,849	4,849	Motor without Voltage Controller	5,717	4,878	20	$345	$0	$1,188	$0.08	29%	3.6	2.6

Electric Measure Description	Annual Customer kWh Savings (kWh/yr)	Rebated Cost / Cust kWh Saved ($/kWh)	Rebated Lifetime cost /Cust KWh Saved ($/kWh)	Customer kW Savings (kW)	Generator Peak kW Savings (kW)	Non-Energy O&M Savings ($)	Energy O&M Savings ($)	Coincidence Factor (%)	2017 Participants (-)	2017 Units (-)	2018 Participants (-)	2018 Units (-)	2019 Participants (-)	2019 Units (-)	NTG (%)	Installation Rate (%)	Realization Rate (%)
Business																	
Business New Construction																	
Average EDA Project - 2017	541,318	$0.108	$0.005	110.7	85.7	$0.00	$0.00	72%	57	57	0	0	0	0	100%	100%	100%
Average EDA Project - 2018	366,338	$0.114	$0.006	80.4	62.3	$0.00	$0.00	72%	0	0	53	53	0	0	100%	100%	100%
Average EDA Project - 2019	266,254	$0.123	$0.006	65.2	50.5	$0.00	$0.00	72%	0	0	0	0	70	70	100%	100%	100%
Average EEB Project - 2017	61,881	$0.141	$0.007	18.5	15.4	-$89.73	$0.00	77%	60	60	0	0	0	0	100%	100%	100%
Average EEB Project - 2018	56,286	$0.144	$0.007	17.3	14.4	-$81.62	$0.00	77%	0	0	37	37	0	0	100%	100%	100%
Average EEB Project - 2019	54,724	$0.152	$0.008	18.1	15.1	-$79.35	$0.00	77%	0	0	0	0	52	52	100%	100%	100%
Commercial Efficiency																	
Average project results from 2015 history	151,147	$0.090	$0.005	25.6	22.0	$476.82	$0.00	80%	153	153	166	166	172	172	100%	100%	100%
Study Cost Allocations	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	4	4	4	4	4	4	100%	100%	100%
Phase 2 Customer Contribution	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	4	4	4	4	4	4	100%	100%	100%
Behavioral Changes	545,921	$0.000	$0.000	62.3	67.0	$0.00	$0.00	100%	1	1	1	1	1	1	100%	100%	100%
Behavioral Changes	-363,947	$0.000	$0.000	-41.5	-44.7	$0.00	$0.00	100%	1	1	1	1	1	1	100%	100%	100%
Computer Efficiency																	
Upstream Power Supply - Bronze	51	$0.000	$0.000	0.0	0.0	$0.00	-$0.20	100%	260	26,000	260	26,000	260	26,000	100%	100%	100%
Upstream Power Supply - Silver	57	$0.000	$0.000	0.0	0.0	$0.00	-$0.23	100%	100	1,000	100	1,000	100	1,000	100%	100%	100%
Upstream Power Supply - Gold	61	$0.000	$0.000	0.0	0.0	$0.00	-$0.24	100%	100	1,000	100	1,000	100	1,000	100%	100%	100%
Upstream Power Supply - Platinum	64	$0.000	$0.000	0.0	0.0	$0.00	-$0.26	100%	200	2,000	200	2,000	200	2,000	100%	100%	100%
Zero & Thin Client Installations	117	$0.514	$0.051	0.0	0.0	$30.50	-$0.46	100%	13	3,500	13	3,500	13	3,500	100%	100%	100%
Network Based PC Power Management	132	$0.038	$0.006	0.0	0.0	-$2.74	-$0.53	0%	8	400	8	800	8	800	100%	100%	100%
Computer Server; with <400W Units with Gold Rated Power Supply	43	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with 400-600W Units with Gold Rated Power Supply	71	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with 600-1000W Units with Gold Rated Power Supply	107	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with >1000W Units with Gold Rated Power Supply	200	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with <400W Units with Platinum Rated Power Supply	83	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with 400-600W Units with Platinum Rated Power Supply	138	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with 600-1000W Units with Platinum Rated Power Supply	207	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with >1000W Units with Platinum Rated Power Supply	387	$0.000	$0.000	0.0	0.1	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with <400W Units with Titanium Rated Power Supply	116	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with 400-600W Units with Titanium Rated Power Supply	194	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with 600-1000W Units with Titanium Rated Power Supply	290	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	60	600	60	600	60	600	100%	100%	100%
Computer Server; with >1000W Units with Titanium Rated Power Supply	542	$0.000	$0.000	0.1	0.1	$0.00	$0.00	100%	50	500	50	500	50	500	100%	100%	100%
Cooling Efficiency																	
DX Units	1,798	$0.630	$0.032	1.2	1.1	$0.00	$0.00	90%	902	1,084	963	1,152	1,000	1,177	100%	100%	100%
RTU Economizer Control with Demand Control Ventilation	601	$0.517	$0.034	1.2	1.2	$0.00	$0.00	90%	69	120	72	125	75	130	100%	100%	100%
Water-source Heat Pumps	246	$0.588	$0.029	0.3	0.3	$0.00	$0.00	90%	140	150	145	155	150	160	100%	100%	100%
PTAC Units	44	$0.780	$0.039	0.0	0.0	$0.00	$0.00	90%	100	120	110	130	120	140	100%	100%	100%
Scroll/Screw Chiller	6,405	$0.241	$0.012	5.9	5.7	$0.00	$0.00	90%	2	2	2	2	2	2	100%	100%	100%
Centrifugal Chiller	109,357	$0.075	$0.004	18.3	17.7	$0.00	$0.00	90%	5	5	5	6	5	7	100%	100%	100%
Air Cooled Chillers	33,692	$0.123	$0.006	13.9	13.5	$0.00	$0.00	90%	17	20	18	21	19	22	100%	100%	100%
Cooling Studies	0			0.0	0.0	$0.00	$0.00	100%	9	9	9	9	9	9	100%	100%	100%
Recommissioning Studies	0			0.0	0.0	$0.00	$0.00	200%	1	1	1	1	1	1	100%	100%	100%
Chiller VFD Retrofit	161,810	$0.147	$0.010	158.5	-13.5	$0.00	$0.00	-8%	1	1	1	1	1	1	100%	100%	100%
Custom Cooling Projects	85,090	$0.106	$0.006	22.9	9.8	$202.06	$0.00	40%	13	16	15	15	13	15	100%	100%	100%
ERV Install on RTU/AHU for reduced cooling load	6,103	$1.834	$0.122	18.1	17.5	$0.00	$0.00	90%	3	3	3	3	3	3	100%	100%	100%
Mini-Split Heat Pump	707	$0.321	$0.018	0.6	0.5	$0.00	$0.00	90%	0	199	0	209	0	216	100%	100%	100%
Mini-Split AC - Data Center	2,926	$0.037	$0.002	0.6	0.6	$0.00	$0.00	100%	0	0	0	0	0	0	100%	100%	100%
ECM Motors - Medium Temp Display Case	414	$0.097	$0.006	0.0	0.1	$0.00	$0.00	99%	18	25	19	27	20	29	100%	100%	100%
ECM Motors - Low Temp Display Case	489	$0.082	$0.005	0.1	0.1	$0.00	$0.00	99%	7	10	7	11	7	12	100%	100%	100%
ECM Motors - Medium Temp Walk-in, Evap fan <= 15" Diameter	793	$0.088	$0.006	0.1	0.1	$0.00	$0.00	98%	47	62	49	68	51	74	100%	100%	100%
ECM Motors - Low Temp Walk-in, Evap fan <= 15" Diameter	936	$0.075	$0.005	0.1	0.1	$0.00	$0.00	98%	20	26	21	30	22	34	100%	100%	100%
ECM Motors - Medium Temp Walk-in, Evap fan > 15" Diameter	605	$0.116	$0.008	0.1	0.1	$0.00	$0.00	98%	14	20	15	22	16	24	100%	100%	100%
ECM Motors - Low Temp Walk-in, Evap fan > 15" Diameter	714	$0.098	$0.007	0.1	0.1	$0.00	$0.00	98%	14	20	15	22	16	24	100%	100%	100%
Anti-Sweat Heater Controls	1,414	$0.042	$0.004	0.2	0.2	$0.00	$0.00	90%	112	157	116	165	120	173	100%	100%	100%
Energy Efficient Case Doors	1,571	$0.080	$0.008	0.2	0.2	$0.00	$0.00	100%	144	157	150	165	156	173	100%	100%	100%
Advanced Digital Economizer Control (per ton) - Placeholder	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	0	0	0	0	0	0	100%	100%	100%
Demand Control Ventilation (per ton) - Placeholder	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	0	0	0	0	0	0	100%	100%	100%
Custom Efficiency																	
Custom Efficiency Electric	91,420	$0.070	$0.004	19.7	15.7	$10,688.27	$0.00	74%	50	50	50	50	50	50	100%	100%	100%
Custom Studies Electric	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	2	2	2	2	2	2	100%	100%	100%
Data Center Efficiency																	
Data Center Efficiency Study	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	0%	10	10	10	10	10	10	100%	100%	100%
Data Center Measures	266,416	$0.045	$0.004	36.4	26.9	$1,392.65	$0.00	69%	22	22	18	18	20	20	100%	100%	100%
Retrofit - EC Plug Fans In-Unit	4,634	$0.259	$0.026	0.6	0.6	$0.00	$0.00	100%	5	10	5	10	5	10	100%	100%	100%
Retrofit - EC Plug Fans Below-Floor	7,681	$0.156	$0.016	0.9	1.0	$0.00	$0.00	100%	5	10	5	10	5	10	100%	100%	100%
New- EC Plug Fans In-Unit	4,439	$0.158	$0.008	0.5	0.6	$0.00	$0.00	100%	15	60	14	56	12	48	100%	100%	100%
New - EC Plug Fans Below-Floor	7,357	$0.095	$0.005	0.9	0.9	$0.00	$0.00	100%	10	40	9	36	9	36	100%	100%	100%
New Construction - Whole Facility	483,333	$0.060	$0.005	55.6	56.8	$0.00	$0.00	95%	3	3	6	6	6	6	100%	100%	100%
Chilled Water Systems Waterside Economizer	180,351	$0.118	$0.006	20.6	0.0	$0.00	$0.00	0%	0	0	0	0	0	0	100%	100%	100%
Efficiency Controls																	
Efficiency Controls - Electric	127,631	$0.092	$0.006	18.5	4.2	$1,117.07	$0.00	21%	55	55	63	63	67	67	100%	100%	100%
Efficiency Controls - Study Allocation	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	3	3	3	3	3	3	100%	100%	100%
Fluid System Optimization																	
Non-Custom Opportunities identified in an FSO study. i.e. recommissioning type adjustments, leaks, waste and demand reduction. study driven credit and revisits	53,182	$0.000	$0.000	6.8	5.2	$0.00	$0.00	71%	9	9	9	9	9	9	100%	100%	100%
Compressed Air Efficiency Study	42,972	$0.104	$0.021	6.0	6.4	$0.00	$0.00	100%	40	40	40	40	40	40	100%	100%	100%
Custom compressed air, pump, fan, blower, vacuum and hydraulic opportunities	217,607	$0.055	$0.003	34.8	25.3	$0.00	$0.00	68%	35	35	35	35	35	35	100%	100%	100%
Cycling Dryers	7,735	$0.096	$0.005	1.1	1.2	$0.00	$0.00	100%	59	62	62	65	67	70	100%	100%	100%
Dewpoint Controls	75,065	$0.013	$0.001	10.5	11.3	$0.00	$0.00	100%	4	4	6	6	8	8	100%	100%	100%
Mist Eliminators	9,890	$0.212	$0.011	1.4	1.5	$61.92	$0.00	100%	30	30	35	35	40	40	100%	100%	100%
No Air Loss Drain	3,616	$0.055	$0.004	0.5	0.4	$0.00	$0.00	68%	52	55	57	60	60	63	100%	100%	100%
VFD Air Compressor New	18,155	$0.144	$0.007	6.1	5.8	$0.00	$0.00	89%	36	37	41	42	41	42	100%	100%	100%
VFD Air Compressor Upgrade	19,709	$0.287	$0.014	6.5	6.2	$0.00	$0.00	89%	18	20	22	22	23	25	100%	100%	100%
VFD Compressor HP Reduction	50,102	$0.130	$0.006	14.2	13.6	$0.00	$0.00	89%	2	2	4	4	6	6	100%	100%	100%
Demand-side compressed air, pump, fan, blower, vacuum and hydraulic studies.	0	#DIV/0!	#DIV/0!	0.1	0.1	$0.00	$0.00	88%	12	12	12	12	12	12	100%	100%	100%
Constant Speed Motor Controller	4,376	$0.079	$0.004	0.9	0.7	$0.00	$0.00	78%	1	1	1	1	1	1	100%	100%	100%

Electric Measure Description	2017 NET Gen kW (kW)	2017 NET Gen kWh (kWh)	2017 Rebate Budget ($)	2017 Incremental Costs ($)	2018 NET Gen kW (kW)	2018 NET Gen kWh (kWh)	2018 Rebate Budget ($)	2018 Incremental Costs ($)	2019 NET Gen kW (kW)	2019 NET Gen kWh (kWh)	2019 Rebate Budget ($)	2019 Incremental Costs ($)
Business												
Business New Construction												
Average EDA Project - 2017	4,883	33,035,462	3,347,136	12,245,626	0	0	0	0	0	0	0	0
Average EDA Project - 2018	0	0	0	0	3,300	20,787,944	2,210,622	7,705,701	0	0	0	0
Average EDA Project - 2019	0	0	0	0	0	0	0	0	3,532	19,954,818	2,289,635	7,396,876
Average EEB Project - 2017	927	3,975,226	524,592	1,414,411	0	0	0	0	0	0	0	0
Average EEB Project - 2018	0	0	0	0	534	2,229,746	300,243	795,669	0	0	0	0
Average EEB Project - 2019	0	0	0	0	0	0	0	0	784	3,046,713	433,310	1,092,415
Commercial Efficiency												
Average project results from 2015 history	3,363	24,759,640	2,079,298	8,703,554	3,648	26,863,400	2,255,970	9,443,072	3,780	27,834,366	2,337,511	9,784,388
Study Cost Allocations	0	0	555,000	555,000	0	0	555,000	555,000	0	0	555,000	555,000
Phase 2 Customer Contribution	0	0	0	30,000	0	0	0	30,000	0	0	0	30,000
Behavioral Changes	67	584,498	0	0	67	584,498	0	0	67	584,498	0	0
Behavioral Changes	-45	-389,665	0	0	-45	-389,665	0	0	-45	-389,665	0	0
Computer Efficiency												
Upstream Power Supply - Bronze	196	1,428,514	0	234,000	196	1,428,514	0	234,000	196	1,428,514	0	234,000
Upstream Power Supply - Silver	8	60,929	0	14,000	8	60,929	0	14,000	8	60,929	0	14,000
Upstream Power Supply - Gold	9	64,919	0	16,000	9	64,919	0	16,000	9	64,919	0	16,000
Upstream Power Supply - Platinum	19	137,819	0	44,000	19	137,819	0	44,000	19	137,819	0	44,000
Zero & Thin Client Installations	60	437,186	210,000	408,833	60	437,186	210,000	408,833	60	437,186	210,000	408,833
Network Based PC Power Management	0	56,712	2,000	5,856	0	113,423	4,000	11,712	0	113,423	4,000	11,712
Computer Server; with <400W Units with Gold Rated Power Supply	3	27,534	0	6,975	3	27,534	0	6,975	3	27,534	0	6,975
Computer Server; with 400-600W Units with Gold Rated Power Supply	6	45,890	0	8,325	6	45,890	0	8,325	6	45,890	0	8,325
Computer Server; with 600-1000W Units with Gold Rated Power Supply	8	68,835	0	9,675	8	68,835	0	9,675	8	68,835	0	9,675
Computer Server; with >1000W Units with Gold Rated Power Supply	16	128,491	0	11,025	16	128,491	0	11,025	16	128,491	0	11,025
Computer Server; with <400W Units with Platinum Rated Power Supply	6	53,243	0	18,600	6	53,243	0	18,600	6	53,243	0	18,600
Computer Server; with 400-600W Units with Platinum Rated Power Supply	11	88,738	0	22,200	11	88,738	0	22,200	11	88,738	0	22,200
Computer Server; with 600-1000W Units with Platinum Rated Power Supply	16	133,108	0	25,800	16	133,108	0	25,800	16	133,108	0	25,800
Computer Server; with >1000W Units with Platinum Rated Power Supply	30	248,467	0	29,400	30	248,467	0	29,400	30	248,467	0	29,400
Computer Server; with <400W Units with Titanium Rated Power Supply	9	74,590	0	34,875	9	74,590	0	34,875	9	74,590	0	34,875
Computer Server; with 400-600W Units with Titanium Rated Power Supply	15	124,316	0	41,625	15	124,316	0	41,625	15	124,316	0	41,625
Computer Server; with 600-1000W Units with Titanium Rated Power Supply	23	186,475	0	48,375	23	186,475	0	48,375	23	186,475	0	48,375
Computer Server; with >1000W Units with Titanium Rated Power Supply	35	290,072	0	45,938	35	290,072	0	45,938	35	290,072	0	45,938
Cooling Efficiency												
DX Units	1,234	2,086,819	1,228,352	2,316,576	1,311	2,217,726	1,305,407	2,461,896	1,340	2,265,854	1,333,736	2,515,323
RTU Economizer Control with Demand Control Ventilation	140	77,154	37,249	180,000	146	80,369	38,801	187,500	152	83,584	40,353	195,000
Water-source Heat Pumps	39	39,449	21,677	74,530	40	40,764	22,399	77,015	41	42,079	23,122	79,499
PTAC Units	5	5,629	4,100	22,160	5	6,098	4,442	24,007	6	6,568	4,784	25,853
Scroll/Screw Chiller	11	13,715	3,089	25,383	11	13,715	3,089	25,383	11	13,715	3,089	25,383
Centrifugal Chiller	89	585,423	41,245	66,652	106	702,508	49,494	79,983	124	819,592	57,743	93,313
Air Cooled Chillers	269	721,461	82,850	493,960	283	757,534	86,993	518,658	296	793,608	91,135	543,356
Cooling Studies	0	0	90,000	130,512	0	0	90,000	130,512	0	0	90,000	130,512
Recommissioning Studies	0	0	10,081	12,526	0	0	10,081	12,526	0	0	10,081	12,526
Chiller VFD Retrofit	-13	173,244	23,769	61,460	-13	173,244	23,769	61,460	-13	173,244	23,769	61,460
Custom Cooling Projects	157	1,457,637	144,547	542,967	147	1,366,535	135,513	509,032	147	1,366,535	135,513	509,032
ERV Install on RTU/AHU for reduced cooling load	52	19,602	33,579	11,197	52	19,602	33,579	11,197	52	19,602	33,579	11,197
Mini-Split Heat Pump	108	150,913	45,310	102,134	113	158,459	47,576	107,241	117	163,212	49,003	110,458
Mini-Split AC - Data Center	0	0	0	0	0	0	0	0	0	0	0	0
ECM Motors - Medium Temp Display Case	1	11,087	1,000	3,518	1	11,974	1,080	3,799	1	12,861	1,160	4,081
ECM Motors - Low Temp Display Case	1	5,231	400	1,407	1	5,755	440	1,548	1	6,278	480	1,689
ECM Motors - Medium Temp Walk-in, Evap fan <= 15" Diameter	6	52,648	4,340	16,679	7	57,743	4,760	18,293	7	62,838	5,180	19,907
ECM Motors - Low Temp Walk-in, Evap fan <= 15" Diameter	3	26,044	1,820	6,994	3	30,051	2,100	8,070	4	34,058	2,380	9,146
ECM Motors - Medium Temp Walk-in, Evap fan > 15" Diameter	1	12,962	1,400	5,380	2	14,258	1,540	5,918	2	15,555	1,680	6,456
ECM Motors - Low Temp Walk-in, Evap fan > 15" Diameter	2	15,291	1,400	5,380	2	16,820	1,540	5,918	2	18,349	1,680	6,456
Anti-Sweat Heater Controls	25	237,725	9,420	47,100	26	249,838	9,900	49,500	27	261,952	10,380	51,900
Energy Efficient Case Doors	30	264,139	19,625	84,388	32	277,598	20,625	88,688	33	291,057	21,625	92,988
Advanced Digital Economizer Control (per ton) - Placeholder	0	0	0	0	0	0	0	0	0	0	0	0
Demand Control Ventilation (per ton) - Placeholder	0	0	0	0	0	0	0	0	0	0	0	0
Custom Efficiency												
Custom Efficiency Electric	783	4,894,015	321,956	1,348,797	783	4,894,015	321,956	1,348,797	783	4,894,015	321,956	1,348,797
Custom Studies Electric	0	0	19,615	38,139	0	0	19,615	38,139	0	0	19,615	38,139
Data Center Efficiency												
Data Center Efficiency Study	0	0	163,014	217,352	0	0	163,014	217,352	0	0	163,014	217,352
Data Center Measures	591	6,275,312	266,316	1,173,606	484	5,134,346	217,895	960,223	538	5,704,829	242,105	1,066,915
Retrofit - EC Plug Fans In-Unit	6	49,617	12,000	27,867	6	49,617	12,000	27,867	6	49,617	12,000	27,867
Retrofit - EC Plug Fans Below-Floor	10	82,239	12,000	27,867	10	82,239	12,000	27,867	10	82,239	12,000	27,867
New- EC Plug Fans In-Unit	34	285,190	42,000	102,000	32	266,177	39,200	95,200	27	228,152	33,600	81,600
New - EC Plug Fans Below-Floor	37	315,093	28,000	68,000	34	283,584	25,200	61,200	34	283,584	25,200	61,200
New Construction - Whole Facility	170	1,552,463	87,102	290,341	341	3,104,925	174,205	580,682	341	3,104,925	174,205	580,682
Chilled Water Systems Waterside Economizer	0	0	0	0	0	0	0	0	0	0	0	0
Efficiency Controls												
Efficiency Controls - Electric	230	7,515,754	647,490	2,499,920	264	8,608,955	741,670	2,863,544	280	9,155,555	788,760	3,045,357
Efficiency Controls - Study Allocation	0	0	7,534	11,506	0	0	7,534	11,506	0	0	7,534	11,506
Fluid System Optimization												
Non-Custom Opportunities identified in an FSO study. i.e. recommissioning type adjustments, leaks, waste and demand reduction. study driven credit and revisits	49	540,703	0	11,045	49	540,703	0	11,045	49	540,703	0	11,045
Compressed Air Efficiency Study	257	1,840,349	178,400	375,798	257	1,840,349	178,400	375,798	257	1,840,349	178,400	375,798
Custom compressed air, pump, fan, blower, vacuum and hydraulic opportunities	886	8,154,440	417,466	1,674,601	886	8,154,440	417,466	1,674,601	886	8,154,440	417,466	1,674,601
Cycling Dryers	72	513,488	46,170	82,595	75	538,334	48,404	86,592	81	579,744	52,127	93,252
Dewpoint Controls	45	321,479	4,000	13,894	68	482,218	6,000	20,842	91	642,957	8,000	27,789
Mist Eliminators	44	317,657	63,000	134,356	51	370,600	73,500	156,749	58	423,543	84,000	179,141
No Air Loss Drain	21	212,943	11,000	24,640	23	232,302	12,000	26,880	24	243,917	12,600	28,224
VFD Air Compressor New	214	719,187	97,000	197,340	243	816,375	110,108	224,007	243	816,375	110,108	224,007
VFD Air Compressor Upgrade	124	422,031	113,100	360,183	136	464,234	124,410	396,202	155	527,539	141,375	450,229
VFD Compressor HP Reduction	27	107,284	13,000	43,332	54	214,568	26,000	86,663	81	321,851	39,000	129,995
Demand-side compressed air, pump, fan, blower, vacuum and hydraulic studies.	1	0	109,557	109,557	1	0	109,557	109,557	1	0	109,557	109,557
Constant Speed Motor Controller	1	4,685	345	1,188	1	4,685	345	1,188	1	4,685	345	1,188

Electric Measure Description	Efficient Product Description / Rating	Efficient Product Consumption (watts)	Efficient Hours of Operation (hrs/yr)	Baseline Product Description / Rating	Baseline Product Consumption (watts)	Baseline Hours of Operation (hrs/yr)	Measure Lifetime (years)	Rebate Amount ($)	Average Baseline Product Cost ($)	Incremental Cost of Efficient Product ($)	Assumed Energy Cost ($/kWh)	Rebate as a % of Incremental Cost (%)	Incremt'l Cost Payback Period w/o Rebate (yrs)	Incremt'l Cost Payback Period w/ Rebate (yrs)	Annual Customer kWh Savings (kWh/yr)	Rebated Cost / Cust kWh Saved ($/kWh)	Rebated Lifetime cost /Cust KWh Saved ($/kWh)	Customer kW Savings (kW)	Generator Peak kW Savings (kW)	Non-Energy O&M Savings ($)	Energy O&M Savings ($)	Coincidence Factor (%)	2017 Participants (-)	2017 Units (-)	2018 Participants (-)	2018 Units (-)	2019 Participants (-)	2019 Units (-)	NTG (%)	Installation Rate (%)	Realization Rate (%)	2017 NET Gen kW (kW)	2017 NET Gen kWh (kWh)	2017 Rebate Budget ($)	2017 Incremental Costs ($)	2018 NET Gen kW (kW)	2018 NET Gen kWh (kWh)	2018 Rebate Budget ($)	2018 Incremental Costs ($)	2019 NET Gen kW (kW)	2019 NET Gen kWh (kWh)	2019 Rebate Budget ($)	2019 Incremental Costs ($)
New Motor Enhanced	NEMA Premium +1% Efficient Motor	3,074	6,135	NEMA Premium	3,126	6,135	20	$40	$797	$181	$0.08	22%	7.5	5.9	319	$0.125	$0.006	0.1	0.0	$0.00	$0.00	78%	1	1	1	1	1	1	100%	100%	100%	0	342	40	181	0	342	40	181	0	342	40	181
Upgrade Motor	NEMA Premium Efficient Motor	15,650	4,806	EPACT Efficient Motor	15,950	4,806	20	$926	$0	$2,362	$0.08	39%	21.8	13.2	1,440	$0.643	$0.032	0.3	0.3	$0.00	$0.00	78%	1	1	1	1	1	1	100%	100%	100%	0	1,541	926	2,362	0	1,541	926	2,362	0	1,541	926	2,362
Upgrade Motor Enhanced	NEMA Premium +1% Efficient Motor	5,447	5,243	EPACT Efficient Motor	5,663	5,243	20	$498	$0	$1,407	$0.08	35%	16.4	10.6	1,136	$0.438	$0.022	0.2	0.2	$0.00	$0.00	78%	1	1	1	1	1	1	100%	100%	100%	0	1,217	498	1,407	0	1,217	498	1,407	0	1,217	498	1,407
Variable Frequency Drive	Equipment coupled with an ASD/VFD	7,699	4,643	Equipment without an ASD/VFD	11,443	4,643	15	$1,531	$0	$5,393	$0.08	28%	4.1	2.9	17,385	$0.088	$0.006	3.7	3.1	$0.00	$0.00	78%	1	1	1	1	1	1	100%	100%	100%	3	18,613	1,531	5,393	3	18,613	1,531	5,393	3	18,613	1,531	5,393
Food Service																																											
Commercial Dishwasher - Under Counter, Electric Only or Combo Customer	ENERGY STAR qualified unit	1,190	6,570	Conventional unit as defined by ENERGY STAR	1,592	6,570	10	$195	$4,925	$82	$0.07	238%	0.4	-0.5	2,644	$0.074	$0.007	0.4	0.4	$35.00	$0.00	86%	8	8	13	13	14	14	100%	100%	100%	3	22,649	1,558	654	5	36,805	2,532	1,062	5	39,636	2,727	1,144
Commercial Dishwasher - Door Type, Electric Only or Combo Customer	ENERGY STAR qualified unit	3,552	6,570	Conventional unit as defined by ENERGY STAR	5,463	6,570	15	$208	$6,729	$360	$0.07	58%	0.3	0.1	12,555	$0.017	$0.001	1.9	1.8	$234.98	$0.00	86%	7	7	8	8	9	9	100%	100%	100%	12	94,095	1,454	2,518	14	107,537	1,662	2,877	16	120,979	1,870	3,237
Hot Food Holding Cabinet	ENERGY STAR qualified unit	261	5,475	Conventional unit as defined by ENERGY STAR	640	5,475	12	$400	$2,069	$1,713	$0.07	23%	12.3	9.5	2,073	$0.193	$0.016	0.4	0.3	$0.00	$0.00	86%	28	28	38	38	41	41	100%	100%	100%	10	62,136	11,200	47,964	13	84,327	15,200	65,094	14	90,985	16,400	70,233
Demand Contolled Ventilation - Electric Only or Combo Customer	Commercial kitchen ventilation hoods with Demand Controlled Ventilation with 8.65 HP Motor	11,766	3,307	Commercial kitchen ventilation hoods without Demand Controlled Ventilation with 8.65 HP Motor	19,597	3,307	20	$865	$0	$16,019	$0.07	5%	3.9	3.7	25,896	$0.033	$0.002	7.8	4.2	$0.00	$2,380.02	49%	8	8	8	8	9	9	100%	100%	100%	33	221,807	6,920	128,150	33	221,807	6,920	128,150	37	249,533	7,785	144,169
Heating Efficiency																																											
EC Fan Motor on New Commercial Furnace	ECM Furnace Fan	405	4,321	Non-ECM Fan	813	4,321	18	$100	$236	$212	$0.11	47%	1.2	0.6	1,763	$0.057	$0.003	0.4	0.3	$0.00	-$9.82	57%	45	60	45	60	45	60	100%	100%	100%	15	115,475	6,000	12,720	15	115,475	6,000	12,720	15	115,475	6,000	12,720
EC Fan Motor on Existing Commercial Furnace	ECM Furnace Fan	541	4,519	Non-ECM Fan	857	4,519	7	$100	$0	$212	$0.11	47%	1.4	0.7	1,426	$0.070	$0.010	0.3	0.2	$0.00	-$3.02	70%	10	10	10	10	10	10	100%	100%	100%	2	15,567	1,000	2,120	2	15,567	1,000	2,120	2	15,567	1,000	2,120
Infrared	Infrared heater	0	1,848	Non-condensing standard forced-air unit heater	1,140	1,848	15	$71	$1,179	$167	$0.11	43%	0.7	0.4	2,108	$0.034	$0.002	1.1	1.3	$0.00	$0.00	100%	9	11	9	11	9	11	100%	100%	100%	14	25,309	780	1,835	14	25,309	780	1,835	14	25,309	780	1,835
Lighting Efficiency																																											
Fluorescent Low Wattage T8 Lamps (Replacing Higher Wattage Incandescent)	Fluorescent Low Wattage T8 Lamps (Replacing Higher Wattage Incandescent)	31	5,336	Fluorescent T8 Lamps	37	5,336	5	$1	$0	$4	$0.07	13%	1.7	1.5	34	$0.015	$0.003	0.0	0.0	$0.00	-$0.19	73%	196	27,500	186	26,000	121	17,000	100%	100%	100%	139	1,008,223	13,750	110,000	131	953,229	13,000	104,000	86	623,265	8,500	68,000
Fluorescent T8 to T8 Lighting Optimization	Fluorescent T8 to T8 Lighting Optimization	63	5,336	Fluorescent T8 Fixture with More Lamps (4.3.2)	113	5,336	20	$12	$0	$43	$0.07	28%	2.4	1.7	269	$0.045	$0.002	0.1	0.0	$0.00	-$1.47	73%	11	1,500	11	1,500	11	1,500	100%	100%	100%	59	432,293	18,000	64,800	59	432,293	18,000	64,800	59	432,293	18,000	64,800
HID High Bay Fixtures with High Efficiency Electronic Ballasts (Replacing HID)	HID High Bay Fixtures with High Efficiency Electronic Ballasts (Replacing HID)	361	5,336	HID Fixtures	586	5,336	20	$60	$0	$271	$0.07	22%	3.4	2.7	1,203	$0.050	$0.002	0.2	0.2	$0.00	-$8.13	73%	21	2,762	19	2,460	14	1,843	100%	100%	100%	489	3,557,127	149,660	661,977	440	3,201,624	134,125	593,656	331	2,412,282	100,890	446,216
Fluorescent Parking Garage Fixtures with High Efficiency Electronic Ballasts (Replacing HID)	Fluorescent Parking Garage Fixtures with High Efficiency Electronic Ballasts (Replacing HID)	109	8,760	HID Fixtures	192	8,760	20	$50	$0	$169	$0.07	30%	3.2	2.3	722	$0.069	$0.003	0.1	0.1	$0.00	$0.00	100%	1	50	1	50	1	50	100%	100%	100%	4	38,655	2,500	8,437	4	38,655	2,500	8,437	4	38,655	2,500	8,437
Fluorescent Parking Garage Low Wattage T8 Lamps (Replacing Higher Wattage Incandescent)	Fluorescent Parking Garage Low Wattage T8 Lamps (Replacing Higher Wattage Incandescent)	25	8,760	Fluorescent T8 Lamps	30	8,760	4	$1	$0	$4	$0.07	13%	1.2	1.1	45	$0.011	$0.003	0.0	0.0	$0.00	$0.00	100%	10	1,287	9	1,199	6	801	100%	100%	100%	7	62,185	644	5,148	7	57,933	600	4,796	4	38,702	401	3,204
Compact Fluorescent Fixtures - Pin Based (Replacing Incandescent)	Compact Fluorescent Fixtures - Pin Based (Replacing Incandescent)	40	5,336	Incandescent	104	5,336	20	$4	$0	$11	$0.07	32%	0.5	0.3	341	$0.010	$0.001	0.1	0.1	$0.00	-$1.62	73%	14	1,560	12	1,410	12	1,252	100%	100%	100%	78	570,089	5,463	16,900	71	514,421	4,913	15,204	63	455,941	4,339	13,435
Sensors	Sensors	134	5,336		191	5,336	8	$32	$0	$114	$0.07	28%	5.9	4.2	306	$0.104	$0.013	0.1	0.0	$0.00	-$3.02	73%	39	4,901	35	4,400	29	3,650	100%	100%	100%	221	1,605,699	137,780	539,375	206	1,498,566	126,500	494,250	184	1,338,186	107,750	418,000
LED or Fluorescent Stairwell Fixture with Integral Occupancy Sensor (Replacing Fluorescent)	LED or Fluorescent Stairwell Fixture with Integral Occupancy Sensor (Replacing Fluorescent)	7	5,336	Stairwell Lighting Fixture	70	5,336	14	$75	$0	$306	$0.07	25%	13.3	10.1	339	$0.221	$0.015	0.1	0.0	$0.00	-$1.86	73%	1	10	1	10	1	10	100%	100%	100%	0	3,635	750	3,060	0	3,635	750	3,060	0	3,635	750	3,060
LED/LEC Exit Sign (Replacing Incandescent)	LED/LEC Exit Sign (Replacing Incandescent)	1	7,602	Incandescent Fixtures	44	7,602	20	$25	$0	$82	$0.07	30%	3.8	2.6	321	$0.078	$0.004	0.0	0.0	$0.00	-$1.76	100%	9	1,250	8	1,000	6	750	100%	100%	100%	57	429,341	31,250	102,504	45	343,473	25,000	82,003	34	257,605	18,750	61,502
LED Downlight Fixtures (Replacing Incandescent)	LED Downlight Fixtures (Replacing Incandescent)	28	5,336	Incandescent Fixtures	62	5,336	20	$39	$0	$152	$0.07	26%	12.6	9.3	178	$0.222	$0.011	0.0	0.0	$0.00	-$0.98	73%	26	3,500	26	3,500	26	3,500	100%	100%	100%	92	667,780	137,500	527,796	92	667,780	137,500	527,796	92	667,780	137,500	527,796
LED Refrigerated Case Lighting (Replacing Fluorescent)	LED Refrigerated Case Lighting (Replacing Fluorescent)	51	8,760	Fluorescent T8 or T12 Lamps	139	8,760	20	$45	$0	$164	$0.07	27%	2.9	2.1	771	$0.058	$0.003	0.1	0.1	$0.00	$0.00	100%	6	750	6	750	5	700	100%	100%	100%	71	619,418	33,750	122,813	71	619,418	33,750	122,813	66	578,123	31,500	114,625
LED Traffic Signals (Replacing Incandescent)	LED Traffic Signals (Replacing Incandescent)	10	4,380	Incandescent Signals	87	4,380	20	$31	$0	$88	$0.07	35%	3.6	2.3	338	$0.092	$0.005	0.1	0.0	$0.00	$0.00	32%	7	35	7	35	7	35	100%	100%	100%	1	12,650	1,170	3,000	1	12,650	1,170	3,000	1	12,650	1,170	3,000
LED Parking Garage Lighting Fixtures (Replacing HID)	LED Parking Garage Lighting Fixtures (Replacing HID)	58	8,760	HID Fixtures	236	8,760	20	$145	$0	$400	$0.07	36%	3.5	2.2	1,563	$0.093	$0.005	0.2	0.2	$0.00	$0.00	100%	6	700	8	1,000	9	1,200	100%	100%	100%	134	1,171,243	100,500	275,364	194	1,692,203	144,000	395,463	231	2,017,345	172,500	473,096
LED Fixtures with Integral Sensors	LED Fixtures with Integral Sensors	33	5,336	Lighting Fixture with Manual Switch	51	5,336	8	$17	$0	$31	$0.07	56%	5.0	2.2	93	$0.189	$0.024	0.0	0.0	$0.00	-$0.51	73%	16	2,100	18	2,296	20	2,500	100%	100%	100%	29	208,155	36,400	65,000	31	226,572	39,088	69,800	34	245,905	42,000	75,000
LED High Bay Fixtures (Replacing HID)	LED High Bay Fixtures (Replacing HID)	285	5,336	HID Fixtures	547	5,336	20	$184	$0	$923	$0.07	20%	9.4	7.5	1,399	$0.132	$0.007	0.3	0.2	$0.00	-$3.96	73%	11	1,255	14	1,808	16	1,865	100%	100%	100%	258	1,879,720	197,500	820,006	440	3,204,273	299,800	1,351,597	470	3,421,306	312,500	1,432,117
LED High Bay Retrofit Fixtures (Replacing HID)	LED High Bay Retrofit Fixtures (Replacing HID)	321	5,336	HID Fixtures	614	5,336	20	$83	$0	$542	$0.07	15%	5.3	4.5	1,564	$0.053	$0.003	0.3	0.2	$0.00	-$12.53	73%	6	530	5	575	6	455	100%	100%	100%	122	887,694	33,000	238,887	143	1,038,125	38,250	265,146	161	1,171,892	40,700	258,186
LED Linear Tubes (Replacing Fluorescent)	LED Linear Tubes (Replacing Fluorescent)	18	5,336	Fluorescent Tube	35	5,336	20	$7	$0	$47	$0.07	15%	7.9	6.7	90	$0.078	$0.004	0.0	0.0	$0.00	-$0.57	73%	263	36,748	322	44,750	394	55,000	100%	100%	100%	485	3,530,810	225,492	1,593,246	592	4,312,497	275,504	1,944,444	724	5,271,023	340,000	2,404,829
LED Street Lighting Fixtures (Replacing HID)	LED Street Lighting Fixtures (Replacing HID)	101	4,903	HID Fixtures	247	4,903	20	$90	$0	$545	$0.07	17%	10.4	8.7	716	$0.126	$0.006	0.1	0.0	$0.00	$0.00	0%	8	700	8	700	8	700	100%	100%	100%	0	536,468	52,875	357,769	0	536,468	52,875	357,769	0	536,468	52,875	357,769
LED Area Lighting Fixtures (Replacing HID)	LED Area Lighting Fixtures (Replacing HID)	123	4,903	HID Fixtures	403	4,903	20	$178	$0	$722	$0.07	25%	7.2	5.4	1,370	$0.130	$0.006	0.3	0.0	$0.00	$0.00	0%	10	850	10	950	10	1,000	100%	100%	100%	0	1,246,720	133,750	537,483	0	1,610,246	156,250	637,289	0	1,792,008	167,500	687,193
LED Troffer Fixtures (Replacing Fluorescent)	LED Troffer Fixtures (Replacing Fluorescent)	51	5,336	Fluorescent Fixtures	97	5,336	20	$50	$0	$225	$0.07	22%	13.4	10.4	250	$0.200	$0.010	0.0	0.0	$0.00	-$1.46	73%	32	4,200	40	5,450	59	7,950	100%	100%	100%	155	1,125,391	210,000	920,516	203	1,478,362	272,500	1,199,817	283	2,059,038	397,500	1,720,475
LED Troffer Retrofit Kits (Replacing Fluorescent)	LED Troffer Retrofit Kits (Replacing Fluorescent)	55	5,336	Fluorescent Fixtures	109	5,336	20	$30	$0	$186	$0.07	16%	9.6	8.0	287	$0.104	$0.005	0.1	0.0	$0.00	-$1.61	73%	19	2,320	22	2,820	26	3,320	100%	100%	100%	98	713,890	69,600	428,063	120	876,811	84,600	522,202	143	1,039,732	99,600	616,340
LED Exterior Wall Pack Fixtures (Replacing HID)	LED Exterior Wall Pack Fixtures (Replacing HID)	53	4,903	HID Fixtures	245	4,903	20	$82	$0	$382	$0.07	21%	5.6	4.4	941	$0.087	$0.004	0.2	0.0	$0.00	$0.00	0%	8	925	9	1,100	10	1,200	100%	100%	100%	0	931,574	69,375	325,726	0	1,116,187	82,750	389,316	0	1,182,954	88,250	418,008
LED Parking Garage Wall Pack Fixtures (Replacing HID)	LED Parking Garage Wall Pack Fixtures (Replacing HID)	52	8,760	HID Fixtures	242	8,760	20	$83	$0	$468	$0.07	18%	3.8	3.2	1,670	$0.050	$0.002	0.2	0.2	$0.00	$0.00	100%	3	45	3	60	3	80	100%	100%	100%	9	80,462	3,150	18,342	12	107,283	4,200	24,456	17	148,937	5,750	33,403
LED Outdoor Canopy Lighting Fixtures (Replacing HID)	LED Outdoor Canopy Lighting Fixtures (Replacing HID)	100	4,903	HID Fixtures	442	4,903	20	$124	$0	$329	$0.07	38%	2.7	1.7	1,675	$0.074	$0.004	0.3	0.0	$0.00	$0.00	0%	6	735	7	800	7	875	100%	100%	100%	0	1,318,272	91,000	242,005	0	1,423,042	98,750	263,683	0	1,536,300	107,500	288,876
LED Interior Lamps (for LED Instant Rebate Program)	LED Interior Lamps (for LED Instant Rebate Program)	11	3,447	Halogen, Incandescent, or CFL Lamps	33	3,447	20	$13	$0	$20	$0.07	66%	11.2	3.9	74	$0.174	$0.009	0.0	0.0	$0.00	-$3.66	73%	275	37,840	327	45,175	382	52,760	100%	100%	100%	786	3,001,773	388,740	658,814	928	3,541,387	458,925	782,946	1,070	4,085,757	529,110	909,127
LED Interior Screw In Lamps (Replacing HID)	LED Interior Screw In Lamps (Replacing HID)	179	5,336	HID Fixture	338	5,336	8	$67	$11	$229	$0.07	29%	4.1	2.9	851	$0.079	$0.010	0.2	0.1	$0.00	-$6.17	73%	8	600	11	1,200	15	1,700	100%	100%	100%	75	546,453	33,750	118,772	144	1,045,663	66,000	232,277	200	1,457,308	92,250	326,295
LED PL/G (Replacing CFL)	LED Plug In Lamp	21	5,336	CFL lamp	46	5,336	8	$7	$1	$20	$0.07	35%	2.2	1.4	136	$0.051	$0.006	0.0	0.0	$0.00	-$0.75	73%	8	1,000	18	2,500	25	3,500	100%	100%	100%	20	145,802	7,000	19,888	50	364,505	17,500	49,720	70	510,307	24,500	69,608
LED Interior Fixture (Replacing CFL)	LED Interior Fixture (Replacing CFL)	33	5,336	CFL fixture	74	5,336	20	$30	$0	$112	$0.07	27%	7.6	5.5	219	$0.139	$0.007	0.0	0.0	$0.00	-$1.20	73%	2	101	2	101	2	101	100%	100%	100%	3	23,635	3,035	11,140	3	23,635	3,035	11,140	3	23,635	3,035	11,140
Fluorescent Low Wattage T8 Lamps (Replacing Higher Wattage Incandescent)	Fluorescent Low Wattage T8 Lamps (Replacing Higher Wattage Incandescent)	31	5,336	Fluorescent T8 Lamps	37	5,336	5	$1	$2	$4	$0.07	13%	1.7	1.5	34	$0.015	$0.003	0.0	0.0	$0.00	-$0.19	73%	104	14,500	90	12,500	72	10,000	100%	100%	100%	73	531,609	7,250	58,000	63	458,283	6,250	50,000	50	366,627	5,000	40,000
Fluorescent High Bays (Replacing HID)	Fluorescent High Bays (Replacing HID)	618	5,336	HID Fixtures	1,096	5,336	20	$16	$289	$139	$0.07	12%	0.8	0.7	2,548	$0.006	$0.000	0.5	0.4	$0.00	-$10.40	79%	9	954	8	837	6	664	100%	100%	100%	387	2,602,779	15,030	130,754	340	2,281,984	13,190	114,676	271	1,809,117	10,480	90,956
Compact Fluorescent Fixtures (Replacing Incandescent)	Compact Fluorescent Fixtures (Replacing Incandescent)	39	5,336	Incandescent	104	5,336	20	$2	$41	$12	$0.07	16%	0.5	0.4	344	$0.006	$0.000	0.1	0.1	$0.00	-$1.89	73%	9	962	9	955	8	809	100%	100%	100%	49	354,767	1,924	11,768	48	352,795	1,910	11,697	41	298,643	1,618	9,908
CFL, 2-foot Low Wattage - 25 - 28W (Replacing Higher-Wattage CFL)	PL 25W CFL	33	5,336	PL 40W CFL	50	5,336	5	$1	$11	$12	$0.07	4%	2.0	1.9	90	$0.006	$0.001	0.0	0.0	$0.00	-$0.49	73%	1	5	1	5	1	5	100%	100%	100%	0	480	3	61	0	480	3	61	0	480	3	61
LED Interior Down Light Fixtures (Replacing Incandescent)	LED Interior Down Light Fixtures (Replacing Incandescent)	42	5,336	Incandescent Luminaire	99	5,336	20	$29	$30	$120	$0.07	24%	5.6	4.3	306	$0.096	$0.005	0.1	0.0	$0.00	-$0.98	73%	21	2,750	27	3,750	33	4,500	100%	100%	100%	72	524,261	80,000	329,201	99	717,597	112,500	459,645	118	861,116	135,000	551,574
LED Refrigerated Case Lighting (Replacing Fluorescent)	LED Strip lighting	51	8,760	T8 or T12 Fluorescent	139	8,760	20	$35	$19	$145	$0	$0	2.6	1.9	771	$0.045	$0.002	0.1	0.1	$0.00	$0.00	100%	6	750	8	1,100	9	1,200	100%	100%	100%	71	619,418	26,250	108,428	104	908,479	38,500	159,027	114	991,068	42,000	173,484
LED Parking Garage Lighting (Replacing HID)	LED Parking Garage Lighting (Replacing HID)	44	8,760	HID Fixture	177	8,760	20	$25	$252	$108	$0.07	23%	1.3	1.0	1,165	$0.021	$0.001	0.1	0.1	$0.00	$0.00	100%	3	300	3	350	3	400	100%	100%	100%	43	374,047	7,500	32,407	50	436,388	8,750	37,808	57	498,729	10,000	43,210
LED High Bay Fixtures (Replacing HID)	LED High Bay Fixtures (Replacing HID)	367	5,336	HID Fixture	751	5,336	20	$158	$352	$972	$0.07	16%	7.2	6.0	2,050	$0.077	$0.004	0.4	0.3	$0.00	-$14.54	73%	7	700	7	875	8	975	100%	100%	100%	211	1,536,132	103,500	537,771	264	1,920,165	129,375	672,213	297	2,161,816	144,500	758,834
LED Street Light Fixtures (Replacing HID)	LED Street Light Fixtures (Replacing HID)	104	4,903	HID Fixture	247	4,903	20	$61	$252	$298	$0.07	20%	5.8	4.6	703	$0.087	$0.004	0.1	0.0	$0.00	$0.00	0%	8	700	8	700	8	700	100%	100%	100%	0	526,546	35,500	197,707	0	526,546	35,500	197,707	0	526,546	35,500	197,707
LED Area Lighting (Replacing HID)	LED Area Lighting (Replacing HID)	103	4,903	HID Fixture	308	4,903	20	$78	$290	$318	$0.07	25%	4.3	3.3	1,004	$0.078	$0.004	0.2	0.0	$0.00	$0.00	0%	5	375	5	375	5	375	100%	100%	100%	0	403,187	27,875	111,656	0	403,187	27,875	111,656	0	403,187	27,875	111,656
LED Troffers (Replacing Fluorescent)	LED Troffers (Replacing Fluorescent)	52	5,336	Fluorescent Fixture	100	5,336	20	$30	$51	$176	$0.07	17%	10.2	8.5	256	$0.117	$0.006	0.0	0.0	$0.00	-$1.49	73%	21	2,850	34	4,600	40	5,350	100%	100%	100%	107	781,553	85,500	490,536	179	1,304,013	138,000	800,116	204	1,487,494	160,500	924,661
LED Exterior Wall Packs (Replacing HID)	LED Exterior Wall Packs (Replacing HID)	55	4,903	HID Wall Pack Fixture	253	4,903	20	$36	$273	$117	$0.07	31%	1.7	1.1	966	$0.037	$0.002	0.2	0.0	$0.00	$0.00	0%	5	475	5	475	5	475	100%	100%	100%	0	491,522	15,125	45,200	0	491,522	15,125	45,200	0	491,522	15,125	45,200
LED Parking Garage Wall Packs (Replacing HID)	LED Parking Garage Wall Packs (Replacing HID)	78	8,760	HID Wall Pack Fixture	327	8,760	20	$44	$277	$270	$0.07	16%	1.7	1.4	2,183	$0.020	$0.001	0.2	0.3	$0.00	$0.00	100%	3	26	3	26	3	26	100%	100%	100%	7	60,768	1,065	6,250	7	60,768	1,065	6,250	7	60,768	1,065	6,250
LED Outdoor Canopy Fixtures (Replacing HID)	LED Outdoor Canopy Fixtures (Replacing HID)	93	4,903	Metal Halide	412	4,903	20	$96	$257	$73	$0.07	131%	0.6	-0.2	1,565	$0.061	$0.003	0.3	0.0	$0.00	$0.00	0%	3	300	3	300	3	300	100%	100%	100%	0	502,636	27,500	23,809	0	502,636	27,500	23,809	0	502,636	27,500	23,809
Lighting Control System	Automated Lighting Controls Systems	78,412	2,612	Manually Switched System	84,111	2,612	15	$2,280	$0	$18,278	$0.07	12%	11.0	9.6	14,883	$0.153	$0.010	5.7	0.0	$575.28	$0.00	0%	1	1	1	1	1	1	100%	100%	100%	0	15,935	2,280	18,278	0	15,935	2,280	18,278	0	15,935	2,280	18,278
Custom Lighting & Recommissioning	Engineering Study		0	Existing Overlit Lighting System	0	0	0	$52,585	$0	$142,104	$0.07	37%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
Custom Lighting	Custom Lighting Solution	99,000	4,558	Existing Overlit Lighting System	115,053	4,558	16	$6,421	$0	$22,054	$0.07	29%	4.1	2.9	73,176	$0.088	$0.005	16.1	11.7	$0.00	$0.00	68%	2	153	1	121	1	100	100%	100%	100%	1,785	11,987,156	982,463	3,374,241	1,412	9,480,038	776,980	2,668,517	1,167	7,834,743	642,132	2,205,386
Lighting Redesign Studies	Redesign Lighting Solution Study			Existing Overlit Lighting System				$12,038	$0	$17,949	$0.07	67%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	10	10	10	10	10	10	100%	100%	100%	0	0	120,381	179,488	0	0	120,381	179,488	0	0	120,381	179,488
Lighting Redesign Implementation	Redesign Lighting Solution Installed	81,354	7,834	Existing Overlit Lighitng System	125,000	7,834	20	$17,459	$0	$86,652	$0.07	20%	3.5	2.8	341,943	$0.051	$0.003	43.6	31.7	$0.00	$0.00	68%	1	1	2	2	4	4	100%	100%	100%	32	366,106	17,459	86,652	63	732,212	34,917	173,303	127	1,464,423	69,834	346,606
Recommissioning Study Allocation	Existing building with measures as identified in Recommissioning study	0	0	Existing Building	0	0	0	$4,530	$0	$7,246	$0.07	63%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	0%	1	14	1	14	1	14	100%	100%	100%	0	0	63,420	101,440	0	0	63,420	101,440	0	0	63,420	101,440
Motor Efficiency																																											
New Motor Enhanced	NEMA Premium +1% Efficient Motor	3,074	6,135	NEMA Premium	3,126	6,135	20	$40	$797	$181	$0.08	22%	7.5	5.9	319	$0.125	$0.006	0.1	0.0	$0.00	$0.00	78%	2	2	3	3	4	4	100%	100%	100%	0	683	80	363	0	1,025	120	544	0	1,366	160	725
Upgrade Motor	NEMA Premium Efficient Motor	15,650	4,806	EPACT Efficient Motor	15,950	4,806	20	$926	$0	$2,362	$0.08	39%	21.8	13.2	1,440	$0.643	$0.032	0.3	0.3	$0.00	$0.00	78%	25	44	35	56	40	54	100%	100%	100%	11	67,821	40,760	103,933	14	86,318	51,876	132,278	14	83,235	50,024	127,554
Upgrade Motor Enhanced	NEMA Premium +1% Efficient Motor	5,447	5,243	EPACT Efficient Motor	5,663	5,243	20	$498	$0	$1,407	$0.08	35%	16.4	10.6	1,136	$0.438	$0.022	0.2	0.2	$0.00	$0.00	78%	5	8	9	13	9	13	100%	100%	100%	1	9,734	3,982	11,258	2	15,817	6,470	18,294	2	15,817	6,470	18,294
Variable Frequency Drive	Equipment coupled with an ASD/VFD	7,699	4,643	Equipment without an ASD/VFD	11,443	4,643	15	$1,531	$0	$5,393	$0.08	28%	4.1	2.9	17,385	$0.088	$0.006	3.7	3.1	$0.00	$0.00	78%	315	1,086	395	1,111	400	1,138	100%	100%	100%	3,410	20,213,851	1,662,728	5,857,117	3,489	20,679,179	1,701,004	5,991,950	3,574	21,181,733	1,742,343	6,137,569
CSMC	Motor with Voltage Controller	4,849	4,849	Motor without Voltage Controller	5,717	4,878	20	$345	$0	$1,188	$0.08	29%	3.6	2.6	4,376	$0.079	$0.004	0.9	0.7	$0.00	$0.00	78%	2	2	4	4	4	4	100%	100%	100%	1	9,370	690	2,377	3	18,740	1,379	4,754	3	18,740	1,379	4,754
VFD on Well Pump	VFD Well Pump	60,222	2,653	Throttled Well Pump	85,155	2,653	15	$6,000	$0	$20,797	$0.08	29%	4.2	3.0	66,143	$0.091	$0.006	24.9	10.2	$0.00	$0.00	38%	3	3	3	3	3	3	100%	100%	100%	31	212,449	18,000	62,390	31	212,449	18,000	62,390	31	212,449	18,000	62,390
Study	Motor Study	0	0	No Study	0	0	7	$10,000	$0	$20,000	$0.08	50%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	78%	1	1	1	1	1	1	100%	100%	100%	0	0	10,000	20,000	0	0	10,000	20,000	0	0	10,000	20,000
Recommissioning Study	Efficient equipment as identified in a recommissioning study	0	0	Existing equipment	0	0	0	$32,980	$0	$56,547	$0.08	58%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	78%	1	1	1	1	1	1	100%	100%	100%	0	0	32,980	56,547	0	0	32,980	56,547	0	0	32,980	56,547
Custom	New Equipment	47,392	4,549	Existing or New Inefficient	80,699	4,549	16	$7,770	$0	$49,399	$0.08	16%	3.6	3.0	151,521	$0.051	$0.003	33.3	12.6	$2,384.63	$0.00	35%	3	3	3	3	3	3	100%	100%	100%	38	486,684	23,310	148,196	38	486,684	23,310	148,196	38	486,684	23,310	148,196
Multi Family Building Efficiency																																											
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in electric DHW heater	1.5 GPM Showerhead	103	8,760	2.5 GPM Showerhead	172	8,760	10	$0	$0	$0	$0.12	#DIV/0!	0.0	0.0	604	$0.000	$0.000	0.1	0.0	$39.46	$0.00	64%	14	119	22	178	33	269	100%	100%	100%	6	76,877	0	0	8	115,315	0	0	13	173,741	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	24	8,760	2.2 GPM Kitchen Faucet Aerator	35	8,760	10	$0	$0	$0	$0.12	#DIV/0!	0.0	0.0	98	$0.000	$0.000	0.0	0.0	$5.40	$0.00	124%	15	122	22	183	34	276	100%	100%	100%	2	12,775	0	0	3	19,162	0	0	4	28,870	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	7	8,760	2.2 GPM Bathroom Faucet Aerator	15	8,760	10	$0	$0	$0	$0.12	#DIV/0!	0.0	0.0	73	$0.000	$0.000	0.0	0.0	$4.75	$0.00	124%	15	122	22	183	34	276	100%	100%	100%	1	9,506	0	0	2	14,259	0	0	3	21,483	0	0
Water Heater Blanket on Electric Water Heater	Add commercial Insulation wrap R8 around Water Heater Tank	41	8,760	No External Insulation on water heater	69	8,760	7	$0	$0	$0	$0.12	#DIV/0!	0.0	0.0	245	$0.000	$0.000	0.0	0.0	$0.00	$0.00	100%	0	4	1	6	1	8	100%	100%	100%	0	985	0	0	0	1,477	0	0	0	2,226	0	0
Replace screw-in incandescents within tenant units with LEDs	LED Bulbs	9	642	Average EISA Standard halogen A-Style Bulb	55	642	16	$0	$0	$0	$0.12	#DIV/0!	0.0	0.0	29	$0.000	$0.000	0.0	0.0	$0.00	$0.00	8%	2,827	23,263	4,240	34,894	6,388	52,573	100%	100%	100%	93	744,547	0	0	140	1,116,820	0	0	211	1,682,676	0	0
Replace screw-in incandescents in common areas with screw-in LEDs	LED Bulbs	9	4,243	Average EISA Standard halogen A-Style Bulb	70	4,243	6	$0	$0	$0	$0.07	#DIV/0!	0.0	0.0	257	$0.000	$0.000	0.1	0.0	$0.00	$0.00	74%	157	1,294	236	1,941	355	2,924	100%	100%	100%	63	356,179	0	0	94	534,268	0	0	142	804,964	0	0
Exit sign retrofit and replacement	LED/LEC Exit	1	7,602	Incandescent	44	7,602	20	$0	$0	$0	$0.07	#DIV/0!	0.0	0.0	321	$0.000	$0.000	0.0	0.0	-$1.76	$0.00	100%	4	30	5	45	8	68	100%	100%	100%	1	10,304	0	0	2	15,456	0	0	3	23,287	0	0
Holistic efficiency projects totaling either 15%, 20%, or 25% whole-building savings	Average Performance Building,	10,315	8,760	Average existing multifamily building after Direct Install measures completed	11,398	8,760	20	$2,491	$17,578	$2,366	$0.07	105%	3.7	-0.2	9,486	$0.263	$0.013	1.1	1.2	$0.00	$0.00	100%	5	45	8	67	12	101	100%	100%	100%	52	457,032	112,106	106,471	78	680,470	166,913	158,523	118	1,025,783	251,615	238,968
Process Efficiency																																											
Custom	Optimized System	1,027,147	6,022	Old or less efficient systems or equipment	1,075,269	6,022	19	$19,054	$0	$141,025	$0.07	14%	2.5	2.2	289,767	$0.066	$0.004	48.1	11.2	$35,302.58	$0.00	22%	79	79	73	73	68	68	100%	100%	100%	884	24,509,173	1,505,258	11,140,969	817	22,647,717	1,390,935	10,294,820	761	21,096,503	1,295,665	9,589,695
Lighting	Optimized System	139	5,042	0	194	5,042	16	$23	$10	$90	$0.07	26%	4.6	3.4	278	$0.083	$0.005	0.1	0.0	$0.00	-$0.73	65%	19	19,500	19	19,500	19	19,500	100%	100%	100%	752	5,797,138	451,832	1,754,788	752	5,797,138	451,832	1,754,788	752	5,797,138	451,832	1,754,788
Motors	Optimized System	8,003	4,696	Old or less efficient systems or equipment	11,546	4,696	15	$1,488	$2	$5,198	$0.08	29%	4.2	3.0	16,639	$0.089	$0.006	3.5	3.0	$0.00	$0.00	78%	63	569	63	569	63	569	100%	100%	100%	1,692	10,142,657	846,995	2,959,441	1,692	10,142,657	846,995	2,959,441	1,692	10,142,657	846,995	2,959,441
Implementation of ECO's found in studies	Post-Recommissioned Building	290,028	5,900	Pre-Recommissioned Building	322,254	5,900	7	$4,105	$0	$13,512	$0.06	30%	1.1	0.7	190,143	$0.022	$0.003	32.2	17.7	$1,365.94	$0.00	51%	1	1	1	1	1	1	100%	100%	100%	18	203,579	4,105	13,512	18	203,579	4,105	13,512	18	203,579	4,105	13,512

Electric Measure Description	Efficient Product Description / Rating	Efficient Product Consumption (watts)	Efficient Hours of Operation (hrs/yr)	Baseline Product Description / Rating	Baseline Product Consumption (watts)	Baseline Hours of Operation (hrs/yr)	Measure Lifetime (years)	Rebate Amount ($)	Average Baseline Product Cost ($)	Incremental Cost of Efficient Product ($)	Assumed Energy Cost ($/kWh)	Rebate as a % of Incremental Cost (%)	Incremt'l Cost Payback Period w/o Rebate (yrs)	Incremt'l Cost Payback Period w/ Rebate (yrs)	Annual Customer kWh Savings (kWh/yr)	Rebated Cost / Cust kWh Saved ($/kWh)	Rebated Lifetime cost /Cust KWh Saved ($/kWh)	Customer kW Savings (kW)	Generator Peak kW Savings (kW)	Non-Energy O&M Savings ($)	Energy O&M Savings ($)	Coincidence Factor (%)	2017 Participants (-)	2017 Units (-)	2018 Participants (-)	2018 Units (-)	2019 Participants (-)	2019 Units (-)	NTG (%)	Installation Rate (%)	Realization Rate (%)	2017 NET Gen kW (kW)	2017 NET Gen kWh (kWh)	2017 Rebate Budget ($)	2017 Incremental Costs ($)	2018 NET Gen kW (kW)	2018 NET Gen kWh (kWh)	2018 Rebate Budget ($)	2018 Incremental Costs ($)	2019 NET Gen kW (kW)	2019 NET Gen kWh (kWh)	2019 Rebate Budget ($)	2019 Incremental Costs ($)
Cooling	More efficient cooling equipment	8,890	1,976	Code-minimum equipment	10,366	1,976	19	$975	$7,017	$2,275	$0.08	43%	10.3	5.9	2,918	$0.334	$0.017	1.5	1.4	$0.00	$0.00	90%	20	843	20	843	20	843	100%	100%	100%	1,198	2,633,200	822,077	1,917,556	1,198	2,633,200	822,077	1,917,556	1,198	2,633,200	822,077	1,917,556
Compressed Air and FSO Measures	Optimized System	53,197	5,896	Non-Optimized System	59,896	5,896	17	$3,390	$2,901	$9,751	$0.07	35%	3.6	2.4	39,501	$0.086	$0.005	6.7	5.1	$0.00	$0.00	71%	13	72	13	72	13	72	100%	100%	100%	366	3,037,464	243,447	700,319	366	3,037,464	243,447	700,319	366	3,037,464	243,447	700,319
Energy Design Assistance	More Efficient than Code Building	147,974	4,659	Code-Compliant Building	211,391	4,659	20	$33,092	$0	$116,752	$0.07	28%	5.6	4.0	295,453	$0.112	$0.006	63.4	49.7	-$46.02	$0.00	73%	9	9	9	9	9	9	100%	100%	100%	447	2,846,976	297,825	1,050,772	447	2,846,976	297,825	1,050,772	447	2,846,976	297,825	1,050,772
Behavioral Changes	Behavior changes that reduce energy use	2,962,572	8,760	No change in behavior	3,024,892	8,760	1	$0	$0	$0	$0.06	#DIV/0!	0.0	0.0	545,921	$0.000	$0.000	62.3	34.2	$0.00	$0.00	51%	2	2	2	2	2	2	100%	100%	100%	68	1,168,996	0	0	68	1,168,996	0	0	68	1,168,996	0	0
Behavioral Changes	Behavior changes that reduce energy use	-1,975,048	8,760	No change in behavior	-2,016,594	8,760	1	$0	$0	$0	$0.06	#DIV/0!	0.0	0.0	-363,947	$0.000	$0.000	-41.5	-40.0	$0.00	$0.00	90%	2	2	2	2	2	2	100%	100%	100%	-80	-779,330	0	0	-80	-779,330	0	0	-80	-779,330	0	0
Phase 2 new customer contribution	0	0	0	0	0	0	0	$0	$0	$6,000	$0.07	0%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	15	15	15	15	15	15	100%	100%	100%	0	0	0	90,000	0	0	0	90,000	0	0	0	90,000
System Optimization and Annual Achievement Bonuses	0	0	0	0	0	0	0	$46,133	$0	$0	$0.07	#DIV/0!	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	10	10	10	10	10	10	100%	100%	100%	0	0	461,325	0	0	0	461,325	0	0	0	461,325	0
Incentives to Trade Partners	0	0	0	0	0	0	0	$2,061	$0	$0	$0.07	#DIV/0!	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	16	16	16	16	16	16	100%	100%	100%	0	0	32,977	0	0	0	32,977	0	0	0	32,977	0
Recommissioning																																											
Recommissioning Implementation	Post-Recommissioned Building	290,028	5,900	Pre-Recommissioned Building	322,254	5,900	7	$4,105	$0	$13,512	$0.06	30%	1.1	0.7	190,143	$0.022	$0.003	32.2	17.7	$1,365.94	$0.00	51%	35	35	30	30	30	30	100%	100%	100%	619	7,125,276	143,670	472,923	531	6,107,379	123,146	405,363	531	6,107,379	123,146	405,363
Recommissioning Studies	Study Cost and Rebate	0	0	0	0	0	0	$8,053	$0	$12,108	$0.06	67%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	45	45	40	40	40	40	100%	100%	100%	0	0	362,375	544,856	0	0	322,111	484,317	0	0	322,111	484,317
BOC Program Attributable Savings	Energy Use After Class	319,343	8,760	Energy Usage Before Class	322,254	8,760	5	$318	$0	$646	$0.06	49%	0.4	0.2	25,498	$0.012	$0.002	2.9	1.6	$0.00	$0.00	51%	19	19	19	19	19	19	100%	100%	100%	30	518,704	6,036	12,269	30	518,704	6,036	12,269	30	518,704	6,036	12,269
Refrigeration Recommissioning	Optimized Refrigeration Systems	0	0	Existing Refrigeration Systems - Not Tuned or Optimized	0	0	0	$0	$0	$0	$0.06	#DIV/0!	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	51%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
Self Direct																																											
Average Project	New Equipment	828,135	2,876	Old or less efficient systems or equipment	1,150,184	2,876	17	$173,612	$0	$503,145	$0.08	35%	6.9	4.5	926,303	$0.187	$0.011	322.0	217.2	$0.00	$0.00	63%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
Turn Key Services																																											
Identification ~ On site audit	Identification of opportunities	0	0	0	0	0	0	$1,735	$0	$2,275	$0.08	76%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	100%	120	120	130	130	145	145	100%	100%	100%	0	0	208,200	273,000	0	0	225,550	295,750	0	0	251,575	329,875
Implementation	High Eff Project	29,500	4,393	Lower Efficient Product or System	39,041	4,393	16	$5,630	$0	$13,712	$0.08	41%	4.2	2.5	41,913	$0.134	$0.008	9.5	5.6	-$22.01	$0.00	55%	118	118	131	131	131	131	100%	100%	100%	665	5,295,166	664,327	1,617,980	738	5,878,532	737,516	1,796,232	738	5,878,532	737,516	1,796,232
Electric Rate Savings																																											
The Electric Rate Savings Program is offered to any business customer who can reduce their electric loads during control periods by at least 50 kW. In return for reducing their electric loads, they receive a monthly discount on their demand charges	Utility Load Control for control period	150,000	18	No Control	350,000	18	5	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	3,532	$0.000	$0.000	200.0	102.1	$0.00	$0.00	47%	45	45	45	45	45	45	100%	100%	100%	4,593	170,174	0	0	4,593	170,174	0	0	4,593	170,174	0	0
Saver's Switch For Business																																											
Commercial AC Switch Single Stage - MN	Utility Load Control for control period with smart switch	0	0	No Control, No Switch	4,562	1	15	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	3	$0.000	$0.000	4.6	1.1	$0.00	$0.00	22%	747	2,240	747	2,240	747	2,240	100%	100%	100%	2,451	6,276	0	0	2,451	6,276	0	0	2,451	6,276	0	0
Commercial AC Switch Multi Stage - MN	Utility Load Control for control period with smart switch	0	0	No Control, No Switch	14,023	0	15	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	6	$0.000	$0.000	14.0	2.4	$0.00	$0.00	16%	187	560	187	560	187	560	100%	100%	100%	1,372	3,393	0	0	1,372	3,393	0	0	1,372	3,393	0	0
Residential																																											
Efficient New Home Construction																																											
Low Income Envelope Improvements - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 1773 and Average 12.7% Better Than Code	12,586	678	Reference Home Based upon Local Code	12,686	678	20	$19	$0	$44	$0.12	42%	5.5	3.2	68	$0.275	$0.014	0.1	0.1	$0.00	$0.00	72%	14	25	14	25	14	25	100%	100%	100%	2	1,850	466	1,108	2	1,850	466	1,108	2	1,850	466	1,108
10% to 15% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 3630 and Average 13.1% Better Than Code	43,895	269	Reference Home Based upon Local Code	44,223	269	20	$250	$0	$1,286	$0.12	19%	6.0	4.8	88	$2.838	$0.142	0.3	0.3	$0.00	$204.17	90%	112	200	112	200	112	200	100%	100%	100%	65	19,233	50,000	257,117	65	19,233	50,000	257,117	65	19,233	50,000	257,117
15% to 20% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 3834 and Average 17.4% Better Than Code	35,432	339	Reference Home Based upon Local Code	35,843	339	20	$500	$0	$2,262	$0.12	22%	7.6	5.9	139	$3.585	$0.179	0.4	0.4	$0.00	$282.37	90%	210	376	210	376	210	376	100%	100%	100%	153	57,255	188,000	850,606	153	57,255	188,000	850,606	153	57,255	188,000	850,606
20% to 25% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 4439 and Average 21.3% Better Than Code	22,868	564	Reference Home Based upon Local Code	23,421	564	20	$117	$0	$401	$0.12	29%	10.9	7.7	312	$0.375	$0.019	0.6	0.5	$0.00	$0.00	90%	80	144	80	144	80	144	100%	100%	100%	79	49,060	16,874	57,724	79	49,060	16,874	57,724	79	49,060	16,874	57,724
25% to 30% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 5711 and Average 25.9% Better Than Code	45,217	349	Reference Home Based upon Local Code	46,217	349	20	$120	$0	$472	$0.12	25%	11.5	8.6	349	$0.343	$0.017	1.0	1.0	$0.00	$0.00	90%	22	40	22	40	22	40	100%	100%	100%	39	15,218	4,783	18,867	39	15,218	4,783	18,867	39	15,218	4,783	18,867
30% to 35% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 5613 and Average 32.7% Better Than Code	6,876	2,660	Reference Home Based upon Local Code	10,209	2,660	20	$771	$0	$4,037	$0.12	19%	3.9	3.1	8,866	$0.087	$0.004	3.3	1.1	$0.00	$0.00	30%	22	40	22	40	22	40	100%	100%	100%	43	387,180	30,831	161,494	43	387,180	30,831	161,494	43	387,180	30,831	161,494
35% and greater improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 4362 and Average 35.8% Better Than Code	4,393	2,419	Reference Home Based upon Local Code	5,893	2,419	20	$432	$0	$2,184	$0.12	20%	5.1	4.1	3,629	$0.119	$0.006	1.5	0.6	$0.00	$0.00	38%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
10% to 15% improvement over local code - Electric Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 3630 and Average 8.1% Better Than Code	20,147	620	Reference Home Based upon Local Code	20,556	620	20	$100	$0	$158	$0.12	63%	5.3	2.0	254	$0.394	$0.020	0.4	0.4	$0.00	$0.00	90%	112	201	112	201	112	201	100%	100%	100%	81	55,663	20,100	31,835	81	55,663	20,100	31,835	81	55,663	20,100	31,835
15% to 20% improvement over local code - Electric Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 3834 and Average 13.2% Better Than Code	21,509	565	Reference Home Based upon Local Code	21,970	565	20	$100	$0	$259	$0.12	39%	8.4	5.2	261	$0.384	$0.019	0.5	0.5	$0.00	$0.00	90%	400	717	400	717	400	717	100%	100%	100%	326	204,039	71,700	185,994	326	204,039	71,700	185,994	326	204,039	71,700	185,994
20% to 25% improvement over local code - Electric Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 4439 and Average 17.5% Better Than Code	20,709	613	Reference Home Based upon Local Code	21,257	613	20	$100	$0	$419	$0.12	24%	10.6	8.0	336	$0.298	$0.015	0.5	0.5	$0.00	$0.00	90%	123	220	123	220	123	220	100%	100%	100%	119	80,709	22,000	92,106	119	80,709	22,000	92,106	119	80,709	22,000	92,106
25% to 30% improvement over local code - Electric Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 5711 and Average 21.3% Better Than Code	45,217	349	Reference Home Based upon Local Code	46,217	349	20	$100	$0	$630	$0.12	16%	15.3	12.9	349	$0.287	$0.014	1.0	1.0	$0.00	$0.00	90%	34	61	34	61	34	61	100%	100%	100%	60	23,208	6,100	38,402	60	23,208	6,100	38,402	60	23,208	6,100	38,402
30% to 35% improvement over local code - Electric Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 5613 and Average 25.9% Better Than Code	6,876	2,660	Reference Home Based upon Local Code	10,209	2,660	20	$100	$0	$4,054	$0.12	2%	3.9	3.8	8,866	$0.011	$0.001	3.3	1.1	$0.00	$0.00	30%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
35% and greater improvement over local code - Electric Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 4362 and Average 32.7% Better Than Code	4,393	2,419	Reference Home Based upon Local Code	5,893	2,419	20	$100	$0	$2,184	$0.12	5%	5.1	4.9	3,629	$0.028	$0.001	1.5	0.6	$0.00	$0.00	38%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
Energy Star Clothes Washer - Combo Customers w/ Electric DHW	Energy Star Clothes Washer	370	295	Standard Clothes Washer	477	295	11	$10	$677	$30	$0.12	33%	2.2	1.5	32	$0.316	$0.029	0.1	0.0	$10.00	$0.00	3%	1	1	1	1	1	1	100%	100%	100%	0	35	10	30	0	35	10	30	0	35	10	30
Energy Star Clothes Washer - Electric Only Customers w/ Electric DHW	Energy Star Clothes Washer	370	295	Standard Clothes Washer	477	295	11	$10	$677	$30	$0.12	33%	2.2	1.5	32	$0.316	$0.029	0.1	0.0	$10.00	$0.00	3%	193	345	193	345	193	345	100%	100%	100%	1	11,904	3,450	10,350	1	11,904	3,450	10,350	1	11,904	3,450	10,350
Energy Star Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Clothes Washer	111	295	Standard Clothes Washer	132	295	11	$2	$677	$7	$0.12	33%	0.6	0.4	6	$0.363	$0.033	0.0	0.0	$10.00	$0.00	3%	143	256	143	256	143	256	100%	100%	100%	0	1,767	588	1,763	0	1,767	588	1,763	0	1,767	588	1,763
Energy Star Clothes Washer - Electric Only Customers w/ Gas DHW	Energy Star Clothes Washer	111	295	Standard Clothes Washer	132	295	11	$10	$677	$7	$0.12	145%	0.6	-0.3	6	$1.582	$0.144	0.0	0.0	$10.00	$0.00	3%	1	1	1	1	1	1	100%	100%	100%	0	7	10	7	0	7	10	7	0	7	10	7
Energy Star Refrigerator	Top Mounted Freezeer w/ Auto Defrost Energy Star refrigerator 22.0 Cf	66	5,592	Top Mounted Freezeer w/ Auto Defrost Standard refrigerator 22.0 Cf	74	5,592	18	$15	$663	$26	$0.12	58%	5.4	2.3	41	$0.364	$0.020	0.0	0.0	$0.00	$0.00	64%	558	1,000	558	1,000	558	1,000	100%	100%	100%	5	45,000	15,000	26,040	5	45,000	15,000	26,040	5	45,000	15,000	26,040
Energy Efficient Showerhead																																											
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in electric DHW heater	1.5 GPM Showerhead	87	8,760	2.5 GPM Showerhead	146	8,760	10	$3	$0	$3	$0.11	100%	0.0	0.0	510	$0.006	$0.001	0.1	0.0	$33.37	$0.00	64%	427	1,920	0	0	0	0	100%	60%	100%	47	641,916	5,952	5,952	0	0	0	0	0	0	0	0
Provide new 1.5 gpm showerhead for second shower to replace existing 2.5 gpm showerhead in electric DHW heater	1.5 GPM Showerhead	59	8,760	2.5 GPM Showerhead	98	8,760	10	$3	$0	$3	$0.11	100%	0.1	0.0	343	$0.009	$0.001	0.0	0.0	$22.44	$0.00	64%	320	1,440	0	0	0	0	100%	50%	100%	20	269,730	4,464	4,464	0	0	0	0	0	0	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	18	8,760	2.2 GPM Kitchen Faucet Aerator	26	8,760	10	$2	$0	$2	$0.11	100%	0.1	0.0	74	$0.020	$0.002	0.0	0.0	$4.17	$0.00	124%	427	1,920	0	0	0	0	100%	40%	100%	9	61,867	2,880	2,880	0	0	0	0	0	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$0	$0	$0	$0.11	100%	0.0	0.0	64	$0.007	$0.001	0.0	0.0	$4.19	$0.00	124%	427	1,920	0	0	0	0	100%	40%	100%	8	53,689	922	922	0	0	0	0	0	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM for second faucet to replace existing 2.2 gpm aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$0	$0	$0	$0.11	100%	0.0	0.0	64	$0.007	$0.001	0.0	0.0	$4.19	$0.00	124%	320	1,440	0	0	0	0	100%	30%	100%	4	30,200	691	691	0	0	0	0	0	0	0	0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in electric DHW heater	1.5 GPM Showerhead	87	8,760	2.5 GPM Showerhead	146	8,760	10	$3	$0	$3	$0.11	100%	0.0	0.0	510	$0.006	$0.001	0.1	0.0	$33.37	$0.00	64%	0	0	427	1,920	0	0	100%	60%	100%	0	0	0	0	47	641,916	6,163	6,163	0	0	0	0
Provide new 1.5 gpm showerhead for second shower to replace existing 2.5 gpm showerhead in electric DHW heater	1.5 GPM Showerhead	59	8,760	2.5 GPM Showerhead	98	8,760	10	$3	$0	$3	$0.11	100%	0.1	0.0	343	$0.009	$0.001	0.0	0.0	$22.44	$0.00	64%	0	0	320	1,440	0	0	100%	50%	100%	0	0	0	0	20	269,730	4,622	4,622	0	0	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	18	8,760	2.2 GPM Kitchen Faucet Aerator	26	8,760	10	$2	$0	$2	$0.11	100%	0.1	0.0	74	$0.021	$0.002	0.0	0.0	$4.17	$0.00	124%	0	0	427	1,920	0	0	100%	40%	100%	0	0	0	0	9	61,867	2,995	2,995	0	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$1	$0	$1	$0.11	100%	0.0	0.0	64	$0.008	$0.001	0.0	0.0	$4.19	$0.00	124%	0	0	427	1,920	0	0	100%	40%	100%	0	0	0	0	8	53,689	998	998	0	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM for second faucet to replace existing 2.2 gpm aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$1	$0	$1	$0.11	100%	0.0	0.0	64	$0.008	$0.001	0.0	0.0	$4.19	$0.00	124%	0	0	320	1,440	0	0	100%	30%	100%	0	0	0	0	4	30,200	749	749	0	0	0	0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in electric DHW heater	1.5 GPM Showerhead	87	8,760	2.5 GPM Showerhead	146	8,760	10	$3	$0	$3	$0.11	100%	0.0	0.0	510	$0.007	$0.001	0.1	0.0	$33.37	$0.00	64%	0	0	0	0	427	1,920	100%	60%	100%	0	0	0	0	0	0	0	0	47	641,916	6,374	6,374
Provide new 1.5 gpm showerhead for second shower to replace existing 2.5 gpm showerhead in electric DHW heater	1.5 GPM Showerhead	59	8,760	2.5 GPM Showerhead	98	8,760	10	$3	$0	$3	$0.11	100%	0.1	0.0	343	$0.010	$0.001	0.0	0.0	$22.44	$0.00	64%	0	0	0	0	320	1,440	100%	50%	100%	0	0	0	0	0	0	0	0	20	269,730	4,781	4,781
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with electric DHW heater	1.5 GPM Kitchen Faucet Aerator	18	8,760	2.2 GPM Kitchen Faucet Aerator	26	8,760	10	$2	$0	$2	$0.11	100%	0.1	0.0	74	$0.022	$0.002	0.0	0.0	$4.17	$0.00	124%	0	0	0	0	427	1,920	100%	40%	100%	0	0	0	0	0	0	0	0	9	61,867	3,091	3,091
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$1	$0	$1	$0.11	100%	0.0	0.0	64	$0.009	$0.001	0.0	0.0	$4.19	$0.00	124%	0	0	0	0	427	1,920	100%	40%	100%	0	0	0	0	0	0	0	0	8	53,689	1,056	1,056
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM for second faucet to replace existing 2.2 gpm aerator in home with electric DHW heater	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$1	$0	$1	$0.11	100%	0.0	0.0	64	$0.009	$0.001	0.0	0.0	$4.19	$0.00	124%	0	0	0	0	320	1,440	100%	30%	100%	0	0	0	0	0	0	0	0	4	30,200	792	792
Energy Feedback Residential																																											
Rollup: Online Group Savings	Treatment	809	8,426	Control	811	8,426	1	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	19	$0.000	$0.000	0.0	0.0	$0.00	$0.00	85%	26,220	26,220	26,220	26,220	26,220	26,220	100%	100%	100%	55	538,606	0	0	55	538,606	0	0	55	538,606	0	0
Rollup: Existing Participant 2017 Savings	Treatment	1,215	4,108	Control	1,267	4,106	1	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	212	$0.000	$0.000	0.1	0.1	$0.00	$0.00	96%	155,600	155,600	0	0	0	0	100%	100%	100%	8,549	35,927,948	0	0	0	0	0	0	0	0	0	0
Rollup: New Participant 2017 Savings	Treatment	1,073	4,156	Control	1,098	4,155	1	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	105	$0.000	$0.000	0.0	0.0	$0.00	$0.00	96%	74,500	74,500	0	0	0	0	100%	100%	100%	1,998	8,504,367	0	0	0	0	0	0	0	0	0	0
Rollup: Existing Participant 2018 Savings	Treatment	1,116	4,120	Control	1,166	4,119	1	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	204	$0.000	$0.000	0.1	0.1	$0.00	$0.00	96%	0	0	210,000	210,000	0	0	100%	100%	100%	0	0	0	0	11,108	46,877,729	0	0	0	0	0	0
Rollup: New Participant 2018 Savings	Treatment	1,028	4,170	Control	1,053	4,169	1	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	104	$0.000	$0.000	0.0	0.0	$0.00	$0.00	96%	0	0	19,900	19,900	0	0	100%	100%	100%	0	0	0	0	526	2,248,908	0	0	0	0	0	0
Rollup: Existing Participant 2019 Savings	Treatment	1,055	4,121	Control	1,105	4,120	1	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	207	$0.000	$0.000	0.1	0.1	$0.00	$0.00	96%	0	0	0	0	210,100	210,100	100%	100%	100%	0	0	0	0	0	0	0	0	11,208	47,379,913	0	0
Rollup: New Participant 2019 Savings	Treatment	974	4,164	Control	999	4,163	1	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	103	$0.000	$0.000	0.0	0.0	$0.00	$0.00	96%	0	0	0	0	20,000	20,000	100%	100%	100%	0	0	0	0	0	0	0	0	527	2,248,908	0	0
Behavioral Adjustment-Online Group Savings	Treatment	-539	8,426	Control	-541	8,426	0	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	-13	$0.000	#DIV/0!	0.0	0.0	$0.00	$0.00	85%	0	26,220	0	26,220	0	26,220	100%	100%	100%	-36	-359,071	0	0	-36	-359,071	0	0	-36	-359,071	0	0
Behavioral Adjustments Rollup: Existing Participants 2017 Savings	Treatment	-810	4,108	Control	-845	4,106	0	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	-141	$0.000	#DIV/0!	0.0	0.0	$0.00	$0.00	96%	0	155,600	0	0	0	0	100%	100%	100%	-5,700	-23,951,965	0	0	0	0	0	0	0	0	0	0
Behavioral Adjustments Rollup: New Participant 2017 Savings	Treatment	-715	4,156	Control	-732	4,155	0	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	-70	$0.000	#DIV/0!	0.0	0.0	$0.00	$0.00	96%	0	74,500	0	0	0	0	100%	100%	100%	-1,332	-5,669,578	0	0	0	0	0	0	0	0	0	0

Electric Measure Description	Efficient Product Description / Rating	Efficient Product Consumption (watts)	Efficient Hours of Operation (hrs/yr)	Baseline Product Description / Rating	Baseline Product Consumption (watts)	Baseline Hours of Operation (hrs/yr)	Measure Lifetime (years)	Rebate Amount ($)	Average Baseline Product Cost ($)	Incremental Cost of Efficient Product ($)	Assumed Energy Cost ($/kWh)	Rebate as a % of Incremental Cost (%)	Incremt'l Cost Payback Period w/o Rebate (yrs)	Incremt'l Cost Payback Period w/ Rebate (yrs)	Annual Customer kWh Savings (kWh/yr)	Rebated Cost / Cust kWh Saved ($/kWh)	Rebated Lifetime cost /Cust KWh Saved ($/kWh)	Customer kW Savings (kW)	Generator Peak kW Savings (kW)	Non-Energy O&M Savings ($)	Energy O&M Savings ($)	Coincidence Factor (%)	2017 Participants (-)	2017 Units (-)	2018 Participants (-)	2018 Units (-)	2019 Participants (-)	2019 Units (-)	NTG (%)	Installation Rate (%)	Realization Rate (%)	2017 NET Gen kW (kW)	2017 NET Gen kWh (kWh)	2017 Rebate Budget ($)	2017 Incremental Costs ($)	2018 NET Gen kW (kW)	2018 NET Gen kWh (kWh)	2018 Rebate Budget ($)	2018 Incremental Costs ($)	2019 NET Gen kW (kW)	2019 NET Gen kWh (kWh)	2019 Rebate Budget ($)	2019 Incremental Costs ($)
Behavioral Adjustments Rollup: Existing Participants 2018 Savings	Treatment	-744	4,120	Control	-777	4,119	0	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	-136	$0.000	#DIV/0!	0.0	0.0	$0.00	$0.00	96%	0	0	0	210,000	0	0	100%	100%	100%	0	0	0	0	-7,405	-31,251,820	0	0	0	0	0	0
Behavioral Adjustments Rollup: New Participant 2018 Savings	Treatment	-685	4,170	Control	-702	4,169	0	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	-69	$0.000	#DIV/0!	0.0	0.0	$0.00	$0.00	96%	0	0	0	19,900	0	0	100%	100%	100%	0	0	0	0	-350	-1,499,272	0	0	0	0	0	0
Behavioral Adjustments Rollup: Existing Participants 2019 Savings	Treatment	-703	4,121	Control	-737	4,120	0	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	-138	$0.000	#DIV/0!	0.0	0.0	$0.00	$0.00	96%	0	0	0	0	0	210,100	100%	100%	100%	0	0	0	0	0	0	0	0	-7,472	-31,586,608	0	0
Behavioral Adjustments Rollup: New Participant 2019 Savings	Treatment	-649	4,164	Control	-666	4,163	0	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0	-69	$0.000	#DIV/0!	0.0	0.0	$0.00	$0.00	96%	0	0	0	0	0	20,000	100%	100%	100%	0	0	0	0	0	0	0	0	-351	-1,499,272	0	0
Home Energy Squad																																											
NEC Energy Squad Service 2017	weighted average Energy Efficient measures by participant	63	955	weighted average Baseline measures by participant	104	955	7		$0	$3	$0.12	0%	0.5	0.5	40	$0.000	$0.000	0.0	0.0	$0.07	$0.87	10%	2,199	50,831	0	0	0	0	100%	100%	100%	231	2,218,264	0	154,000	0	0	0	0	0	0	0	0
NEC Energy Squad Service 2018	weighted average Energy Efficient measures by participant	63	955	weighted average Baseline measures by participant	104	955	6		$0	$3	$0.12	0%	0.5	0.5	40	$0.000	$0.000	0.0	0.0	$0.07	$0.87	10%	0	0	2,199	50,831	0	0	100%	100%	100%	0	0	0	0	230	2,218,264	0	154,000	0	0	0	0
NEC Energy Squad Service 2019	weighted average Energy Efficient measures by participant	63	955	weighted average Baseline measures by participant	104	955	5		$0	$3	$0.12	0%	0.5	0.5	40	$0.000	$0.000	0.0	0.0	$0.07	$0.87	10%	0	0	0	0	2,199	50,831	100%	100%	100%	0	0	0	0	0	0	0	0	230	2,218,264	0	154,000
NEC - TV peripherals turned off with Timer	TV peripherals turned off with Timer (replacing power strip)	2	4,420	Power used in "standby" mode while equipment is unused	28	4,420	5	$0	$0	$20	$0.12	0%	1.5	1.5	115	$0.000	$0.000	0.0	0.0	$0.00	$0.00	19%	0	1	0	1	0	1	100%	100%	100%	0	120	0	19	0	120	0	19	0	120	0	19
Install Second Programmable Thermostat	Second T-state w/ Auto setup by 1 F for cooling assume 3 ton AC, 10 SEER	1,504	442	Base modeled home w/ 10 SEER AC and no setup temp	1,565	449	10	$0	$0	$30	$0.12	0%	1.0	1.0	38	$0.000	$0.000	0.1	0.1	$0.00	$25.17	90%	1	17	1	17	1	17	100%	100%	100%	1	709	0	518	1	709	0	518	1	709	0	518
CEE Energy Squad Service 2017	weighted average Energy Efficient measures by participant	83	973	weighted average Baseline measures by participant	125	973	7		$0	$0	$0.12	0%	0.1	0.1	41	$0.000	$0.000	0.0	0.0	$0.09	$0.00	11%	2,499	41,688	0	0	0	0	100%	100%	100%	205	1,875,592	0	19,495	0	0	0	0	0	0	0	0
CEE Energy Squad Service 2018	weighted average Energy Efficient measures by participant	83	973	weighted average Baseline measures by participant	125	973	6		$0	$0	$0.12	0%	0.1	0.1	41	$0.000	$0.000	0.0	0.0	$0.09	$0.00	11%	0	0	2,499	41,688	0	0	100%	100%	100%	0	0	0	0	205	1,875,592	0	16,660	0	0	0	0
CEE Energy Squad Service 2019	weighted average Energy Efficient measures by participant	83	973	weighted average Baseline measures by participant	125	973	6		$0	$0	$0.12	0%	0.1	0.1	41	$0.000	$0.000	0.0	0.0	$0.09	$0.00	11%	0	0	0	0	2,499	41,688	100%	100%	100%	0	0	0	0	0	0	0	0	205	1,875,592	0	14,805
CEE - TV peripherals turned off with Timer	TV peripherals turned off with Timer (replacing power strip)	2	4,420	Power used in "standby" mode while equipment is unused	28	4,420	5	$0	$0	$20	$0.12	0%	1.5	1.5	115	$0.000	$0.000	0.0	0.0	$0.00	$0.00	19%	0	1	0	1	0	1	100%	100%	100%	0	139	0	22	0	139	0	22	0	139	0	22
CEE - Install Second Programmable Thermostat	Second T-state w/ Auto setup by 1 F for cooling assume 3 ton AC, 10 SEER	1,504	442	Base modeled home w/ 10 SEER AC and no setup temp	1,565	449	10	$0	$0	$9	$0.12	0%	2.0	2.0	38	$0.000	$0.000	0.1	0.1	$0.00	$0.00	76%	1	20	1	20	1	20	100%	100%	100%	1	821	0	181	1	821	0	181	1	821	0	181
Home Lighting																																											
Average CFL	Average CFL	15	854	Average EISA Standard Halogen A-Style Bulb	48	854	7	$1	$1	$1	$0.11	119%	0.3	-0.1	29	$0.044	$0.006	0.0	0.0	$0.00	$0.00	8%	2,693	35,015	31	0	0	0	100%	100%	100%	103	1,093,519	44,119	37,081	0	0	0	0	0	0	0	0
Average CFL	Average CFL	15	6,148	Average EISA Standard Halogen A-Style Bulb	48	6,148	2	$1	$1	$1	$0.11	119%	0.0	0.0	206	$0.006	$0.004	0.0	0.0	$0.00	$0.00	73%	86	2,235	225	0	0	0	100%	100%	100%	60	502,488	2,816	2,367	0	0	0	0	0	0	0	0
Average LED Bulb	Average LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	48	909	7	$3	$2	$7	$0.11	38%	1.9	1.2	34	$0.080	$0.011	0.03777	0.00331	$0.00	$0.00	8%	78,598	1,021,780	37	0	0	0	100%	100%	100%	3,386	38,301,782	2,789,459	7,324,229	0	0	0	0	0	0	0	0
Average LED Bulb	Average LED Bulb	10	6,148	Average EISA Standard Halogen A-Style Bulb	48	6,148	3	$3	$2	$7	$0.11	38%	0.3	0.2	232	$0.012	$0.004	0.0	0.0	$0.00	$0.00	73%	2,508	65,220	254	0	0	0	100%	100%	100%	1,972	16,535,310	178,051	467,504	0	0	0	0	0	0	0	0
Average Value LED Bulb	Average Value LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	43	909	7	$2	$1	$2	$0.11	68%	0.7	0.2	30	$0.049	$0.007	0.0	0.0	$0.00	$0.00	8%	65,077	846,000	33	0	0	0	100%	100%	100%	2,475	27,998,490	1,269,000	1,876,313	0	0	0	0	0	0	0	0
Average Value LED Bulb	Average Value LED Bulb	10	6,148	Average EISA Standard Halogen A-Style Bulb	43	6,148	2	$2	$1	$2	$0.11	68%	0.1	0.0	205	$0.007	$0.004	0.0	0.0	$0.00	$0.00	73%	2,077	54,000	224	0	0	0	100%	100%	100%	1,442	12,087,263	81,000	119,765	0	0	0	0	0	0	0	0
Average CFL	Average CFL	15	854	Average EISA Standard Halogen A-Style Bulb	48	854	6	$1	$1	$1	$0.11	119%	0.3	-0.1	29	$0.044	$0.007	0.0	0.0	$0.00	$0.00	8%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
Average CFL	Average CFL	15	6,148	Average EISA Standard Halogen A-Style Bulb	48	6,148	2	$1	$1	$1	$0.11	119%	0.0	0.0	206	$0.006	$0.004	0.0	0.0	$0.00	$0.00	73%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
Average LED Bulb	Average LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	48	909	6	$3	$2	$6	$0.11	44%	1.7	0.9	34	$0.080	$0.013	0.0	0.0	$0.00	$0.00	8%	0	0	79,820	1,037,666	0	0	100%	100%	100%	0	0	0	0	3,438	38,897,274	2,832,828	6,496,972	0	0	0	0
Average LED Bulb	Average LED Bulb	10	6,148	Average EISA Standard Halogen A-Style Bulb	48	6,148	3	$3	$2	$6	$0.11	44%	0.2	0.1	232	$0.012	$0.004	0.0	0.0	$0.00	$0.00	73%	0	0	2,547	66,234	0	0	100%	100%	100%	0	0	0	0	2,003	16,792,391	180,819	414,700	0	0	0	0
Average Value LED Bulb	Average Value LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	43	909	6	$2	$1	$2	$0.11	80%	0.6	0.1	30	$0.049	$0.008	0.0	0.0	$0.00	$0.00	8%	0	0	72,308	940,000	0	0	100%	100%	100%	0	0	0	0	2,750	31,109,433	1,410,000	1,759,753	0	0	0	0
Average Value LED Bulb	Average Value LED Bulb	10	6,148	Average EISA Standard Halogen A-Style Bulb	43	6,148	2	$2	$1	$2	$0.11	80%	0.1	0.0	205	$0.007	$0.004	0.0	0.0	$0.00	$0.00	73%	0	0	2,308	60,000	0	0	100%	100%	100%	0	0	0	0	1,602	13,430,293	90,000	112,325	0	0	0	0
Average CFL	Average CFL	15	854	Average EISA Standard Halogen A-Style Bulb	48	854	5	$1	$1	$1	$0.11	119%	0.3	-0.1	29	$0.044	$0.009	0.0	0.0	$0.00	$0.00	8%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
Average CFL	Average CFL	15	6,148	Average EISA Standard Halogen A-Style Bulb	48	6,148	2	$1	$1	$1	$0.11	119%	0.0	0.0	206	$0.006	$0.004	0.0	0.0	$0.00	$0.00	73%	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0	0	0	0
Average LED Bulb	Average LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	48	909	5	$3	$1	$6	$0.11	47%	1.6	0.8	34	$0.080	$0.016	0.0	0.0	$0.00	$0.00	8%	0	0	0	0	72,308	940,000	100%	100%	100%	0	0	0	0	0	0	0	0	3,115	35,236,230	2,566,200	5,505,050
Average LED Bulb	Average LED Bulb	10	6,148	Average EISA Standard Halogen A-Style Bulb	48	6,148	3	$3	$1	$6	$0.11	47%	0.2	0.1	232	$0.012	$0.004	0.0	0.0	$0.00	$0.00	73%	0	0	0	0	2,308	60,000	100%	100%	100%	0	0	0	0	0	0	0	0	1,814	15,211,877	163,800	351,386
Average Value LED Bulb	Average Value LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	43	909	5	$2	$1	$2	$0.11	96%	0.5	0.0	30	$0.049	$0.010	0.0	0.0	$0.00	$0.00	8%	0	0	0	0	69,242	900,144	100%	100%	100%	0	0	0	0	0	0	0	0	2,633	29,790,393	1,350,216	1,405,008
Average Value LED Bulb	Average Value LED Bulb	10	6,148	Average EISA Standard Halogen A-Style Bulb	43	6,148	2	$2	$1	$2	$0.11	96%	0.1	0.0	205	$0.007	$0.004	0.0	0.0	$0.00	$0.00	73%	0	0	0	0	2,210	57,456	100%	100%	100%	0	0	0	0	0	0	0	0	1,534	12,860,848	86,184	89,681
Insulation Rebate																																											
Electric Heat Homes Without Cooling	Home with additional insulation	5,936	1,261	Home with R20 or less existing Insulation	8,000	1,261	20	$297	$0	$2,077	$0.11	14%	7.3	6.2	2,602	$0.114	$0.006	2.1	0.0	$0.00	$0.00	0%	14	20	16	22	17	23	100%	100%	100%	0	56,816	5,934	41,539	0	62,497	6,528	45,693	0	65,338	6,824	47,770
Electric Heat Homes With Cooling	Home with additional insulation	6,687	1,751	Home with R20 or less existing Insulation	8,000	1,751	20	$288	$0	$1,682	$0.11	17%	6.7	5.5	2,299	$0.125	$0.006	1.3	0.1	$0.00	$0.00	10%	21	30	22	31	25	35	100%	100%	100%	4	75,301	8,631	50,449	4	77,811	8,919	52,130	5	87,851	10,070	58,857
Gas Heat Homes With Cooling, Combo Customer	Home with additional insulation	3,880	490	Home with R20 or less existing Insulation	4,000	490	20	$292	$0	$1,966	$0.11	15%	22.5	19.1	59	$4.971	$0.249	0.1	0.1	$0.00	$81.07	100%	223	325	235	327	254	350	100%	100%	100%	43	20,814	94,766	638,980	43	20,942	95,349	642,912	46	22,415	102,055	688,132
Electric Heat Homes Without Cooling	R-11 insulation	392	1,261	Baseline assumes R-0 in wall cavities as existing level	8,000	1,261	20	$276	$0	$3,935	$0.11	7%	3.7	3.5	9,594	$0.029	$0.001	7.6	0.0	$0.00	$0.00	0%	45	65	50	70	62	85	100%	100%	100%	0	680,788	17,916	255,777	0	733,156	19,294	275,452	0	890,261	23,428	334,477
Electric Heat Homes With Cooling	R-11 insulation	-665	1,751	Baseline assumes R-0 in wall cavities as existing level	8,000	1,751	20	$300	$0	$1,751	$0.11	17%	1.0	0.9	15,173	$0.020	$0.001	8.7	1.0	$0.00	$0.00	10%	7	10	16	22	21	29	100%	100%	100%	10	165,640	3,000	17,509	21	364,408	6,600	38,521	28	480,356	8,700	50,777
Gas Heat Homes With Cooling, Combo Customer	R-11 insulation	3,682	490	Baseline assumes R-0 in wall cavities as existing level	4,000	490	20	$253	$0	$1,865	$0.11	14%	8.0	6.9	156	$1.623	$0.081	0.3	0.3	$0.00	$215.52	100%	76	111	82	114	87	120	100%	100%	100%	39	18,897	28,087	207,024	40	19,408	28,846	212,619	42	20,429	30,364	223,810
Electric Heat Homes Without Cooling	Home with Tier 2 Air Sealing	3,481	1,261	Existing Home Without Air Sealing	8,000	1,261	10	$131	$0	$2,338	$0.11	6%	3.7	3.5	5,699	$0.023	$0.002	4.5	0.0	$0.00	$0.00	0%	5	7	7	10	11	15	100%	100%	100%	0	43,547	919	16,368	0	62,211	1,313	23,383	0	93,316	1,969	35,074
Electric Heat Homes With Cooling	Home with Tier 2 Air Sealing	4,980	1,751	Existing Home Without Air Sealing	8,000	1,751	10	$135	$0	$635	$0.11	21%	1.1	0.9	5,289	$0.026	$0.003	3.0	0.2	$0.00	$0.00	7%	4	6	6	8	8	11	100%	100%	100%	1	34,641	810	3,809	2	46,189	1,080	5,079	3	63,509	1,485	6,983
Gas Heat Homes With Cooling, Combo Customer	Home with Tier 2 Air Sealing	3,781	490	Existing Home Without Air Sealing	4,000	490	10	$143	$0	$874	$0.11	16%	4.0	3.3	107	$1.330	$0.133	0.2	0.2	$0.00	$208.54	100%	96	140	104	145	108	149	100%	100%	100%	34	16,385	19,964	122,310	35	16,970	20,677	126,679	36	17,438	21,247	130,173
Refrigerator Recycling																																											
Remove refrigerator from service and recycle	removal of refrigerator	0	0	existing secondary unit - age mostly >10 years	170	5,592	9	$35	$0	$0	$0.12	#DIV/0!	0.0	-0.3	953	$0.037	$0.004	0.2	0.1	$0.00	$0.00	64%	5,750	5,750	5,800	5,800	6,000	6,000	100%	100%	100%	686	5,979,693	201,250	0	692	6,031,691	203,000	0	715	6,239,680	210,000	0
Remove freezer from service and recycle	removal of freezer	0	0	existing freezer unit - age mostly >10 years	206	5,592	6	$35	$0	$0	$0.12	#DIV/0!	0.0	-0.3	1,155	$0.030	$0.005	0.2	0.1	$0.00	$0.00	64%	900	900	900	900	900	900	100%	100%	100%	130	1,134,437	31,500	0	130	1,134,437	31,500	0	130	1,134,437	31,500	0
Residential Cooling																																											
Installation of new AC 15 SEER 2.5 tons	Non - Quality Installation of 15 SEER 2.5 tons	2,439	412	Non-Quality Installation of 13 SEER (Baseline and Model) 2.5 tons	2,683	432	15	$200	$1,057	$461	$0.11	43%	27.1	15.3	155	$1.294	$0.086	0.2	0.24112	$0.00	$0.00	90%	5	10	5	10	5	10	100%	100%	100%	2	1,688	2,000	4,606	2	1,688	2,000	4,606	2	1,688	2,000	4,606
Installation of new AC 16 SEER 2.5 tons	Non - Quality Installation of 16 SEER 2.5 tons	2,344	402	Non-Quality Installation of 13 SEER (Baseline and Model) 2.5 tons	2,683	432	15	$300	$1,057	$691	$0.11	43%	28.9	16.4	217	$1.380	$0.092	0.3	0.33514	$0.00	$0.00	90%	13	25	12	24	12	24	100%	100%	100%	8	5,933	7,500	17,274	8	5,695	7,200	16,583	8	5,695	7,200	16,583
Provide Quality Installation of new AC 13 - 14.5 SEER 2.5 tons	Quality Installation of 13 - 14.5 SEER 2.5 tons	2,576	386	Non-Quality Installation of 13 - 14.5 SEER 2.5 tons	2,576	424	15	$150	$0	$117	$0.11	128%	10.8	-3.1	98	$1.527	$0.102	0.0	0.00000	$0.00	$0.00	90%	38	38	36	36	37	37	100%	100%	100%	0	4,074	5,700	4,444	0	3,860	5,400	4,210	0	3,967	5,550	4,327
Provide Quality Installation of new AC 15 SEER 2.5 tons	Quality Installation of 15 SEER 2.5 tons	2,439	375	Non-Quality Installation of 15 SEER 2.5 tons	2,439	412	15	$150	$0	$117	$0.11	128%	11.8	-3.3	90	$1.659	$0.111	0.0	0.00000	$0.00	$0.00	90%	5	10	5	10	5	10	100%	100%	100%	0	987	1,500	1,170	0	987	1,500	1,170	0	987	1,500	1,170
Provide Quality Installation of new AC 16 SEER 2.5 tons	Quality Installation of 16 SEER 2.5 tons	2,344	366	Non-Quality Installation of 16 SEER 2.5 tons	2,344	402	15	$150	$0	$117	$0.11	128%	12.5	-3.5	85	$1.769	$0.118	0.0	0.00000	$0.00	$0.00	90%	13	25	12	24	12	24	100%	100%	100%	0	2,314	3,750	2,924	0	2,221	3,600	2,807	0	2,221	3,600	2,807
Installation of new AC 15 SEER 2.5 tons	Non - Quality Installation of 15 SEER 2.5 tons	2,479	435	Non-Quality Installation of 13 SEER (Baseline and Model) 2.5 tons	2,732	456	15	$200	$1,057	$461	$0.11	43%	25.2	14.3	166	$1.205	$0.080	0.3	0.24931	$0.00	$0.00	90%	891	1,782	855	1,711	868	1,736	100%	100%	100%	444	322,793	356,400	820,834	427	309,932	342,200	788,129	433	314,460	347,200	799,645
Installation of new AC 16 SEER 2.5 tons	Non - Quality Installation of 16 SEER 2.5 tons	2,380	425	Non-Quality Installation of 13 SEER (Baseline and Model) 2.5 tons	2,732	456	15	$300	$1,057	$691	$0.11	43%	26.9	15.2	233	$1.286	$0.086	0.4	0.34685	$0.00	$0.00	90%	2,447	4,894	2,358	4,716	2,389	4,778	100%	100%	100%	1,697	1,246,645	1,468,200	3,381,509	1,636	1,201,303	1,414,800	3,258,520	1,657	1,217,096	1,433,400	3,301,359
Provide Quality Installation of new AC 13 - 14.5 SEER 2.5 tons	Quality Installation of 13 - 14.5 SEER 2.5 tons	2,318	421	Non-Quality Installation of 2.5 Ton AC 13 - 14.5 SEER 2.5 tons	2,620	447	15	$150	$0	$152	$0.11	99%	7.1	0.1	196	$0.766	$0.051	0.3021	0.29817	$0.00	$0.00	90%	4,840	4,840	4,666	4,666	4,727	4,727	100%	100%	100%	1,443	1,034,462	726,000	736,273	1,391	997,273	699,900	709,804	1,409	1,010,310	709,050	719,083
Provide Quality Installation of new AC 15 SEER 2.5 tons	Quality Installation of 15 SEER 2.5 tons	2,195	409	Non-Quality Installation of 2.5 Ton AC 15 SEER 2.5 tons	2,479	435	15	$150	$0	$121	$0.11	124%	6.1	-1.4	180	$0.832	$0.055	0.2838	0.28003	$0.00	$0.00	90%	891	1,782	855	1,711	868	1,736	100%	100%	100%	499	350,664	267,300	216,362	479	336,692	256,650	207,741	486	341,612	260,400	210,776
Provide Quality Installation of new AC 16 SEER 2.5 tons	Quality Installation of 16 SEER 2.5 tons	2,109	399	Non-Quality Installation of 2.5 Ton AC 16 SEER 2.5 tons	2,380	425	15	$150	$0	$98	$0.11	152%	5.3	-2.8	169	$0.888	$0.059	0.2707	0.26711	$0.00	$0.00	90%	2,447	4,894	2,358	4,716	2,389	4,778	100%	100%	100%	1,307	902,855	734,100	481,484	1,260	870,018	707,400	463,972	1,276	881,456	716,700	470,072
Installation of new ASHP 15 SEER ASHP 2.5 Tons	Non - Quality Installation of 15 SEER ASHP 2.5 Tons	2,439	412	Non-Quality Installation of 14 SEER (Baseline) ASHP 2.5 Tons	2,551	422	15	$200	$1,944	$457	$0.11	44%	57.9	32.6	72	$2.787	$0.186	0.1120	0.11052	$0.00	$0.00	90%	1	1	1	1	1	1	100%	100%	100%	0	78	200	457	0	78	200	457	0	78	200	457
Installation of new ASHP 16 SEER ASHP 2.5 Tons	Non - Quality Installation of 16 SEER ASHP 2.5 Tons	2,344	402	Non-Quality Installation of 14 SEER (Baseline) ASHP 2.5 Tons	2,551	422	15	$300	$1,944	$914	$0.11	33%	61.8	41.5	135	$2.229	$0.149	0.2073	0.20454	$0.00	$0.00	90%	1	1	1	1	1	1	100%	100%	100%	0	147	300	914	0	147	300	914	0	147	300	914
Provide Quality Installation of new ASHP 14 SEER (Baseline) ASHP 2.5 Tons	Quality Installation of 14 SEER (Baseline) ASHP 2.5 Tons	2,551	384	Non-Quality Installation of 14 SEER (Baseline) ASHP 2.5 Tons	2,551	422	15	$150	$0	$117	$0.11	128%	11.0	-3.1	97	$1.548	$0.103	0.0000	0.00000	$0.00	$0.00	90%	1	1	1	1	1	1	100%	100%	100%	0	106	150	117	0	106	150	117	0	106	150	117
Provide Quality Installation of new ASHP 15 SEER ASHP 2.5 Tons	Quality Installation of 15 SEER ASHP 2.5 Tons	2,439	375	Non-Quality Installation of 15 SEER ASHP 2.5 Tons	2,439	412	15	$150	$0	$117	$0.11	128%	11.8	-3.3	90	$1.659	$0.111	0.0000	0.00000	$0.00	$0.00	90%	1	1	1	1	1	1	100%	100%	100%	0	99	150	117	0	99	150	117	0	99	150	117
Provide Quality Installation of new ASHP 16 SEER ASHP 2.5 Tons	Quality Installation of 16 SEER ASHP 2.5 Tons	2,344	366	Non-Quality Installation of 16 SEER ASHP 2.5 Tons	2,344	402	15	$150	$0	$117	$0.11	128%	12.5	-3.5	85	$1.769	$0.118	0.0	0.00000	$0.00	$0.00	90%	1	1	1	1	1	1	100%	100%	100%	0	93	150	117	0	93	150	117	0	93	150	117
Installation of new ASHP 15 SEER ASHP 2.5 Tons	Non - Quality Installation of ASHP 15 SEER ASHP 2.5 Tons	2,479	435	Non-Quality Installation of ASHP 14 SEER (Baseline) ASHP 2.5 Tons	2,595	445	15	$200	$1,944	$457	$0.11	44%	53.9	30.3	77	$2.596	$0.173	0.1	0.11439	$0.00	$0.00	90%	7	14	7	13	7	14	100%	100%	100%	2	1,177	2,800	6,397	1	1,093	2,600	5,940	2	1,177	2,800	6,397
Installation of new ASHP 16 SEER ASHP 2.5 Tons	Non - Quality Installation of ASHP 16 SEER ASHP 2.5 Tons	2,380	425	Non-Quality Installation of ASHP 14 SEER (Baseline) ASHP 2.5 Tons	2,595	445	15	$300	$1,944	$914	$0.11	33%	57.5	38.6	144	$2.077	$0.138	0.2	0.21194	$0.00	$0.00	90%	25	25	24	24	25	25	100%	100%	100%	5	3,942	7,500	22,845	5	3,785	7,200	21,931	5	3,942	7,500	22,845
Provide Quality Installation of new ASHP 14 SEER (Baseline) ASHP 2.5 Tons	Quality Installation of 2.5 Ton ASHP 14 SEER (Baseline) ASHP 2.5 Tons	2,296	419	Non-Quality Installation of 2.5 Ton ASHP 14 SEER (Baseline) ASHP 2.5 Tons	2,595	445	15	$150	$0	$79	$0.11	190%	3.7	-3.4	193	$0.777	$0.052	0.3	0.29496	$0.00	$0.00	90%	4	4	4	4	4	4	100%	100%	100%	1	843	600	315	1	843	600	315	1	843	600	315
Provide Quality Installation of new ASHP 15 SEER ASHP 2.5 Tons	Quality Installation of 2.5 Ton ASHP 15 SEER ASHP 2.5 Tons	2,195	409	Non-Quality Installation of 2.5 Ton ASHP 15 SEER ASHP 2.5 Tons	2,479	435	15	$150	$0	$75	$0.11	200%	3.8	-3.8	180	$0.832	$0.055	0.3	0.28003	$0.00	$0.00	90%	1	3	1	3	1	3	100%	100%	100%	1	590	450	225	1	590	450	225	1	590	450	225
Provide Quality Installation of new ASHP 16 SEER ASHP 2.5 Tons	Quality Installation of 2.5 Ton ASHP 16 SEER ASHP 2.5 Tons	2,109	399	Non-Quality Installation of 2.5 Ton ASHP 16 SEER ASHP 2.5 Tons	2,380	425	15	$150	$0	$75	$0.11	200%	4.0	-4.0	169	$0.888	$0.059	0.3	0.26711	$0.00	$0.00	90%	7	14	12	24	12	25	100%	100%	100%	4	2,583	2,100	1,050	6	4,428	3,600	1,800	7	4,612	3,750	1,875
Installation of High Efficiency GSHP equipment New/Existing Home	Quality Installation of 2 Ton, closed loop, 14.1 EER GSHP	1,702	414	Non-Quality Installation of 2 Ton 13 SEER AC	2,185	524	20	$300	$846	$1,168	$0.11	26%	24.2	18.0	440	$0.682	$0.034	0.5	0.47673	$0.00	$0.00	90%	68	68	65	65	66	66	100%	100%	100%	32	32,632	20,400	79,424	31	31,193	19,500	75,920	31	31,673	19,800	77,088
Mini-Split Heat Pump	MSHP size 1.2 tons, 21.27 SEER, 10.50 HSPF	1,088	1,216	MSHP size 1.2 tons, 14 SEER, 8.2 HSPF	1,647	1,216	18	$200	$3,440	$512	$0.11	39%	6.9	4.2	680	$0.294	$0.016	0.6	0.55159	$0.00	$0.00	90%	150	150	150	150	150	150	100%	100%	100%	83	111,276	30,000	76,854	83	111,276	30,000	76,854	83	111,276	30,000	76,854
Residential Heating																																											
EC Fan Motor on Retrofit Residential Furnace with AC	ECM Furnace Fan	357	2,542	Non-ECM Fan	569	2,542	7	$100	$236	$212	$0.11	47%	4.3	2.3	539	$0.186	$0.027	0.2	0.1	-$9.50	$0.00	63%	50	50	50	50	50	50	100%	100%	100%	7	29,421	5,000	10,600	7	29,421	5,000	10,600	7	29,421	5,000	10,600
EC Fan Motor on Retrofit Residential Furnace no AC	ECM Furnace Fan	298	2,133	Non-ECM Fan	501	2,133	7	$100	$236	$212	$0.11	47%	5.6	2.9	433	$0.231	$0.033	0.2	0.1	-$9.50	$0.00	27%	50	50	50	50	50	50	100%	100%	100%	3	23,635	5,000	10,600	3	23,635	5,000	10,600	3	23,635	5,000	10,600
EC Fan Motor on new Residential Furnace with AC	ECM Furnace Fan	390	3,556	Non-ECM Fan	579	3,556	18	$100	$236	$212	$0.11	47%	3.5	1.9	672	$0.149	$0.008	0.2	0.1	-$14.06	$0.00	71%	8,900	8,900	8,900	8,900	8,900	8,900	100%	100%	100%	1,310	6,529,258	890,000	1,886,800	1,310	6,529,258	890,000	1,886,800	1,310	6,529,258	890,000	1,886,800
EC Fan Motor on new Residential Furnace no AC	ECM Furnace Fan	301	2,783	Non-ECM Fan	504	2,783	18	$100	$236	$212	$0.11	47%	4.4	2.3	565	$0.177	$0.010	0.2	0.1	-$14.06	$0.00	27%	1,000	1,000	1,000	1,000	1,000	1,000	100%	100%	100%	60	616,812	100,000	212,000	60	616,812	100,000	212,000	60	616,812	100,000	212,000
School Education Kits																																											
9 Watt LED Bulbs - 2017	High efficiency LED lighting (2 at 9W)	18	909	Incandescent light bulb	86	909	7	$6	$0	$6	$0.11	100%	0.9	0.0	62	$0.103	$0.015	0.1	0.0	$0.00	$0.00	8%	2,800	14,000	0	0	0	0	100%	55%	100%	46	519,599	89,320	89,320	0	0	0	0	0	0	0	0
11 Watt LED Bulbs - 2017	High efficiency LED lighting (2 at 11W)	22	909	Incandescent light bulb	106	909	7	$10	$0	$10	$0.11	100%	1.1	0.0	76	$0.126	$0.018	0.1	0.0	$0.00	$0.00	8%	2,800	14,000	0	0	0	0	100%	55%	100%	57	641,857	134,680	134,680	0	0	0	0	0	0	0	0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2017	1.5 GPM Showerhead	87	8,760	2.5 GPM Showerhead	146	8,760	10	$3	$0	$3	$0.11	100%	0.0	0.0	510	$0.006	$0.001	0.1	0.0	$33.37	$0.00	64%	2,800	1,680	0	0	0	0	100%	35%	100%	24	327,645	5,416	5,416	0	0	0	0	0	0	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2017	1.5 GPM Kitchen Faucet Aerator	18	8,760	2.2 GPM Kitchen Faucet Aerator	26	8,760	10	$1	$0	$1	$0.11	100%	0.1	0.0	74	$0.016	$0.002	0.0	0.0	$4.17	$0.00	124%	2,800	1,680	0	0	0	0	100%	30%	100%	6	40,600	2,042	2,042	0	0	0	0	0	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2017	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$0	$0	$0	$0.11	100%	0.0	0.0	64	$0.008	$0.001	0.0	0.0	$4.19	$0.00	124%	2,800	1,680	0	0	0	0	100%	25%	100%	4	29,361	813	813	0	0	0	0	0	0	0	0
9 Watt LED Bulbs - 2018	High efficiency LED lighting (2 at 9W)	18	909	Incandescent light bulb	86	909	6	$6	$0	$6	$0.11	100%	0.9	0.0	62	$0.103	$0.017	0.1	0.0	$0.00	$0.00	8%	0	0	2,800	14,000	0	0	100%	55%	100%	0	0	0	0	46	519,599	89,320	89,320	0	0	0	0

Electric Measure Description	Efficient Product Description / Rating	Efficient Product Consumption (watts)	Efficient Hours of Operation (hrs/yr)	Baseline Product Description / Rating	Baseline Product Consumption (watts)	Baseline Hours of Operation (hrs/yr)	Measure Lifetime (years)	Rebate Amount ($)	Average Baseline Product Cost ($)	Incremental Cost of Efficient Product ($)	Assumed Energy Cost ($/kWh)	Rebate as a % of Incremental Cost (%)	Incremt'l Cost Payback Period w/o Rebate (yrs)	Incremt'l Cost Payback Period w/ Rebate (yrs)
11 Watt LED Bulbs - 2018	High efficiency LED lighting (2 at 11W)	22	909	Incandescent light bulb	106	909	6	$10	$0	$10	$0.11	100%	1.1	0.0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2018	1.5 GPM Showerhead	87	8,760	2.5 GPM Showerhead	146	8,760	10	$3	$0	$3	$0.11	100%	0.0	0.0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2018	1.5 GPM Kitchen Faucet Aerator	18	8,760	2.2 GPM Kitchen Faucet Aerator	26	8,760	10	$1	$0	$1	$0.11	100%	0.1	0.0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2018	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$0	$0	$0	$0.11	100%	0.0	0.0
9 Watt LED Bulbs - 2019	High efficiency LED lighting (2 at 9W)	18	909	Incandescent light bulb	86	909	5	$6	$0	$6	$0.11	100%	0.9	0.0
11 Watt LED Bulbs - 2019	High efficiency LED lighting (2 at 11W)	22	909	Incandescent light bulb	106	909	5	$10	$0	$10	$0.11	100%	1.1	0.0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2019	1.5 GPM Showerhead	87	8,760	2.5 GPM Showerhead	146	8,760	10	$3	$0	$3	$0.11	100%	0.0	0.0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2019	1.5 GPM Kitchen Faucet Aerator	18	8,760	2.2 GPM Kitchen Faucet Aerator	26	8,760	10	$1	$0	$1	$0.11	100%	0.1	0.0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2019	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$1	$0	$1	$0.11	100%	0.0	0.0
Whole Home Efficiency														
EC Fan Motor on new Residential Furnace with AC	ECM Furnace Fan	390	3,556	Non-ECM Fan	579	3,556	18	$125	$236	$212	$0.11	59%	3.5	1.5
EC Fan Motor on new Residential Furnace no AC	ECM Furnace Fan	301	2,783	Non-ECM Fan	504	2,783	18	$125	$236	$212	$0.11	59%	4.4	1.8
EC Fan Motor on Retrofit Residential Furnace with AC	ECM Furnace Fan	357	2,542	Non-ECM Fan	569	2,542	7	$125	$236	$212	$0.11	59%	4.3	1.7
EC Fan Motor on Retrofit Residential Furnace no AC	ECM Furnace Fan	298	2,133	Non-ECM Fan	501	2,133	7	$125	$236	$212	$0.11	59%	5.6	2.3
Installation of new AC 15 SEER 2.5 tons	Non - Quality Installation of 15 SEER 2.5 tons	2,479	435	Non-Quality Installation of 13 SEER (Baseline and Model) 2.5 tons	2,732	456	15	$200	$1,057	$461	$0.11	43%	25.2	14.3
Installation of new AC 16 SEER 2.5 tons	Non - Quality Installation of 16 SEER 2.5 tons	2,380	425	Non-Quality Installation of 13 SEER (Baseline and Model) 2.5 tons	2,732	456	15	$300	$1,057	$691	$0.11	43%	26.9	15.2
Provide Quality Installation of new AC 13 - 14.5 SEER 2.5 tons	Quality Installation of 13 - 14.5 SEER 2.5 tons	2,318	421	Non-Quality Installation of 2.5 Ton AC 13 - 14.5 SEER 2.5 tons	2,620	447	15	$175	$0	$152	$0.11	115%	7.1	-1.1
Provide Quality Installation of new AC 15 SEER 2.5 tons	Quality Installation of 15 SEER 2.5 tons	2,195	409	Non-Quality Installation of 2.5 Ton AC 15 SEER 2.5 tons	2,479	435	15	$175	$0	$121	$0.11	144%	6.1	-2.7
Provide Quality Installation of new AC 16 SEER 2.5 tons	Quality Installation of 16 SEER 2.5 tons	2,109	399	Non-Quality Installation of 2.5 Ton AC 16 SEER 2.5 tons	2,380	425	15	$175	$0	$98	$0.11	178%	5.3	-4.1
Energy Star Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Clothes Washer	111	295	Standard Clothes Washer	132	295	11	$2	$677	$7	$0.11	33%	2.3	1.5
Refrigerator Replacement	Top Mounted Freeezer w/ Auto Defrost Energy Star refrigerator 22.0 Cf	66	5,592	Top Mounted Freeezer w/ Auto Defrost Standard refrigerator 22.0 Cf	74	5,592	18	$15	$663	$26	$0.11	58%	5.7	2.4
Attic Insulation in Gas Heated Homes With Cooling - Combo Customer	Home with additional insulation	3,880	490	Home with R20 or less existing Insulation	4,000	490	20	$39	$0	$263	$0.11	15%	40.7	34.7
Wall Insulation in Gas Heated Homes With Cooling - Combo Customer	R-11 insulation	3,682	490	Baseline assumes R-0 in wall cavities as existing level	4,000	490	20	$34	$0	$249	$0.11	14%	14.5	12.6
Air Sealing T2 - 25% - Gas Heated Homes With Cooling - Combo Customer	Home with Tier 2 Air Sealing - Average 27% reduction	7,787	490	Existing Home Without Air Sealing	8,000	490	10	$28	$0	$163	$0.11	17%	14.2	11.8
Air Sealing T3 - 30% - Gas Heated Homes With Cooling - Combo Customer	Home with Tier 3 Air Sealing - average 42% reduction	7,524	490	Existing Home Without Air Sealing	8,000	490	10	$19	$0	$131	$0.11	15%	5.1	4.4
Programmable Thermostat (Install and Program)	New T-stat w/ Auto setup by 1.2 F for cooling assume 3 ton AC, 10 SEER	3,008	442	Base modeled home w/ 10 SEER AC and no setup temp	3,130	449	10	$2	$0	$8	$0.11	31%	0.9	0.6
Energy Efficient Showerhead in home with electric DHW (Direct Install)	1.5 GPM Showerhead	87	8,760	2.5 GPM Showerhead	146	8,760	10	$4	$0	$4	$0.11	100%	0.0	0.0
Energy Efficient Bathroom Aerator in home with electric DHW (Direct Install	1.5 GPM Kitchen Faucet Aerator	18	8,760	2.2 GPM Kitchen Faucet Aerator	26	8,760	10	$1	$0	$1	$0.11	100%	0.1	0.0
Energy Efficient Kitchen Aerator in home with electric DHW (Direct Install)	1.0 GPM Bathroom Faucet Aerator	6	8,760	2.2 GPM Bathroom Faucet Aerator	13	8,760	10	$2	$0	$2	$0.11	100%	0.2	0.0
Water heater blankets (direct install)	Add commercial Insulation wrap R8 around Water Heater Tank	40	8,760	No External Insulation on water heater	69	8,760	7	$23	$0	$23	$0.11	100%	0.8	0.0
Average Value LED Bulb - 2017 (Direct Install)	Average Value LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	43	909	7	$3	$0	$3	$0.11	100%	0.8	0.0
Average Value LED Bulb - 2018 (Direct Install)	Average Value LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	43	909	6	$3	$0	$3	$0.11	100%	0.8	0.0
Average Value LED Bulb - 2019 (Direct Install)	Average Value LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	43	909	5	$3	$0	$3	$0.11	100%	0.8	0.0
Mini-Split Heat Pump	0	0	0	0	0	0	0	$0	$0	$0	$0.11	#DIV/0!	#DIV/0!	#DIV/0!
Residential Saver's Switch														
Residential AC Switch	Utility Load Control for control period with smart switch	0	0	No Control, No Switch	2,402	1	15	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0
Residential WH Switch	Utility Load Control for control period with smart switch	0	0	No Control, No Switch	4,500	1	15	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0
Low Income														
Home Energy Savings Program														
Refrigerator Replacements	Top Mounted Freeezer w/ Auto Defrost Energy Star refrigerator 22.0 Cf	66	5,592	Top Mounted Freeezer w/ Auto Defrost Refrigerator 22.0 Cf > 15 years	173	5,592	18	$617	$0	$617	$0.11	100%	9.4	0.0
Freezer Replacement	Energy Star standard freezer	57	5,592	Existing unit vintage > 15 years old	147	5,592	18	$320	$0	$320	$0.11	100%	5.7	0.0
Refrigerator Recycling	Removal of second refrigerator	0	0	Existing primary unit - age mostly >15 years	203	5,592	8	$47	$0	$47	$0.11	100%	0.4	0.0
Freezer Recycling	Removal of freezer	0	0	Existing primary unit - age mostly >10 years	206	5,592	6	$43	$0	$43	$0.11	100%	0.3	0.0
Window Air Conditioner Replacement	Energy Star 10,000 Btu/hr 10.8 EER Window AC Unit	885	662	Standard 10,000 Btu/hr 9.8 EER Window AC Unit	917	662	9	$409	$0	$409	$0.11	100%	173.2	0.0
Window Air Conditioner Recycling	Removal of Standard 10,000 Btu/hr 9.8 EER Window AC Unit	0	662	Standard 10,000 Btu/hr 9.8 EER Window AC Unit	917	662	5	$63	$0	$63	$0.11	100%	0.9	0.0
EC Fan Motor on New Residential Furnace without AC	ECM Furnace Fan	301	2,783	Non-ECM Fan	504	2,783	18	$525	$0	$525	$0.11	100%	10.9	0.0
Attic Insulation - Gas Heated & Electrically Cooled Home	Insulate the attic to R-48 & perform Bypass air sealing	32,685	490	Existing home with average attic area of 823 sq. ft. and R-17 insulation	32,770	490	20	$24	$0	$24	$0.11	100%	5.1	0.0
Attic Insulation - Electrically Heated & Non-Cooled Home	Insulate the attic to R-48 & perform Bypass air sealing	31,626	1,261	Existing home with average attic area of 823 sq. ft. and R-17 insulation	32,770	1,261	20	$1,524	$0	$1,524	$0.11	100%	9.6	0.0
Attic Insulation - Electrically Heated & Cooled Home	Insulate the attic to R-48 & perform Bypass air sealing	31,922	1,751	Existing home with average attic area of 823 sq. ft. and R-17 insulation	32,770	1,751	20	$1,524	$0	$1,524	$0.11	100%	9.3	0.0
Air Sealing - Gas Heated & Electrically Cooled Home	Perform Bypass air sealing along with Attic Insulation	32,624	490	Existing home with average home size of 1406 sq. ft.	32,685	490	10	$77	$0	$77	$0.11	100%	23.3	0.0
Air Sealing - Electrically Heated & Non-Cooled Home	Perform Bypass air sealing along with Attic Insulation	30,480	1,261	Existing home with average home size of 1406 sq. ft.	31,626	1,261	10	$880	$0	$880	$0.11	100%	5.5	0.0
Air Sealing - Electrically Heated & Cooled Home	Perform Bypass air sealing along with Attic Insulation	31,080	1,751	Existing home with average home size of 1406 sq. ft.	31,922	1,751	10	$880	$0	$880	$0.11	100%	5.4	0.0
Wall Insulation - Gas Heated and Electricallly Cooled Home	Add Insulation to Walls (R-11 added)	32,580	490	Existing Home with empty wall cavity (assume structure insulation value)	32,770	490	20	$103	$0	$103	$0.11	100%	10.0	0.0
Wall Insulation - Electricallly Heated and Non-Cooled Home	Add Insulation to Walls (R-11 added)	30,208	1,261	Existing Home with empty wall cavity (assume structure insulation value)	32,770	1,261	20	$1,295	$0	$1,295	$0.11	100%	3.6	0.0
Wall Insulation - Electricallly Heated and Cooled Home	Add Insulation to Walls (R-11 added)	30,872	1,751	Existing Home with empty wall cavity (assume structure insulation value)	32,770	1,751	20	$1,295	$0	$1,295	$0.11	100%	3.5	0.0
LI Home Energy Squad														
Total Energy Squad Service 2017	Weighted Average of 2017 LI Squad Services	63	965	Existing Home	104	965	7	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0
Total Energy Squad Service 2018	Weighted Average of 2018 LI Squad Services	63	965	Existing Home	104	965	6	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0
Total Energy Squad Service 2019	Weighted Average of 2019 LI Squad Services	63	965	Existing Home	104	965	5	$0	$0	$0	$0.11	#DIV/0!	0.0	0.0
Multi-Family Energy Savings Program														
Refrigerator Replacement with new Energy Star Refrigerator	Top Mounted Freeezer w/ Auto Defrost Energy Star refrigerator 22.0 Cf	66	5,592	Top Mounted Freeezer w/ Auto Defrost Refrigerator 22.0 Cf > 15 years	173	5,592	18	$520	$0	$520	$0.11	100%	7.9	0.0
Freezer Replacement with new Energy Star Freezer	Energy Star standard freezer	57	5,592	Existing unit vintage > 15 years old	147	5,592	18	$244	$0	$244	$0.11	100%	4.4	0.0
Refrigerator Removal and Recycling	Removal of second refrigerator	0	0	Existing primary unit - age mostly >15 years	203	5,592	8	$33	$0	$33	$0.11	100%	0.3	0.0
Freezer Removal and Recycling	Removal of freezer	0	0	Existing primary unit - age mostly >10 years	206	5,592	6	$33	$0	$33	$0.11	100%	0.3	0.0
Window Air Conditioner Replacement with Energy Star 10,000 Btu/hr 10.8 EER Window AC Unit	Energy Star 10,000 Btu/hr 10.8 EER Window AC Unit	885	662	Standard 10,000 Btu/hr 9.8 EER Window AC Unit	917	662	9	$409	$0	$409	$0.11	100%	180.2	0.0
Window Air Conditioner Removal and Recycling of Standard 10,000 Btu/hr 9.8 EER Window AC Unit	Removal of Standard 10,000 Btu/hr 9.8 EER Window AC Unit	0	0	Standard 10,000 Btu/hr 9.8 EER Window AC Unit	917	662	5	$33	$0	$33	$0.11	100%	0.5	0.0
Value LED Bulbs - 2017	Average LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	48	909	7	$5	$0	$5	$0.11	100%	1.4	0.0
Value LED Bulbs - 2018	Average LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	48	909	6	$5	$0	$5	$0.11	100%	1.4	0.0
Value LED Bulbs - 2019	Average LED Bulb	10	909	Average EISA Standard Halogen A-Style Bulb	48	909	5	$5	$0	$5	$0.11	100%	1.4	0.0
Pilot Programs														
Energy Star Retail Products														
Sound Bars	ENERGY STAR ® + 50%	3	8,760	Industry Standard	10	8,760	7	$15	$0	$0	$0.11	#DIV/0!	0.0	-2.1
Freezers	ENERGY STAR ®	58	4,818	Industry Standard	65	4,818	11	$20	$0	$10	$0.11	198%	3.0	-2.9
Gas Clothes Dryers	ENERGY STAR ®	121	283	Industry Standard	149	283	12	$5	$0	$26	$0.11	19%	30.2	24.6
Electric Clothes Dryers	ENERGY STAR ®	2,150	283	Industry Standard	2,717	283	12	$50	$0	$225	$0.11	22%	12.8	9.9
Air Cleaners	ENERGY STAR ®	54	5,840	Industry Standard	91	5,840	9	$20	$0	$56	$0.11	36%	2.4	1.5
Room Air Conditioners (MN)	ENERGY STAR ®	848	662	Industry Standard	922	662	9	$10	$0	$114	$0.10	9%	22.9	20.9
Energy Information Systems														
Energy Information System	New Energy Information System	0	0	No EIS	0	0	5	$9,720	$0	$32,400	$0.08	30%	#DIV/0!	#DIV/0!
Behavioral and Operational Measures	Efficient behavior/operations	853,920	8,760	Less efficient behavior/operations	875,815	8,760	1	$1,752	$0	$0	$0.06	#DIV/0!	0.0	0.3
Behavioral and Operational Measures Adjustment	Efficient behavior/operations	-683,136	8,760	Less efficient behavior/operations	-700,652	8,760	1	$0	$0	$0	$0.06	#DIV/0!	0.0	0.0
Retrocommissioning Measures	Optimized Building Systems	1,293,826	5,900	Non-optimized Building Systems	1,300,271	5,900	7	$656	$0	$821	$0.06	80%	0.1	0.0

Electric Measure Description	Annual Customer kWh Savings (kWh/yr)	Rebated Cost / Cust kWh Saved ($/kWh)	Rebated Lifetime cost /Cust KWh Saved ($/kWh)	Customer kW Savings (kW)	Generator Peak kW Savings (kW)	Non-Energy O&M Savings ($)	Energy O&M Savings ($)	Coincidence Factor (%)	2017 Participants (-)	2017 Units (-)	2018 Participants (-)	2018 Units (-)	2019 Participants (-)	2019 Units (-)	NTG (%)	Installation Rate (%)	Realization Rate (%)
11 Watt LED Bulbs - 2018	76	$0.126	$0.021	0.1	0.0	$0.00	$0.00	8%	0	0	2,800	14,000	0	0	100%	55%	100%
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2018	510	$0.007	$0.001	0.1	0.0	$33.37	$0.00	64%	0	0	2,800	1,680	0	0	100%	35%	100%
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2018	74	$0.017	$0.002	0.0	0.0	$4.17	$0.00	124%	0	0	2,800	1,680	0	0	100%	30%	100%
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2018	64	$0.008	$0.001	0.0	0.0	$4.19	$0.00	124%	0	0	2,800	1,680	0	0	100%	25%	100%
9 Watt LED Bulbs - 2019	62	$0.103	$0.020	0.1	0.0	$0.00	$0.00	8%	0	0	0	0	2,800	14,000	100%	55%	100%
11 Watt LED Bulbs - 2019	76	$0.126	$0.025	0.1	0.0	$0.00	$0.00	8%	0	0	0	0	2,800	14,000	100%	55%	100%
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2019	510	$0.007	$0.001	0.1	0.0	$33.37	$0.00	64%	0	0	0	0	2,800	1,680	100%	35%	100%
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2019	74	$0.017	$0.002	0.0	0.0	$4.17	$0.00	124%	0	0	0	0	2,800	1,680	100%	30%	100%
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2019	64	$0.008	$0.001	0.0	0.0	$4.19	$0.00	124%	0	0	0	0	2,800	1,680	100%	25%	100%
Whole Home Efficiency																	
EC Fan Motor on new Residential Furnace with AC	672	$0.186	$0.010	0.2	0.1	-$14.06	$0.00	71%	3	30	3	30	3	30	100%	100%	100%
EC Fan Motor on new Residential Furnace no AC	565	$0.221	$0.012	0.2	0.1	-$14.06	$0.00	27%	1	10	1	10	1	10	100%	100%	100%
EC Fan Motor on Retrofit Residential Furnace with AC	539	$0.232	$0.033	0.2	0.1	-$9.50	$0.00	63%	2	20	2	20	2	20	100%	100%	100%
EC Fan Motor on Retrofit Residential Furnace no AC	433	$0.289	$0.041	0.2	0.1	-$9.50	$0.00	27%	0	5	0	5	0	5	100%	100%	100%
Installation of new AC 15 SEER 2.5 tons	166	$1.205	$0.080	0.3	0.2	$0.00	$0.00	90%	0	2	0	2	0	2	100%	100%	100%
Installation of new AC 16 SEER 2.5 tons	233	$1.286	$0.086	0.4	0.3	$0.00	$0.00	90%	1	10	1	10	1	10	100%	100%	100%
Provide Quality Installation of new AC 13 - 14.5 SEER 2.5 tons	196	$0.894	$0.060	0.3	0.3	$0.00	$0.00	90%	0	5	0	5	0	5	100%	100%	100%
Provide Quality Installation of new AC 15 SEER 2.5 tons	180	$0.971	$0.065	0.3	0.3	$0.00	$0.00	90%	0	2	0	2	0	2	100%	100%	100%
Provide Quality Installation of new AC 16 SEER 2.5 tons	169	$1.036	$0.069	0.3	0.3	$0.00	$0.00	90%	1	10	1	10	1	10	100%	100%	100%
Energy Star Clothes Washer - Combo Customers w/ Gas DHW	6	$0.363	$0.033	0.0	0.0	$2.30	$0.00	3%	1	15	1	15	1	15	100%	100%	100%
Refrigerator Replacement	41	$0.364	$0.020	0.0	0.0	$0.00	$0.00	64%	2	20	2	20	2	20	100%	100%	100%
Attic Insulation in Gas Heated Homes With Cooling - Combo Customer	59	$0.664	$0.033	0.1	0.1	$0.00	$0.00	100%	9	100	9	100	9	100	100%	100%	100%
Wall Insulation in Gas Heated Homes With Cooling - Combo Customer	156	$0.217	$0.011	0.3	0.3	$0.00	$0.00	100%	11	120	11	120	11	120	100%	100%	100%
Air Sealing T2 - 25% - Gas Heated Homes With Cooling - Combo Customer	104	$0.268	$0.027	0.2	0.2	$0.00	$0.00	100%	4	40	4	40	4	40	100%	100%	100%
Air Sealing T3 - 30% - Gas Heated Homes With Cooling - Combo Customer	233	$0.083	$0.008	0.5	0.5	$0.00	$0.00	100%	6	70	6	70	6	70	100%	100%	100%
Programmable Thermostat (Install and Program)	75	$0.031	$0.003	0.1	0.1	$0.00	$0.00	76%	4	40	4	40	4	40	100%	100%	100%
Energy Efficient Showerhead in home with electric DHW (Direct Install)	510	$0.007	$0.001	0.1	0.0	$33.37	$0.00	64%	1	12	1	12	1	12	100%	100%	100%
Energy Efficient Bathroom Aerator in home with electric DHW (Direct Install	74	$0.014	$0.001	0.0	0.0	$4.17	$0.00	124%	2	18	2	18	2	18	100%	100%	100%
Energy Efficient Kitchen Aerator in home with electric DHW (Direct Install)	64	$0.031	$0.003	0.0	0.0	$4.19	$0.00	124%	1	12	1	12	1	12	100%	100%	100%
Water heater blankets (direct install)	254	$0.092	$0.014	0.0	0.0	$0.00	$0.00	100%	2	25	2	25	2	25	100%	100%	100%
Average Value LED Bulb - 2017 (Direct Install)	30	$0.091	$0.013	0.0	0.0	$0.00	$0.00	8%	147	1,600	0	0	0	0	100%	100%	100%
Average Value LED Bulb - 2018 (Direct Install)	30	$0.091	$0.015	0.0	0.0	$0.00	$0.00	8%	0	0	147	1,600	0	0	100%	100%	100%
Average Value LED Bulb - 2019 (Direct Install)	30	$0.091	$0.018	0.0	0.0	$0.00	$0.00	8%	0	0	0	0	147	1,600	100%	100%	100%
Mini-Split Heat Pump	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	0%	0	5	0	5	0	5	100%	100%	100%
Residential Saver's Switch																	
Residential AC Switch	2	$0.000	$0.000	2.4	0.7	$0.00	$0.00	28%	20,000	20,000	20,000	20,000	20,000	20,000	100%	100%	100%
Residential WH Switch	3	$0.000	$0.000	4.5	0.2	$0.00	$0.00	4%	25	25	25	25	25	25	100%	100%	100%
Low Income																	
Home Energy Savings Program																	
Refrigerator Replacements	595	$1.036	$0.058	0.1	0.1	$0.00	$0.00	64%	409	650	483	650	483	650	100%	100%	100%
Freezer Replacement	508	$0.629	$0.035	0.1	0.1	$0.00	$0.00	64%	170	270	201	270	201	270	100%	100%	100%
Refrigerator Recycling	1,133	$0.041	$0.005	0.2	0.1	$0.00	$0.00	64%	3	5	4	5	4	5	100%	100%	100%
Freezer Recycling	1,155	$0.037	$0.006	0.2	0.1	$0.00	$0.00	64%	1	2	1	2	1	2	100%	100%	100%
Window Air Conditioner Replacement	21	$19.044	$2.116	0.0	0.0	$0.00	$0.00	90%	283	450	334	450	334	450	100%	100%	100%
Window Air Conditioner Recycling	607	$0.103	$0.023	0.9	0.9	$0.00	$0.00	90%	0	0	0	0	0	0	100%	100%	100%
EC Fan Motor on New Residential Furnace without AC	565	$0.929	$0.052	0.2	0.1	-$14.06	$0.00	27%	69	110	82	110	82	110	100%	100%	100%
Attic Insulation - Gas Heated & Electrically Cooled Home	42	$0.567	$0.028	0.1	0.0	$0.00	$0.00	0%	72	114	85	114	85	114	100%	100%	100%
Attic Insulation - Electrically Heated & Non-Cooled Home	1,443	$1.056	$0.053	1.1	0.0	$0.00	$0.00	0%	3	5	4	5	4	5	100%	100%	100%
Attic Insulation - Electrically Heated & Cooled Home	1,484	$1.027	$0.051	0.8	0.0	$0.00	$0.00	0%	0	0	0	0	0	0	100%	100%	100%
Air Sealing - Gas Heated & Electrically Cooled Home	30	$2.573	$0.257	0.1	0.1	$0.00	$0.00	100%	72	114	85	114	85	114	100%	100%	100%
Air Sealing - Electrically Heated & Non-Cooled Home	1,445	$0.609	$0.061	1.1	0.0	$0.00	$0.00	0%	3	5	4	5	4	5	100%	100%	100%
Air Sealing - Electrically Heated & Cooled Home	1,475	$0.597	$0.060	0.8	0.1	$0.00	$0.00	10%	0	0	0	0	0	0	100%	100%	100%
Wall Insulation - Gas Heated and Electricallly Cooled Home	93	$1.105	$0.055	0.2	0.2	$0.00	$0.00	100%	11	18	13	18	13	18	100%	100%	100%
Wall Insulation - Electricallly Heated and Non-Cooled Home	3,230	$0.401	$0.020	2.6	0.0	$0.00	$0.00	0%	4	7	5	7	5	7	100%	100%	100%
Wall Insulation - Electricallly Heated and Cooled Home	3,324	$0.390	$0.019	1.9	0.2	$0.00	$0.00	10%	0	0	0	0	0	0	100%	100%	100%
LI Home Energy Squad																	
Total Energy Squad Service 2017	39	$0.000	$0.000	0.0	0.0	$0.00	$0.00	11%	1,900	31,942	0	0	0	0	100%	100%	100%
Total Energy Squad Service 2018	39	$0.000	$0.000	0.0	0.0	$0.00	$0.00	11%	0	0	1,900	31,942	0	0	100%	100%	100%
Total Energy Squad Service 2019	39	$0.000	$0.000	0.0	0.0	$0.00	$0.00	11%	0	0	0	0	1,900	31,942	100%	100%	100%
Multi-Family Energy Savings Program																	
Refrigerator Replacement with new Energy Star Refrigerator	595	$0.874	$0.049	0.1	0.1	$0.00	$0.00	64%	89	697	89	697	89	697	100%	100%	100%
Freezer Replacement with new Energy Star Freezer	508	$0.480	$0.027	0.1	0.1	$0.00	$0.00	64%	3	22	3	22	3	22	100%	100%	100%
Refrigerator Removal and Recycling	1,133	$0.029	$0.004	0.2	0.1	$0.00	$0.00	64%	1	11	1	11	1	11	100%	100%	100%
Freezer Removal and Recycling	1,155	$0.029	$0.005	0.2	0.1	$0.00	$0.00	64%	1	11	1	11	1	11	100%	100%	100%
Window Air Conditioner Replacement with Energy Star 10,000 Btu/hr 10.8 EER Window AC Unit	21	$19.044	$2.116	0.0	0.0	$0.00	$0.00	55%	53	414	53	414	53	414	100%	100%	100%
Window Air Conditioner Removal and Recycling of Standard 10,000 Btu/hr 9.8 EER Window AC Unit	607	$0.054	$0.012	0.9	0.6	$0.00	$0.00	55%	0	0	0	0	0	0	100%	100%	100%
Value LED Bulbs - 2017	34	$0.151	$0.021	0.0	0.0	$0.00	$0.00	8%	1,619	12,702	0	0	0	0	100%	100%	100%
Value LED Bulbs - 2018	34	$0.151	$0.025	0.0	0.0	$0.00	$0.00	8%	0	0	1,619	12,702	0	0	100%	100%	100%
Value LED Bulbs - 2019	34	$0.151	$0.030	0.0	0.0	$0.00	$0.00	8%	0	0	0	0	1,619	12,702	100%	100%	100%
Pilot Programs																	
Energy Star Retail Products																	
Sound Bars	66	$0.227	$0.032	0.0	0.0	$0.00	$0.00	100%	2,614	2,614	3,922	3,922	4,706	4,706	100%	100%	100%
Freezers	31	$0.640	$0.058	0.0	0.0	$0.00	$0.00	55%	1,160	1,160	1,740	1,740	2,088	2,088	100%	100%	100%
Gas Clothes Dryers	8	$0.614	$0.051	0.0	0.0	$0.00	$0.00	2%	582	582	873	873	1,048	1,048	100%	100%	100%
Electric Clothes Dryers	160	$0.312	$0.026	0.6	0.0	$0.00	$0.00	2%	4,963	4,963	7,444	7,444	8,933	8,933	100%	100%	100%
Air Cleaners	214	$0.094	$0.010	0.0	0.0	$0.00	$0.00	100%	2,244	2,244	3,366	3,366	4,039	4,039	100%	100%	100%
Room Air Conditioners (MN)	49	$0.205	$0.023	0.1	0.1	$0.00	$0.00	90%	7,539	7,539	11,308	11,308	13,569	13,569	100%	100%	100%
Energy Information Systems																	
Energy Information System	0	#DIV/0!	#DIV/0!	0.0	0.0	$0.00	$0.00	0%	5	5	5	5	5	5	100%	100%	100%
Behavioral and Operational Measures	191,804	$0.009	$0.009	21.9	12.0	-$18,000.00	$0.00	51%	10	10	15	15	20	20	100%	100%	100%
Behavioral and Operational Measures Adjustment	-153,443	$0.000	$0.000	-17.5	-9.6	$14,400.00	$0.00	51%		10		15		20	100%	100%	100%
Retrocommissioning Measures	38,029	$0.017	$0.002	6.4	3.5	$273.19	$11,355.85	51%	10	38	15	45	20	52	100%	100%	100%

Electric Measure Description	2017 NET Gen kW (kW)	2017 NET Gen kWh (kWh)	2017 Rebate Budget ($)	2017 Incremental Costs ($)	2018 NET Gen kW (kW)	2018 NET Gen kWh (kWh)	2018 Rebate Budget ($)	2018 Incremental Costs ($)	2019 NET Gen kW (kW)	2019 NET Gen kWh (kWh)	2019 Rebate Budget ($)	2019 Incremental Costs ($)
11 Watt LED Bulbs - 2018	0	0	0	0	57	641,857	134,680	134,680	0	0	0	0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2018	0	0	0	0	24	327,645	5,579	5,579	0	0	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2018	0	0	0	0	6	40,600	2,103	2,103	0	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2018	0	0	0	0	4	29,361	838	838	0	0	0	0
9 Watt LED Bulbs - 2019	0	0	0	0	0	0	0	0	46	519,599	89,320	89,320
11 Watt LED Bulbs - 2019	0	0	0	0	0	0	0	0	57	641,857	134,680	134,680
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2019	0	0	0	0	0	0	0	0	24	327,645	5,746	5,746
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2019	0	0	0	0	0	0	0	0	6	40,600	2,166	2,166
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2019	0	0	0	0	0	0	0	0	4	29,361	863	863
Whole Home Efficiency												
EC Fan Motor on new Residential Furnace with AC	4	22,009	3,750	6,360	4	22,009	3,750	6,360	4	22,009	3,750	6,360
EC Fan Motor on new Residential Furnace no AC	1	6,168	1,250	2,120	1	6,168	1,250	2,120	1	6,168	1,250	2,120
EC Fan Motor on Retrofit Residential Furnace with AC	3	11,769	2,500	4,240	3	11,769	2,500	4,240	3	11,769	2,500	4,240
EC Fan Motor on Retrofit Residential Furnace no AC	0	2,364	625	1,060	0	2,364	625	1,060	0	2,364	625	1,060
Installation of new AC 15 SEER 2.5 tons	0	362	400	921	0	362	400	921	0	362	400	921
Installation of new AC 16 SEER 2.5 tons	3	2,547	3,000	6,910	3	2,547	3,000	6,910	3	2,547	3,000	6,910
Provide Quality Installation of new AC 13 - 14.5 SEER 2.5 tons	1	1,069	875	761	1	1,069	875	761	1	1,069	875	761
Provide Quality Installation of new AC 15 SEER 2.5 tons	1	394	350	243	1	394	350	243	1	394	350	243
Provide Quality Installation of new AC 16 SEER 2.5 tons	3	1,845	1,750	984	3	1,845	1,750	984	3	1,845	1,750	984
Energy Star Clothes Washer - Combo Customers w/ Gas DHW	0	104	34	103	0	104	34	103	0	104	34	103
Refrigerator Replacement	0	900	300	521	0	900	300	521	0	900	300	521
Attic Insulation in Gas Heated Homes With Cooling - Combo Customer	13	6,404	3,896	26,267	13	6,404	3,896	26,267	13	6,404	3,896	26,267
Wall Insulation in Gas Heated Homes With Cooling - Combo Customer	42	20,429	4,057	29,901	42	20,429	4,057	29,901	42	20,429	4,057	29,901
Air Sealing T2 - 25% - Gas Heated Homes With Cooling - Combo Customer	9	4,562	1,120	6,524	9	4,562	1,120	6,524	9	4,562	1,120	6,524
Air Sealing T3 - 30% - Gas Heated Homes With Cooling - Combo Customer	37	17,819	1,350	9,194	37	17,819	1,350	9,194	37	17,819	1,350	9,194
Programmable Thermostat (Install and Program)	4	3,285	94	302	4	3,285	94	302	4	3,285	94	302
Energy Efficient Showerhead in home with electric DHW (Direct Install)	0	6,687	45	45	0	6,687	45	45	0	6,687	45	45
Energy Efficient Bathroom Aerator in home with electric DHW (Direct Install	0	1,450	18	18	0	1,450	18	18	0	1,450	18	18
Energy Efficient Kitchen Aerator in home with electric DHW (Direct Install)	0	839	24	24	0	839	24	24	0	839	24	24
Water heater blankets (direct install)	1	6,936	587	587	1	6,936	587	587	1	6,936	587	587
Average Value LED Bulb - 2017 (Direct Install)	5	52,952	4,400	4,400	0	0	0	0	0	0	0	0
Average Value LED Bulb - 2018 (Direct Install)	0	0	0	0	5	52,952	4,400	4,400	0	0	0	0
Average Value LED Bulb - 2019 (Direct Install)	0	0	0	0	0	0	0	0	5	52,952	4,400	4,400
Mini-Split Heat Pump	0	0	0	0	0	0	0	0	0	0	0	0
Residential Saver's Switch												
Residential AC Switch	14,987	39,031	0	0	14,987	39,031	0	0	14,987	39,031	0	0
Residential WH Switch	5	91	0	0	5	91	0	0	5	91	0	0
Low Income												
Home Energy Savings Program												
Refrigerator Replacements	48	422,399	400,938	400,938	48	422,399	400,938	400,938	48	422,399	400,938	400,938
Freezer Replacement	17	149,852	86,357	86,357	17	149,852	86,357	86,357	17	149,852	86,357	86,357
Refrigerator Recycling	1	6,184	235	235	1	6,184	235	235	1	6,184	235	235
Freezer Recycling	0	2,521	85	85	0	2,521	85	85	0	2,521	85	85
Window Air Conditioner Replacement	14	10,562	184,243	184,243	14	10,562	184,243	184,243	14	10,562	184,243	184,243
Window Air Conditioner Recycling	0	0	0	0	0	0	0	0	0	0	0	0
EC Fan Motor on New Residential Furnace without AC	7	67,849	57,733	57,733	7	67,849	57,733	57,733	7	67,849	57,733	57,733
Attic Insulation - Gas Heated & Electrically Cooled Home	0	5,182	2,689	2,689	0	5,182	2,689	2,689	0	5,182	2,689	2,689
Attic Insulation - Electrically Heated & Non-Cooled Home	0	7,875	7,621	7,621	0	7,875	7,621	7,621	0	7,875	7,621	7,621
Attic Insulation - Electrically Heated & Cooled Home	0	0	0	0	0	0	0	0	0	0	0	0
Air Sealing - Gas Heated & Electrically Cooled Home	8	3,713	8,749	8,749	8	3,713	8,749	8,749	8	3,713	8,749	8,749
Air Sealing - Electrically Heated & Non-Cooled Home	0	7,889	4,401	4,401	0	7,889	4,401	4,401	0	7,889	4,401	4,401
Air Sealing - Electrically Heated & Cooled Home	0	0	0	0	0	0	0	0	0	0	0	0
Wall Insulation - Gas Heated and Electricallly Cooled Home	4	1,832	1,855	1,855	4	1,832	1,855	1,855	4	1,832	1,855	1,855
Wall Insulation - Electricallly Heated and Non-Cooled Home	0	24,686	9,065	9,065	0	24,686	9,065	9,065	0	24,686	9,065	9,065
Wall Insulation - Electricallly Heated and Cooled Home	0	0	0	0	0	0	0	0	0	0	0	0
LI Home Energy Squad												
Total Energy Squad Service 2017	152	1,374,942	0	0	0	0	0	0	0	0	0	0
Total Energy Squad Service 2018	0	0	0	0	152	1,374,942	0	0	0	0	0	0
Total Energy Squad Service 2019	0	0	0	0	0	0	0	0	152	1,374,942	0	0
Multi-Family Energy Savings Program												
Refrigerator Replacement with new Energy Star Refrigerator	52	452,942	362,440	362,440	52	452,942	362,440	362,440	52	452,942	362,440	362,440
Freezer Replacement with new Energy Star Freezer	1	12,210	5,368	5,368	1	12,210	5,368	5,368	1	12,210	5,368	5,368
Refrigerator Removal and Recycling	2	13,606	363	363	2	13,606	363	363	2	13,606	363	363
Freezer Removal and Recycling	2	13,865	363	363	2	13,865	363	363	2	13,865	363	363
Window Air Conditioner Replacement with Energy Star 10,000 Btu/hr 10.8 EER Window AC Unit	8	9,717	169,504	169,504	8	9,717	169,504	169,504	8	9,717	169,504	169,504
Window Air Conditioner Removal and Recycling of Standard 10,000 Btu/hr 9.8 EER Window AC Unit	0	0	0	0	0	0	0	0	0	0	0	0
Value LED Bulbs - 2017	42	476,139	66,050	66,050	0	0	0	0	0	0	0	0
Value LED Bulbs - 2018	0	0	0	0	42	476,139	66,050	66,050	0	0	0	0
Value LED Bulbs - 2019	0	0	0	0	0	0	0	0	42	476,139	66,050	66,050
Pilot Programs												
Energy Star Retail Products												
Sound Bars	22	188,345	39,210	0	32	282,590	58,830	0	39	339,079	70,590	0
Freezers	5	39,573	23,200	11,730	7	59,360	34,800	17,595	8	71,232	41,760	21,114
Gas Clothes Dryers	0	4,920	2,767	14,953	0	7,379	4,151	22,429	1	8,859	4,983	26,925
Electric Clothes Dryers	50	869,266	248,150	1,116,228	76	1,303,812	372,200	1,674,230	91	1,564,609	446,650	2,009,121
Air Cleaners	90	523,971	44,880	125,664	135	785,957	67,320	188,496	162	943,101	80,780	226,184
Room Air Conditioners (MN)	548	401,119	75,390	862,839	822	601,651	113,080	1,294,201	986	721,950	135,690	1,552,972
Energy Information Systems												
Energy Information System	0	0	48,600	162,000	0	0	48,600	162,000	0	0	48,600	162,000
Behavioral and Operational Measures	120	2,053,571	17,516	0	180	3,080,357	26,274	0	241	4,107,142	35,033	0
Behavioral and Operational Measures Adjustment	-96	-1,642,857	0	0	-144	-2,464,285	0	0	-192	-3,285,714	0	0
Retrocommissioning Measures	135	1,547,203	24,947	31,197	159	1,832,214	29,542	36,944	184	2,117,225	34,138	42,691

Natural Gas Measure Description	High Efficiency Product Description / Rating	Efficient Product Consumption	Baseline Product Description / Rating	Baseline Product Consumption	Life of Product (years)	Rebate Amount	Average Baseline Product Cost	Incremental Cost of Efficient Product	Assumed Energy Cost ($/Dth)
		Dth/yr		Dth/yr	yr	$	$	$	$
Business									
Business New Construction									
Average EDA Project - 2017	More Efficient than Code Building	5,026	Code-Compliant Building	7,180	20	12,353	0	$105,174	$9
Average EDA Project - 2018	More Efficient than Code Building	3,528	Code-Compliant Building	5,041	20	8,672	0	$73,839	$9
Average EDA Project - 2019	More Efficient than Code Building	3,759	Code-Compliant Building	5,369	20	9,238	0	$78,658	$9
Average EEB Project - 2017	More Efficient than Code Building	1,552	Code-Compliant Building	2,217	20	4,676	0	$18,850	$9
Average EEB Project - 2018	More Efficient than Code Building	1,060	Code-Compliant Building	1,514	20	3,193	0	$12,872	$9
Average EEB Project - 2019	More Efficient than Code Building	1,292	Code-Compliant Building	1,846	20	3,894	0	$15,697	$9
Commercial Efficiency									
Custom Gas Project	New Equipment	23,938	Less Efficient Product/Systems	24,888	15	$3,040	$0	$33,211	$8.67
Phase 2 Customer Contribution	0	0	0	0	0	$100,000	$0	$100,000	$8.67
Behavioral Changes	Behavior changes that reduce energy use	19,771	No change in behavior	20,812	1	$0	$0	$0	$8.67
Behavioral Changes	Behavior changes that reduce energy use	-13,181	No change in behavior	-13,875	1	$0	$0	$0	$8.67
Cooling Efficiency									
ERV Install on RTU/AHU for reduced heating load	72% Sensible Effectiveness Heat Recovery on 11193 CFM OA (Heating Mode)	874	No heat recovery on 11193 CFM OA	2,864	15	$11,193	$0	$38,413	$8.67
Custom Efficiency									
Custom Efficiency Gas	High Efficiency Product/system	22,566	Less Efficient Product/Systems	23,462	19	$4,477	$52,436	$68,955	$8.67
Custom Studies Gas	0	0	0	0	0	$9,152	$0	$24,740	$9.12
Efficiency Controls									
Efficiency Controls - Gas	New Digital Controls System	10,000	Non Digital or Obsolete Digital System	11,071	15	$8,486	$0	$66,151	$8.67
Efficiency Controls - Study Allocation	Study Allocation	0	0	0	0	$3,718	$0	$5,678	$8.67
Foodservice Equipment									
Convection Oven	Convection Oven	70	Deck Oven	174	11	$500	$7,870	$2,060	$8.67
Conveyor Oven	Conveyor Oven	269	Pizza Deck Oven	454	11	$750	$25,000	$7,080	$8.67
Combi-Oven	Combination Oven	62	Steamer	204	11	$1,000	$20,828	$4,272	$8.67
Rotisserie Oven	Rotisserie Oven - Infrared	71	Open Flame Rotisserie Oven	126	11	$500	$15,500	$2,665	$8.67
Rotating Rack Oven	Rotating Rack Oven	331	Deck Oven	502	11	$500	$18,530	$2,977	$8.67
Commercial Gas Fryer	High Efficiency Unit	99	Standard Efficiency Unit	142	11	$250	$3,630	$4,272	$8.67
Upright Broiler	Upright Broiler	105	Standard Radiant Broiler	214	11	$600	$12,587	$4,413	$8.67
High Efficiency Charbroiler	High Efficiency Charbroiler	73	Standard Charbroiler	148	11	$300	$1,800	$2,173	$8.67
High Efficiency Salamander Broiler	High Efficiency Salamander Broiler	17	Standard Salamander Broiler	41	11	$150	$5,002	$1,006	$8.67
Pasta Cooker	Pasta Cooker	1,551	Gas Range	1,689	11	$200	$2,317	$2,413	$8.67
Commercial Dishwasher - Under Counter, Gas Only or Combo Customer	ENERGY STAR qualified unit	19	Conventional unit as defined by ENERGY STAR	25	10	$157	$4,960	$53	$8.67
Commercial Dishwasher - Door Type, Gas Only or Combo Customer	ENERGY STAR qualified unit	80	Conventional unit as defined by ENERGY STAR	118	15	$168	$6,900	$333	$8.67
Demand Controlled Ventilation - Gas Only or Combo Customer	Commercial kitchen ventilation hoods with Demand Controlled Ventilation with 8.65 HP Motor	4,267	Commercial kitchen ventilation hoods with Demand Controlled Ventilation with 8.65 HP Motor	4,634	20	$2,163	$0	$17,360	$8.67
Heating Efficiency									
Hot Water Boiler - Non Condensing -Plan A	85% Efficient Boiler	1,810	80% Efficient Boiler	1,924	20	$954	$8,412	$4,792	$8.67
Hot Water Boiler - Condensing - Plan A	92% Efficient Boiler	1,807	80% Efficient Boiler	2,056	20	$4,166	$8,669	$10,447	$8.67
Hot Water Boiler - Condensing - Plan B	92% Efficient Boiler	784	78% Efficient Boiler	914	20	$6,488	$0	$14,837	$8.67
Low Pressure Steam Boiler - Total	84% Efficient Boiler	3,340	80% Efficient Boiler	3,507	20	$5,000	$18,757	$16,500	$8.67
High Pressure Steam Boiler - Total	83% Efficient Boiler	3,340	80% Efficient Boiler	3,466	20	$5,000	$20,633	$16,500	$8.67
Commercial Water Heaters - Total	96% Efficient Storage or 95% Efficient Tankless Water Heater	484	80% Efficient Storage Water Heater	597	15	$943	$7,657	$4,528	$8.67
90% Efficient Furnaces	90% Efficient Furnaces	76	78% Eff Furnace	88	18	$100	$1,866	$1,254	$8.67
92% Efficient Furnaces	92% Efficient Furnaces	76	78% Eff Furnace	90	18	$200	$1,866	$1,342	$8.67
94% Efficient Furnaces	94% Efficient Furnaces	76	78% Eff Furnace	92	18	$250	$1,866	$1,429	$8.67
96% Efficient Furnaces	96% Efficient Furnaces	76	78% Eff Furnace	94	18	$300	$1,866	$1,517	$8.67
Non-Condensing Power Vent (83% efficiency)	Non-condensing power vent unit heater	272	Non-condensing standard forced-air unit heater	283	20	$84	$1,179	$227	$8.67
Condensing (>90% efficiency)	Condensing power vent unit heater	251	Non-condensing standard forced-air unit heater	283	20	$778	$1,179	$1,407	$8.67
Infrared	Infrared heater	247	Non-condensing standard forced-air unit heater	283	15	$115	$1,179	$270	$8.67
Custom Boiler - Total	Various	33,226	Various	34,951	18	$8,625	$222,537	$55,410	$8.67
Boiler Tune up - Total	Boiler Tune-up - 2% additive improvement in efficiency, Boiler now at 80% efficiency for non-condensing; 0.8% additive improvement in efficiency, Boiler now at 88% average annual operating efficiency for condensing.	5,401	Existing boiler Poorly functioning at 78% efficiency for non-condensing, 98.2% for condensing.	5,538	2	$63	$0	$250	$8.67
Outdoor Air Reset - Total	83% Efficient Boiler	1,044	80% Efficient existing boiler	1,083	20	$200	$0	$1,004	$8.67
Stack Dampers - Total	81% Efficient Boiler	10,745	80% Efficient existing boiler	10,879	12	$128	$0	$1,209	$8.67
Modulating Burners - Total	83% Efficient Boiler	5,595	80% Efficient existing boiler	5,805	20	$3,067	$0	$11,619	$8.67
Turbulators - Totals	83% Efficient Boiler	2,005	80% Efficient existing boiler	2,080	20	$239	$0	$1,031	$8.67
O2 Trim Control - Totals	82% Efficient Boiler	20,018	80% Efficient existing boiler	20,518	20	$1,046	$0	$4,185	$8.67
Steam Traps - Total	New Steam Traps	1,596	Existing Boiler, malfunctioning steam traps	1,640	5	$50	$0	$263	$8.67
Pipe Insulation - Total	100 ft of pipe with new insulation	10	100 ft of pipe with no or old insulation	93	13	$1,248	$0	$2,715	$8.67
Heating System Optimization Study - Total	implement recommended measures	21,177	Existing system	21,880	7	$10,064	$0	$14,933	$8.67
Recommissioning Study Allocation	Efficient equipment as identified in a recommissioning study	0	Existing equipment	0	0	$5,597	$0	$15,379	$8.67
Multi Family Building Efficiency									
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in natural gas DHW unit home	1.5 GPM Showerhead	4	2.5 GPM Showerhead	6	10	$0	$0	$0	$8.67
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	1	2.2 GPM Kitchen Faucet Aerator	1	10	$0	$0	$0	$8.67
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	0	2.2 GPM Bathroom Faucet Aerator	1	10	$0	$0	$0	$8.67
Water Heater Blanket on Gas Water Heater	Add commercial Insulation wrap R8 around Water Heater Tank	2	No External Insulation on water heater	3	7	$0	$0	$0	$8.67
Holistic efficiency projects totaling either 15%, 20%, or 25% whole-building savings	Average Performance Building,	901	Average existing multifamily building after Direct Install measures completed	996	20	$5,909	$14,333	$5,612	$8.67
Process Efficiency									
Custom	New System	40,630	Old System	47,711	4	$24,697	$0	$243,302	$8.67
Commercial Heating	New System	743	Old System	784	10	$522	$1,450	$1,690	$8.67
Recommissioning	Optimized Building Systems	11,790	Existing Building System - Not Tuned or Optimized	13,100	7	$3,424	$0	$9,774	$8.67
Behavioral Changes	Behavior changes that reduce energy use	19,771	No change in behavior	20,812	1	$0	$0	$0	$8.67
Behavioral Changes	Behavior changes that reduce energy use	-13,181	No change in behavior	-13,875	1	$0	$0	$0	$8.67
Energy Design Assistance	High Efficiency Building	3,746	Code Level Efficiency Building	5,351	20	$9,524	$0	$73,370	$8.67
Phase 2 customer contribution	0	0	0	0	0	$0	$0	$1,500	$8.67
Recommissioning									
Recommissioning Implementation	Post-Recommissioned Building	11,790	Pre-Recommissioned Building	13,100	7	$2,740	$0	$9,774	$8.67
Recommissioning Studies	Study Cost and Rebate	0	0	0	0	$5,697	$0	$10,420	$8.67
BOC Program Attributable Savings	After BOC Training	12,931	Before BOC Training	13,100	5	$248	$0	$554	$8.67
Self Direct									
Average Project	New Equipment	12,721	Old or less efficient systems or equipment	17,655	17	$39,471	$0	$148,656	$8.67
Turn Key Services									
Identification ~ On site audit	Perform Study + Low Cost No Cost	0	0	0	0	$435	$0	$555	$8.67
Implementation	High Eff Project	5,000	Less Efficient System	5,532	13	$10,999	$0	$19,313	$9.12
Residential									
Efficient New Home Construction									
Low Income Envelope Improvements - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 1773 and Average 12.7% Better Than Code	62	Reference Home Based upon Local Code	74	20	$481	$0	$1,145	$9.12
10% to 15% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 3630 and Average 13.1% Better Than Code	110	Reference Home Based upon Local Code	132	20	$250	$0	$1,286	$9.12

Natural Gas Measure Description	Rebate as a % of Incremental Cost	Increm't Cost Period w/o Rebate	Increm't Cost Payback Period w/ Rebate	Annual Customer Dth Savings	Rebated cost /Cust Dth Saved	Rebated Lifetime cost /Cust Dth Saved	Non-Fuel O&M Savings	Electric or Natural Gas O&M Savings	Participants 2017	Units 2017	Participants 2018	Units 2018	Participants 2019	Units 2019
	%	Years	Years	Dth	$	$	$	$	#	#	#	#	#	#
Business														
Business New Construction														
Average EDA Project - 2017	$0	$5.63	497%	2153.9	5.7	0	$0.000	$0.000	12.0	12.0	$0.00	$0.00	0%	0
Average EDA Project - 2018	$0	$5.63	497%	1512.2	5.7	0	$0.000	$0.000	0.0	0.0	$13.00	$13.00	0%	0
Average EDA Project - 2019	$0	$5.63	497%	1610.8	5.7	0	$0.000	$0.000	0.0	0.0	$0.00	$0.00	900%	9
Average EEB Project - 2017	$0	$3.27	246%	665.2	7.0	0	$0.000	$0.000	7.0	7.0	$0.00	$0.00	0%	0
Average EEB Project - 2018	$0	$3.27	246%	454.2	7.0	0	$0.000	$0.000	0.0	0.0	$8.00	$8.00	0%	0
Average EEB Project - 2019	$0	$3.27	246%	553.9	7.0	0	$0.000	$0.000	0.0	0.0	$0.00	$0.00	1600%	16
Commercial Efficiency														
Custom Gas Project	9%	2.4	2.2	950	$3.200	$0.213	$5,657.319	$0.000	43	43	43	43	43	43
Phase 2 Customer Contribution	100%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	$0.000	$0.000	1	1	1	1	1	1
Behavioral Changes	#DIV/0!	0.0	0.0	1,041	$0.000	$0.000	$0.000	$0.000	1	1	1	1	1	1
Behavioral Changes	#DIV/0!	0.0	0.0	-694	$0.000	$0.000	$0.000	$0.000	1	1	1	1	1	1
Cooling Efficiency														
ERV Install on RTU/AHU for reduced heating load	29%	2.2	1.6	1,989	$5.627	$0.375	$0.000	$0.000	3	3	3	3	3	3
Custom Efficiency														
Custom Efficiency Gas	6%	6.5	6.1	895	$5.000	$0.257	$2,887.568	$0.000	18	18	19	19	19	19
Custom Studies Gas	37%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	$0.000	$0.000	2	2	2	2	2	2
Efficiency Controls														
Efficiency Controls - Gas	13%	6.0	5.2	1,071	$7.925	$0.528	$1,776.409	$0.000	15	15	15	15	15	15
Efficiency Controls - Study Allocation	65%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	$0.000	$0.000	1	1	2	2	2	2
Foodservice Equipment														
Convection Oven	24%	2.3	1.7	104	$4.805	$0.437	$0.000	$0.000	18	18	18	18	18	18
Conveyor Oven	11%	4.4	3.9	185	$4.054	$0.369	$0.000	$0.000	3	3	3	3	3	3
Combi-Oven	23%	3.5	2.7	142	$7.045	$0.640	$0.000	$0.000	4	4	4	4	4	4
Rotisserie Oven	19%	5.6	4.5	55	$9.030	$0.821	$0.000	$0.000	4	4	4	4	4	4
Rotating Rack Oven	17%	2.0	1.7	171	$2.931	$0.266	$0.000	$0.000	3	3	3	3	3	3
Commercial Gas Fryer	6%	11.4	10.7	43	$5.790	$0.526	$0.000	$0.000	7	7	7	7	7	7
Upright Broiler	14%	4.7	4.1	108	$5.543	$0.504	$0.000	$0.000	2	2	2	2	2	2
High Efficiency Charbroiler	14%	3.3	2.9	75	$3.976	$0.361	$0.000	$0.000	1	1	1	1	1	1
High Efficiency Salamander Broiler	15%	4.9	4.2	24	$6.357	$0.578	$0.000	$0.000	1	1	1	1	1	1
Pasta Cooker	8%	2.0	1.8	138	$1.448	$0.132	$0.000	$0.000	4	4	4	4	4	4
Commercial Dishwasher - Under Counter, Gas Only or Combo Customer	294%	0.6	-1.1	6	$25.839	$2.584	$20.684	$19.417	10	10	10	10	10	10
Commercial Dishwasher - Door Type, Gas Only or Combo Customer	50%	0.6	0.3	38	$4.469	$0.298	$162.959	$27.302	8	8	8	8	8	8
Demand Controlled Ventilation - Gas Only or Combo Customer	12%	4.0	3.5	366	$5.907	$0.295	$0.000	$1,171.381	2	2	2	2	2	2
Heating Efficiency														
Hot Water Boiler - Non Condensing -Plan A	20%	4.9	3.9	113	$8.430	$0.422	$0.000	$0.000	13	15	13	15	13	15
Hot Water Boiler - Condensing - Plan A	40%	4.8	2.9	248	$16.764	$0.838	$0.000	$0.000	16	29	16	32	16	32
Hot Water Boiler - Condensing - Plan B	44%	13.1	7.4	131	$49.668	$2.483	$0.000	$0.000	9	18	9	18	9	18
Low Pressure Steam Boiler - Total	30%	11.4	7.9	167	$29.936	$1.497	$0.000	$0.000	4	6	4	6	4	6
High Pressure Steam Boiler - Total	30%	15.2	10.6	125	$39.915	$1.996	$0.000	$0.000	1	1	1	1	1	1
Commercial Water Heaters - Total	21%	6.8	5.4	113	$8.372	$0.558	-$313.043	$0.000	33	56	33	55	33	55
90% Efficient Furnaces	8%	12.3	11.3	12	$8.502	$0.472	$0.000	$0.000	1	1	1	1	1	1
92% Efficient Furnaces	15%	11.3	9.6	14	$14.575	$0.810	$0.000	$0.000	14	20	14	20	14	20
94% Efficient Furnaces	17%	10.5	8.7	16	$15.942	$0.886	$0.000	$0.000	21	25	21	25	21	25
96% Efficient Furnaces	20%	9.9	8.0	18	$17.004	$0.945	$0.000	$0.000	64	90	64	90	64	90
Non-Condensing Power Vent (83% efficiency)	37%	2.6	1.6	10	$8.258	$0.413	$0.000	$0.000	3	5	3	5	3	5
Condensing (>90% efficiency)	55%	5.2	2.3	31	$24.775	$1.239	$0.000	$0.000	7	10	7	10	7	10
Infrared	43%	0.9	0.5	35	$3.268	$0.218	$0.000	$0.000	9	11	9	11	9	11
Custom Boiler - Total	16%	3.7	3.1	1,725	$5.000	$0.278	$0.000	$0.000	2	2	2	2	2	2
Boiler Tune up - Total	25%	0.2	0.2	138	$0.454	$0.227	$0.000	$0.000	233	441	213	438	213	438
Outdoor Air Reset - Total	20%	3.0	2.4	39	$5.110	$0.256	$0.000	$0.000	18	18	18	18	18	18
Stack Dampers - Total	11%	1.0	0.9	134	$0.955	$0.080	$0.000	$0.000	7	10	7	10	7	10
Modulating Burners - Total	26%	6.4	4.7	210	$14.619	$0.731	$0.000	$0.000	9	12	9	12	9	12
Turbulators - Totals	23%	1.6	1.2	75	$3.179	$0.159	$0.000	$0.000	1	2	1	2	1	2
O2 Trim Control - Totals	25%	1.0	0.7	500	$2.090	$0.105	$0.000	$0.000	1	1	1	1	1	1
Steam Traps - Total	19%	0.7	0.6	44	$1.130	$0.226	$0.000	$0.000	18	280	20	310	20	310
Pipe Insulation - Total	46%	3.8	2.0	83	$15.120	$1.163	$0.000	$0.000	87	87	87	87	87	87
Heating System Optimization Study - Total	67%	2.5	0.8	702	$14.329	$2.047	$0.000	$0.000	2	2	2	2	2	2
Recommissioning Study Allocation	36%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	$0.000	$0.000	1	1	1	1	1	1
Multi Family Building Efficiency														
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in natural gas DHW unit home	#DIV/0!	0.0	0.0	3	$0.000	$0.000	$39.464	$0.000	326	793	489	1,189	737	1,792
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	#DIV/0!	0.0	0.0	0	$0.000	$0.000	$5.397	$0.000	335	814	502	1,221	757	1,840
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	#DIV/0!	0.0	0.0	0	$0.000	$0.000	$4.748	$0.000	335	815	503	1,223	757	1,842
Water Heater Blanket on Gas Water Heater	#DIV/0!	0.0	0.0	1	$0.000	$0.000	$0.000	$0.000	10	25	15	38	23	57
Holistic efficiency projects totaling either 15%, 20%, or 25% whole-building savings	105%	6.8	-0.4	95	$62.266	$3.113	$0.000	$0.000	7	16	9	22	14	34
Process Efficiency														
Custom	10%	3.6	3.2	7,081	$3.488	$0.991	$6,124.214	$0.000	25	25	25	25	24	24
Commercial Heating	31%	4.9	3.4	41	$12.671	$1.293	-$14.941	$0.000	9	9	9	9	9	9
Recommissioning	35%	0.6	0.4	1,310	$2.614	$0.373	$4,528.077	$0.000	6	6	2	2	4	4
Behavioral Changes	#DIV/0!	0.0	0.0	1,041	$0.000	$0.000	$0.000	$0.000	2	2	2	2	4	4
Behavioral Changes	#DIV/0!	0.0	0.0	-694	$0.000	$0.000	$0.000	$0.000	2	2	2	2	4	4
Energy Design Assistance	13%	5.3	4.6	1,605	$5.933	$0.297	$0.000	$0.000	2	2	2	2	2	2
Phase 2 customer contribution	0%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	$0.000	$0.000	28	28	28	28	28	28
Recommissioning														
Recommissioning Implementation	28%	0.6	0.4	1,310	$2.091	$0.299	$4,528.077	$0.000	13	13	15	15	14	14
Recommissioning Studies	55%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	$0.000	$0.000	18	18	20	20	19	19
BOC Program Attributable Savings	45%	0.4	0.2	170	$1.459	$0.292	$0.000	$0.000	16	16	16	16	16	16
Self Direct														
Average Project	27%	3.5	2.6	4,934	$8.000	$0.471	$0.000	$0.000	0	0	0	0	0	0
Turn Key Services														
Identification ~ On site audit	78%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	$0.000	$0.000	60	60	60	60	60	60
Implementation	57%	4.0	1.7	532	$20.684	$1.644	$0.000	$0.000	9	9	10	10	8	8
Residential														
Efficient New Home Construction														
Low Income Envelope Improvements - Combo Customers	42%	9.8	5.7	13	$37.431	$1.872	$0.000	$0.000	19	25	19	25	19	25
10% to 15% improvement over local code - Combo Customers	19%	6.0	4.8	22	$11.165	$0.558	$0.000	$10.393	149	200	149	200	149	200

Natural Gas Measure Description	NTG (%)	Installation Rate (%)	Realization Rate (%)	2017 NET Dth (Dth)	2017 Rebate Budget ($)	2017 Incremental Cost ($)	2018 NET Dth (Dth)	2018 Rebate Budget ($)	2018 Incremental Cost ($)	2019 NET Dth (Dth)	2019 Rebate Budget ($)	2019 Incremental Cost ($)
Business												
Business New Construction												
Average EDA Project - 2017	100%	100%	100%	25,846	148,233	126208867%	0%	0%	0	0	0	0
Average EDA Project - 2018	100%	100%	100%	0	0	0%	1965816%	11274197%	959,913	0	0	0
Average EDA Project - 2019	100%	100%	100%	0	0	0%	0%	0%	0	14,498	83,145	707,920
Average EEB Project - 2017	100%	100%	100%	4,656	32,729	13194988%	0%	0%	0	0	0	0
Average EEB Project - 2018	100%	100%	100%	0	0	0%	363371%	2554113%	102,972	0	0	0
Average EEB Project - 2019	100%	100%	100%	0	0	0%	0%	0%	0	8,863	62,296	251,155
Commercial Efficiency												
Custom Gas Project	100%	100%	100%	40,839	130,703	1,428,083	40,839	130,703	1,428,083	40,839	130,703	1,428,083
Phase 2 Customer Contribution	100%	100%	100%	0	100,000	100,000	0	100,000	100,000	0	100,000	100,000
Behavioral Changes	100%	100%	100%	1,041	0	0	1,041	0	0	1,041	0	0
Behavioral Changes	100%	100%	100%	-694	0	0	-694	0	0	-694	0	0
Cooling Efficiency												
ERV Install on RTU/AHU for reduced heating load	100%	100%	100%	5,968	33,579	115,238	5,968	33,579	115,238	5,968	33,579	115,238
Custom Efficiency												
Custom Efficiency Gas	100%	100%	100%	16,116	80,579	1,241,184	17,011	85,055	1,310,138	17,011	85,055	1,310,138
Custom Studies Gas	100%	100%	100%	0	18,304	49,480	0	18,304	49,480	0	18,304	49,480
Efficiency Controls												
Efficiency Controls - Gas	100%	100%	100%	16,062	127,293	992,266	16,062	127,293	992,266	16,062	127,293	992,266
Efficiency Controls - Study Allocation	100%	100%	100%	0	3,718	5,678	0	7,436	11,357	0	7,436	11,357
Foodservice Equipment												
Convection Oven	100%	100%	100%	1,873	9,000	37,080	1,873	9,000	37,080	1,873	9,000	37,080
Conveyor Oven	100%	100%	100%	555	2,250	21,240	555	2,250	21,240	555	2,250	21,240
Combi-Oven	100%	100%	100%	568	4,000	17,088	568	4,000	17,088	568	4,000	17,088
Rotisserie Oven	100%	100%	100%	221	2,000	10,660	221	2,000	10,660	221	2,000	10,660
Rotating Rack Oven	100%	100%	100%	512	1,500	8,931	512	1,500	8,931	512	1,500	8,931
Commercial Gas Fryer	100%	100%	100%	302	1,750	29,904	302	1,750	29,904	302	1,750	29,904
Upright Broiler	100%	100%	100%	216	1,200	8,826	216	1,200	8,826	216	1,200	8,826
High Efficiency Charbroiler	100%	100%	100%	75	300	2,173	75	300	2,173	75	300	2,173
High Efficiency Salamander Broiler	100%	100%	100%	24	150	1,006	24	150	1,006	24	150	1,006
Pasta Cooker	100%	100%	100%	552	800	9,652	552	800	9,652	552	800	9,652
Commercial Dishwasher - Under Counter, Gas Only or Combo Customer	100%	100%	100%	61	1,567	533	61	1,567	533	61	1,567	533
Commercial Dishwasher - Door Type, Gas Only or Combo Customer	100%	100%	100%	300	1,341	2,664	300	1,341	2,664	300	1,341	2,664
Demand Controlled Ventilation - Gas Only or Combo Customer	100%	100%	100%	732	4,325	34,719	732	4,325	34,719	732	4,325	34,719
Heating Efficiency												
Hot Water Boiler - Non Condensing -Plan A	100%	100%	100%	1,697	14,308	71,885	1,697	14,308	71,885	1,697	14,308	71,885
Hot Water Boiler - Condensing - Plan A	100%	100%	100%	7,206	120,809	302,959	7,952	133,306	334,300	7,952	133,306	334,300
Hot Water Boiler - Condensing - Plan B	100%	100%	100%	2,351	116,783	267,067	2,351	116,783	267,067	2,351	116,783	267,067
Low Pressure Steam Boiler - Total	100%	100%	100%	1,002	30,000	99,000	1,002	30,000	99,000	1,002	30,000	99,000
High Pressure Steam Boiler - Total	100%	100%	100%	125	5,000	16,500	125	5,000	16,500	125	5,000	16,500
Commercial Water Heaters - Total	100%	100%	100%	6,310	52,830	253,560	6,198	51,887	249,032	6,198	51,887	249,032
90% Efficient Furnaces	100%	100%	100%	12	100	1,254	12	100	1,254	12	100	1,254
92% Efficient Furnaces	100%	100%	100%	274	4,000	26,838	274	4,000	26,838	274	4,000	26,838
94% Efficient Furnaces	100%	100%	100%	392	6,250	35,737	392	6,250	35,737	392	6,250	35,737
96% Efficient Furnaces	100%	100%	100%	1,588	27,000	136,536	1,588	27,000	136,536	1,588	27,000	136,536
Non-Condensing Power Vent (83% efficiency)	100%	100%	100%	51	422	1,135	51	422	1,135	51	422	1,135
Condensing (>90% efficiency)	100%	100%	100%	314	7,778	14,069	314	7,778	14,069	314	7,778	14,069
Infrared	100%	100%	100%	387	1,265	2,974	387	1,265	2,974	387	1,265	2,974
Custom Boiler - Total	100%	100%	100%	3,450	17,250	110,819	3,450	17,250	110,819	3,450	17,250	110,819
Boiler Tune up - Total	100%	100%	100%	60,649	27,563	110,250	60,237	27,375	109,500	60,237	27,375	109,500
Outdoor Air Reset - Total	100%	100%	100%	704	3,600	18,081	704	3,600	18,081	704	3,600	18,081
Stack Dampers - Total	100%	100%	100%	1,343	1,283	12,087	1,343	1,283	12,087	1,343	1,283	12,087
Modulating Burners - Total	100%	100%	100%	2,518	36,810	139,433	2,518	36,810	139,433	2,518	36,810	139,433
Turbulators - Totals	100%	100%	100%	150	478	2,062	150	478	2,062	150	478	2,062
O2 Trim Control - Totals	100%	100%	100%	500	1,046	4,185	500	1,046	4,185	500	1,046	4,185
Steam Traps - Total	100%	100%	100%	12,389	14,000	73,704	13,717	15,500	81,601	13,717	15,500	81,601
Pipe Insulation - Total	100%	100%	100%	7,182	108,587	236,181	7,182	108,587	236,181	7,182	108,587	236,181
Heating System Optimization Study - Total	100%	100%	100%	1,405	20,128	29,866	1,405	20,128	29,866	1,405	20,128	29,866
Recommissioning Study Allocation	100%	100%	100%	0	5,597	15,379	0	5,597	15,379	0	5,597	15,379
Multi Family Building Efficiency												
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in natural gas DHW unit home	100%	100%	100%	2,042	0	0	3,062	0	0	4,614	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	100%	100%	100%	339	0	0	509	0	0	767	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	100%	100%	100%	252	0	0	379	0	0	571	0	0
Water Heater Blanket on Gas Water Heater	100%	100%	100%	25	0	0	38	0	0	57	0	0
Holistic efficiency projects totaling either 15%, 20%, or 25% whole-building savings	100%	100%	100%	1,518	94,540	89,788	2,088	129,993	123,459	3,226	200,898	190,800
Process Efficiency												
Custom	100%	100%	100%	177,031	617,420	6,082,543	177,031	617,420	6,082,543	169,950	592,723	5,839,241
Commercial Heating	100%	100%	100%	371	4,702	15,208	371	4,702	15,208	371	4,702	15,208
Recommissioning	100%	100%	100%	7,550	17,122	48,869	2,620	6,849	19,548	5,240	13,698	39,095
Behavioral Changes	100%	100%	100%	2,081	0	0	2,081	0	0	4,162	0	0
Behavioral Changes	100%	100%	100%	-1,387	0	0	-1,387	0	0	-2,775	0	0
Energy Design Assistance	2%	100%	100%	64	19,049	146,741	64	19,049	146,741	64	19,049	146,741
Phase 2 customer contribution	100%	100%	100%	0	0	42,000	0	0	42,000	0	0	42,000
Recommissioning												
Recommissioning Implementation	100%	100%	100%	17,031	35,614	127,059	19,651	41,093	146,607	18,341	38,353	136,833
Recommissioning Studies	100%	100%	100%	0	102,539	187,566	0	113,933	208,407	0	108,236	197,986
BOC Program Attributable Savings	100%	100%	100%	2,718	3,964	8,868	2,718	3,964	8,868	2,718	3,964	8,868
Self Direct												
Average Project	100%	100%	100%	0	0	0	0	0	0	0	0	0
Turn Key Services												
Identification ~ On site audit	100%	100%	100%	0	26,100	33,300	0	26,100	33,300	0	26,100	33,300
Implementation	100%	100%	100%	4,786	98,988	173,818	5,317	109,987	193,132	4,254	87,989	154,505
Residential												
Efficient New Home Construction												
Low Income Envelope Improvements - Combo Customers	100%	100%	100%	322	12,034	28,635	322	12,034	28,635	322	12,034	28,635
10% to 15% improvement over local code - Combo Customers	100%	100%	100%	4,475	49,959	256,907	4,475	49,959	256,907	4,475	49,959	256,907

Natural Gas Measure Description	High Efficiency Product Description / Rating	Efficient Product Consumption	Baseline Product Description / Rating	Baseline Product Consumption	Life of Product (years)	Rebate Amount	Average Baseline Product Cost	Incremental Cost of Efficient Product	Assumed Energy Cost ($/Dth)	Rebate as a % of Incremental Cost	Increm'l Cost Period w/o Rebate	Increm'l Cost Payback Period w/ Rebate	Annual Customer Dth Savings	Rebated cost /Cust Dth Saved	Rebated Lifetime cost /Cust Dth Saved	Non-Fuel O&M Savings	Electric or Natural Gas O&M Savings	Participants 2017	Units 2017	Participants 2018	Units 2018	Participants 2019	Units 2019	NTG (%)	Installation Rate (%)	Realization Rate (%)	2017 NET Dth (Dth)	2017 Rebate Budget ($)	2017 Incremental Cost ($)	2018 NET Dth (Dth)	2018 Rebate Budget ($)	2018 Incremental Cost ($)	2019 NET Dth (Dth)	2019 Rebate Budget ($)	2019 Incremental Cost ($)
15% to 20% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 3834 and Average 17.4% Better Than Code	108	Reference Home Based upon Local Code	139	20	$500	$0	$2,262	$9.12	22%	7.6	5.9	31	$16.145	$0.807	$0.000	$16.457	281	376	281	376	281	376	100%	100%	100%	11,650	188,082	850,976	11,650	188,082	850,976	11,650	188,082	850,976
20% to 25% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 4439 and Average 21.3% Better Than Code	115	Reference Home Based upon Local Code	157	20	$883	$0	$3,020	$9.12	29%	7.9	5.6	42	$21.058	$1.053	$0.000	$0.000	108	144	108	144	108	144	100%	100%	100%	6,037	127,126	434,887	6,037	127,126	434,887	6,037	127,126	434,887
25% to 30% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 5711 and Average 25.9% Better Than Code	132	Reference Home Based upon Local Code	195	20	$1,080	$0	$4,262	$9.12	25%	7.3	5.5	64	$16.974	$0.849	$0.000	$0.000	30	40	30	40	30	40	100%	100%	100%	2,546	43,217	170,470	2,546	43,217	170,470	2,546	43,217	170,470
30% to 35% improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 5813 and Average 32.7% Better Than Code	79	Reference Home Based upon Local Code	118	20	$729	$0	$3,820	$9.12	19%	10.8	8.7	39	$18.757	$0.938	$0.000	$0.000	30	40	30	40	30	40	100%	100%	100%	1,555	29,169	152,785	1,555	29,169	152,785	1,555	29,169	152,785
35% and greater improvement over local code - Combo Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 4362 and Average 35.8% Better Than Code	90	Reference Home Based upon Local Code	148	20	$1,568	$0	$7,917	$9.12	20%	15.0	12.0	58	$27.086	$1.354	$0.000	$0.000	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0
Low Income Envelope Improvements - Gas Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 1773 and Average 12.7% Better Than Code	62	Reference Home Based upon Local Code	74	20	$500	$0	$1,110	$9.12	45%	9.5	5.2	13	$38.880	$1.944	$0.000	$0.000	7	10	7	10	7	10	100%	100%	100%	129	5,000	11,100	129	5,000	11,100	129	5,000	11,100
10% to 15% improvement over local code - Gas Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 3630 and Average 13.1% Better Than Code	110	Reference Home Based upon Local Code	132	20	$250	$0	$1,286	$9.12	19%	6.3	5.1	22	$11.165	$0.558	$0.000	$0.000	47	63	47	63	47	63	100%	100%	100%	1,422	15,873	81,625	1,422	15,873	81,625	1,422	15,873	81,625
15% to 20% improvement over local code - Gas Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 3834 and Average 17.4% Better Than Code	108	Reference Home Based upon Local Code	139	20	$500	$0	$2,262	$9.12	22%	8.0	6.2	31	$16.145	$0.807	$0.000	$0.000	24	32	24	32	24	32	100%	100%	100%	983	15,873	71,817	983	15,873	71,817	983	15,873	71,817
20% to 25% improvement over local code - Gas Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 4439 and Average 21.3% Better Than Code	115	Reference Home Based upon Local Code	157	20	$1,000	$0	$3,004	$9.12	33%	7.9	5.2	42	$23.853	$1.193	$0.000	$0.000	13	18	13	18	13	18	100%	100%	100%	749	17,857	53,635	749	17,857	53,635	749	17,857	53,635
25% to 30% improvement over local code - Gas Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 5711 and Average 25.9% Better Than Code	132	Reference Home Based upon Local Code	195	20	$1,200	$0	$4,104	$9.12	29%	7.1	5.0	64	$18.853	$0.943	$0.000	$0.000	4	6	4	6	4	6	100%	100%	100%	379	7,143	24,428	379	7,143	24,428	379	7,143	24,428
30% to 35% improvement over local code - Gas Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 5813 and Average 32.7% Better Than Code	79	Reference Home Based upon Local Code	118	20	$1,500	$0	$3,803	$9.12	39%	10.7	6.5	39	$38.584	$1.929	$0.000	$0.000	4	6	4	6	4	6	100%	100%	100%	231	8,929	22,636	231	8,929	22,636	231	8,929	22,636
35% and greater improvement over local code - Gas Only Customers	Energy Efficient Home Based Upon REMRate model by House Rater with Average Size 4362 and Average 35.8% Better Than Code	90	Reference Home Based upon Local Code	148	20	$2,000	$0	$7,917	$9.12	25%	15.0	11.2	58	$34.558	$1.728	$0.000	$0.000	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0
Energy Star Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Clothes Washer	0	Standard Clothes Washer	0	11	$8	$677	$23	$9.12	33%	2.1	1.4	0	$66.972	$6.088	$10.002	$0.000	187	250	187	250	187	250	100%	100%	100%	29	1,926	5,778	29	1,926	5,778	29	1,926	5,778
Energy Star Clothes Washer - Gas Only Customers w/ Gas DHW	Energy Star Clothes Washer	0	Standard Clothes Washer	0	11	$10	$677	$23	$9.12	43%	2.1	1.2	0	$86.931	$7.903	$10.002	$0.000	56	75	56	75	56	75	100%	100%	100%	9	750	1,733	9	750	1,733	9	750	1,733
Energy Efficient Showerhead																																			
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in natural gas DHW unit home	1.5 GPM Showerhead	3	2.5 GPM Showerhead	5	10	$3	$0	$3	$9.12	100%	0.1	0.0	2	$1.424	$0.142	$33.370	$0.000	3,129	14,080	0	0	0	0	100%	60%	100%	18,391	43,648	43,648	0	0	0	0	0	0
Provide new 1.5 gpm showerhead for second shower to replace existing 2.5 gpm showerhead in natural gas DHW unit home	1.5 GPM Showerhead	2	2.5 GPM Showerhead	4	10	$3	$0	$3	$9.12	100%	0.1	0.0	1	$2.118	$0.212	$22.436	$0.000	2,347	10,560	0	0	0	0	100%	50%	100%	7,728	32,736	32,736	0	0	0	0	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	1	2.2 GPM Kitchen Faucet Aerator	1	10	$2	$0	$2	$9.12	100%	0.2	0.0	0	$4.766	$0.477	$4.173	$0.000	3,129	14,080	0	0	0	0	100%	40%	100%	1,772	21,120	21,120	0	0	0	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	0	2.2 GPM Bathroom Faucet Aerator	1	10	$0	$0	$0	$9.12	100%	0.1	0.0	0	$1.758	$0.176	$4.187	$0.000	3,129	14,080	0	0	0	0	100%	40%	100%	1,538	6,758	6,758	0	0	0	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM for second faucet to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	0	2.2 GPM Bathroom Faucet Aerator	1	10	$0	$0	$0	$9.12	100%	0.1	0.0	0	$1.758	$0.176	$4.187	$0.000	2,347	10,560	0	0	0	0	100%	30%	100%	865	5,069	5,069	0	0	0	0	0	0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in natural gas DHW unit home	1.5 GPM Showerhead	3	2.5 GPM Showerhead	5	10	$3	$0	$3	$9.12	100%	0.1	0.0	2	$1.475	$0.147	$33.370	$0.000	0	0	3,129	14,080	0	0	100%	60%	100%	0	0	0	18,391	45,197	45,197	0	0	0
Provide new 1.5 gpm showerhead for second shower to replace existing 2.5 gpm showerhead in natural gas DHW unit home	1.5 GPM Showerhead	2	2.5 GPM Showerhead	4	10	$3	$0	$3	$9.12	100%	0.1	0.0	1	$2.193	$0.219	$22.436	$0.000	0	0	2,347	10,560	0	0	100%	50%	100%	0	0	0	7,728	33,898	33,898	0	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	1	2.2 GPM Kitchen Faucet Aerator	1	10	$2	$0	$2	$9.12	100%	0.2	0.0	0	$4.957	$0.496	$4.173	$0.000	0	0	3,129	14,080	0	0	100%	40%	100%	0	0	0	1,772	21,965	21,965	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	0	2.2 GPM Bathroom Faucet Aerator	1	10	$1	$0	$1	$9.12	100%	0.1	0.0	0	$1.904	$0.190	$4.187	$0.000	0	0	3,129	14,080	0	0	100%	40%	100%	0	0	0	1,538	7,322	7,322	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM for second faucet to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	0	2.2 GPM Bathroom Faucet Aerator	1	10	$1	$0	$1	$9.12	100%	0.1	0.0	0	$1.904	$0.190	$4.187	$0.000	0	0	2,347	10,560	0	0	100%	30%	100%	0	0	0	865	5,491	5,491	0	0	0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in natural gas DHW unit home	1.5 GPM Showerhead	3	2.5 GPM Showerhead	5	10	$3	$0	$3	$9.12	100%	0.1	0.0	2	$1.525	$0.153	$33.370	$0.000	0	0	0	0	3,129	14,080	100%	60%	100%	0	0	0	0	0	0	18,391	46,746	46,746
Provide new 1.5 gpm showerhead for second shower to replace existing 2.5 gpm showerhead in natural gas DHW unit home	1.5 GPM Showerhead	2	2.5 GPM Showerhead	4	10	$3	$0	$3	$9.12	100%	0.1	0.0	1	$2.268	$0.227	$22.436	$0.000	0	0	0	0	2,347	10,560	100%	50%	100%	0	0	0	0	0	0	7,728	35,059	35,059
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.5 GPM Kitchen Faucet Aerator	1	2.2 GPM Kitchen Faucet Aerator	1	10	$2	$0	$2	$9.12	100%	0.2	0.0	0	$5.116	$0.512	$4.173	$0.000	0	0	0	0	3,129	14,080	100%	40%	100%	0	0	0	0	0	0	1,772	22,669	22,669
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	0	2.2 GPM Bathroom Faucet Aerator	1	10	$1	$0	$1	$9.12	100%	0.1	0.0	0	$2.014	$0.201	$4.187	$0.000	0	0	0	0	3,129	14,080	100%	40%	100%	0	0	0	0	0	0	1,538	7,744	7,744
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM for second faucet to replace existing 2.2 gpm aerator in home with natural gas DHW heater	1.0 GPM Bathroom Faucet Aerator	0	2.2 GPM Bathroom Faucet Aerator	1	10	$1	$0	$1	$9.12	100%	0.1	0.0	0	$2.014	$0.201	$4.187	$0.000	0	0	0	0	2,347	10,560	100%	30%	100%	0	0	0	0	0	0	865	5,808	5,808
Energy Feedback																																			
Rollout: Online Group Savings	Treatment	852	Control	852	1	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	$0.000	$0.000	$0.000	10,898	10,898	10,898	10,898	10,898	10,898	100%	100%	100%	1,407	0	0	1,407	0	0	1,407	0	0
Rollout: Existing Participant 2017 Savings	Treatment	851	Control	852	1	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	1	$0.000	$0.000	$0.000	$0.000	110,900	110,900	0	0	0	0	100%	100%	100%	57,300	0	0	0	0	0	0	0	0
Rollout: New Participant 2017 Savings	Treatment	852	Control	852	1	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	$0.000	$0.000	$0.000	49,200	49,200	0	0	0	0	100%	100%	100%	12,650	0	0	0	0	0	0	0	0
Rollout: Existing Participant 2018 Savings	Treatment	851	Control	851	1	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	$0.000	$0.000	$0.000	0	0	147,100	147,100	0	0	100%	100%	100%	0	0	0	71,210	0	0	0	0	0
Rollout: New Participant 2018 Savings	Treatment	852	Control	852	1	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	$0.000	$0.000	$0.000	0	0	12,900	12,900	0	0	100%	100%	100%	0	0	0	3,310	0	0	0	0	0
Rollout: Existing Participant 2019 Savings	Treatment	851	Control	851	1	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	$0.000	$0.000	$0.000	0	0	0	0	147,000	147,000	100%	100%	100%	0	0	0	0	0	0	69,540	0	0
Rollout: New Participant 2019 Savings	Treatment	852	Control	852	1	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	$0.000	$0.000	$0.000	0	0	0	0	13,000	13,000	100%	100%	100%	0	0	0	0	0	0	3,340	0	0
Behavioral Adjustments Rollup: Online Group Savings	Treatment	-568	Control	-568	0	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	#DIV/0!	$0.000	$0.000	0	10,898	0	0	10,898	0	100%	100%	100%	-938	0	0	-938	0	0	-938	0	0
Behavioral Adjustments Rollup: Existing Participants 2017 Savings	Treatment	-568	Control	-568	0	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	#DIV/0!	$0.000	$0.000	0	110,900	0	0	0	0	100%	100%	100%	-38,200	0	0	0	0	0	0	0	0
Behavioral Adjustments Rollup: New Participant 2017 Savings	Treatment	-568	Control	-568	0	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	#DIV/0!	$0.000	$0.000	0	49,200	0	0	0	0	100%	100%	100%	-8,433	0	0	0	0	0	0	0	0
Behavioral Adjustments Rollup: Existing Participants 2018 Savings	Treatment	-567	Control	-568	0	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	#DIV/0!	$0.000	$0.000	0	0	147,100	0	0	0	100%	100%	100%	0	0	0	-47,473	0	0	0	0	0
Behavioral Adjustments Rollup: New Participant 2018 Savings	Treatment	-568	Control	-568	0	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	#DIV/0!	$0.000	$0.000	0	0	12,900	0	0	0	100%	100%	100%	0	0	0	-2,207	0	0	0	0	0
Behavioral Adjustments Rollup: Existing Participants 2019 Savings	Treatment	-567	Control	-567	0	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	#DIV/0!	$0.000	$0.000	0	0	0	0	147,000	147,000	100%	100%	100%	0	0	0	0	0	0	-46,360	0	0
Behavioral Adjustments Rollup: New Participant 2019 Savings	Treatment	-568	Control	-568	0	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	0	$0.000	#DIV/0!	$0.000	$0.000	0	0	0	0	13,000	100%	100%	100%	0	0	0	0	0	0	-2,227	0	0	0
Home Energy Squad																																			
NEC Energy Squad Service 2017	weighted average Energy Efficient Gas measures by participant	9	weighted average Baseline Gas measures by participant	10	10		$0	$15	$9.12	0%	0.7	0.7	2	$0.000	$0.000	$4.650	$0.761	2,186	10,281					100%	100%	100%	17,177	0	154,000	0	0	0	0	0	0
NEC Energy Squad Service 2018	weighted average Energy Efficient Gas measures by participant	9	weighted average Baseline Gas measures by participant	10	10		$0	$15	$9.12	0%	0.7	0.7	2	$0.000	$0.000	$4.650	$0.761			2,186	10,281			100%	100%	100%	0	0	0	17,177	0	154,000	0	0	0
NEC Energy Squad Service 2019	weighted average Energy Efficient Gas measures by participant	9	weighted average Baseline Gas measures by participant	10	10		$0	$15	$9.12	0%	0.7	0.7	2	$0.000	$0.000	$4.650	$0.761					2,186	10,281	100%	100%	100%	0	0	0	0	0	0	17,177	0	154,000
Weatherstrip 1 additional door	Weatherstrip 1 additional Door to achieve leakage rate or 0.18 cfm/linear feet of crack	1	Additional Door with leakage rate of 0.68 cfm/linear feet of crack	3	10	$0	$0	$10	$9.12	0%	0.6	0.6	2	$0.000	$0.000	$0.000	$0.000	10	47	10	47	10	47	100%	100%	100%	81	0	470	81	0	470	81	0	470
Install Second Programmable Thermostat	Install second T-stat and Auto setback thermostat by 2.6 F for heating	44	Existing non-programmable thermostat	46	10	$0	$0	$30	$9.12	0%	1.0	1.0	3	$0.000	$0.000	$0.000	$4.438	4	17	4	17	4	17	100%	100%	100%	48	0	518	48	0	518	48	0	518
Insulation Rebate																																			
Gas Heat Homes Without Cooling	Home with additional insulation	49	Home with R20 or less existing Insulation	60	20	$283	$0	$1,744	$9.12	16%	17.7	14.8	11	$26.176	$1.309	$0.000	$0.000	32	35	30	35	39	45	100%	100%	100%	378	9,900	61,055	378	9,900	61,055	486	12,728	78,500
Gas Heat Homes With Cooling, Combo Customer	Home with additional insulation	51	Home with R20 or less existing Insulation	60	20	$292	$0	$1,966	$9.12	15%	22.5	19.1	9	$32.793	$1.640	$0.000	$6.451	184	205	181	215	194	225	100%	100%	100%	1,823	59,775	403,049	1,912	62,691	422,710	2,001	65,607	442,371
Gas Heat Homes With Cooling, Gas Only Customer	Home with additional insulation	48	Home with R20 or less existing Insulation	60	20	$294	$0	$1,801	$9.12	16%	15.6	13.1	12	$25.103	$1.255	$0.000	$8.507	67	75	63	75	71	83	100%	100%	100%	879	22,076	135,053	879	22,076	135,053	973	24,431	149,459
Gas Heat Homes Without Cooling	R-11 insulation	23	Baseline assumes R-0 in wall cavities as existing level	60	20	$287	$0	$2,704	$9.12	11%	8.0	7.1	37	$7.732	$0.387	$0.000	$0.000	72	80	84	100	95	110	100%	100%	100%	2,971	22,974	216,326	3,714	28,718	270,407	4,086	31,590	297,448
Gas Heat Homes With Cooling, Combo Customer	R-11 insulation	36	Baseline assumes R-0 in wall cavities as existing level	60	20	$253	$0	$1,865	$9.12	14%	8.0	6.9	24	$10.705	$0.535	$0.000	$17.148	171	190	190	225	197	229	100%	100%	100%	4,491	48,076	354,365	5,318	56,932	419,643	5,413	57,945	427,103
Gas Heat Homes With Cooling, Gas Only Customer	R-11 insulation	31	Baseline assumes R-0 in wall cavities as existing level	60	20	$299	$0	$2,384	$9.12	13%	8.4	7.4	29	$10.408	$0.520	$0.000	$20.818	45	50	42	50	45	52	100%	100%	100%	1,435	14,934	119,224	1,435	14,934	119,224	1,492	15,531	123,993
Gas Heat Homes Without Cooling	Home with Tier 2 Air Sealing	38	Existing Home Without Air Sealing	60	10	$143	$0	$1,114	$9.12	13%	5.4	4.7	22	$6.380	$0.638	$0.000	$0.000	7	8	21	25	23	27	100%	100%	100%	179	1,145	8,910	561	3,577	27,842	605	3,863	30,070
Gas Heat Homes With Cooling, Combo Customer	Home with Tier 2 Air Sealing	37	Existing Home Without Air Sealing	60	10	$143	$0	$874	$9.12	16%	4.0	3.3	23	$6.235	$0.623	$0.000	$11.788	27	30	59	70	62	72	100%	100%	100%	686	4,278	26,209	1,601	9,982	61,155	1,647	10,267	62,902
Gas Heat Homes With Cooling, Gas Only Customer	Home with Tier 2 Air Sealing	37	Existing Home Without Air Sealing	60	10	$143	$0	$910	$9.12	16%	4.1	3.4	23	$6.121	$0.612	$0.000	$11.949	36	40	34	40	47	55	100%	100%	100%	932	5,708	36,382	932	5,708	36,382	1,282	7,848	50,025
Residential Heating																																			
95% Efficient Furnace in New Home	95% Efficient Furnace	68	90% Efficient Furnace	72	18	$100	$957	$165	$9.12	61%	4.8	1.9	4	$26.337	$1.463	$0.000	$0.000	100	100	100	100	100	100	100%	100%	100%	380	10,000	16,493	380	10,000	16,493	380	10,000	16,493
96% Efficient Furnace in New Home	96% Efficient Furnace	68	90% Efficient Furnace	72	18	$150	$957	$379	$9	$0	9.1	5.5	5	$32.921	$1.829	$0.000	$0.000	186	186	186	186	186	186	100%	100%	100%	847	27,900	70,466	847	27,900	70,466	847	27,900	70,466
97% Efficient Furnace in New Home	97% Efficient Furnace	67	90% Efficient Furnace	72	18	$200	$957	$477	$9.12	42%	9.8	5.7	5	$37.624	$2.090	$0.000	$0.000	30	30	30	30	30	30	100%	100%	100%	159	6,000	14,305	159	6,000	14,305	159	6,000	14,305
95% Efficient Furnace in Existing Home	95% Efficient Furnace	89	80% Efficient Furnace	106	18	$200	$1,030	$736	$9.12	27%	4.8	3.5	17	$12.002	$0.667	$0.000	$0.000	850	850	850	850	850	850	100%	100%	100%	14,164	170,000	625,884	14,164	170,000	625,884	14,164	170,000	625,884
96% Efficient Furnace in Existing Home	96% Efficient Furnace	106	80% Efficient Furnace	106	18	$300	$1,030	$950	$9.12	32%	5.9	4.0	18	$16.878	$0.938	$0.000	$0.000	3,956	3,956	3,956	3,956	3,956	3,956	100%	100%	100%	70,317	1,186,800	3,759,193	70,317	1,186,800	3,759,193	70,317	1,186,800	3,759,193
97% Efficient Furnace in Existing Home	97% Efficient Furnace	87	80% Efficient Furnace	106	18	$400	$1,030	$1,048	$9.12	38%	6.1	3.8	19	$21.180	$1.177	$0.000	$0.000	1,500	1,500	1,500	1,500	1,500	1,500	100%	100%	100%	28,329	600,000	1,572,358	28,329	600,000	1,572,358	28,329	600,000	1,572,358
84% Efficient Boiler	84% Efficient Boiler	127	82% Efficient Boiler	130	20	$100	$685	$1,446	$9.12	7%	51.2	47.7	3	$32.311	$1.616	$0.000	$0.000	275	275	275	275	275	275	100%	100%	100%	851	27,500	397,563	851	27,500	397,563	851	27,500	397,563
90% Efficient Boiler	90% Efficient Boiler	118	82% Efficient Boiler	130	20	$300	$685	$2,379	$9.12	13%	21.1	18.4	12	$24.233	$1.212	$0.000	$0.000	75	75	75	75	75	75	100%	100%	100%	928	22,500	178,434	928	22,500	178,434	928	22,500	178,434
95% Efficient Boiler	95% Efficient Boiler	110	82% Efficient Boiler	130	20	$400	$685	$3,001	$9.12	13%	16.4	14.2	20	$19.884	$0.994	$0.000	$0.000	200	200	200	200	200	200	100%	100%	100%	4,023	80,000	600,283	4,023	80,000	600,283	4,023	80,000	600,283
School Education Kits																																			
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2017	1.5 GPM Showerhead	3	Federal Maximum Standard flow rate 2.5 GPM	5	10	$3	$0	$3	$9.12	100%	0.1	0.0	2	$1.461	$0.146	$33.370	$0.000	4,667	12,320	0	0	0	0	100%	35%	100%	9,387	39,718	39,718	0	0	0	0	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2017	1.5 GPM Kitchen Faucet Aerator	1	Federal Maximum Standard flow rate 2.2 GPM	1	10	$1	$0	$1	$9.12	100%	0.2	0.0	0	$3.862	$0.386	$4.173	$0.000	4,667	12,320	0	0	0	0	100%	30%	100%	1,163	14,974	14,974	0	0	0	0	0	0

Natural Gas Measure Description	High Efficiency Product Description / Rating	Efficient Product Consumption	Baseline Product Description / Rating	Baseline Product Consumption	Life of Product (years)	Rebate Amount	Average Baseline Product Cost	Incremental Cost of Efficient Product	Assumed Energy Cost ($/Dth)	Rebate as a % of Incremental Cost	Increm'l Cost Period w/o Rebate	Increm'l Cost Payback Period w/ Rebate	Annual Customer Dth Savings	Rebated cost /Cust Dth Saved	Rebated Lifetime cost /Cust Dth Saved	Non-Fuel O&M Savings	Electric or Natural Gas O&M Savings	Participants 2017	Units 2017	Participants 2018	Units 2018	Participants 2019	Units 2019	NTG (%)	Installation Rate (%)	Realization Rate (%)	2017 NET Dth (Dth)	2017 Rebate Budget ($)	2017 Incremental Cost ($)	2018 NET Dth (Dth)	2018 Rebate Budget ($)	2018 Incremental Cost ($)	2019 NET Dth (Dth)	2019 Rebate Budget ($)	2019 Incremental Cost ($)
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2017	1.0 GPM Bathroom Faucet Aerator	0	Federal Maximum Standard flow rate 2.2 GPM	1	10	$0	$0	$0	$9.12	100%	0.1	0.0	0	$1.773	$0.177	$4.187	$0.000	4,667	12,320	0	0	0	0	100%	25%	100%	841	5,964	5,964	0	0	0	0	0	0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2018	1.5 GPM Showerhead	3	Federal Maximum Standard flow rate 2.5 GPM	5	10	$3	$0	$3	$9.12	100%	0.1	0.0	2	$1.525	$0.153	$33.370	$0.000	0	0	4,667	12,320	0	0	100%	35%	100%	0	0	0	9,387	40,910	40,910	0	0	0
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2018	1.5 GPM Kitchen Faucet Aerator	1	Federal Maximum Standard flow rate 2.2 GPM	1	10	$1	$0	$1	$9.12	100%	0.2	0.0	0	$3.978	$0.398	$4.173	$0.000	0	0	4,667	12,320	0	0	100%	30%	100%	0	0	0	1,163	15,423	15,423	0	0	0
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2018	1.0 GPM Bathroom Faucet Aerator	0	Federal Maximum Standard flow rate 2.2 GPM	1	10	$0	$0	$0	$9.12	100%	0.1	0.0	0	$1.826	$0.183	$4.187	$0.000	0	0	4,667	12,320	0	0	100%	25%	100%	0	0	0	841	6,143	6,143	0	0	0
Provide new 1.5 gpm showerhead to replace existing 2.5 gpm showerhead in home with Unknown DHW heater - 2019	1.5 GPM Showerhead	3	Federal Maximum Standard flow rate 2.5 GPM	5	10	$3	$0	$3	$9.12	100%	0.1	0.0	2	$1.571	$0.157	$33.370	$0.000	0	0	0	0	4,667	12,320	100%	35%	100%	0	0	0	0	0	0	9,387	42,137	42,137
Provide Energy Efficient Kitchen Aerator - 1.5 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2019	1.5 GPM Kitchen Faucet Aerator	1	Federal Maximum Standard flow rate 2.2 GPM	1	10	$1	$0	$1	$9.12	100%	0.2	0.0	0	$4.097	$0.410	$4.173	$0.000	0	0	0	0	4,667	12,320	100%	30%	100%	0	0	0	0	0	0	1,163	15,886	15,886
Provide Energy Efficient Bath Faucet Aerator - 1.0 GPM to replace existing 2.2 gpm aerator in home with Unknown DHW heater - 2019	1.0 GPM Bathroom Faucet Aerator	0	Federal Maximum Standard flow rate 2.2 GPM	1	10	$1	$0	$1	$9.12	100%	0.1	0.0	0	$1.880	$0.188	$4.187	$0.000	0	0	0	0	4,667	12,320	100%	25%	100%	0	0	0	0	0	0	841	6,327	6,327
Water Heater Rebates																																			
0.67 EF Storage Water Heater	0.67 EF Storage Water Heater	24	0.62 EF Storage Water Heater	27	13	$75	$932	$223	$9.12	34%	9.8	6.5	2	$30.064	$2.313	$0.000	$0.000	614	614	641	641	628	628	100%	100%	100%	1,532	46,072	136,878	1,599	48,075	142,829	1,565	47,063	139,820
0.7 EF Storage Water Heater	0.7 EF Storage Water Heater	23	0.62 EF Storage Water Heater	27	13	$150	$932	$402	$9.12	37%	12.5	7.8	4	$42.447	$3.265	$0.000	$0.000	268	268	364	364	356	356	100%	100%	100%	948	40,244	107,761	1,286	54,600	146,204	1,259	53,430	143,071
0.9 EF Tankless Water Heater	0.9 EF Tankless Water Heater	18	0.62 EF Storage Water Heater	27	20	$250	$932	$608	$9.12	41%	7.7	4.5	9	$28.764	$1.438	$0.000	$0.000	66	66	89	89	87	87	100%	100%	100%	572	16,459	40,002	774	22,263	54,107	757	21,775	52,922
Whole Home Efficiency																																			
Attic Insulation - Gas Heated Homes Without Cooling	Home with additional insulation	49	Home with R20 or less existing Insulation	60	20	$283	$0	$1,744	$9.12	16%	17.7	14.8	11	$26.176	$1.309	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	108	2,828	17,444	108	2,828	17,444	108	2,828	17,444
Attic Insulation - Gas Heat Homes With Cooling, Combo Customer	Home with additional insulation	51	Home with R20 or less existing Insulation	60	20	$253	$0	$1,703	$9.12	15%	21.0	17.9	9	$28.412	$1.421	$0.000	$0.000	20	80	20	80	20	80	100%	100%	100%	711	20,210	136,274	711	20,210	136,274	711	20,210	136,274
Attic Insulation - Gas Heat Homes With Cooling, Gas Only Customer	Home with additional insulation	48	Home with R20 or less existing Insulation	60	20	$294	$0	$1,560	$9.12	19%	14.6	11.8	12	$25.103	$1.255	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	117	2,943	15,601	117	2,943	15,601	117	2,943	15,601
Wall Insulation - Gas Heat Homes Without Cooling	R-11 insulation	23	Baseline assumes R-0 in wall cavities as existing level	60	20	$287	$0	$2,704	$9.12	11%	8.0	7.1	37	$7.732	$0.387	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	371	2,872	27,041	371	2,872	27,041	371	2,872	27,041
Wall Insulation - Gas Heat Homes With Cooling, Combo Customer	R-11 insulation	36	Baseline assumes R-0 in wall cavities as existing level	60	20	$219	$0	$1,616	$9.12	14%	7.5	6.5	24	$9.275	$0.464	$0.000	$0.000	25	100	25	100	25	100	100%	100%	100%	2,364	21,923	161,591	2,364	21,923	161,591	2,364	21,923	161,591
Wall Insulation - Gas Heat Homes With Cooling, Gas Only Customer	R-11 insulation	31	Baseline assumes R-0 in wall cavities as existing level	60	20	$299	$0	$2,066	$9.12	14%	7.9	6.8	29	$10.408	$0.520	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	287	2,987	20,659	287	2,987	20,659	287	2,987	20,659
Air Sealing T2 - 25% reduction - Gas Heat Homes Without Cooling	Home with Tier 2 Air Sealing - Average 27% reduction	45	Existing Home Without Air Sealing	60	10	$150	$0	$874	$9.12	17%	6.3	5.2	15	$9.891	$0.989	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	152	1,500	8,736	152	1,500	8,736	152	1,500	8,736
Air Sealing T2 - 25% reduction - Gas Heat Homes With Cooling, Combo Customer	Home with Tier 2 Air Sealing - Average 27% reduction	45	Existing Home Without Air Sealing	60	10	$122	$0	$711	$9.12	17%	5.1	4.3	15	$8.044	$0.804	$0.000	$0.000	5	20	5	20	5	20	100%	100%	100%	303	2,440	14,211	303	2,440	14,211	303	2,440	14,211
Air Sealing T2 - 25% reduction - Gas Heat Homes With Cooling, Gas Only Customer	Home with Tier 2 Air Sealing - Average 27% reduction	45	Existing Home Without Air Sealing	60	10	$150	$0	$711	$9.12	21%	5.1	4.1	15	$9.891	$0.989	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	152	1,500	7,105	152	1,500	7,105	152	1,500	7,105
Air Sealing T3 - 30% reduction - Gas Heat Homes Without Cooling	Home with Tier 3 Air Sealing - average 42% reduction	26	Existing Home Without Air Sealing	60	10	$200	$0	$1,362	$9.12	15%	4.4	3.7	34	$5.873	$0.587	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	341	2,000	13,625	341	2,000	13,625	341	2,000	13,625
Air Sealing T3 - 30% reduction - Gas Heat Homes With Cooling, Combo Customer	Home with Tier 3 Air Sealing - average 42% reduction	26	Existing Home Without Air Sealing	60	10	$181	$0	$1,231	$9.12	15%	4.0	3.4	34	$5.307	$0.531	$0.000	$0.000	12	50	12	50	12	50	100%	100%	100%	1,703	9,036	61,556	1,703	9,036	61,556	1,703	9,036	61,556
Air Sealing T3 - 30% reduction - Gas Heat Homes With Cooling, Gas Only Customer	Home with Tier 3 Air Sealing - average 42% reduction	26	Existing Home Without Air Sealing	60	10	$200	$0	$1,231	$9.12	16%	4.0	3.3	34	$5.873	$0.587	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	341	2,000	12,311	341	2,000	12,311	341	2,000	12,311
0.67 EF Storage Water Heater	0.67 EF Storage Water Heater	24	0.62 EF Storage Water Heater	27	13	$100	$932	$223	$9.12	45%	9.8	5.4	2	$40.086	$3.084	$0.000	$0.000	2	10	2	10	2	10	100%	100%	100%	25	1,000	2,228	25	1,000	2,228	25	1,000	2,228
0.7 EF Storage Water Heater	0.7 EF Storage Water Heater	23	0.62 EF Storage Water Heater	27	13	$175	$932	$402	$9.12	44%	12.5	7.0	4	$49.521	$3.809	$0.000	$0.000	5	20	5	20	5	20	100%	100%	100%	71	3,500	8,033	71	3,500	8,033	71	3,500	8,033
0.9 EF Tankless Water Heater	0.9 EF Tankless Water Heater	18	0.62 EF Storage Water Heater	27	20	$250	$932	$608	$9.12	41%	7.7	4.5	9	$28.764	$1.438	$0.000	$0.000	0	1	0	1	0	1	100%	100%	100%	12	350	851	12	350	851	12	350	851
95% Efficient Furnace in Existing Home	95% Efficient Furnace	89	80% Efficient Furnace	106	18	$70	$1,030	$736	$9.12	10%	4.8	4.4	17	$4.201	$0.233	$0.000	$0.000	1	5	1	5	1	5	100%	100%	100%	83	350	3,682	83	350	3,682	83	350	3,682
96% Efficient Furnace in Existing Home	96% Efficient Furnace	88	80% Efficient Furnace	106	18	$325	$1,030	$950	$9.12	34%	5.9	3.9	18	$18.284	$1.016	$0.000	$0.000	5	20	5	20	5	20	100%	100%	100%	355	6,500	19,005	355	6,500	19,005	355	6,500	19,005
97% Efficient Furnace in Existing Home	97% Efficient Furnace	87	80% Efficient Furnace	106	18	$425	$1,030	$1,048	$9.12	41%	6.1	3.6	19	$22.504	$1.250	$0.000	$0.000	0	2	0	2	0	2	100%	100%	100%	38	850	2,096	38	850	2,096	38	850	2,096
84% Efficient Boiler	84% Efficient Boiler	127	82% Efficient Boiler	130	20	$125	$685	$1,446	$9.12	9%	51.2	46.8	3	$40.389	$2.019	$0.000	$0.000	0	2	0	2	0	2	100%	100%	100%	6	250	2,891	6	250	2,891	6	250	2,891
90% Efficient Boiler	90% Efficient Boiler	118	82% Efficient Boiler	130	20	$300	$685	$2,379	$9.12	13%	21.1	18.4	12	$24.233	$1.212	$0.000	$0.000	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0
95% Efficient Boiler	95% Efficient Boiler	110	82% Efficient Boiler	130	20	$400	$685	$3,001	$9.12	13%	16.4	14.2	20	$19.884	$0.994	$0.000	$0.000	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0
Programmable Thermostat (Install and Program)	New T-stats w/ Auto setback by 2.6 F for heating	87	Existing non-programmable thermostat	93	10	$8	$0	$24	$9.12	31%	0.5	0.3	6	$1.384	$0.138	$0.000	$0.000	10	40	10	40	10	40	100%	100%	100%	221	306	978	221	306	978	221	306	978
Energy Star Clothes Washer - Combo Customers w/ Gas DHW	Energy Star Clothes Washer	0	Standard Clothes Washer	0	11	$8	$677	$23	$9.12	33%	2.6	1.8	0	$66.972	$6.088	$7.705	$0.000	4	15	4	15	4	15	100%	100%	100%	2	116	347	2	116	347	2	116	347
Energy Efficient Showerhead (Direct Install)	1.5 GPM Showerhead	3	2.5 GPM Showerhead	5	10	$4	$0	$4	$9.12	100%	0.1	0.0	2	$1.723	$0.172	$33.370	$0.000	22	88	22	88	22	88	100%	100%	100%	192	330	330	192	330	330	192	330	330
Energy Efficient Bathroom Aerator (Direct Install	1.5 GPM Kitchen Faucet Aerator	1	2.2 GPM Kitchen Faucet Aerator	1	10	$1	$0	$1	$9.12	100%	0.1	0.0	0	$3.178	$0.318	$4.173	$0.000	33	132	33	132	33	132	100%	100%	100%	42	132	132	42	132	132	42	132	132
Energy Efficient Kitchen Aerator (Direct Install)	1.0 GPM Bathroom Faucet Aerator	0	2.2 GPM Bathroom Faucet Aerator	1	10	$2	$0	$2	$9.12	100%	0.3	0.0	0	$7.323	$0.732	$4.187	$0.000	22	88	22	88	22	88	100%	100%	100%	24	176	176	24	176	176	24	176	176
Water Heater Blanket	Add commercial insulation wrap R8 around Water Heater Tank	2	No External insulation on water heater	3	7	$25	$0	$25	$9.12	100%	2.5	0.0	1	$23.066	$3.549	$0.000	$0.000	12	50	12	50	12	50	100%	100%	100%	54	1,250	1,250	54	1,250	1,250	54	1,250	1,250
Gas Water Heater Setback	setback WH setpoint to 120 F	2	Existing WH at setpoint of 130 F	3	8	$15	$0	$0	$9.12	#DIV/0!	0.0	-4.1	0	$37.299	$4.662	$0.000	$0.000	0	0	0	0	0	0	100%	100%	100%	0	0	0	0	0	0	0	0	0
Low Income																																			
Home Energy Savings Program																																			
Attic Insulation and Bypass Air Sealing - Gas Heated & Non-Cooled Home	Insulate the attic to R-48 & perform Bypass air sealing	64	Existing home with average attic area of 823 sq. ft. and R-17 insulation	70	20	$1,524	$0	$1,524	$9.12	100%	26.5	0.0	6	$241.502	$12.075	$0.000	$0.000	47	76	47	76	47	76	100%	100%	100%	480	115,836	115,836	480	115,836	115,836	480	115,836	115,836
Attic Insulation and Bypass Air Sealing - Gas Heated & Electrically Cooled Home	Insulate the attic to R-48 & perform Bypass air sealing	64	Existing home with average attic area of 823 sq. ft. and R-17 insulation	70	20	$1,501	$0	$1,501	$9.12	100%	26.1	0.0	6	$237.764	$11.888	$0.000	$0.000	71	114	71	114	71	114	100%	100%	100%	719	171,064	171,064	719	171,064	171,064	719	171,064	171,064
Air Sealing - Gas Heated & Non-Cooled Home	Perform Bypass air sealing along with Attic Insulation	57	Existing home with average home size of 1406 sq. ft.	64	10	$880	$0	$880	$9.12	100%	15.3	0.0	6	$139.221	$13.922	$0.000	$0.000	47	76	47	76	47	76	100%	100%	100%	480	66,894	66,894	480	66,894	66,894	480	66,894	66,894
Air Sealing - Gas Heated & Electrically Cooled Home	Perform Bypass air sealing along with Attic Insulation	57	Existing home with average home size of 1406 sq. ft.	64	10	$803	$0	$803	$9.12	100%	13.9	0.0	6	$127.082	$12.708	$0.000	$0.000	71	114	71	114	71	114	100%	100%	100%	721	91,592	91,592	721	91,592	91,592	721	91,592	91,592
Wall Insulation - Gas Heated and Non-Cooled Home	R-11 insulation	56	Existing home with average attic area of 823 sq. ft. and R-17 insulation	70	20	$1,295	$0	$1,295	$9.12	100%	10.1	0.0	14	$91.649	$4.582	$0.000	$0.000	7	12	7	12	7	12	100%	100%	100%	170	15,541	15,541	170	15,541	15,541	170	15,541	15,541
Wall Insulation - Gas Heated and Electrically Cooled Home	R-11 insulation	56	Existing home with average attic area of 823 sq. ft. and R-17 insulation	70	20	$1,192	$0	$1,192	$9.12	100%	9.3	0.0	14	$84.357	$4.218	$0.000	$0.000	11	18	11	18	11	18	100%	100%	100%	254	21,456	21,456	254	21,456	21,456	254	21,456	21,456
0.67 EF Hot Water Heater (SF)	0.67 EF Storage Water Heater	24	0.62 EF Storage Water Heater	27	13	$1,598	$0	$1,598	$9.12	100%	70.3	0.0	2	$640.677	$49.283	$0.000	$0.000	102	165	102	165	102	165	100%	100%	100%	412	263,713	263,713	412	263,713	263,713	412	263,713	263,713
New 84% boiler (SF)	84% Efficient Boiler	127	82% Efficient Boiler	130	20	$3,000	$0	$3,000	$9.12	100%	106.3	0.0	3	$969.338	$48.467	$0.000	$0.000	35	57	35	57	35	57	100%	100%	100%	176	171,000	171,000	176	171,000	171,000	176	171,000	171,000
Replace Furnace AFUE 80 to 95 (SF)	95% Efficient Furnace	89	80% Efficient Furnace	106	18	$4,635	$0	$4,635	$9.12	100%	30.5	0.0	17	$278.145	$15.453	$0.000	$0.000	7	12	7	12	7	12	100%	100%	100%	200	55,620	55,620	200	55,620	55,620	200	55,620	55,620
LI Home Energy Squad																																			
Total LI Energy Squad Service 2017	Weighted Average of 2017 LI Squad Services	14	Existing Home	15	10	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	2	$0.000	$0.000	$6.999	$0.000	1,500	6,211	0	0	0	0	100%	100%	100%	9,777	0	0	0	0	0	0	0	0
Total LI Energy Squad Service 2018	Weighted Average of 2018 LI Squad Services	14	Existing Home	15	10	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	2	$0.000	$0.000	$6.999	$0.000	0	0	1,500	6,211	0	0	100%	100%	100%	0	0	0	9,777	0	0	0	0	0
Total LI Energy Squad Service 2019	Weighted Average of 2019 LI Squad Services	14	Existing Home	15	10	$0	$0	$0	$9.12	#DIV/0!	0.0	0.0	2	$0.000	$0.000	$6.999	$0.000	0	0	0	0	1,500	6,211	100%	100%	100%	0	0	0	0	0	0	9,777	0	0
Pilot Programs																																			
Energy Star Retail Products																																			
Gas Clothes Dryers	ENERGY STAR ®	2	Industry Standard	3	12	$45	$0	$244	$9.12	19%	53.6	43.7	1	$90.457	$7.538	$0.000	$0.000	582	582	873	873	1,048	1,048	100%	100%	100%	291	26,333	142,280	437	39,499	213,420	524	47,417	256,202
Energy Information Systems																																			
Energy Information System	New Energy Information System	0	No EIS	0	5	$1,080	$0	$3,600	$8.67	30%	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	$0.000	$0.000	2	1	2	2	3	3	100%	100%	100%	0	1,080	3,600	0	2,160	7,200	0	3,240	10,800
Behavioral and Operational Measures	Efficient behavior/operations	48,707	Less efficient behavior/operations	48,951	1	$1,224	$0	$0	$8.67	#DIV/0!	0.0	-10.1	245	$5.000	$5.000	-$2,000.000	$0.000			3	3	5	5	100%	100%	100%	0	0	0	734	3,671	0	1,224	6,119	0
Behavioral and Operational Measures	Efficient behavior/operations	-38,965	Less efficient behavior/operations	-39,161	1	$0	$0	$0	$8.67	#DIV/0!	0.0	0.0	-196	$0.000	$0.000	$1,600.000	$0.000				3		5	100%	100%	100%	0	0	0	-587	0	0	-979	0	0
Retrocommissioning Measures	Optimized Building Systems	48,689	Non-optimized Building Systems	48,951	7	$1,310	$0	$1,955	$8.67	67%	0.1	0.0	262	$5.000	$0.714	$4,528.077	$11,239.410	2	8	3	15	5	17	100%	100%	100%	2,096	10,480	15,638	3,930	19,651	29,321	4,323	21,616	32,254

Product: Business New Construction

Description:

This is a custom program including electric and gas measures. Third-party consultants work with customer design teams to optimize the energy performance of new buildings or retrofits of existing buildings. Depending on building size, project schedule, and scope, the project will fit into one of the following tracks: Energy Design Assistance Enhanced, Energy Design Assistance Standard, Energy Design Assistance Quick, or Energy Efficient Buildings.

Algorithms:

Customer kW	= Baseline_kW - Proposed_kW
Peak kW Coincident at the Customer	= Customer_kW x CF
Customer kWh	= Baseline_kWh - Proposed_kWh
Customer Dth	= Baseline_Dth - Proposed_Dth

Variables:

Baseline_kW	= Energy simulation output corresponding with the peak baseline building electrical load coincident with summer cooling design conditions.
Proposed_kW	= Energy simulation output corresponding with the peak proposed building electrical load coincident with summer cooling design conditions.
CF	= Probability that the Customer kW value will be realized during NSP-MN peak generation periods. Based on historical studies, this value is 92.8% for EDA and 75.3% for EEB.
Baseline_kWh	= Energy simulation output corresponding with the annual baseline building electrical consumption.
Proposed_kWh	= Energy simulation output corresponding with the annual proposed building electrical consumption.
Baseline_Dth	= Energy simulation output corresponding with the annual baseline building natural gas consumption.
Proposed_Dth	= Energy simulation output corresponding with the annual proposed building natural gas consumption.

Inputs:

- Building Characteristics for the proposed building are defined by building design team, which includes mechanical engineers, electrical engineers, and architects.
- Characteristics for the baseline building are defined by the energy consultant, utilizing methodology described by ASHRAE 90.1 Standard Appendix G and supplemented by Xcel Energy where required to accommodate regulatory requirements.

Product: Commercial Efficiency

Description:

The Commercial Efficiency Business Program targets energy use at large commercial facilities Customers who implement identified upgrades may receive rebates for large energy efficiency improvements that are not completed through Custom Efficiency or the prescriptive programs. The are also incentives for energy savings from behavioral measures.

Algorithms:

Electrical energy savings, electrical demand savings and gas savings will be calculated based on the methodologies presented in each of the end use programs. Please consult the the Deemed Savings Technical Assumptions of the other end uses for more details.

Product: Computer Efficiency

Description:

Manufacturer incentives will be offered for desktop computers that are either Energy Star or 80 Plus labeled. Incentives are administered via Ecos Plug Load Solutions PLS. Prescriptive rebates offered for end-use customers for installing VDI (Virtual Desktop Infrastructure) devices, also known as "Thin Client" systems instead of new PCs. PC Power Management is a prescriptive measure for an office-type occupancy which will provide customers with rebates for installing centralized PC power management software. Commercial customer incentives for installing servers with power supplies rated higher than Silver. At the moment, Silver efficiency power supplies are most commonplace in the market and will serve as the baseline. Gold, Platinum, and Titanium power supplies are eligible for incentive. All eligible servers are required to have redundant power supplies.

Algorithms:

General:

Gross Coincident kW Saved at Customer per Unit (kW)	= Customer kW x CF

Upstream Manufacturer Incentives:

Gross kW Saved at Customer per Unit (kW)	= (Baseline Computer kW - Efficient PS Computer kW) * Cooling kW factor * Quantity
Gross Annual kWh Saved at Customer per Unit (kWh/yr)	= (Baseline Computer kWh - Efficient PS Computer kWh) * Cooling kWh factor * Quantity
UMI Energy O&M Savings	= Customer kWh * Heating Penalty Factor * Gas Cost * Quantity

Desktop PC Virtualization:

Gross kW Saved at Customer per Unit (kW)	= (Baseline Computer kW - Virtualized kW) * Cooling kW factor * Quantity
Gross Annual kWh Saved at Customer per Unit (kWh/yr)	= (Baseline Computer kWh - Virtualized kWh) * Cooling kWh factor * Quantity
VDI Energy O&M Savings	= (Customer kWh * Heating Penalty Factor * Gas Cost * Quantity) + (Quantity * (O&M - Hours Savings + O&M - License C

Network PC Power Management:

Gross kW Saved at Customer per Unit (kW)	= (kW_Base - kW_EE) x Cooling kW factor * Quantity
Gross Annual kWh Saved at Customer per Unit (kWh/yr)	= (kW_Base - kW_EE) x Hours x Cooling kWh factor * Quantity
VDI Energy O&M Savings	= (Customer kWh * Heating Penalty Factor * Gas Cost * Quantity) + (Quantity * O&M - License Cost)

High Efficiency Power Supply Server:

Power Supply reduction kW	= Baseline Power Supply kW - Proposed Power Supply kW
Power Supply Output Wattage	= input wattage * number of power supplies * load factor
Baseline Power Supply kW	= Power Supply Output Wattage / (1000 * Silver Efficiency)
Baseline Power Supply kWh	= Baseline kW * hours of operation
Proposed Power Supply kW	= Power Supply Output Wattage / (1000 * Proposed Efficiency)
Proposed Power Supply kWh	= Proposed kW * hours of operation
Cooling Interaction kW	= PS Cooling Load (tons) * Cooling System kW/ton [per temperature bin]
Cooling Interaction kWh	= Cooling Interaction kW * Cooling System Hours [per temperature bin]
PS Cooling Load (tons)	= Power Supply Reduction (kW) * 3413 / 12000
Gross kW Saved at Customer per Unit (kW)	= Power Supply Reduction + Cooling Interaction kW
Gross Coincident kW Saved at Customer per Unit (kW)	= Gross kW Saved at Customer per Unit * Coincidence Factor
Gross Annual kWh Saved at Customer per Unit (kWh/yr)	= (Power Supply Reduction * Hours of Operation) + Cooling Interaction kWh

Variables:

General:

Customer kW	Calculated	Per measure kW savings value.
CF	Table 8	Probability that the calculated 'customer kW' will coincide with the period of generator peak operation
Cooling kW factor	Table 7	Average annual demand of cooling system necessary to cool the heat gain from the equipment (Ref. 10).
Cooling kWh factor	Table 7	= Average annual energy of cooling system necessary to cool the heat gain from the equipment (Ref. 10).
Heating Penalty Factor (Dth/kWh)	Table 7	= Average annual energy of heating system necessary to compensate for the negative heat gain associated with the more efficient equipment (Reference 10).
Gas Cost	$8.67	=Average Forecast Utility Cost ($/Dth) of Commercial Gas

Upstream Manufacturer Incentives:

Baseline Computer kW	Table 3	Average baseline computer energy demand (= Baseline Computer kWh / 8760 *Quantity)
Baseline Computer kWh	Table 3	Average baseline computer energy usage ('= UEC * PC Frequency * Quantity)
PC Frequency	Table 2	PC Frequency of Operating Patterns = Assumed % of the population that enables power management software in one of four available configurations (power management enabled, computer turned off; power management not enabled, computer turned off; power management enabled, computer left on; power management not enabled, computer left on (Reference 4); this is used to estimate average kWh usage over the entire population.
UEC	Table 3	Unit Energy Consumption = Sum of the products of the wattages and the annual hours in the four states of operation (active, idle, sleep, off) = (Active Wattage *Active Annual Hours of Operation)+(Idle Wattage * Idle Annual Hours of Operation)+(Sleep Wattage * Sleep Annual Hours of Operation)+(Off Wattage*Off Annual Hours of Operation) = Wattages are shown in Table 1 and Hours in each state are shown in Table 2.
Efficient PS Computer kW	Table 3	Average wattage demand of High Efficiency Power Supply
Efficient PS Computer kWh	Table 3	Average energy usage of High Efficiency Power Supply
Quantity		# of computers with a more efficient power supply
Measure Life	5 years	Average life of desktop computers (Reference 1)
Incremental Cost	Table 1	Cost of high efficiency model over baseline model
Net-to-Gross	88%	Reference 17

Desktop PC Virtualization:

Baseline Computer kW	Table 5	Societal aggregate baseline computer energy demand (= Baseline Computer kWh / 8760 *Quantity)
Baseline Computer kWh	Table 5	Societal aggregate of baseline computer energy usage * Quantity
Incremental Server kW	0.00401	Average energy usage per virtualized server = 273W (per Server) / 68 Virtual Machines (per Server) - Ref.8
Hours	8760	Average 'on' hours for a virtualized server
Quantity		# of VDI (thin client) devices installed instead of a desktop PC computer
VDI kW		kW of VDI product (provided by the customer) (Ref 25 for forecasting)
Measure Life	10 years	(Reference 9)
Incremental Cost	$117.00	Cost of high efficiency model over baseline model (Reference 6)
Net-to-Gross	88%	Calculated by applying a market penetration % of the efficient computer power supplies to the wattage and kilowatt-hour savings amount at five baseline levels. If our program was not in place, some of the customers that bought VDI boxes would have bought desktop computers at ESTAR 5 or higher.
O&M - Hours Savings	1/2	Hours Per Year per desktop @ $85/hr
O&M - License Cost	$12.00	Software License Fee per year per desktop

Network PC Power Management:

kW_Base	Table 5	Average weighted computer kW WITHOUT centralized power management.
kWh_Base	Table 5	Average weighted computer kWh WITHOUT centralized power management.
kW_EE	Table 5	Average weighted computer kW WITH centralized power management.
kWh_EE	Table 5	Average weighted computer kWh WITH centralized power management.
Hours	Table 6	Average PC hours broken out by operational state
Quantity		# of computers to be equipped with network power management control
Measure Life	6 Years	Length of time software will be utilized (Reference 16)
Baseline Cost	$0.00	Cost of the baseline technology. (The baseline is to continue to operate the existing system.)
Incremental Efficiency Cost	$14.64	Cost of the High Efficiency technology = average of various vendor products(Reference 12)
Net-to-Gross	88%	Aligns with the Computer Efficiency program as a whole
O&M - Licence Cost	$2.74	Software License Fee per year per desktop

High Efficiency Power Supply Server:

Proposed Efficiency	See Table 8	Power supply efficiency is dependent on efficiency level and loading
Power Supply input wattage	750	rated wattage of the power supply
HVAC System Type	Chilled Water	HVAC system type serving the data center where the power supplies will be installed. There are five options and the customer must indicate which option best matches their system. The options are shown in Table 10 below.
Load Factor	See Table 9	Power supply load factor
Number of Power Supplies	2	each power supply contains two power supplies for 100% redundancy. Load factors take the redundancy into account.
Hours of operation	8760	Servers operate all hours of the year
Chiller Efficiency (COP)	5.55	Assumed efficiency of data center central centrifugal chiller (ASHRAE 90.1-2001 (150-300 tons, centrif) page 34, Table 6.2.1L). Converted to kW/ton for use in the analysis.
DX Efficiency (EER)	9.5	Assumed efficiency of DX CRAC units (ASHRAE 90.1-2001 (>=240,000 BTU/h and <760,000 BTU/h, air cooled DX) page 27, Table 6.2.1A). Converted to kW/ton for use in the analysis
Glycol-Cooled DX Efficiency (EER	11	Assumed efficiency of glycol (water) cooled DX CRAC units (ASHRAE 90.1-2001 (>=240,000 BTU/h, water cooled air conditioners) page 27, Table 6.2.1A). Converted to kW/ton for use in the analysis.
Cooling Tower Fan Energy (GPM/	20	ASHRAE maximum cooling tower fan energy requirement (ASHRAE 90.1-2001 Centrif. Cooling Tower Fan Power, page 32, Table 6.2.1G) used to determine the cooling tower fan power/ton, along with the GPM/ton assumption.
Cooling Tower Sizing Factor (GPM	3	Standard cooling tower sizing rule of thumb (Ref 19,20,21)
Primary Chilled Water Pump Powe	5	Assumed, based on assumed chiller size and typical primary pump size
Primary Chilled Water Pump Load	75%	Assumed, based on rule-of-thumb for pump load factor
Primary Chilled Water Pump Moto	89.50%	Assumed, based on NEMA Premium motor efficiency for 5-hp motors
Chiller Size (tons)	150	Assumed, based on minimum chiller size within range used for chiller efficiency determination. This and the primary chilled water pump assumptions only affect the primary pump analysis and are only a very small portion of the total savings for this measure.
Measure Life (Retrofit)	5	Lifetime (in years) of the retrofit measure. This is based on subtracting the average CRAC unit age from the new construction lifetime. Ref 18.
Desired Chilled Water Temperatur	45	Chilled water supply temperature. This is a typical value for most chilled water systems.
Cooling Tower Approach (F)	7	Cooling tower approach (difference between outdoor air wet bulb temperature and condensing temperature). Values can range from 4-12 F, but 7 is typical.
Cooling Tower Design Wet Bulb T	69	Assumed design wet bulb temperature for cooling towers installed in the relevant location (69 F used for CO), based on weather data.
Chiller Minimum Efficiency Dry Bu	93	Assumed design dry bulb temperature for chiller in the relevant location (93 F used for CO), based on weather data.
Chiller Maximum Efficiency Dry Bu	30	Assumed dry bulb temperature below which the chiller's efficiency will not decrease any further.
Dry Cooler Dry Bulb Approach Tem	15	Dry cooler approach (difference between outdoor air dry bulb temperature and condensing temperature). 15 F is the most common value (Ref 23)
Cooling Equipment Temperature-based Efficiency Improvement	0.50%	Assumed efficiency improvement for chiller and DX systems (and, for simplicity, cooling tower fans) based on outdoor dry bulb temperature decrease (due to lower condenser pressure). Standard Xcel Energy
Net-to-Gross	88%	To match overall program. Program will be evaluated in 2016.

Table 1: Desktop Computer Wattages

Desktop Computer	Avg Active Watts (W)	Idle (W)	Sleep (W)	Off /Standby (W)	Incremental Cost (reference 5)	Notes
ES 6.0 or 80 Plus Bronze Qualified (Baseline)	58.48	24.93	1.60	0.57	N/A	Reference 5
ES 6.0 or 80 Plus Silver Qualified	56.63	24.14	1.60	0.57	$14.00	Reference 5
ES 6.0 or 80 Plus Gold Qualified	55.40	23.62	1.60	0.57	$16.00	Reference 5
ES 6.0 or 80 Plus Platinum Qualified	54.17	23.09	1.60	0.57	$22.00	Reference 5

Table 2: Annual Hours in each Operational State and Frequency of PC Operation Patterns (PC Frec

Computer State	Active (Hrs/year)	Idle (Hrs/year)	Sleep (Hrs/year)	Standby / Off (Hrs/year)	PC Frequency	Notes
Power managed (local), turned off	175	5,011	431	3,143	18.7%	Reference 3
Not power managed (local), turned off	175	5,442	0	3,143	66.3%	Reference 3
Power managed (local), left on	175	5,687	2,898	0	3.3%	Reference 3
Not power managed (local), left on	175	8,585	0	0	11.7%	Reference 3

Table 3: Energy and Demand Savings (Reference 1-5)

Desktop Computer	UEC	Computer Watts	Computer kWh/yr	Cooling Watts	Cooling Peak kWh	Customer kW Savings	Customer kWh Savings	Heating Dth Penalty
ES 6.0 or 80 Plus Bronze Qualified (Baseline)	666	18.4	161	6.1	18			
ES 6.0 or 80 Plus Silver Qualified	645	17.8	156	5.9	17	0.0008	5.6	-0.026
ES 6.0 or 80 Plus Gold Qualified	632	17.4	153	5.8	17	0.0013	9.3	-0.028
ES 6.0 or 80 Plus Platinum Qualified	618	17.1	149	5.6	16	0.0018	13.0	-0.029

Table 4: Computer Annual kWh and Average kW (Reference 11, 15, 26, 27)

	No centralized PC Power		With centralized PC Power		% of Program
Desktop PC	kWh_Base	kW_Base	kWh_EE	kW_EE	Participation
ENERGY STAR 3.0 Aggregate	337.66	0.0385	117.04	0.0134	0.00%
ENERGY STAR 4.0 Desktop PC	319.03	0.0364	111.65	0.0127	4.50%
ENERGYSTAR 5.0 Desktop PC	255.13	0.0291	91.45	0.0104	12.00%
ENERGYSTAR 6.0 Desktop PC	174.16	0.0199	65.99	0.0075	83.50%
Aggregate of Society	190.40	0.0217	71.10	0.0081	100.00%

Table 5: Hours of Operation (Reference 11, 13, 14 & Table 2 - for non-network aggregate operation.)

Desktop PC	Active	Idle	Sleep	Off	Total
Not network power managed, left on	175	8,150	435	0	8,760
Not network power managed, turned off	175	5,377	65	3,143	8,760
Network power managed, left on	175	1,631	6,954	0	8,760
Network power managed turned off	175	1,631	431	6,523	8,760

Table 6: Secondary Cooling/Heating Values

Location	kW	kWh	Dth/kWh	Notes
Front Range	1.33	1.11	-0.000508	Reference 10
Western Slope	1.33	1.137	-0.000508	Reference 10
Mountain	1.33	1.098	-0.000704	Reference 10

Table 7: Per Measure Coincidence Factors

Upstream Manufaturer Incentives	100%
Desktop PC Virtualization	100%
PC Power Management	0%
High Efficiency Server Power Supply	100%

Table 8: Power Supply Efficiency

Loading	Silver	Gold	Platinum	Titanium
5%	75.1%	80.2%	85.6%	90.6%
10%	79.0%	83.4%	87.9%	92.1%
15%	82.9%	86.5%	90.2%	93.5%
20%	86.8%	89.6%	92.5%	94.9%
30%	88.0%	90.6%	93.1%	95.3%
40%	89.2%	91.5%	93.7%	95.8%
50%	90.4%	92.5%	94.3%	96.2%
60%	90.1%	92.2%	94.0%	95.9%
70%	89.8%	92.0%	93.7%	95.6%
80%	89.5%	91.8%	93.4%	95.3%
90%	89.2%	91.5%	93.2%	95.1%
100%	88.9%	91.3%	92.9%	94.8%

Ref 18, 22

Table 9: Power Supply Load Factor

Loading	% operating hours	
	Hi Performance	Bus Computing
5%	5%	10%
10%	10%	55%
15%	55%	30%
20%	30%	5%
30%	0%	0%
40%	0%	0%
50%	0%	0%
60%	0%	0%
70%	0%	0%
80%	0%	0%
90%	0%	0%
100%	0%	0%

Ref 18, 22

Table 10: Cooling System Efficiencies

HVAC System Type	Efficiency	kW/ton	Notes
Chilled Water	5.55 COP	0.634	kW/ton is the rated efficiency
DX	9.5 EER	1.263	kW/ton is the rated efficiency
Glycol-Cooled DX	11 EER	1.091	kW/ton is the rated efficiency
Glycol-Cooled DX with Waterside Economizer	N/A	0.756	kW/ton is calculated from weather data and includes free cooling
Chilled Water with Waterside Economizer	N/A	0.407	kW/ton is calculated from weather data and includes free cooling

Table 11: Cooling Efficiency Table (kW/Ton)

Temperature	Water-Cooled Chiller	DX	Water-Cooled DX	Water-Cooled DX w/ WS Economizer	Water-Cooled Chiller w/WS Economizer
Determinate Temperature: (dB/wB)	Wet Bulb	Dry Bulb	Dry Bulb	Dry Bulb	Wet Bulb
-3	0.4584	0.8653	0.8316	0.1231	0.0036
-1	0.4584	0.8653	0.8316	0.1231	0.0036
1	0.4584	0.8653	0.8316	0.1231	0.0036
3	0.4584	0.8653	0.8316	0.1231	0.0036
5	0.4584	0.8653	0.8316	0.1231	0.0036
7	0.4584	0.8653	0.8316	0.1231	0.0036
9	0.4584	0.8653	0.8316	0.1231	0.0043
11	0.4584	0.8653	0.8316	0.1231	0.0052
13	0.4584	0.8653	0.8316	0.1231	0.0065
15	0.4584	0.8653	0.8316	0.1231	0.0083
17	0.4584	0.8653	0.8316	0.1231	0.0108
19	0.4591	0.8653	0.8316	0.1231	0.0145
21	0.4601	0.8653	0.8316	0.1231	0.0202
23	0.4613	0.8653	0.8316	0.1231	0.0297
25	0.4645	0.8653	0.8316	0.1231	0.0468
27	0.4766	0.8653	0.8316	0.1231	0.0817
29	0.4903	0.8653	0.8316	0.1231	0.1141
31	0.4993	0.8716	0.8377	0.2252	0.1141
33	0.5202	0.8842	0.8498	0.3307	0.1141
35	0.5468	0.8968	0.8619	0.4397	0.1141
37	0.5924	0.9095	0.8741	0.5522	0.1141
39	0.6314	0.9221	0.8862	0.6682	0.6314
41	0.6385	0.9347	0.8984	0.7876	0.6385
43	0.6492	0.9474	0.9105	0.9105	0.6492
45	0.6514	0.9600	0.9226	0.9226	0.6514
47	0.6587	0.9726	0.9348	0.9348	0.6587
49	0.6735	0.9853	0.9469	0.9469	0.6735
51	0.6808	0.9979	0.9591	0.9591	0.6808
53	0.6871	1.0105	0.9712	0.9712	0.6871
55	0.6971	1.0232	0.9833	0.9833	0.6971
57	0.7086	1.0358	0.9955	0.9955	0.7086
59	0.7167	1.0484	1.0076	1.0076	0.7167
61	0.7172	1.0611	1.0198	1.0198	0.7172
63	0.7284	1.0737	1.0319	1.0319	0.7284
65	0.7303	1.0863	1.0440	1.0440	0.7303
67	0.7302	1.0989	1.0562	1.0562	0.7302
69	0.7512	1.1116	1.0683	1.0683	0.7512
71	N/A	1.1242	1.0805	1.0805	N/A
73	N/A	1.1368	1.0926	1.0926	N/A
75	N/A	1.1495	1.1047	1.1047	N/A
77	N/A	1.1621	1.1169	1.1169	N/A
79	N/A	1.1747	1.1290	1.1290	N/A
81	N/A	1.1874	1.1412	1.1412	N/A
83	N/A	1.2000	1.1533	1.1533	N/A
85	N/A	1.2126	1.1654	1.1654	N/A
87	N/A	1.2253	1.1776	1.1776	N/A
89	N/A	1.2379	1.1897	1.1897	N/A
91	N/A	1.2505	1.2019	1.2019	N/A
93	N/A	1.2632	1.2140	1.2140	N/A
95	N/A	1.2632	1.2140	1.2140	N/A
97	N/A	1.2632	1.2140	1.2140	N/A
99	N/A	1.2632	1.2140	1.2140	N/A
101	N/A	1.2632	1.2140	1.2140	N/A
103	N/A	1.2632	1.2140	1.2140	N/A

Table 12: Power Supply Costs and Market Share

Watts	Silver	Gold	Platinum	Titanium	Market Share
300	$ 30.00	$ 37.50	$ 50.00	$ 67.50	10%
500	$ 40.00	$ 47.50	$ 60.00	$ 77.50	50%
750	$ 50.00	$ 57.50	$ 70.00	$ 87.50	25%
1400	$ 65.00	$ 72.50	$ 85.00	$ 102.50	15%

Ref 18, 23

Table 13: Incremental Cost per Power Supply ($)

Server Efficiency	min	max	avg
silver to gold	$ 5.00	$ 10.00	$ 7.50
gold to platinum	$ 10.00	$ 15.00	$ 12.50
platinum to titanium	$ 15.00	$ 20.00	$ 17.50

Ref 18, 23

Table 14 Incremental Cost per Server

Server Efficiency	Server Wattage Range			
	<400	400-600	600-1000	>1000
Gold	$ 11.63	$ 13.88	$ 16.13	$ 18.38
Platinum	$ 31.00	$ 37.00	$ 43.00	$ 49.00
Titanium	$ 58.13	$ 69.38	$ 80.63	$ 91.88

Ref 24

Table 15: Assumed Allocation of Cooling Systems (For Forecasting purposes)

Type of Cooling System	% Allocation
Chiller	20%
DX	20%
Water-Cooled DX	20%
Water-Cooled DX with WSE	20%
Chiller with WSE	20%

References:

1. Koomey, J., M. Cramer, M.A. Piette and J. Eto. 1995. "Efficiency Improvements in U.S. Office Equipment: Expected Policy Impacts and Uncertainties." Lawrence Berkeley Laboratory. LBL-37383. December. Table 3.
2. Energy Star Calculator Tool; LBNL 2007 or Energy Star Specification
3. Hours of operation for desktop computers from office desktops/laptops and office monitors from Piette, M. A., M. Cramer, J. Eto and J. Koomey. 1995. "Office Technology Energy Use and Savings Potential in New York." Prepared for the NY State Energy R&D Authority and Con-Ed by LBNL. Lawrence
4. LBNL Estimate based on Reference 3
5. Ecos Consulting information from manufacturers
6. Vendor data; see "Ref Cost-PC Virt" worksheet
7. Baseline desktop PC cost assumed at $600; info from the internet indicates a PC with keyboard averages between $300-$1,000 or $650; assumed the keyboard is $50 of that (Ref 6)
8. Server Wattages from Custom Efficiency program participant; average wattage of 42 models. (Wattages last confirmed in 2014)
9. 10-year life for thin-client and zero-client based on conversation with MN vendor Nowmicro
10. Based upon Rundquist Method Calculation (Matches Colorado Commercial Lighting Program)
11. Ecos Consulting (now Ecova), 2009
12. Various Equipment Vendors
13. Measured Energy Savings and Performance of Power-Managed Personal Computers and Monitors, 1996, Lawrence Berkeley National Laboratory
14. PC and Monitor Night Status: Power Management Enabling and Manual Turn-off, 1998, Lawrence Berkeley National Laboratory
15. ENERGY STAR, 2012
16. Xcel Energy Custom Efficiency projects
17. 2014 Michaels Energy (independent 3rd party) NTG review.
18. Ecova, multiple discussions
19. Cooling Plant Optimization
(http://academic.udayton.edu/kissock/http/EEB/LecturesAndHomework/23-CoolingPlantOptimization/CoolingPlantOptimization.docx)
20. Georgia Tech Student Thesis (http://www-old.me.gatech.edu/energy/students/liuthesis.pdf)
21. Condenser Water Energy Savings
(http://web.stanford.edu/group/narratives/classes/08-09/CEE215/ReferenceLibrary/Chillers/York%20Engineering%20Updates/Reduced%20 condenser-water%20flow%20rate_energy-saving%20miracle%20or%20mirage.pdf)
22. Server Power Supplies Data Points_PMO.XLS supplied by Ecova on 9/1/14
23. 80 Plus Servers Calculator_Xcel14Aug2014.xlsx file provided by Ecova on 9/1/14
24. Inernal adjustment by Xcel energy to distribute power supply cost in a commensurate with wattage served. Values will be reviewed over time as additional information becomes available.
25. Energy Star 6.0 Product Database, downloaded on 12/21/15
26. Energy Star Office Equipment Calculator, accessed 12/21/15
http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/purchase-energy-saving-products
27. Energy Star 5.0 Product Database, downloaded on 12/21/15 from historical archive

Changes from Previous Filing:

1. Adjusted average societal baseline for PC Power Management and VDI Measures to increase shift to ES 5.0 computers. Refer to Table 5.
2. Revised the NTG to match the findings of the 2014 third-party review.
3. Addition of High Efficiency Power Supply Server Measure
4. Adjusted baselines for PC Virt, PC power management, and upstream power supplies to account for changing societal baseline and energy efficiency programs (Energy Star)
5. Reformatted Forecast worksheets to include forecast lines at top, remove unnecessary material, and improve usability
6. Added ENERGY STAR 6.0 to PC Power Management, Virtualization, and Upstream Power Supplies
7. Adjusted ENERGY STAR 5.0 wattage values using new data
8. Consolidated "Forecast Measures" worksheets for several products into their "Forecast kW kWh" worksheets for simplicity
9. Updated Upstream program to use ES 6.0 Bronze Power Supply baseline

Product: Cooling Efficiency

Prescriptive rebates will be offered for new cooling equipment. Rebates for most measures are dependent on size and on meeting a minimum efficiency. Additional rebates are available for better efficiencies than the minimum qualifying efficiencies.
Custom rebates are available for cooling-related improvements that are not covered by the aforementioned prescriptive rebates. These would include applications such as heat recovery. Energy Recovery Ventilators (ERVs) allow air from inside a building to be used to pre-condition outside air lowering the load seen at the RTU or AHU for both heating and cooling modes. ERVs will have a total cooling and heating effectiveness greater than or equal to 60% as rated by AHRI. For new Mini-Split Heat Pumps (MSHP) it is assumed that the MSHP is being installed in either new construction or to supplement an existing heating and cooling system. The MSHP rebate is intended to incent customers to install a high efficiency MSHP rather than the code level baseline unit.

Algorithms:

Energy Efficiency Ratio (EER)	= Seasonal Energy Efficiency Ratio x 0.85 NOTE: 0.90 is used for WSHP see 'Assumptions' below for details For forecasting purposes the EER for MSHPs will be determined by the following empirical formula based on AHRI information: = (-0.0003 x (SEER/ton)^3 + 0.0101 x (SEER/ton)^2 + 0.5264 x (SEER/ton) - 0.0233) x tons
kW/ton	= 12 / Energy Efficiency Ratio (EER)
Energy Efficiency Ratio (EER)	= 3.413 x Coefficient of Performance (COP)
Heating Seasonal Performance Factor (HSPF)	= 3.413 x Heat Energy Output (BTU) / Energy Input to Compressor (BTU)

For Direct Expansion (DX) Units, Water Source Heat Pumps

Cooling Electrical Energy Savings (Customer kWh)	= Size x EFLH x (12 / SEER_Baseline - 12 / SEER_Eff) NOTE: IEER replaces SEER for most RTU's and SEER x 0.90 = EER for WSHP
Cooling Electrical Demand Savings (Customer kW)	= Size x (12 / EER_Baseline - 12 / EER_Eff)

For Chillers

Cooling Electrical Energy Savings (Customer kWh)	= Size x EFLH x (IPLV_Baseline - IPLV_Eff)
Cooling Electrical Demand Savings (Customer kW)	= Size x (FLV_Baseline - FLV_Eff)

For Centrifugal Chillers

FLV_standard	= FLV_ARI / K_{adj}
IPLV_standard	= IPLV_ARI / K_{adj}
K_{adj}	=A x B
A	=0.00000014592 x (Lift)^4 - 0.0000346496 x (Lift)^3 + 0.00314196 x (Lift)^2 - 0.147199 x (Lift) + 3.9302
B	=0.0015 x LvgEvap +0.934
Lift	=LvgCond - LvgEvap

For DX Economizers with Demand Ventilation

Cooling Electrical Energy Savings (Customer kWh)	= Size x FLV_DX x (Base_OA_Load - Reduced_OA_Load) x Cooling_RTU_Op_Hours
Cooling Electrical Demand Savings (Customer kW)	= Size x FLV_DX x (Base_OA_Load - Reduced_OA_Load)

For VFD's on Centrifugal Chillers

Cooling Electrical Energy Savings (Customer kWh)	= Size x EFLH x (IPLV_VFD_Baseline - IPLV_VFD_Eff)
Cooling Electrical Demand Savings (Customer kW)	= Size x (FLV_VFD_Baseline - FLV_VFD_Eff)

For ERV's

Cooling Electrical Energy Savings (Customer kWh)	= 6103 x EER_Bin_Analysis / Cooling_System_Efficiency x EFLH / EFLH_Hospitals x OA_CFM / OA_Bin_Analysis x Cooling_Effectiveness / Cooling_Effectiveness_Bin_Analysis NOTE: 6103 kWh comes from internal bin analysis verified by 3rd party reviewer and includes the fan penalty
Cooling Electrical Demand Savings (Customer kW)	= 4.5 x OA_CFM x (DD_Enth - RA_Enth) / 12000 x Cooling_Effectiveness x 12 / Cooling System_Efficiency + Fan_Penalty
Fan_Penalty	= (OA_CFM x Pressure_Drop) / (6356 x Fan_Efficiency) x 0.746 / Motor_Efficiency x 2
Dth	= 1989 x OA_CFM / OA_Bin_Analysis x Heating_Effectiveness / Heating_Effectiveness_Bin_Analysis NOTE: Savings from internal bin analysis verified by 3rd party reviewer

For Mini-splits

Cooling Electrical Energy Savings (kWh)	= Size x EFLH x (12 / SEER_Baseline - 12 / SEER_Eff)
Heating Electrical Energy Savings (kWh)	= MSHP_Size_Heating x MSHP_EFLHH / 1000 x (1 / HSPF_Standard - 1 / HSPF_Eff)
Heat Pump Electrical Energy Savings (Gross Annual kWh Saved at Customer)	= Cooling Energy Savings + Heating Energy Savings
Cooling-Only New Equipment Electrical Energy Savings (Gross Annual kWh Saved at Customer)	= Cooling Energy Savings
New Equipment Electrical Demand Savings (Gross kW	= Size x (12 / EER_Baseline - 12 / EER_Eff)

Variables:	Value	Description
Size	Customer Input	The equipment capacity in tons. NOTE: The maximum size unit for MSHPs is 5 tons.
EFLH	See Table 2	Equivalent Full Load Hours. The equivalent number of hours that the equipment would be running at full load over the course of the year.
SEER_Baseline / IEER_Baseline	See Table 1	Seasonal (or Integrated) Energy Efficiency Ratio in BTU/W-hr of standard equipment, based upon the minimum acceptable efficiency defined by ASHRAE 90.1-2010.
SEER_Eff / IEER_Eff	Customer Input	Seasonal (or Integrated) Energy Efficiency Ratio in Btu/W-hr of high efficiency equipment that the customer will install.
EER_Baseline	See Table 1	EER of standard equipment, based upon the minimum acceptable efficiency defined by the ASHRAE 90.1-2010.
EER_Eff	Customer Input	EER of high efficiency equipment that the customer will install.
FLV_Baseline	See Table 1	Full load cooling efficiency in kW/ton of standard equipment, based upon the minimum acceptable efficiency defined by ASHRAE 90.1-2010 for a given chiller type and size. NOTE: For non-centrifugal chillers, FLV_Baseline is the value in ASHRAE 90.1-2010. For centrifugal chillers, condenser water temperature, chilled water temperature, and condenser flow rate are used in the formula given in algorithms in order to convert the efficiency values at standard ARI conditions to the customer's actual operating conditions.
FLV_ARI (same as IPLV_ARI)	See Table 1	ASHRAE Standard 90.1-2010 minimum acceptable FLV (or IPLV) for centrifugal chillers at the ARI Standard 550/590 rated condition of 85 °F condensing water temperature, 44 °F chilled water temperature, and 3 gpm/ton.
LvgEvap	Customer Input	The full load water temperature leaving the evaporator, in °F.
LvgCond	Customer Input	The full load water temperature leaving the condenser, in °F.
FLV_Eff	Customer Input	Full Load Value cooling efficiency in kW/ton, representing the efficiency at design conditions for the customer's operating conditions.
IPLV_Baseline	See Table 1	Integrated Part Load Value in kW/ton (representing the average efficiency over a range of loaded states) based upon the minimum acceptable efficiency defined by ASHRAE 90.1-2010 for a given chiller type and size. NOTE: For non-centrifugal chillers, IPLV_Baseline is the value in ASHRAE 90.1-2010. For centrifugal chillers, condenser water temperature, chilled water temperature, and condenser flow rate are used in the formula given in algorithms in order to convert the efficiency values at standard ARI conditions to the customer's actual operating conditions.
IPLV_Eff	Customer Input	Integrated Part Load Value (representing the average efficiency over a range of loaded states) cooling efficiency in kW/ton of high efficiency equipment at the customer's operating conditions.

Variables for DX Economizers with Demand Ventilation

Base_OA_Load	10%	Ratio of outside air ventilation load of the RTU to the peak cooling load.
Reduced_OA_Load	5%	Ratio of outside air ventilation load of the RTU to the peak cooling load.
Cooling_RTU_Op_Hours	3,477	The total operating hours that the RTU runs in mechanical cooling mode, based on all hours in which outside air dry bulb temperature is greater than 55 °F.
FLV_DX	1.2	Efficiency of a DX unit when operating, in kW/ton. For use in the DX Economizers with CO_2-based Demand Ventilation

Variables for VFD's on Centrifugal Chillers

FLV_VFD_Baseline	Customer Input	Full Load Value cooling efficiency in kW/ton, representing the efficiency of existing chiller without a VFD at 95% load.
FLV_VFD_Eff	Customer Input	Full Load Value cooling efficiency in kW/ton, representing the efficiency of existing chiller with a VFD at 95% load.
IPLV_VFD_Baseline	Customer Input	Integrated Part Load Value (representing the average efficiency over a range of loaded states) cooling efficiency in kW/ton of existing chiller without a VFD.
IPLV_VFD_Eff	Customer Input	Integrated Part Load Value (representing the average efficiency over a range of loaded states) cooling efficiency in kW/ton of existing chiller with a VFD.

Variables for ERV's

Cooling_System_Efficiency	Customer Input	The EER value at full load for the DX unit or chiller.
EER_Bin_Analysis	19.21	EER value used during bin analysis for program.[10]
EFLH_Hospitals	1,298	Equivalent Full Load Hours for hospitals in Zone 3.
OA_CFM	Customer Input	Volume of air from outside passing through the ERV.
OA_Bin_Analysis	11,193	Outside air value used during bin analysis for program.[10]
4.5	4.5	Sensible and latent heat equation constant used to convert units of flow and enthalpy to BTU/hr.
12000	12000	Standard conversion from BTU/hr to tons. 1 ton = 12,000 BTU/hr
Cooling_Effectiveness	Customer Input	Rating given to the ERV per the AHRI Certificate at 100% air flow during cooling season.
Cooling_Effectiveness_Bin_ Analysis	73.49%	Rating used during bin analysis for program.[10]
Heating_Effectiveness	Customer Input	Rating given to the ERV per the AHRI Certificate at 100% air flow during heating season.
Heating_Effectiveness_Bin_ Analysis	72.01%	Rating used during bin analysis for program.[10]
DD_Enth	38.56	Design Day Enthalpy BTU/lb, from TMY3 weather data for Minneapolis/St. Paul.
RA_Enth	28.00	Return Air Enthalpy BTU/lb, based on return air properties listed in assumptions.
Pressure_Drop	Customer Input	Pressure Drop in inches of water gauge across the ERV per the AHRI Certificate.
6356	6356	= Fan power equation constant used to convert units of flow and pressure to horsepower.
Fan Efficiency	75%	Common engineering assumption for fan efficiency, note that this is generally a conservative assumption.
0.746	0.746	= Standard conversion from horsepower to kW. 1 HP = 0.746 kW
Motor Efficiency	93%	= Assuming a 15 HP fan motor that is NEMA Premium and 1800 RPM ODP.[10]
Heating System Efficiency	80%	= Federal Baseline Heating Efficiency

Variables for MSHP's

MSHP_Size_Heating	Customer Input	Heating capacity of Mini Split Heat Pump, in BTU/h
MSHP_EFLHH	849	Mini-Split Heat Pump Equivalent Full Load Hours Heating: The equivalent number of hours that MSHP equipment would be running at full load over the course of the year for heating. From Heating Efficiency Program.
HSPF_Standard	8.20	Heating Seasonal Performance Factor (HSPF) of standard equipment, based upon the minimum Federal standard for efficiency as manufactured.
HSPF_Eff	Customer Input	Heating Seasonal Performance Factor (HSPF) of High Efficiency equipment that the customer will install.

Other Variables:

Measure Life (DX, Chillers, WSHP, PTAC)	20	Measure life is taken at this length for all cooling equipment except those listed below[2]
Measure Life (Demand Control Ventilation)	15	[2]
Measure Life (VFD)	15	Equal to the value used in the Motors and Drives program for VFDs.
Measure Life (MSHP)	18	[9]
Coincidence Factor	90.0%	For all measures except Chiller VFD Retrofits
Coincidence Factor (Chiller VFD Retrofit)	-7.9%	
Baseline Costs of Equipment		The cost of equipment that would exactly meet code requirements. Not applicable for RTU Economizers or ERV's.[3, 5, 6, 7]
Incremental Costs of Equipment	See Table 1	The incremental cost of equipment above the code requirements, typically expressed on a dollar per ton basis.[3, 4, 5, 7]
Incremental Cost VFD	$71.88	$/Ton, The incremental cost of equipment above the code requirements.[2]
Incremental O&M cost	$0.00	Conservative approach, taking no credit for improved mean time between failure.

Needed from Customer/Vendor/Administrator for Calculations:

Cooling equipment type
Cooling equipment size (tons)
Cooling equipment efficiency (SEER, EER, or FLV, IPLV in kW/ton - dependent on the technology)
Climate zone
Building type
Equipment quantity

For Centrifugal Chillers (in addition to above):

Condenser water leaving temperature (°F)
Chilled water leaving temperature (°F)
Condenser fluid flow rate (GPM/ton)
NOTE: Chiller Efficiency Adjustment Factor algorithm is only valid when evaporator leaving temperature is greater than or equal to 36 °F, the condenser

Provided by Customer: for Chiller VFD Retrofit

FLV of the chiller without a VFD
FLV of the chiller with the VFD
IPLV of the chiller without a VFD
IPLV of the chiller with the VFD
Chiller Tons

Provided by Customer: for ERV

Cooling Effectiveness (Total)
Heating Effectiveness (Total)
Flow (CFM) of outside air through the ERV
Pressure Drop (in wg)
Cooling system efficiency (EER)

Provided by Customer: for Mini-Splits

Cooling capacity (BTU/h)
Heating capacity (BTU/h)
Cooling efficiency (SEER)
Heating efficiency (HSPF)
Climate zone
Building type
Equipment quantity
Primary use, cooling or heating (MSHP)

Assumptions:

- Each piece of cooling equipment is going in instead of a unit of the same size that only met minimum ASHRAE Standard 90.1-2010 requirements.
- Prescriptive rebates are not given for backup cooling equipment.
- Some equipment is rated in only EER or SEER. To convert a Seasonal Energy Efficiency Ratio (SEER) to an Energy Efficiency Ratio (EER), multiply SEER by 0.85. The conversion factor of 0.85 a generally accepted factor for converting from SEER to EER {The exception is for Water Source Heat Pumps, which uses a value of 0.90 A higher value is used since there will be less temperature variation in the condenser water loop than ambient conditions}. Once EER is obtained, convert EER to kW/ton using the following equation: kW/ton = 12/EER. To convert kW/ton to kW, multiply by tons.
- Chillers are rated at specified ARI conditions, but these may not match what the customer's actual operating conditions would be. A corresponding baseline efficiency will be determined based on a formula dependent on the condenser water flow, the condenser water temperature difference and chilled water supply temperature. Formula given by ASHRAE Standard 90.1-2010 under section 6.4.1.2.1 Water-cooled centrifugal chilling packages in order to convert FLV_ARI to FLV_Baseline and IPV_ARI to IPLV_Baseline.
- No heating demand (kW) saving are claimed for MSHP during winter, only summer cooling demand (kW) savings are claimed.
- ERV's have a bypass damper to allow outside air around the wheel or plate and eliminate the fan penalty during economizer mode
- Hospitals are the baseline building for kWh savings with a run time of 8760. All other sectors take a ratio of savings based on the sectors ELFH / ELFH_Hospitals (See Table 1)
- Return air properties are 76 °F and 50% RH in the summer and 70 °F and 40% RH in the winter.

References

1. NYSERDA (New York State Energy Research and Development Authority); NY Energy $mart Programs Deemed Savings Database - Source for coincidence factor
2. ASHRAE, 2007, Applications Handbook, Ch. 36, table 4, Comparison of Service Life Estimates
3. 2013-2015 MN Cooling Program Participation Data, used for developing incremental costs and forecasts
4. Minnesota Technical Reference Manual, v1.3
5. California DEER Ex Ante Measure Cost Study (http://www.deeresources.com/files/DEER2016/download/2010-2012_WO017_Ex_Ante_Measure_Cost_Study_-_Final_Report.pdf)
6. Provided by a mechanical contracting firm in 2010 and inflation-adjusted to 2017 dollars using average inflation rate
7. NEEP Incremental Cost Study, Phases 2 and 3,Navigant. May 2014. Incremental Cost Study Phase Three Final Report. Prepared for NEEP Regional Evaluation, Measurement & Verification Forum, Navigant. 2013. Incremental Cost Study Phase Two Final Report. Burlington, MA.
8. Incremental costs for MSHPs were determined from the NEEP Incremental Cost Study Phase 2 Report
9. MSHP equipment life is from Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures; http://library.cee1.org/content/measure-life-report-residential-and-commercialindustrial-lighting-and-hvac-measures
10. Values derived from 2014-2015 Xcel Cooling Program participants.

Summary of Changes

Centrifugal chiller adjustment formula and validation rules
ERV formulas
Mini-split measures and all associated parameters, formulas, etc.
Check DX Economizer parameters
Code baseline efficiencies for all equipment
Minimum qualifying efficiencies for most all equipment
Update incremental costs for all equipment
Update EFLH parameters
Update rebates (DX, WSHP, PTAC, chillers,

Table 1. Deemed Baseline Efficiency and Incremental Costs

Equipment	Equipment Classification	SEER/IEER	EER	FLV (kW/ton)	IPLV (kW/ton)	Incremental Cost ($ per ton)
DX Units < 5.4 tons	Baseline Efficiency	13.0	11.1			
	High Efficiency					230
DX Units 5.4 - 11.3 tons	Baseline Efficiency	11.2	11.0			
	High Efficiency					380
DX Units 11.4 - 19.9 tons	Baseline Efficiency	11.0	10.8			
	High Efficiency					240
DX Units 20 - 63.3 tons	Baseline Efficiency	9.9	9.8			
	High Efficiency					189
DX Units ≥ 63.3 tons	Baseline Efficiency	9.6	9.5			
	High Efficiency					57
Water-source Heat Pumps	Baseline Efficiency	13.3	12.0			
	High Efficiency					256
PTAC	Baseline Efficiency	13.1	11.1			
	High Efficiency					250
Scroll/Screw chiller < 75 tons	Baseline Efficiency			0.780	0.630	
	High Efficiency					132
Scroll/Screw chiller 75 - 150 tons	Baseline Efficiency			0.775	0.615	
	High Efficiency					125
Scroll/Screw chiller 150 - 300 tons	Baseline Efficiency			0.680	0.580	
	High Efficiency					85
Scroll/Screw chiller ≥ 300 tons	Baseline Efficiency			0.620	0.540	
	High Efficiency					59
Centrifugal Chillers < 150 tons	Baseline Efficiency at ARI Conditions			0.634	0.596	
	High Efficiency					96
Centrifugal Chillers 150 - 300 tons	Baseline Efficiency at ARI Conditions			0.634	0.596	
	High Efficiency					50
Centrifugal Chillers 300 - 600 tons	Baseline Efficiency at ARI Conditions			0.576	0.549	
	High Efficiency					36
Centrifugal Chillers ≥ 600 tons	Baseline Efficiency at ARI Conditions			0.570	0.539	
	High Efficiency					24
Air-Cooled Chillers < 150 tons	Baseline Efficiency	12.50	9.56			
	High Efficiency					305
Air-Cooled Chillers ≥ 150 tons	Baseline Efficiency	12.75	9.56			
	High Efficiency					117
Mini-Split Heat Pump	Standard Efficiency	14.00	8.35			
	High Efficiency					441
Mini-Split Air Conditioner	Standard Efficiency	14.00	8.35			
	High Efficiency					441

Notes:

* Bold values indicates direct sourcing to ASHRAE 90.1-2010, otherwise estimated by multiplying SEER or dividing EER by the following:
+ 0.85 for DX Units < 5.4 tons and PTAC's
+ 0.90 for WSHP's
+ 0.60 for Mini-Splits for the purposes of this illustration. A 3rd degree polynomial curve fit, derived from the AHRI database, will be used for actual savings calculations
* High Efficiency SEER/IEER and EER values are supplied by Customer.
* ARI rated efficiency is converted to Standard efficiency as per ASHRAE 90.1-2010
* Values for Centrifugal Chillers assumed to be at ARI rating conditions of 85 °F condensing temperature, 44 °F chilled water temperature, and 3 gpm/ton chilled water flow. Reference ASHRAE 90.1-2010
* Values for PTAC units are based on 3/4 ton new construction units. Reference ASHRAE 90.1-2010

Table 2. Equivalent Full Load Hours by Building Type[4]

Building Type	Zone 1 EFLH	Zone 2 EFLH	Zone 3 EFLH
Convenience Store	647	825	986
Education - Community College/University	682	782	785
Education - Primary	289	338	408
Education - Secondary	484	473	563
Health/Medical - Clinic	558	738	865
Health/Medical - Hospital	663	1089	1298
Lodging	401	606	754
Manufacturing	347	472	589
Office-Low Rise (> 25,000 ft2, 1 - 2 stories)	257	359	446
Office-Mid Rise (25,000 - 250,000 ft2, 3 - 8 stories)	373	529	651
Office-High Rise (> 250,000 ft2, > 8 stories)	669	1061	1263
Restaurant	347	535	652
Retail - Large Department Store	462	588	686
Retail - Strip Mall	307	441	574
Warehouse	164	343	409
Data Center	8,760	8,760	8,760
Process Load	5,840	5,840	5,840

NOTE: Zone 1 (Northern MN), Zone 2 (Central), and Zone 3 (Southern MN, Twin Cities)

Table 3. Bin Hours and Weather Conditions

OADB (°F)	Hours	Humidity Ratio (lb_m/lb_m)	Enthalpy (BTU/lb_m)	MCWB (°F)
104	0	0.00000	0.00	0.00
102	0	0.00000	0.00	0.00
100	0	0.00000	0.00	0.00
98	3	0.01641	41.84	77.74
96	4	0.01604	40.85	76.73
94	17	0.01602	40.20	76.01
92	15	0.01503	38.56	74.25
90	32	0.01541	38.48	74.15
88	47	0.01455	37.04	72.52
86	31	0.01420	36.28	71.79
84	76	0.01421	35.89	71.40
82	120	0.01302	34.12	69.40
80	146	0.01271	33.27	68.36
78	172	0.01200	32.03	66.87
76	327	0.01167	31.03	65.57
74	261	0.01096	29.63	63.78
72	272	0.01127	29.50	63.61
70	265	0.01025	27.90	61.44
68	148	0.01023	27.50	60.84
66	299	0.00969	26.54	59.50
64	272	0.00934	25.69	58.24
62	241	0.00796	23.69	55.25
60	216	0.00749	22.68	53.62
58	299	0.00680	21.35	51.38
56	214	0.00635	20.24	49.46
54	222	0.00582	19.17	47.49
52	211	0.00564	18.49	46.20
50	117	0.00517	17.61	44.49
48	221	0.00528	17.38	44.02
46	222	0.00499	16.58	42.46
44	207	0.00445	15.50	40.21
42	265	0.00434	14.89	38.90
40	334	0.00394	13.87	36.64
38	216	0.00340	12.66	33.77
36	221	0.00315	11.93	31.98
34	294	0.00309	11.36	30.61
32	167	0.00278	10.68	28.96
30	266	0.00256	10.06	27.47
28	240	0.00225	9.25	25.40
26	237	0.00194	8.45	23.27
24	241	0.00182	7.85	21.69
22	305	0.00156	6.97	19.22
20	226	0.00135	6.12	16.79
18	179	0.00122	5.51	15.00
16	159	0.00109	4.89	13.13
14	52	0.00100	4.43	11.68
12	91	0.00092	3.98	10.26
10	71	0.00089	3.49	8.71
8	75	0.00076	2.81	6.52
6	57	0.00070	2.33	4.92
4	70	0.00062	1.63	2.54
2	40	0.00049	0.87	-0.09
0	45	0.00044	0.34	-1.95
-2	45	0.00037	-0.24	-4.01
-4	33	0.00037	-0.57	-5.20
-6	37	0.00034	-0.92	-6.46
-8	31	0.00030	-1.49	-8.58
-10	36	0.00027	-1.95	-10.28
-12	12	0.00025	-2.51	-12.37
-14	22	0.00023	-3.17	-14.87
-16	8	0.00020	-3.64	-16.68
-18	3	0.00017	-4.29	-19.19
-20	1	0.00016	-4.85	-21.38
-22	2	0.00015	-5.12	-22.42
-24	2	0.00015	-5.49	-23.88

Table 4. Bin Hours WB and Mean Coincident Dry Bulb Temps

MCDB (°F)	WB (°F)	Hours
88.5	82	2
90.2	80	27
86.9	78	53
83.9	76	73
81.4	74	96
78.7	72	169
77.7	70	197
75.1	68	255
73.6	66	360
70.9	64	367
70.0	62	296
67.6	60	338
65.8	58	254
62.9	56	250
60.8	54	261
57.9	52	260
55.1	50	296
53.4	48	263
50.2	46	246
48.2	44	278
46.2	42	260
43.4	40	271
41.7	38	273
39.0	36	209
36.0	34	301
34.4	32	251
32.4	30	272
30.8	28	297
28.3	26	219
26.3	24	299
24.0	22	239
21.9	20	195
19.8	18	227
17.8	16	218
15.7	14	155
13.6	12	103
11.1	10	104
8.8	8	61
7.0	6	75
4.8	4	46
2.6	2	45
0.5	0	46
-1.5	-2	39
-3.6	-4	63
-5.4	-6	35
-8.0	-8	43
-9.7	-10	28
-12.4	-12	13
-14.6	-14	16
-16.1	-16	8
-18.6	-18	3
-20.9	-20	1
-22.4	-22	3
-24.0	-24	1

Product: Custom Efficiency

Description:

Customer may apply for rebate under the Custom Efficiency Program for electric or gas projects not listed under prescriptive rebate programs. Each Custom Efficiency project will be analyzed individually by Xcel Energy. Technical variables required for the analysis will be obtained from the customer or vendor. Analysis will be based on standard engineering methodologies.

Algorithms:

	Electrical energy savings and electrical demand savings will be calculated based on the project specific details. Each project will undergo an engineering review in accordance with standard engineering practices. The review will be in accordance with the calculation methodologies detailed in the prescriptive programs where applicable. A demand loss factor of 7.00% will be used for all Custom Efficiency calculations. This represents the percentage loss of electricity as it flows from the power plant to the customer during peak system demand. An energy loss factor of 6.60% will be used for all Custom Efficiency calculations. This represents the percentage loss of electricity as it flows from the power plant to the customer during non-peak system demand.
	Natural Gas savings will be calculated based on the project specific details. Each project will undergo an engineering review in accordance with standard engineering practices. The review will be in accordance with the calculation methodologies detailed in the prescriptive programs where applicable.

Variables:

	Product Life will be evaluated for each project, lifetimes for end use technologies will be in accordance with prescriptive programs where applicable
	Coincidence factor will be evaluated for each project.
	Operation and Maintenance Savings will be evaluated for each project.

Program: Data Center Efficiency

Description:

Holistic: Customers may apply for rebates under the Data Center Efficiency product for measures not listed under prescriptive rebate products for this program.
Custom: Each Data Center efficiency project will be analyzed individually by Xcel Energy. Technical variables required for the analysis will be obtained from the customer or vendor. Analysis will be based on standard engineering methodologies.
Prescriptive: Commercial customers receive a rebate for installing electronically-commutated, backward-curved plug fans on computer room air conditioning units' (CRAC) supply fans in data centers instead of baseline forward-curved AC centrifugal fans in new or retrofit applications. Due to federal DX CRAC unit efficiency standards that are making EC fans a standard feature, only chilled-water based CRAC units are eligible for the new

Program References:

Holistic Program Savings	Refer to the appropriate program to find all applicable formulas (Customer kW, Customer kWh, Customer PCkW, etc.) or assumptions (Hours, Runtime, etc.) for prescriptive measures savings claimed through the holistic data center product architecture.

Algorithms:

Custom Calculations:	Non-prescriptive electrical energy savings and electrical demand savings will be calculated based on the project-specific details. Each project will undergo an engineering review in accordance with standard engineering practices. Where prescriptive elements exist, the review will be in accordance with the calculation methodologies detailed in the prescriptive products.
Fan Power Reduction (kW)	= (Baseline Fan Power - Efficient Fan Power) * Typical % of CRAC Units in Use
Baseline Fan Power (kW)	= Fan HP * 0.7457 kW/HP
Efficient Fan Power (kW)	= Fan HP * 0.7457 kW/HP * Comparison Load Factor
Comparison Load Factor	= (Base Efficiency Adjustment Factor / Proposed Efficiency Adjustment Factor) - Underfloor Distribution Savings Factor (when applicable)
Base Efficiency Adjustment Factor	= Baseline Fan Efficiency * Baseline Belt Efficiency * Baseline Motor Efficiency
Proposed Efficiency Adjustment Factor	= Proposed Fan Efficiency * Proposed Drive Efficiency * Proposed Motor Efficiency
Cooling Interaction kW	= Fan Cooling Load (tons) * Cooling System kW/ton [per temperature bin]
Cooling Interaction kWh	= Cooling Interaction kW * Cooling System Hours [per temperature bin]
Fan Cooling Load (tons)	= Fan Power Reduction (kW) * 3413 / 12000
Gross kW Saved at Customer per Unit (kW)	= Fan Power Reduction + Cooling Interaction kW
Gross Coincident kW Saved at Customer per UnitkW)	= Gross kW Saved at Customer per Unit * Coincidence Factor
Gross Annual kWh Saved at Customer per Unit (kWh/y	= (Fan Power Reduction * Fan Hours of Operation) + Cooling Interaction kWh

Chilled Water System Waterside Economizers

Slope	= $(Load_{onset} - 0) / (T_{onset} - T_{balance})$
Intercept	= -Slope x $T_{balance}$
Cooling Load (OADB) [tons]	= Slope x OADB + Intercept
$Load_{design}$ [tons]	= Slope x (T_{design}) + Intercept
Top [ton-hours]	=Σ [Cooling Load (OADB) x hours(OADB)] for OADB: $T_{balance}$ -> T_{onset}
Bottom [ton-hours]	=Σ [Cooling Load (OADB) x hours(OADB)] for OADB: $T_{balance}$ -> T_{design}
Cooling Electrical Energy Savings (Customer kWh)	= EFLH x $Load_{design}$ x ($IPLV_{Chiller}$ - Added Tower kW/ton)
Cooling Electrical Demand Savings (Customer kW)	= Cooling Electrical Energy Savings/8760
Average Energy Cost	= [kWh savings * ($/Annual kWh) + Max kW Savings * Equivalent Month of Demand Savings * ($/ Annual kW)] / kWh Savings

Variables:	Value	Description
Custom Project - Operation and Maintenance Savings	#	Will be calculated for each specific project based on project details.
Custom Project - Measure Lifetime	#	Will be calculated for each specific project based on project details.
Custom Project - Incremental Cost	#	Will be calculated for each specific project based on project details.
Underfloor Distribution Savings Factor	13.30%	Additional Fan Energy Savings Caused by Mounting EC Fans Below the CRAC Unit For Underfloor Air Distribution (Derived from Results in Ref 2). This value is not used if the efficient fans will not be installed underfloor.
Baseline Fan Efficiency	53.81%	Efficiency of baseline forward-curved fans. Computed by taking the average of two values: the efficiency given by Ref 7 for the input motor size and the societal average value used in California given by Ref 8
Baseline Belt Efficiency	95%	Percentage of energy input into the belt drive from the baseline fan motor that passes to the impeller, averaged over the lifetime of the belt, since the belt's efficiency deteriorates over time (Ref 7)
Baseline Motor Efficiency	91.18%	Efficiency of baseline fan motor. This value is dependent on the motor size and is calculated by interpolating within the NEMA Premium Motor Efficiency Table and using the motor type (number of poles, open/closed) distribution assumption to find the average NEMA Premium efficiency for that motor size.
Proposed Fan Efficiency	65.97%	Efficiency of efficient (EC) fan motor. This value is derived from manufacturer efficiency data on various sizes of EC fan collected from several sources (Ref 8, 11, 12).
Proposed Drive Efficiency	99.50%	Percentage of energy input into the motor drive from the EC fan motor that passes to the impeller, averaged over the lifetime of the drive, since the drive's efficiency deteriorates over time (Ref 7)
Proposed Motor Efficiency	88.96%	Efficiency of the EC fan motor. This value is dependent on the motor size and is calculated by inputting the motor size into each of three motor efficiency cubic curve fits derived from curves in Ref 5 and applying the motor type (number of poles) distribution assumption below to find the average EC motor efficiency for that motor size.
Coincidence Factor	100%	Assumed, based on the fact that most data centers operate 24/7
Existing CRAC Unit Age	10	Assumed age of existing CRAC unit that the fan(s) will be installed in, based on information in Ref 3. This value is used to determine the Retrofit measure lifetime value.
Typical % of CRAC Units In Use	83%	Assumed % of total CRAC units in the facility that will be operating simultaneously. Many data centers use redundancy for backup capacity, meaning some fans installed in CRAC units will be installed in units that do not operate regularly. To account for this in forecasting and for Net-to-Gross, a %-in-use value is used. This value was derived from a sample of custom rebate projects in Colorado involving CRAC units in data centers.
Average Cost per Fan, Retrofit	$4,386	Estimated average cost of retrofitting an EC fan onto an existing CRAC unit. Derived from a sample of custom rebate projects in Colorado involving EC fan replacements.
Average Cost per Fan, New (Incremental)	$1,700	Estimated average cost of selecting an EC fan option over a baseline fan option when purchasing a new CRAC unit. This comes from a Colorado custom rebate project.

Chilled Water System Waterside Economizer Variables

Variable ID	Value	Description
Measure Life	20	Measure life is taken at 20 years for all cooling equipment. (Reference 16)
Incremental Cost of Equipment	$737/ton	The incremental cost of equipment above the code requirements. $737/Hx ton
CF	0%	Coincidence Factor, the probability that peak demand of the equipment will coincide with peak utility system demand. Because this technology is used when temperatures are at or below 65 F, the CF =0%.
T_{onset}	See Table 3	Mean Coincident Dry Bulb Temperature (as determined from binned TMY3 data for the location, shown in Table 3) corresponding to the Onset Wet Bulb Temperature provided by the customer
$T_{balance}$	-20	Building Balance Point Temperature, the outside air dry bulb temperature at which there is no cooling load, assumed to be -20 deg F for data centers as they always require cooling.
T_{design}	92	Design temperature for cooling in Minneapolis/St. Paul [17]
EFLH	8760	= Equivalent Full Load Hours. data Centers operate continuously with little variability in the load.
OADB		Outside Air Dry Bulb Temperature (°F)
hours(OADB)		Number of hours in for that OADB bin from TMY3 data for the location
Added Tower kW/ton		Average additional power use of the Cooling Tower due to the installation of the heat exchanger (tower fans will need to run more to bring down the water temperature to meet the cooling load directly as opposed to providing

Chilled Water System Waterside Economizer Inputs Provided by Customer: for plate and frame

Chiller IPLV [kW/ton]
Onset Wet-bulb Temperature for the Heat Exchanger [°F]
Heat Exchanger tonnage [tons]
Cooling load at onset wet-bulb temp [tons] Loadonset
Market segment

Inputs:	Default Value	Description
Custom Project	#	All variables for each project (equipment wattage, equipment efficiency, hours of operation, etc.) will be calculated for each specific project based on project
Number of Fans	#	Number of fans installed in this project, customer input
Fan Power (HP)	#	Rated/nominal baseline forward curved fan motor power, customer input
Distribution Type	In-unit or Below-Floor	Air distribution type/fan location, either in-unit or underfloor. Customer must indicate whether the new EC fans will be installed in unit or underfloor
HVAC System Type	Chilled Water	HVAC system type serving the data center/CRAC units where the fans will be installed. There are five options and the customer must indicate which option best matches their system. The options are shown in Table 1 below.

Assumptions:	Value	Description
Fan Hours of Operation	8,760	Hours of operation for the CRAC unit fans
Chiller Efficiency (COP)	5.55	Assumed efficiency of data center central centrifugal chiller (ASHRAE 90.1-2001 (150-300 tons, centrif) page 34, Table 6.2.1L). Converted to kW/ton for use in the analysis.
DX Efficiency (EER)	9.5	Assumed efficiency of DX CRAC units (ASHRAE 90.1-2001 (>=240,000 BTU/h and <760,000 BTU/h, air cooled DX) page 27, Table 6.2.1A). Converted to kW/ton for use in the analysis
Glycol-Cooled DX Efficiency (EER)	11	Assumed efficiency of glycol (water) cooled DX CRAC units (ASHRAE 90.1-2001 (>=240,000 BTU/h, water cooled air conditioners) page 27, Table 6.2.1A). Converted to kW/ton for use in the analysis.
Cooling Tower Fan Energy (GPM/HP)	20	ASHRAE maximum cooling tower fan energy requirement (ASHRAE 90.1-2001 Centrif. Cooling Tower Fan Power, page 32, Table 6.2.1G) used to determine the cooling tower fan power/ton, along with the GPM/ton assumption.
Cooling Tower Sizing Factor (GPM/ton)	3	Standard cooling tower sizing rule of thumb (Ref 13,14,15)
Primary Chilled Water Pump Power (HP)	5	Assumed, based on assumed chiller size and typical primary pump size
Primary Chilled Water Pump Load	75%	Assumed, based on rule-of-thumb for pump load factor
Primary Chilled Water Pump Motor Efficiency	89.50%	Assumed, based on NEMA Premium motor efficiency for 5-hp motors
Chiller Size (tons)	150	Assumed, based on minimum chiller size within range used for chiller efficiency determination. This and the primary chilled water pump assumptions only affect the primary pump analysis and are only a very small portion of the total savings for this measure.
Measure Life (Retrofit)	10	Lifetime (in years) of the retrofit measure. This is based on subtracting the average CRAC unit age from the new construction lifetime.
Measure Life (New Construction)	20	Lifetime (in years) of the new construction measure. This is based on the primary cooling equipment lifetimes used in other Xcel Minnesota programs, along with the California DEER 2013 lifetime for new chillers.
Desired Chilled Water Temperature (F)	45	Chilled water supply temperature. This is a typical value for most chilled water systems.
Cooling Tower Approach (F)	7	Cooling tower approach (difference between outdoor air wet bulb temperature and condensing temperature). Values can range from 4-12 F, but 7 is typical.
Cooling Tower Design Wet Bulb Temperature (F)	72	Assumed design wet bulb temperature for cooling towers installed in the relevant location (72 F used for MN), based on weather data.
Chiller Minimum Efficiency Dry Bulb Temperature (F)	88	Assumed design dry bulb temperature for chiller in the relevant location (88 F used for MN), based on weather data.
Chiller Maximum Efficiency Dry Bulb Temperature (F)	30	Assumed dry bulb temperature below which the chiller's efficiency will not decrease any further.
Dry Cooler Dry Bulb Approach Temperature (F)	15	Dry cooler approach (difference between outdoor air dry bulb temperature and condensing temperature). 15 F is the most common value (Ref 7)
Cooling Equipment Temperature-based Efficiency Improvement (%/F)	0.50%	Assumed efficiency improvement for chiller and DX systems (and, for simplicity, cooling tower fans) based on outdoor dry bulb temperature decrease (due to lower condenser pressure). Standard Xcel Energy assumption for
Distribution of AC Motors by Type	16.67%	Assumed distribution of the six AC motor types: TEFC with 2, 4, and 6 poles, and ODP with 2, 4, and 6 poles. For simplicity, it is assumed that all six occur with equal frequency.
Distribution of EC Motors by Type	33.33%	Assumed distribution of the three EC motor types: 2, 4, and 6-poles. For simplicity, it is assumed that all three occur with equal frequency.
Existing Motor Load Factor	75.00%	Assumed load factor on existing CRAC/CRAH fan. This value is consistent with our other prescriptive programs for constant speed fans.
Total System Cooling Efficiency (kW/ton)	See Table 2	Assumed cooling system total efficiencies including peripheral equipment (fans and pumps) at each determinate outdoor air condition. Values calculated using assumptions listed above and Minneapolis weather data.

Table 1: Cooling System Efficiencies

HVAC System Type	Rated Efficiency	kW/ton	Notes
Chilled Water	5.55 COP	0.634	kW/ton is the rated efficiency, peripheral equipment kW/ton added to this value for pumps and fans
DX	9.5 EER	1.263	kW/ton is the rated efficiency, air-cooled equipment
Glycol-Cooled DX	11 EER	1.091	kW/ton is the rated efficiency, peripheral equipment kW/ton added to this value for pumps and fans
Glycol-Cooled DX with Waterside Economizer	N/A	0.689	kW/ton is calculated from weather data and includes free cooling
Chilled Water with Waterside Economizer	N/A	0.400	kW/ton is calculated from weather data and includes free cooling

Table 2: Cooling Total Efficiency Table (kW/Ton)

Temperature	Chilled Water	DX	Water-Cooled DX	Water-Cooled DX w/ WS Economizer	Chilled Water w/WS Economizer
Determinate Temperature: (dB/wB)	Wet Bulb	Dry Bulb	Dry Bulb	Dry Bulb	Wet Bulb
-17	0.4584	0.8653	0.8316	0.1231	0.0036
-15	0.4584	0.8653	0.8316	0.1231	0.0036
-13	0.4584	0.8653	0.8316	0.1231	0.0036
-11	0.4584	0.8653	0.8316	0.1231	0.0036
-9	0.4584	0.8653	0.8316	0.1231	0.0036
-7	0.4584	0.8653	0.8316	0.1231	0.0036
-5	0.4584	0.8653	0.8316	0.1231	0.0036
-3	0.4584	0.8653	0.8316	0.1231	0.0036
-1	0.4584	0.8653	0.8316	0.1231	0.0036
1	0.4584	0.8653	0.8316	0.1231	0.0036
3	0.4584	0.8653	0.8316	0.1231	0.0036
5	0.4584	0.8653	0.8316	0.1231	0.0036
7	0.4584	0.8653	0.8316	0.1231	0.0036
9	0.4584	0.8653	0.8316	0.1231	0.0043
11	0.4584	0.8653	0.8316	0.1231	0.0052
13	0.4584	0.8653	0.8316	0.1231	0.0065
15	0.4584	0.8653	0.8316	0.1231	0.0083
17	0.4584	0.8653	0.8316	0.1231	0.0108
19	0.4591	0.8653	0.8316	0.1231	0.0145
21	0.4601	0.8653	0.8316	0.1231	0.0202
23	0.4613	0.8653	0.8316	0.1231	0.0297
25	0.4631	0.8653	0.8316	0.1231	0.0468
27	0.4682	0.8653	0.8316	0.1231	0.0817
29	0.4768	0.8653	0.8316	0.1231	0.1141
31	0.4889	0.8716	0.8377	0.2252	0.1141
33	0.5037	0.8842	0.8498	0.3307	0.1141
35	0.5300	0.8968	0.8619	0.4397	0.1141
37	0.5735	0.9095	0.8741	0.5522	0.1141
39	0.6114	0.9221	0.8862	0.6682	0.6114
41	0.6202	0.9347	0.8984	0.7876	0.6202
43	0.6261	0.9474	0.9105	0.9105	0.6261
45	0.6340	0.9600	0.9226	0.9226	0.6340
47	0.6429	0.9726	0.9348	0.9348	0.6429
49	0.6483	0.9853	0.9469	0.9469	0.6483
51	0.6575	0.9979	0.9591	0.9591	0.6575
53	0.6663	1.0105	0.9712	0.9712	0.6663
55	0.6733	1.0232	0.9833	0.9833	0.6733
57	0.6823	1.0358	0.9955	0.9955	0.6823
59	0.6882	1.0484	1.0076	1.0076	0.6882
61	0.6954	1.0611	1.0198	1.0198	0.6954
63	0.6990	1.0737	1.0319	1.0319	0.6990
65	0.7063	1.0863	1.0440	1.0440	0.7063
67	0.7117	1.0989	1.0562	1.0562	0.7117
69	0.7203	1.1116	1.0683	1.0683	0.7203
71	0.7231	1.1242	1.0805	1.0805	0.7231
73	0.7321	1.1368	1.0926	1.0926	0.7321
75	0.7396	1.1495	1.1047	1.1047	0.7396
77	0.7495	1.1621	1.1169	1.1169	0.7495
79	0.7590	1.1747	1.1290	1.1290	0.7590
81	0.7543	1.1874	1.1412	1.1412	0.7543
83	N/A	1.2000	1.1533	1.1533	N/A
85	N/A	1.2126	1.1654	1.1654	N/A
87	N/A	1.2253	1.1776	1.1776	N/A
89	N/A	1.2379	1.1897	1.1897	N/A
91	N/A	1.2505	1.2019	1.2019	N/A
93	N/A	1.2632	1.2140	1.2140	N/A
95	N/A	1.2632	1.2140	1.2140	N/A
97	N/A	1.2632	1.2140	1.2140	N/A
99	N/A	1.2632	1.2140	1.2140	N/A

Table 3. Bin Hours and Mean Coincident Wet Bulb Temperatures

OADB (°F)	Hours	MCWB (°F)
104	0	0.00
102	0	0.00
100	0	0.00
98	3	77.74
96	4	76.73
94	17	76.01
92	15	74.25
90	32	74.15
88	47	72.52
86	31	71.79
84	76	71.40
82	120	69.40
80	146	68.36
78	172	66.87
76	327	65.57
74	261	63.78
72	272	63.61
70	265	61.44
68	148	60.84
66	299	59.50
64	272	58.24
62	241	55.25
60	216	53.62
58	299	51.38
56	214	49.46
54	222	47.49
52	211	46.20
50	117	44.49
48	221	44.02
46	222	42.46
44	207	40.21
42	265	38.90
40	334	36.64
38	216	33.77
36	221	31.98
34	294	30.61
32	167	28.96
30	266	27.47
28	240	25.40
26	237	23.27
24	241	21.69
22	305	19.22
20	226	16.79
18	179	15.00
16	159	13.13
14	52	11.68
12	91	10.26
10	71	8.71
8	75	6.52
6	57	4.92
4	70	2.54
2	40	-0.09
0	45	-1.95
-2	45	-4.01
-4	33	-5.20
-6	37	-6.46
-8	31	-8.58
-10	36	-10.28
-12	12	-12.37
-14	22	-14.87
-16	8	-16.68
-18	3	-19.19
-20	1	-21.38
-22	2	-22.42
-24	2	-23.88

Table 3-2. Bin Hours WB and Mean Coincident Dry Bulb Temps

MCDB (°F)	WB (°F)	Hours
88.5	82	2
90.2	80	27
86.9	78	53
83.9	76	73
81.4	74	96
78.7	72	169
77.7	70	197
75.1	68	255
73.6	66	360
70.9	64	367
70.0	62	296
67.6	60	338
65.8	58	254
62.9	56	250
60.8	54	261
57.9	52	260
55.1	50	296
53.4	48	263
50.2	46	246
48.2	44	278
46.2	42	260
43.4	40	271
41.7	38	273
39.0	36	209
36.0	34	301
34.4	32	251
32.4	30	272
30.8	28	297
28.3	26	219
26.3	24	299
24.0	22	239
21.9	20	195
19.8	18	227
17.8	16	218
15.7	14	155
13.6	12	103
11.1	10	104
8.8	8	61
7.0	6	75
4.8	4	46
2.6	2	45
0.5	0	46
-1.5	-2	39
-3.6	-4	63
-5.4	-6	35
-8.0	-8	43
-9.7	-10	28
-12.4	-12	13
-14.6	-14	16
-16.1	-16	8
-18.6	-18	3
-20.9	-20	1
-22.4	-22	3
-24.0	-24	1

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15. Condenser Water Energy Savings (http://web.stanford.edu/group/narratives/classes/08-09/CEE215/ReferenceLibrary/Chillers/York%20Engineering%20Updates/Reduced%20condenser-water%20flow%20rate_energy-saving%20miracle%20or%20mirage.pdf)
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17. ASHRAE Fundamentals 2013
18. Data from historic Xcel Energy Custom Efficiency cooling tower projects

Changes from Recent Filing

1. Added EC Fan prescriptive measure, limited new construction measure to only chilled water CRAC units.
2. Added Chilled Water Systems Waterside Economizer

Product: Efficiency Controls

Description

This is a custom product including both gas and electric measures. Customer may apply for rebate under the EC product. Each EMS project will be analyzed individually by Xcel Energy. Technical variables required for the analysis will be obtained from the customer or vendor. Analysis will be based on good engineering practices and standards. The Efficiency Controls Program looks at saving energy through the use of automatic scheduling and energy management routines available in current EMS offered in the marketplace. Energy savings are divided by 8760 to get to a marketing kW value; added to this can be actual billed kW reductions resulting from such features as reduced cooling from outside air reductions.

Algorithms:

Determined on a case by case basis

Assumptions:

Program lifetime is 15 years

References:

The Efficiency Controls Model was developed by Xcel Energy to reflect the average building performance in the State of Minnesota and uses a generic template and specific inputs for each building analyzed, essentially making all results custom.

Product: Fluid System Optimization

Description:

Custom and prescriptive rebates will be offered under the fluid system optimization program. Prescriptive rebates are available for Variable Frequency Drive Compressors that are less than 50 hp, no air loss drain valves, cycling refrigerated dryers, mist eliminator filters, and dewpoint demand control for desiccant regenerative dryers. Demand side measures for Compressed Air, Pump, Fan, and Vacuum systems will be identified through studies and implemented as custom projects. Each custom efficiency project will be analyzed individually by Xcel Energy. Engineering variables required for the analysis will be obtained from the customer or vendor. Analysis will be based on standard engineering methodologies. Prescriptive rebates will also be offered for installing a smaller VFD controlled air compressor than the current air compressor used.

Equations:

Constant Speed Motor Controllers New Enhanced Motor Upgrade Motor Upgrade Motor Enhanced Variable Frequency Drives	See Motors & Drives Technical Assumptions
VFD Compressors (Gross kW Saved at Customer/Unit)	= Eq.Horsepower * P_Service_Factor * 0.746 * ((Eq.Baseline_Load / Eq.Baseline_Efficiency) - (Eq.Proposed_Load / Eq.Proposed_Efficiency)) * I_Qty_Prop_Equip
VFD Compressors (Gross Annual kWh Saved at Customer/Unit)	= Eq.Horsepower * P_Service_Factor * 0.746 * ((Eq.Baseline_Load / Eq.Baseline_Efficiency) - (Eq.Proposed_Load / Eq.Proposed_Efficiency)) * Eq.Hours * I_Qty_Prop_Equip
F_CompHP_Reduction_kW (Gross kW Saved at Customer/Unit)	= P_Service_Factor * 0.746 * (Existing_Model__r.Horsepower * (F_CompHP_Reduction_Base_Load / Existing_Model__r.Baseline_Efficiency) - Eq.Horsepower * (Eq.Proposed_Load / Eq.Proposed_Efficiency / Eq.VFD_Efficiency))
F_CompHP_Reduction_Base_Load	= P_CompHP_Red_x2 * (F_CompHP_Reduction_Base_Flow ^ 2) + P_CompHP_Red_x * F_CompHP_Reduction_Base_Flow + P_CompHP_Red_b
F_CompHP_Reduction_Base_Flow	= Equipment_Model__r.Percent_Flow * Equipment_Model__r.Horsepower / Existing_Model__r.Horsepower
HP Reduction (Gross Annual kWh Saved at Customer/Unit)	= F_CompHP_Reduction_kW * Eq.Hours
No Air Loss Drain (Gross Annual kWh Saved at Customer/Unit)	= I_Qty_Prop_Equip * kW_per_Drain x Drain_Hours
No Air Loss Drain (Gross kW Saved at Customer/Unit)	= I_Qty_Prop_Equip * kW_per_Drain
Cycling Dryer Electrical Energy Savings (Gross Annual kWh Saved at Customer/Unit)	= I_Qty_Prop_Equip * Eq.kWh_Savings *Historical system information gathered through four years of compressed air study data was utilized to estimate savings. Based on dryer size, an average connected system flowrate was determined. Savings due to the reduction in average operating kW for the cycling dryer are proportional to the average flowrate divided by the dryer rated flowrate. See Table 1 for savings results.
Cycling Dryer Electrical Demand Savings (Gross kW Saved at Customer/Unit)	= I_Qty_Prop_Equip * Eq.kW_Savings * Historical system information gathered through four years of compressed air study data was utilized to estimate savings. Based on dryer size, an average connected system flowrate was determined. Savings due to the reduction in average operating kW for the cycling dryer are proportional to the average flowrate divided by the dryer rated flowrate. See Table 1 for savings results.
Mist Eliminator Filter Electrical Energy Savings (Gross Annual kWh Saved at Customer/Unit)	= I_Qty_Prop_Equip * Eq.kWh_Savings *Historical system information gathered through four years of compressed air study data was utilized to estimate savings. Based on filter size, an average connected system flowrate and compressor discharge pressure were determined. Savings are due to the reduction in compressor discharge pressure resulting from a smaller pressure drop across the dryer. See Table 2 for savings results.
Mist Eliminator Filter Electrical Demand Savings (Gross kW Saved at Customer/Unit)	= I_Qty_Prop_Equip * Eq.kW_Savings *Historical system information gathered through four years of compressed air study data was utilized to estimate savings. Based on filter size, an average connected system flowrate and compressor discharge pressure were determined. Savings are due to the reduction in compressor discharge pressure resulting from a smaller pressure drop across the dryer. See Table 2 for savings results.
Dewpoint Demand Control Electrical Energy Savings (Gross Annual kWh Saved at Customer/Unit)	= I_Qty_Prop_Equip * Eq.kWh_Savings *Historical system information gathered through four years of compressed air study data was utilized to estimate savings. Based on dryer size, an average connected system flowrate was determined. Savings are due to the reduction in required purge air to regenerate the dessicant bed. See Table 3 for savings results.
Dewpoint Demand Control Electrical Demand Savings (Gross kW Saved at Customer/Unit)	= I_Qty_Prop_Equip * Eq.kW_Savings *Historical system information gathered through four years of compressed air study data was utilized to estimate savings. Based on dryer size, an average connected system flowrate was determined. Savings are due to the reduction in required purge air to regenerate the dessicant bed. See Table 3 for savings results.

Variable ID	Value	Description
0.746	0.746	Standard conversion from HP to kW.
CF_NALD	67.7%	No Air Loss Drain Coincidence Factor - Probability that the measure peak demand reduction will occur at the same time as the grid peak demand. Based on historic custom compressed air projects in CO.
CF_VFD	88.80%	Small VFD Compressor Coincidence Factor - Probability that the measure peak demand reduction will occur at the same time as the grid peak demand. Based on historic small VFD compressor projects in MN and CO.
Eq.Baseline_Efficiency	See Table 4	Efficiency of existing compressor motor as determined by customer provided HP.
Eq.Baseline_Load	87.43%	Average percent loading for baseline compressor as calculated on VFD Air Comp Calcs tab.
Eq.Horsepower	Customer Input	Nominal horsepower of new compressor for new & upgrade situations.
Eq.Hours	see Table 4	Operating hours of new compressors.
Eq.Proposed_Efficiency	see Table 4	Efficiency of proposed compressor motor as determined by customer provided HP.
Eq.Proposed_Load	61.05%	Average percent loading for upgrade and new VFD compressors.
Eq.Proposed_Load	73.68%	Average percent loading for HP reduction VFD compressors.
Eq.VFD_Efficiency	95.00%	Efficiency of VFD.
Equipment_Model__r.Horsepower	Customer Input	Nominal horsepower of new compressor for HP Reduction situations.
Equipment_Model__r.Percent_Flow	70.00%	Average percent flow for proposed VFD compressor.
Existing_Model__r.Baseline_Efficiency	see Table 4	Efficiency of existing compressor motor as determined by customer provided HP.
Existing_Model__r.Horsepower	Customer Input	Nominal horsepower of baseline compressor.
Hours_Drain	6,996	Operating hours of compressed air systems. Based on an average of completed CO custom compressed air project hours.
I_Qty_Prop_Equip	Customer Input	Quantity of proposed equipment installed.
Incremental Cost of Efficient Equipment	see Table 1, 2, 3, & 5	Incremental cost of efficient measures compared to the do-nothing option.
kW_per_Drain	0.517	kW savings per no air loss drain.
Lifetime	see Table 6	Lifetimes for individual measures.
P_CompHP_Red_x2	-0.5196	Baseline load curve fit equation coefficient.
P_CompHP_Red_x	1.0853	Baseline load curve fit equation coefficient.
P_CompHP_Red_b	0.4216	Baseline load curve fit equation coefficient.
P_Service_Factor	1.1	Service factor of the motor (Reference 1).

Inputs:

Provided by Customer:	Verified during M&V:
Quantity of No Air Loss Drains	Yes
Compressor HP, Quantity	Yes
Cycling Dryer CFM and Quantity	Yes
Mist Eliminator CFM and Quantity	Yes
Dew Point Demand Controls CFM and Quantity	Yes

Assumptions:

VFD Compressors<50 hp

Compressed air system in which VFD compressor is installed must have a nominal rating < 50hp.
Existing compressor was a non-reciprocating load/no load type with 2 gallon of storage per cfm capacity or less, or modulation with or without unload.
To qualify for a HP reduction rebate the combined HP of the system (including backups) must be lower after the installation of the new VFD unit.
For HP reduction Baseline unit may greater than or equal to 50HP, but HP reduction cannot exceed 20HP.
HP reduction rebate will require documented removal of a compressor.

No Air Loss Drains

2.74 SCFM loss from existing timed drain (Reference 3).
Existing timed drain is open 15 seconds every 7.5 minutes (Reference 3).

Cycling Dryer

Rated Flowrate of Dryer is equal to the connected system peak flowrate.
Non-cycling dryer load factor of 100% (Reference 3).

Mist Eliminator Filter

Rated Flowrate of filter is equal to the connected system peak flowrate.
Baseline filter pressure drop of 4 psig (Reference 3, confirmed by Ref 9).
Efficient filter pressure drop of 0.75 psig (Reference 3, confirmed by Ref 9).
Filter element life expectancy of 5 - 10 years.

Dewpoint Demand Control

Rated Flowrate of Dryer is equal to the connected system peak flowrate.
Uncontrolled dryer purge rate of 17% (Reference 3) for heatless desiccant dryers.
Heated or heated blower desiccant dryers are not eligible.

Hours

Hours for NALDs, cycling dryers, mist eliminators, and dew point demand controls are based on the equipment CFM and historical system information gathered through four years of compressed air study data. Variations in forecast hours between these measures is due to the anticipated quantity per CFM range of these products we will process.

Tables:

Table 1: Energy Savings and Costs For Cycling Dryers (Reference 4 & 7)

Dryer CFM	Customer kW	Customer kWh	Incremental Cost	Incremental O&M
75 CFM to 99 CFM Cycling Dryer	0.193	1,311	$554	$0
100 CFM to 124 CFM Cycling Dryer	0.380	2,582	$580	$0
125 CFM to 149 CFM Cycling Dryer	0.450	3,060	$461	$0
150 CFM to 199 CFM Cycling Dryer	0.564	3,839	$637	$0
200 CFM to 249 CFM Cycling Dryer	0.514	3,517	$1,203	$0
250 CFM to 299 CFM Cycling Dryer	0.848	5,827	$860	$0
300 CFM to 399 CFM Cycling Dryer	1.011	6,981	$1,047	$0
400 CFM to 499 CFM Cycling Dryer	1.386	9,690	$1,187	$0
500 CFM to 599 CFM Cycling Dryer	1.462	10,380	$1,095	$0
600 CFM to 699 CFM Cycling Dryer	1.719	12,415	$629	$0
700 CFM to 799 CFM Cycling Dryer	2.214	16,306	$883	$0
800 CFM to 999 CFM Cycling Dryer	2.167	16,319	$2,080	$0
1000 CFM to 1199 CFM Cycling Dryer	2.447	19,362	$1,785	$0
1200 CFM to 1599 CFM Cycling Dryer	2.215	18,533	$2,536	$0
1600 CFM to 1999 CFM Cycling Dryer	0.202	1,771	$3,857	$0
2000 CFM to 2399 CFM Cycling Dryer	0.449	3,931	$5,811	$0
2400 CFM and above Cycling Dryer	1.348	11,808	$3,498	$0

Table 2: Energy Savings and Costs for Mist Eliminator Filters (Reference 4 & 7)

Filter CFM	Customer kW	Customer kWh	Incremental Cost	Incremental O&M
125 CFM to 249 CFM Mist Eliminator Filter	0.376	2,554	$3,397	-$13
250 CFM to 499 CFM Mist Eliminator Filter	0.590	4,046	$3,230	$43
500 CFM to 799 CFM Mist Eliminator Filter	0.936	6,603	$3,691	$70
800 CFM to 1099 CFM Mist Eliminator Filter	1.497	11,034	$4,862	$67
1100 CFM to 1499 CFM Mist Eliminator Filter	2.059	15,927	$5,307	$85
1500 CFM to 1899 CFM Mist Eliminator Filter	2.808	23,167	$6,621	$78
1900 CFM and above Mist Eliminator Filter	3.556	31,073	$8,568	$111

Table 3: Energy Savings and Costs for Dewpoint Demand Control (Reference 4 & 7)

Dryer CFM	Customer kW	Customer kWh	Incremental Cost	Incremental O&M
90 CFM to 119 CFM Dewpoint Demand Control	2.807	19,046	$3,148	$0
120 CFM to 159 CFM Dewpoint Demand Control	3.579	24,324	$3,176	$0
160 CFM to 199 CFM Dewpoint Demand Control	4.469	30,449	$3,210	$0
200 CFM to 249 CFM Dewpoint Demand Control	5.285	36,120	$3,515	$0
250 CFM to 299 CFM Dewpoint Demand Control	6.092	41,810	$3,286	$0
300 CFM to 399 CFM Dewpoint Demand Control	6.834	47,120	$3,335	$0
400 CFM to 499 CFM Dewpoint Demand Control	8.201	57,168	$3,375	$0
500 CFM to 599 CFM Dewpoint Demand Control	9.857	69,549	$3,438	$0
600 CFM to 799 CFM Dewpoint Demand Control	11.820	84,539	$3,438	$0
800 CFM to 999 CFM Dewpoint Demand Control	15.787	116,331	$3,473	$0
1000 CFM to 1249 CFM Dewpoint Demand Control	19.714	150,000	$3,858	$0
1250 CFM to 1499 CFM Dewpoint Demand Control	24.662	195,517	$3,678	$0
1500 CFM to 1999 CFM Dewpoint Demand Control	29.570	243,985	$3,725	$0
2000 CFM and above Dewpoint Demand Control	39.427	345,381	$3,861	$0

Table 4. Motor Efficiencies & Operating Hours

Compressor HP	Motor Description	New Unit Baseline Motor Efficiency	Upgrade Unit Existing Compressor Motor Efficiency	New and Upgrade Unit Proposed Motor Efficiency	Operating Hours
10	10 HP 1800 RPM ODP	91.7%	89.5%	91.7%	2,131
15	15 HP 1800 RPM ODP	93.0%	91.0%	93.0%	2,131
20	20 HP 1800 RPM ODP	93.0%	91.0%	93.0%	2,131
25	25 HP 1800 RPM ODP	93.6%	91.7%	93.6%	3,528
30	30 HP 1800 RPM ODP	94.1%	92.4%	94.1%	3,528
40	40 HP 1800 RPM ODP	94.1%	93.0%	94.1%	3,528
50	50 HP 1800 RPM ODP	n/a	93.0%	n/a	n/a
60	60 HP 1800 RPM ODP	n/a	93.6%	n/a	n/a

Upgrade Compressor Motor Efficiency and New Compressor Motor Efficiency values are from NEMA EPACT and Premium (New Compressors only) motors standards (Reference 5).

United States Industrial Electric Motor Systems Market Opportunities Assessment, EERE, US DOE, Dec 2002 - Source for operating hours for industrial motors and source for load factor (Reference 6).

Table 5. Incremental Costs for Efficient Measures

Measure	Upgrade & HP Reduction Units	New Unit
10 HP VFD Compressor	$10,338	$2,577
15 HP VFD Compressor	$12,277	$2,694
20 HP VFD Compressor	$15,086	$3,609
25 HP VFD Compressor	$17,639	$5,149
30 HP VFD Compressor	$20,345	$7,212
40 HP VFD Compressor	$22,986	$7,468
No Air Loss Drain	$448	

Compressor prices are the average price from three retailers plus $1500 for installation.
NALD price is average of nine retailers prices as calculated on Forecast NALD tab

Table 6. Measure Lifetimes

Measure	Lifetime, Years
Compressed Air Efficiency Study	5
Cycling Dryers	20
Dewpoint Controls	15
Mist Eliminators	15
No Air Loss Drain	13
VFD Air Compressor New	20
VFD Air Compressor Upgrade	20
HP Reduction	20
Custom Efficiency - Compressed Air	20

References:

(1) Service factor (1.1) from Compressed Air & Gas Institute (CAGI) standards comparing nameplate HP to actual BHP @100% full rated pressure and flow
(2) National Energy Efficiency Best Practices Report (http://www.eebestpractices.com)
(3) Historic compressed air product experience
(4) Analysis of Compressed Air Study participants 2008 - 2011
(5) National Electric Manufacturers Association. Motor efficiency standards from Pre-EPAct 2005 and after.
(6) United States Industrial Electric Motor Systems Market Opportunities Assessment. US DOE, Dec 2002, Appendix B2
(7) Various anonymous retailer and vendor quotes
(8) per page iv of "Tetra Tech, Process and Impact Evaluation of the Compressed Air Efficiency Program — Colorado, January
(9) Massachusetts Technical Reference Manual 2013-2015 Program Years
(10) Compressed Air Challenge (Best Practices Guide): source for baseline compressor curves, % efficiency/psi reduction, SCFM per orifice
(11) Massachusetts Joint Utilities "Measure Life Study". Energy & Resource Solutions. Table 1-1. 2005. Source for NALD Lifetime

Changes from 2015-16 Filing

Cleaned up formatting of all analysis sheets
Updated motor efficiencies to NEMA Premium for new compressor measures
Updated Modulating Compressor with Unload curve to match Custom Rebates Model
Adjusted lifetime for NALD measure to 13 years to match the source being cited previously
Adjusted CF for NALD to match other measures
Updated O&M savings and lifetime for Mist Eliminators
Updated coincidence factor for leaks
Updates to cycling dryer kW, kWh and costs data
Updated lifetime for dewpoint controls
Updated lifetime for dewpoint controls

Program: Commercial Food Service Equipment - Electric Measures

This prescriptive program includes the electric measures for high efficiency commercial dishwashers, hot food holding cabinets and demand-controlled

Algorithms:

Electrical Demand Savings (Customer kW)	= Baseline kW - Efficient kW
Electrical Energy Savings (Customer kWh)	= Customer kW x Hours
Electrical Energy Savings (Generator kWh)	= Customer kWh / (1-ELF)
Electrical Demand Savings (Generator kW)	= Customer kW x CF / (1-DLF)
Peak Coincident kW at the Customer (PC_KW_CUST)	= Customer kW x CF
Baseline kWh	= Baseline kW x Hours
Efficient kWh	= Efficient kW x Hours

Demand Controlled Ventilation (DCV):

Customer kW_{DCV}	=Total Exhaust Fan hp * ESF_{DCV}
Customer kWh_{DCV}	=Customer kW_{DCV}*Hours

Variables:

Baseline kW	standard or baseline equipment wattage
Efficient kW	energy efficiency equipment wattage
CF	Coincidence Factor (Table 1)
Hours	Annual Hours of Operation (Table 3)
ELF	Energy Loss Factor = 6.6%, the percentage loss of electricity as it flows from the power plant to the customer during non-peak system demand. (The Transmission Distribution Loss Factor for Energy)
DLF	Demand Loss Factor = 7.0%, the percentage loss of electricity as it flows from the power plant to the customer during peak system demand. (The Transmission Distribution Loss Factor for Demand)
NTG	Net-to-Gross = 100%
ESF_{DCV}	Demand Controlled Ventilation Electric Savings Factor = 0.9054 kW per name plate HP.
O&M savings	see Table 1 & 2
Incremental costs	Difference in cost between the standard equipment and the more efficient equipment. Table 1 & 2
Measure Life	see Table 1 & 2

Info needed from Customer/Vendor Administrator for Calculations:	**Verified during M&V:**
All equipment:	
model Name	Yes
model Number	Yes
quantity	Yes
size	Yes
Dishwashers:	
Primary water heating fuel	Yes
Secondary water heating (booster water heating) fuel	Yes
Demand Controlled Ventilation:	
total exhaust fan HP	Yes

Table 1: Deemed Equipment Information

	Baseline Cost	Incremental Cost	Measure Life (yrs)	Coincidence Factor (CF)	Non-Energy O&M Savings	Energy O&M Savings
Dishwasher: Electric Water Heating without Booster Heater (Low Temperature) - Ref 3						
Under Counter	$4,800	$50	10	85.40%	$27.08	$0.00
Door Type	$6,500	$0	15	85.40%	$270.91	$0.00
Dishwasher: Electric Water Heating with Electric Booster Heater (High Temperature) - Ref 3						
Under Counter	$5,000	$125	10	85.40%	$106.14	$0.00
Door Type	$6,900	$250	15	85.40%	$198.13	$0.00
Dishwasher: Electric Water Heating with Gas Booster Heater (High Temperature) - Ref 3						
Under Counter	$5,000	$125	10	85.40%	$106.14	$125.45
Door Type	$6,900	$250	15	85.40%	$198.13	$234.17
Hot Food Holding Cabinet (Ref 3)	$2,069	$1,713	12	85.40%	$0	$0

Table 2: Deemed Equipment Information

	Baseline Cost	Incremental Cost Per Name Plate HP	Measure Life (yrs)	Coincidence Factor (CF) Ref 6 & 7	O&M Savings - non energy Per Name Plate HP	O&M Savings - energy Per Name Plate HP
Demand Controlled Ventilation Combo Customer - Elec Allocation	$0	$ 828.97	20	49.46%	$0	$0
Demand Controlled Ventilation - Electric Only	$0	$ 2,451.55	20	49.46%	$0	$482

Table 3: Pre and Post Retrofit Equipment

Post-retrofit technology	Efficient kW	Pre-retrofit technology	Baseline kW	Hours (Baseline
Energy Star Rated Dishwasher: Electric Water Heating without Booster Heater (Low Temperature) - Ref 3		Standard Dishwasher: Electric Water Heating without Booster Heater (Low Temperature)		
Under Counter	1.28	Under Counter	1.67	6570
Door Type	3.52	Door Type	5.98	6570
Energy Star Rated Dishwasher: Electric Water Heating with Electric Booster Heater (High Temperature) - Ref 3		Standard Dishwasher: Electric Water Heating with Electric Booster (High Temperature)		
Under Counter	1.40	Under Counter	1.88	6570
Door Type	4.26	Door Type	6.06	6570
Energy Star Rated Dishwasher: Electric Water Heating with Gas Booster Heater (High Temperature) - Ref 3		Standard Dishwasher: Electric Water Heating with Gas Booster (High Temperature)		
Under Counter	1.05	Under Counter	1.43	6570
Door Type	2.90	Door Type	4.09	6570
Hot Food Holding Cabinet (Ref 3)	0.26	Hot Food Holding Cabinet	0.64	5475
Demand Controlled Ventilation (Ref 6)		Standard Ventilation (Ref 6)		3,307

References:

1. Food Service Technology Center (FSTC) research on available models, 2009
2. Consortium for Energy Efficiency, 2010
3. ENERGY STAR
4. Custom Efficiency Projects, 2010-2011
5. Cadmus Group, 2009
6. Custom DCV Projects, 2010-2011
7. MN Lighting Efficiency Tech Assumption , Tab "Forcst Market Segment".

Product: Commercial Food Service Equipment; Gas Measures

Description
This prescriptive program includes natural gas measures for high efficiency commercial ovens, fryers, pasta cookers, dishwashers and demand-controlled

Algorithms:

Customer $Dth_{cooking\_appliance}$ Savings	$BTU_{Cooking\_Appliance}$ Savings Factor X Btuh_In/1000000
Customer $Dth_{dishwasher}$ Savings	$Dth/yr_{baseline}$ - $Dth/yr_{efficient}$
Customer $Dth_{Demand\_Controlled\_Ventilation}$ Savings	Total Exhaust Fan HP * GSF_{DCV}

Variables:

GSF_{DCV}	Demand Controlled Ventilation Gas Savings Factor =42.3224 Dth per name plate hp.
$BTU_{Cooking\_Appliance}$ Savings Factor	Annual BTU savings per Btuh input of cooking appliance. See Table 1.
$HVAC_{Cooking\_Appliance}$ Savings Factor	Annual Watt-hour interactive HVAC savings per Btuh input of cooking appliance; This factor is ignored being insignificant. See Table 1.
O&M savings	See Tables 3a & 3b.
Incremental costs	Cost of the higher efficiency option over the baseline option for the end-use customer. See Table 3a & 3b
Measure Life	See Tables 3a & 3b.

Inputs:

All equipment:

Model Name
Model Number
quantity
size

Dishwashers:

Primary water heating fuel
Secondary water heating (booster water heating) fuel

Demand Controlled Ventilation (DCV):

total exhaust fan hp

Cooking Equipment

Input Capacity (Btuh_In)

Tables:

Table 1: Pre- and Post-retrofit Cooking Appliance, Savings Factors, and Incremental Costs (Ref 4)

Post-retrofit Cooking Technology	Pre-retrofit technology	$BTU_{Cooking\_Appliance}$ Savings Factor (Btu per Btuh_In per year)	$HVAC_{Cooking\_Appliance}$ Savings Factor (Watt-hours per Btuh_In per year)
Convection Oven	Deck Oven	1,892	168
Conveyor Oven	Pizza Deck oven	1,542	12
Combi-Oven	Steamer	1,183	32
Fryer	Standard Fryer	328	9
Pasta Cooker	Range	1,689	46
Upright Broiler	Standard Radiant Broiler	1,041	30
Charbroiler	Standard Charbroiler	1,078	29
Salamander Broiler	Standard Salamander	885	28
Rotisserie Oven	Open Flame Rotisserie	554	15
Rotating Rack Oven	Deck Oven	948	26

Table 2: Pre- and Post-retrofit Dishwasher (Ref 8)

Post-retrofit Technology	Dth/yr Efficient	Pre-retrofit technology	Dth/yr Baseline
Energy Star Rated Dishwasher: Gas Water Heating without Booster Heater (Low Temperature)		Standard Dishwasher: Gas Water Heating without Booster Heater (Low Temperature)	
Under Counter	23.40	Under Counter	34.02
Door Type	102.66	Door Type	154.15
Energy Star Rated Dishwasher: Gas Water Heating with Electric Booster Heater (High Temperature)		Standard Dishwasher: Gas Water Heating with Electric Booster Heater (High Temperature)	
Under Counter	16.91	Under Counter	21.43
Door Type	65.33	Door Type	94.69
Energy Star Rated Dishwasher: Gas Water Heating with Gas Booster Heater (High Temperature) - Ref 3		Standard Dishwasher: Gas Water Heating with Gas Booster Heater (High Temperature)	
Under Counter	26.57	Under Counter	33.68
Door Type	102.66	Door Type	148.80

Table 3a: Measure Life, Cost, O&M Savings - Cooking Appliance (Ref 4)

	Measure Life (years)	Baseline Cost	Incremental Cost	Incremental Cost Per Name Plate Input Btuh ($/Btuh_In)	Non-Energy O&M Savings	Energy O&M Savings	Non-Energy O&M Savings ($/Name Plate Input Btuh)	Energy O&M Savings ($/Name Plate Input Btuh)
Convection Oven	11	$7,870	n/a	$0.0375	$0	$0	n/a	n/a
Conveyor Oven	11	$25,000	n/a	$0.0590	$0	$0	n/a	n/a
Combi-Oven	11	$20,828	n/a	$0.0356	$0	$0	n/a	n/a
Rotisserie Oven	11	$15,500	n/a	$0.0267	$0	$0	n/a	n/a
Rotating Rack Oven	11	$18,530	n/a	$0.0165	$0	$0	n/a	n/a
Fryer	11	$3,630	n/a	$0.0156	$0	$0	n/a	n/a
Pasta Cooker	11	$2,317	n/a	$0.0295	$0	$0	n/a	n/a
Upright Broiler	11	$12,587	n/a	$0.0424	$0	$0	n/a	n/a
Charbroiler	11	$1,800	n/a	$0.0310	$0	$0	n/a	n/a
Salamander Broiler	11	$5,002	n/a	$0.0373	$0	$0	n/a	n/a

Table 3b: Measure Life, Cost, O&M Savings - Dishwasher (Ref 8)

	Measure Life (years)	Baseline Cost	Incremental Cost	Incremental Cost Per Name Plate HP	Non-Energy O&M Savings	Energy O&M Savings	Non-Energy O&M Savings ($/Name Plate HP)	Energy O&M Savings ($/Name Plate HP)
Dishwasher: Gas Water Heating without Booster Heater (Low Temperature)								
Under Counter	10	$4,800	$50	n/a	$20.68	$19.42	n/a	n/a
Door Type	15	$6,500	$0	n/a	$372.00	$54.60	n/a	n/a
Dishwasher: Gas Water Heating with Electric Booster Heater (High Temperature)								
Under Counter	10	$5,000	$125	n/a	$6.67	$0.00	n/a	n/a
Door Type	15	$6,900	$125	n/a	$59.05	$0.00	n/a	n/a
Dishwasher: Gas Water Heating with Gas Booster Heater (High Temperature)								
Under Counter	10	$5,000	$250	n/a	$6.67	$0.00	n/a	n/a
Door Type	15	$6,900	$250	n/a	$59.05	$0.00	n/a	n/a

Table 3c: Measure Life, Cost, O&M Savings - Demand Controlled Ventilation (Ref 9)

	Measure Life (years)	Baseline Cost	Incremental Cost	Incremental Cost Per Name Plate HP	Non-Energy O&M Savings	Energy O&M Savings	Non-Energy O&M Savings ($/Name Plate HP)	Energy O&M Savings ($/Name Plate HP)
Demand Controlled Ventilation - Combo	20	$0	n/a	$1,623	n/a	n/a	$ -	$ -
Demand Controlled Ventilation -Gas Only	20	$0	n/a	$2,452	n/a	n/a	$ -	$ 173.66

References:

1. Savings per installed BTU derived from the Arkansas Food Service Deemed Savings table
2. Measure life left per CenterPoint Energy assumptions; their values are consistent with the Arkansas Deemed Savings assumptions as reported in "PROPOSED DEEMED SAVINGS ESTIMATES FOR COMMERCIAL FOOD SERVICE SECTOR QUICKSTART MEASURES WORKPAPERS"
3. Incremental costs confirmed using "Commercial Cooking Appliance Technology Assessment, FSTC Report #5011.02.2, Food Service Technology Center, 2002" and product manufacturer Web sites
4. MN DER, 2012 Deemed Savings
5. "Commercial Cooking Appliance Technology Assessment, FSTC Report #5011.02.2, Food Service Technology Center, 2002" and product manufacturer Web sites
6. Consortium for Energy Efficiency
7. CenterPoint Energy, Food Service Program
8. ENERGY STAR
9. Custom Efficiency projects from 2010-2011

Product: Commercial Heating Efficiency Program

Description:

Prescriptive rebates will be offered for Hot Water Boilers (Condensing and non-condensing), Commercial Water Heaters and various heating system improvements. Prescriptive rebates will be offered for installing high efficiency unit heaters that are either: power vented (83% efficiency), condensing (>= 90% efficiency), or low-intensity tube radiant heaters.

Gas Savings Algorithms:

New High Efficiency Boiler Savings (Gross Dth)	= Input Capacity x Alt x (Effb / (Effh - Adj) - 1) x EFLH / 1,000,000
Boiler Tune Up savings (Gross Dth)	= Input Capacity x Alt x (Effb / Effh - 1) x EFLH / 1,000,000
Outdoor Air Reset savings (Gross Dth)	= Input Capacity x Alt x (1 - Effh / Effb) x EFLH / 1,000,000
Stack Dampers savings (Gross Dth)	= Input Capacity x Alt x (1 - Effh / Effb) x EFLH / 1,000,000
Modulating Burner Controls savings (Gross Dth)	= Input Capacity x Alt x (1 - Effh / Effb) x EFLH / 1,000,000
O2 Trim Control savings (Gross Dth)	= Input Capacity x Alt x (1 - Effh / Effb) x EFLH / 1,000,000
New High Efficiency Furnace Savings (Gross Dth	= Input Capacity x Alt x (Effb / Effh - 1) x EFLH / 1,000,000
Steam Traps savings (Gross Dth)	= Leak_Rate x Leak_Hours x BTU_per_Pound / EFFb/1,000,000
New Water Heater Savings (Dth)	= {density x C_p x Volume_Daily_SqFt_Usage x Days_Year x SqFt_Served x (T_setpoint - T_supply) x (1/ Eff_Rating_Standard - 1 / Eff_Rating_High) + [(SL_base - SL_new) x 8760 hours]} x (1 MMBTU / 1,000,000 BTU)
Pipe Insulation Savings (Dth)	= LF x Hrs x (BTU_per_foot_U - BTU_per_foot_I) x Existing / EFFb
BTU_per_Foot_U	= Heat loss per foot of uninsulated pipe = [Coef0 + (Coef1 x DeltaT) + (Coef2 x DeltaT^2) + (Coef3 x DeltaT^3)] / EFFb where the coefficients are selected based on the pipe size and an insulation thickenss (both provided by customer).
BTU_per_Foot_I	= Heat loss per foot of uninsulated pipe = [Coef0 + (Coef1 x DeltaT) + (Coef2 x DeltaT^2) + (Coef3 x DeltaT^3)] / EFFb where the coefficients are selected based on the pipe size (provided by customer) and an insulation thickenss of zero.
DeltaT	= (Tfluid - Tambient)
Unit Heater Savings (Dth)	= Output Capacity x Alt x (1/Effb - 1 / Effh) x EFLH-UH / 1,000,000
Dth_eff_radiant	= Rad Input Capacity x Alt x EFLH-UH x (1 - IR Factor) - Dth_fan
EFLH-UH	= HDD x (24 Hrs/Day) x (Oversize Factor_heat) x [1/ (T_indoor - T_design)]
HDD	= %Conditioned x Sum (T_indoor - T_avg)$^{365\ days}$
Dth_fan	= Fan_kW x 3412 x FLH / 1,000,000
Fan_kW	= Fan_HP x 0.746 x LF / Mtr_eff
Fan_HP	= kBtu/hr_heat x HP/BTUh x 1000
Custom Boiler savings (Dth)	Gas energy savings and any associated savings or increase in electrical energy will be calculated based on the project specific details. Each project will undergo an engineering review in accordance with standard engineering practices. The review will be in accordance with the calculation methodologies detailed in the prescriptive products where applicable.
Heating System Optimization Savings	Gas energy savings and any associated savings or increase in electrical energy will be calculated based on the project specific details. Each project will undergo an engineering review in accordance with standard engineering practices. The review will be in accordance with the calculation methodologies detailed in the prescriptive programs where applicable.

Electric Savings Algorithms:

EC Furnace Motor Customer kWh	=(Heating_kW_PSC - Heating_kW x Heat_EFLH + (Cooling_KW_PSC -Cooling_kW) x Cool_EFLH + (Ventilation_kW_PSC - Ventilation_kW) x Ventilation_Only_Hours+Cooling_kWh_Savings = New_Motor_HP x 3375 for new units with cooling = New_Motor_HP x 2522 for new units without cooling = New_Motor_HP x 2781 for retrofits with cooling = New_Motor_HP x 1738 for retrofit without cooling
EC Furnace Motor Customer kW	= Customer kWh/Total_Fan_Hours = New_Motor_HP x 0.747 for new units with cooling = New_Motor_HP x 0.648 for new units without cooling = New_Motor_HP x 0.615 for retrofits with cooling = New_Motor_HP x 0.447 for retrofit without cooling
Cooling_kWh_Savings	= Cooling_kW_Savings x Cool_EFLH = New_Motor_Hp x 307.754
Cooling_kW_Savings	= kW/ton x (Cooling_kW_PSC - Cooling_kW) x 3.413 / 12 = New_Motor_HP x 0.225
Peak Coincident KW	= Customer kW X Coincidence Factor
Heating Penalty (reftrofit)	= -(Heating_kW_PSC -Heating_kW) x 3413 x Heat_EFLH / 1,000,000 / EFFb, = New_Motor_HP x $-10.97, taken as a non-energy benefit

Variables:

Input Capacity	= Rated input BTUH nameplate data for the new boiler, furnace, unit heater, or water heater.
Alt	= Altitude Adjustment factor to adjust the sea level manufacturer's rated input for altitude effects = 0.891
EFFb	= Efficiency of Baseline equipment. Refer Table 1 below
EFFh	= Efficiency for higher efficiency equipment. Refer Table 1 below.
Adj	= Adjustment for operation at less than nominal efficiency =5% for condensing boilers (Ref 29) =0% for all other equipment
EFLH	=The equivalent full load heating hours for the boiler, furnace, or unit heater. Refer to Table 2a below.
1,000,000	= Conversion from BTU to Dth
Leak_Rate	=Leakage rate, pounds of steam per hour. High Pressure = 11, Low Pressure = 5 (Reference 24)
Leak_Hours	= Annual hours boiler lines are pressurized = 6000 hours (Based on estimate of 30% installed on systems operate year round, and 70% installed on heating only systems.)
BTU_Per_Pound	Low Pressure Applications: = 1164 BTU per pound for lost to atmosphere, 964 BTU per pound lost to condensate. Assume 50/50 mix = 1064 BTU per pound. (Reference 24) High Pressure Applications: = 1181 BTU per pound for lost to atmosphere, 981 BTU per pound lost to condensate. Assume 50/50 mix = 1081 BTU per pound. (Reference 24)
density	Density of water = 8.33 lbs/gal
C_p	Specific heat of water = 1 Btu / lb - F
Volume_Daily_SqFt_Usage	Average daily hot water consumption, use values from Table 1 [gallons / 1,000 ft2 / day].
Days_Year	Applicable days per year of building operation, if unkonw use values from Table 3a.
SqFt_Served	Number of Square feet served by water heater in thousands of square feet, site specific.
T_setpoint	Water heater setpoint = 140 deg F (Ref 31).
T_supply	Supply temperature of water heater = 58 deg F (Ref 31).
Eff_Rating_Standard	Efficiency Rating of standard replacement water heater, Thermal Efficiency = 80%
Eff_Rating_High	Efficiency Rating of high efficiency replacement water heater, Thermal Efficiency, provided by customer
SL_base	Standby Losses for baseline storage water heater = 13.21 BTUH per gallon of storage (Ref 30)
SL_new	Standby Losses for efficient water heater = 8.90 BTUH per gallon of storage (Ref 30)
LF	= Linear feet of insulation installed, provided by the customer.
Hrs	=The operating hours for the boiler system. Refer to Table 2b below.
T_{fluid}	= Average temperature of the fluid in the pipe receiving insulation in degrees F, provided by the customer.
$T_{ambient}$	= Average temperature of the space surrounding the pipe. We will ask the customer if the pipe is in a conditioned space or outside. We will use 70 degrees for conditioned spaces and 51 degrees for outside domestic hot water (full year average) and 44 degrees for outside space heating (average excluding June-September) which are the average TMY3 temperatures for Colorado. (Ref 10)
Existing	= Pipe insulation savings multiplier to determine credit if existing deteriorated insulation is being replaced. We will use 1 if no existing insulation is present and 0.25 if existing insulation is being replaced.
kBtu/hr_heat	= Rated output kBTU/h of the unit heater; provided by customer.
Rad Input Capacity	= Rated capacity/input of the new radiant heater, in kBTU/h, provided by customer
%conditioned	= Percentage of the time during heating season the space is heated, provided by customer
T_indoor	= Space temperature set point of space being heated, provided by customer
T_avg	= Average daily outdoor dry bulb temperature for the given location, calculated from TMY3 weather data
HP/BTUh	=Average fan power (rated) per BTU/h of heating output. Taken from manufacturer data for 38 unit heaters from Trane and Sterling. =1.8990E-6 for axial/propeller fans, 4.0377E-6 for centrifugal/blower
Oversize Factor_heat	= Factor to account for design oversize commonly found on unit heater installations. = 0.9 (Ref 1)
T_design	= Design temperature for the given location, = -16 for Minneapolis (Ref 2)
LF	= Design load factor of fan motor, deemed at 0.8 based on typical engineering assumption
Heat_base	= Thermal efficiency of the baseline, non-power-vented, code-compliant unit heater. = 0.8 (Ref 3)
Heat_eff	= Thermal efficiency of the new, efficient unit heater. Refer to Table 1 below.
Heat_eff_radiant	= Thermal efficiency of the new, radiant heater. = 0.80, same as baseline because the radiant heaters do not have specific combustion efficiency improvements over the baseline unit heater, their savings are all from radiation heat transfer versus convection. Also, Ref 5 uses this value.
Radiation Size Factor	= Factor to account for the fact that radiant heaters should be designed smaller than an equivalent standard unit heater due to radiation heat transfer being more effective at producing thermal comfort. This also accounts for the lower room temperature afforded by radiant heaters. = 0.85 (Ref 4)
Mtr_eff	= Average efficiency of 6 unit heater fans, calculated by taking the manufacturer-provided (Reznor, Sterling, and Trane) current draw to calculate power consumption and working backwards with the rated motor power and an assumed load factor of 0.8 to compute the efficiency for each fan and then taking the average of all of the fans. = 0.296 and includes both axial and centrifugal fans.
0.746	= Conversion factor from HP to kW
1,000	= Conversion factor from kBTU/h to BTU/h
3,412	= Conversion factor from kW to BTU/h
heat EFLH	= Annual Equivalent Full Load Hours (EFLH) of the furnace for heating
Occ Hours	= Annual operating hours of the space served by the furnace, assumed to be equal to the operating hours of a typical office, as used in the Lighting Efficiency program (2567 hours)
Op_Hrs	= Combined heating and cooling full load hours occuring during unoccupied hours plus Occ Hours. Calculated using bin hours and the assumed balance point of 57F. This value is location specific.
Measure Life	= Length of time the boiler (or furnace) equipment will be operational = See table 10.
Incremental Cost	= Refer to Tables 3 to 10.

ECM Furnace Variables

Heat_EFLH	= Annual Equivalent Full Load Hours (EFLH) of the furnace for heating = 849.45 (Reference 39).
Heating_Speed	= Speed of furnace fan in the heating mode = 80%
Cooling_Speed	= Speed of furnace fan in the cooling mode = 100%
Ventilation_Speed	= Speed of the furnace fan in fan only mode = 80% for the baseline and 80% for furnaces retrofitted with ECMs, and 60% for new furnaces equipped with ECMs.
Op_Hrs	= Annual operating hours of the space served by the furnace, assumed to be equal to the operating hours of a typical office, as used in the Lighting Efficiency program (3,435 hours)
Total_Fan_Hours	= Op_Hrs + Cooling Hours during the unoccupied time (626) + Heating Hours during the unoccupied time (458) = 4519 hours with cooling and 3893 hours without cooling
Full_Load_kW	= New_Motor_HP / New_Motor_Eff x 0.746 kW/HP = New_Motor_HP x 0.878
Heating_kW	= Full_Load_kW x Heating_Speed $^{Fan\_Law\_Exp}$ = New_Motor_HP x 0.502
Cooling_kW	= Full_Load_kW = New_Motor_HP x 0.878
Ventilation_kW	= Heating_kW for furnaces retrofitted with ECMs, and Full_Load_kW x Ventilation_Speed $^{2.5}$ = New_Motor_HP x 0.245 for new furnaces with ECMs
Fan_Law_Exp	= 2.5
Cool_EFLH	= Annual Equivalent Full Load Hours (EFLH) of the furnace for cooling, calculated by estimating building loads based on outdoor conditions and building balance point (balance point set by heating EFLH analysis) = 1,366 Hours
Ventilation_Only_Hours	= Annual hours of the furnace in ventilation mode, calculated by subtracting the cooling and heating EFLH occuring during occupied hours from Op_Hrs = 2,303 hours with cooling and 3,043 hours with no cooling
kW/ton	= Efficiency of air conditioning system, calculated by taking new baseline SEER of 13, dividing by 1.1 to get EER and then taking 12 / EER to get kW/ton = 1.015 kW/ton
Cooling_kW_PSC	= Cooling_kW x New_Motor_Eff / PSC_Motor_Eff = New_Motor_HP x 1.658
Heating_kW_PSC	= Heating_kW x New_Motor_Eff / PSC_Motor_Eff = New_Motor_HP x 0.948
Ventilation_kW_PSC	= Heating_kW_PSC = New_Motor_HP x 0.948
New_Motor_HP	= Rated power of EC fan motor installed by customer, in HP, taken from application
PSC_Motor_HP	=New_Motor_HP
New_Motor_Eff	= Efficiency of the EC motor = 85%
PSC_Motor_Eff	= Efficiency of the PSC Motor = 45%
Coincidence Factor	= 100% as the furnace fan will be running during the time of our system peak
3.413	= Conversion from Watts of power to BTU/h of heat
12,000	= Conversion from BTU/h to tons of cooling
Measure Life	= Length of time the furnace equipment will be operational = 18 years (Reference 40) for new furnaces and 7 years for retrofit ECMs in existing furnaces.
Incremental Cost, ECM Fan	= Deemed at $212, based on DOE study results and market research (Reference 43 & 44)

Needed from Customer/Vendor/Administrator for Calculations:

For boilers:

Boiler size rated at sea level (BTUH)
New boiler type (Non-Condensing or Condensing)
Boiler Use (Space heating and/or water heating)

For steam traps:

High or low pressure
Incremental cost

For all but boilers, steam traps, and pipe insulation:

Boiler size (BTUH)
Implemented measure
Incremental cost

For insulation:

Linear feet of insulation added
Nominal diameter of pipe
Thickness of insulation
Insulation R-Value or thermal conductivity (k)
Average fluid temperature
Pipe location (conditioned space or not)
Pipe use (Space heating and/or water heating)
Was existing insulation replaced
Incremental cost

For water heaters:

Building type
Square footage served by water heater
Storage capacity (gallons); 0 if tankless
BTUH input
Other Water Heater BTUH Input
Thermal efficiency rating

For furnaces:

New furnace size (BTUH)
New furnace efficiency
For Furnace fans:
New furnace fan size (HP)
Quantity
Cooling or No Cooling
New Furnace or Retrofit

For non-radiant unit heaters:

Space temperature set point
% of the time the space is heated
Output capacity of the unit heater in kBTU/h
Fan type (blower/propeller)

For radiant heaters:

Space temperature set point
% of the time the space is heated
Input capacity of the heater in kBTU/h

Assumptions:

- Each boiler or furnace is replaced with the same size on a 1 for 1 basis.
- Only boilers used for space and/or domestic water heating can receive prescriptive rebates; other boilers must go through Custom Efficiency.
- Assumed savings for boiler tune-up = 2% for non condensing boiler. This is an average value of the two years, 4% initial to no savings at the end of the two years. Life of product is 2 years. DOE states up to 5%.
- Assumed savings for outdoor air reset on non condensing boilers = 3%. Life of product is 20 years. The Natural Gas consortium states up to 5% savings
- Assumed savings for installing Stack dampers on non condensing boilers = 1%. Life of product is 20 years. Canada energy council, up to 4%
- Assumed savings for modulating burner controls on non condensing boilers = 3%. Life of product is 20 years. The Natural Gas consortium states up to 4% savings
- Assumed savings for O2 trim controls on non condensing boilers = 2%. Life of product is 20 years. The Natural Gas consortium states of 2 to 4% savings
- The baseline efficiency for the furnace is based on 2015 IECC, minimum of 80%.
- Thermal Efficiency as defined in ASHRAE 90.1-2007 indicates the total efficiency of the boiler equal to 100% fuel energy minus all losses.
- Prescriptive rebates are only given for furnaces put into service, rebates are not given for backup furnaces.
- Furnaces must have a minimum efficiency of 92% AFUE for a rebate, and 94% AFUE or higher efficiency will receive a larger rebate.
- Infrared heater is vented (has exhaust to exterior)
- "% Conditioned" is the percentage of the time that the space temperature set point is maintained
- The infrared heater has no fan energy consumption (it may have a very small (<100W) fan to distribute hot exhaust, but that is ignored)
- The fan full load hours equal the heating full load hours
- Fan power per BTU/h is constant, regardless of fan size for each fan type
- Heat produced by the fan is beneficial to heating the space
- Fan motor efficiency is constant
- Radiant heaters are low-intensity tube type
- Furnace fan will operate for ventilation during all business hours, assumed to be equal to the "office" lighting hours for the business lighting program technical assumptions
- For furnace fan measure, cooling is assumed to be 13 SEER and heating 90% efficient
- The baseline PSC furnace fan motor is 2/3 the size of the new motor, based on Ref 20 and 21
- Furnace fan measure: there is no ventilation during unoccupied hours
- Climate zone assumed to be Minneapolis, unless otherwise specified

Table 1: Heating Equipment Efficiencies

	Baseline Efficiency (EFFb)	Efficient Efficiency (EFFh)	Unit	Reference
New Boilers (Non-Condensing) <300,000 BTU/h	80.0%	85.0%*	AFUE	Ref. 11
New Boilers (Non-Condensing) >= 300,000 BTU/h and <=2,500,000 BTU/h	80.0%	85.0%*	Et (Thermal Eff)	Ref. 11
New Boilers (Non-Condensing) >2,500,000 BTU/h	82.0%	85.0%*	Ec (Combustion Eff)	Ref. 11
New Boilers (Condensing) <300,000 BTU/h	80.0%	92.0%*	AFUE	Ref. 11
New Boilers (Condensing) >= 300,000 BTU/h and <=2,500,000 BTU/h	80.0%	92.0%*	Et (Thermal Eff)	Ref. 11
New Boilers (Condensing) >2,500,000 BTU/h	82.0%	92.0%*	Ec (Combustion Eff)	Ref. 11
Boiler Tune Up (Non-Condensing)	78.0%	80.0%		Ref. 12
Boiler Tune Up (Condensing)	87.2%	88.0%		Ref. 29
Outdoor Air Reset	80.0%	83.0%		Ref. 13
Stack Dampers	80.0%	81.0%		Ref. 14
Modulating Burner Controls	80.0%	83.0%		Ref. 15
O2 Trim Control	80.0%	82.0%		Ref. 16
Steam Traps	80.0%	N/A		Ref. 17
Turbulators	80.0%	83.0%		
Commercial Furnaces	78.0%	92.0%*	AFUE	Ref. 3
	80.0%	92.0%*	Et (Thermal Eff)	Ref. 3
Water Heaters	80.0%	92.0%*		Ref. 18
Unit Heater (Non-condensing)	80.0%	83.0%*		Ref. 3
Unit Heater (Condensing)	80.0%	90.0%*		Ref. 3
Pipe Insulation	80.0%	N/A		Ref 17

*High efficiency boiler and furnace efficiencies are per customer. Listed efficiencies are minimum qualifying efficiencies.

Table 2a: Effective Full Load Heating Hours

Equipment	Use	Hours	Explanation
Boiler	Space Heating Only	948	Based on Bin Analysis assuming 30% oversizing for boiler plant. See "Forecast Boiler Op Hours " tab.
	Only	2,187	
	Space Heating and Domestic Hot Water	1,519	Based on Bin Analysis assuming 30% oversizing for boiler plant. See "Forecast Boiler Op Hours " tab.
Furnace	All	849	

Table 2b: Hours for Pipe Insulation

Use of Pipe	Location	Hours	Explanation
Domestic Hot Water	Inside	4,828	Hours when outside temp is above building balance point. Heat loss from pipe is wasted.
Domestic Hot Water	Outside	1,888	Domestic hot water available year round, outside temp is always less than 120 F.
Space Heating	Inside	8,760	Hours when boiler is running but outdoor temp is above building balance point
Space Heating	Outside	5,037	Hours that boiler is running

Table 3a: Annual Hot Water Use Data (Ref 33 and 35)

Building Type	Days/Year	day
Small Office	250	2.3
Large Office	250	2.3
Fast Food Restaurant	365	549.2
Sit-Down Restaurant	365	816.0
Retail	365	2.0
Grocery	365	2.2
Warehouse	250	1.0
Elementary School	200	5.7
Jr. High/High School/College	200	17.1
Health	365	342.0
Motel	365	100.0
Hotel	365	30.8
Other Commercial	250	0.7
Industrial	Site Specific	Site Specific

Table 3b: Baseline Equipment Sizing compared to New Construction Tankless (Ref 37)

Customer Segment	Sizing multiplier for equivalent Storage System with 100 gallons of storage
Fast Food Restaurant	48%
Sit-Down Restaurant	54%
Elementary School	52%
Junior High School	88%
Motel	98%
Apartment Building	51%
Fitness Center	65%
Other	65%

References:

1. 1999 Minnesota Energy Code - Chapter 7676.1100 Subpart 3D, 4A
2. Centerpoint TRM
3. International Energy Conservation Code (IECC) 2015 Table C403.2.3 (4)
4. ASHRAE HVAC Systems and Equipment 2008 pg 15.1
5. Whole Building Design Guide for US Army. Tech Note 14: Overhead Radiant Heating <https://www.wbdg.org/ccb/ARMYCOE/COETN/technote14.pdf>
6. Removed
7. Cost data from online review on 8/5/15 of products available at Younits.com, ecomfort.com, hvacdistribution.com, grainger.com, simplyplumbing.com, homedepot.com, h-mac.com, ingramswaterandair.com, and zoro.com
8. Nicor Gas Energy Efficiency Plan 2011-2014. Revised Plan Filed Pursuant to Order Docket 10-0562, May 27, 2011
9. Sachs, Harvey M., Unit Heaters Deserve Attention for Commercial Programs, ACEEE, April 2003
10. TMY3 Weather data from Department of Energy
11. International Energy Conservation Code (IECC) 2012
12. 2% efficiency improvement for boiler tune up based on Michaels Energy literature review. Sources included (but not limited to):
    12A. Illinois Technical Reference Manual (2015-2016) <http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_4/2-13-15 Final/Updated/Illinois_Statewide_TRM_Effective_060115_Final_02-24-15_Clean.pdf>
    12B. Michigan Energy Measures Database (MEMD) accessed at <http://www.michigan.gov/mpsc/0,4639,7-159-52495_55129---,00.html>
    12C. Arkansas Technical Reference Manual <http://www.apscservices.info/EEInfo/TRM4.pdf>
13. 3% efficiency improvement for boiler outdoor air reset based on Michaels Energy literature review. Sources included (but not limited to):
    13A. Arkansas Technical Reference Manual <http://www.apscservices.info/EEInfo/TRM4.pdf>
    13B. NEEP Mid-Atlantic TRM. V5. >http://www.neep.org/sites/default/files/resources/Mid-Atlantic_TRM_V5_FINAL_5-26-2015.pdf>
14. 1% efficiency improvement for stack dampers based on Michaels Energy literature review. Sources included (but not limited to):
    14A. Arkansas Technical Reference Manual <http://www.apscservices.info/EEInfo/TRM4.pdf>
    14B. Illinois Technical Reference Manual (2015-2016) <http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_4/2-13-15 Final/Updated/Illinois_Statewide_TRM_Effective_060115_Final_02-24-15_Clean.pdf>
    14C. Minnesota TRM. Version 1.3. <http://mn.gov/commerce-stat/pdfs/trm-version-1.3.pdf>
15. 3% efficiency improvement for modulating boiler controls based on Michaels Energy literature review. Sources included (but not limited to):
    15A. Illinois Technical Reference Manual (2015-2016) <http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_4/2-13-15 Final/Updated/Illinois_Statewide_TRM_Effective_060115_Final_02-24-15_Clean.pdf>
    15B. Minnesota TRM. Version 1.3. <http://mn.gov/commerce-stat/pdfs/trm-version-1.3.pdf>
16. 2% efficiency improvement for O2 trim control based on Michaels Energy literature review. Sources included (but not limited to):
    16A. Illinois Technical Reference Manual (2015-2016) <http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_4/2-13-15 Final/Updated/Illinois_Statewide_TRM_Effective_060115_Final_02-24-15_Clean.pdf>
    16B. Minnesota TRM. Version 1.3. <http://mn.gov/commerce-stat/pdfs/trm-version-1.3.pdf>
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22. California DEER Database, 2014 (value used is for remaining useful life of commercial high efficiency furnaces)
23. AHRI Directory of Certified Product Performance; average of Standby Loss in BTUH per gallon of storage calculated for units with 80% or less thermal efficiency for baseline unit and <96% thermal efficiency for efficient unit
24. Leakage data from Energy Management Handbook, by Wayne Turner
25. Measure life from the Federal Energy Management Program (FEMP).
26. The average baseline and high efficiency costs are based on the California DEER database.

27. Cost information supplied by Engineered Products
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29. Commercial Condensing Boiler Optimization. Center for Energy and Environment. Prepared for Minnesota Department of Commerse, Division of Energy Resources. 2015.
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31. Arkansas Deemed Savings Quick Start Program Draft Report Commercial Measures Final Report, Nexant.
32. MN Bin Temp Bin Hrs are taken from the "Thermal Environmental Engineering, Third Edition, Thomas H. Kuehn, James W. Ramsey and James L. Threlkeld, Pages 717-718, Table B.5" to determine full load equivalent hours (FLEH) in Minnesota area. See Forecast furnace operating hours for
33. Arkansas Deemed Savings Quick Start Program Draft Report Commercial Measures Final Report, Nexant.
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35. Minnesota DER Deemed Values
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41. 2006 IECC
42. "Electricity Savings from Variable-Speed Furnaces in Cold Climates" Pigg, Scott and Talerico, Tom. ACEEE Summer Study Proceedings 2004 (http://aceee.org/files/proceedings/2004/data/papers/SS04_Panel1_Paper23.pdf)
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45. Wisconsin Focus on Energy, ECM Furnace Fan Impact Evaluation Report,

Table 4: Hot water boiler costs (Ref 27)

	Non-condensing		Condensing	Incremental	Incremental
Boiler Nameplate Capacity	Baseline	High Efficient - Non Condensing	High Efficient - Condensing	Baseline to High Efficient - Non Condensing	Baseline to High Efficient - Condensing
175,000 Btuh	$3,000	$3,500	$4,600	$500	$1,600
500,000 Btuh	$5,000	$9,000	$11,200	$4,000	$6,200
1,000,000 Btuh	$7,300	$11,700	$15,000	$4,400	$7,700
2,000,000 Btuh	$12,000	$17,000	$26,500	$5,000	$14,500
4,000,000 Btuh	$24,000	$34,000	$53,000	$10,000	$29,000
6,000,000 Btuh	$36,000	$51,000	$79,500	$15,000	$43,500
8,000,000 Btuh	$48,000	$68,000	$106,000	$20,000	$58,000

Table 4b: Steam boiler costs, Vendor supplied, Engineered Products

Boiler Nameplate Capacity	Baseline	High Efficient	Incremental
Low Pressure Steam Boiler - 300 MBTUH	$2,920	$4,240	$1,320
Low Pressure Steam Boiler - 1 MMBTUH	$5,275	$8,443	$3,168
Low Pressure Steam Boiler - 10 MMBTUH	$18,757	$35,257	$16,500
High Pressure Steam Boiler - 300 MBTUH	$3,211	$4,531	$1,320
High Pressure Steam Boiler - 1 MMBTUH	$5,802	$8,970	$3,168
High Pressure Steam Boiler - 10 MMBTUH	$20,633	$37,133	$16,500

Table 5: Other Heating System

Custom Boiler	Actual costs will be provided by customer
Boiler Tune Up	Actual costs will be provided by customer
Turbulators	Actual costs will be provided by customer
Outdoor Air Reset	Actual costs will be provided by customer
Stack Dampers > 750 Mbtuh	Actual costs will be provided by customer
Stack Dampers > 750 Mbtuh	Actual costs will be provided by customer
Modulating Burner Controls < 750 Mbtuh	Actual costs will be provided by customer
Modulating Burner Controls > 750 Mbtuh	Actual costs will be provided by customer
O2 Trim Control	Actual costs will be provided by customer
Steam Traps	Actual costs will be provided by customer
Pipe Insulation	Actual costs will be provided by customer
Heating System Optimization Study	Actual costs will be provided by customer

Table 6: Commercial Furnaces

Btu Input	Incremental Cost
60,000	$804.95
70,000	$782.26
80,000	$775.83
90,000	$785.68
100,000	$811.80
115,000	$893.02
120,000	$912.86
125,000	$948.29
140,000	$1,079.00

Table 7: Commercial Furnaces (References 18 & 19)

	Cost
Baseline Fan	$236.00
EC Fan	$448.00
Incremental	$212.00

Table 8: Unit Heater and Radiant Heater Costs (Ref 7)

	$/kBTUh (output)	Incremental Cost ($/kBTUh)
Baseline Unit Heater	$8.42	N/A
Power-vented Unit Heater (83%)	$10.04	$1.62
Condensing Unit Heater (90%)	$18.47	$10.05
Radiant Heater (uses input kBTU/h)	$9.45	$1.03

Table 9: Incremental Cost per Nameplate Input BTUH for Storage Water Heater per 100 Gallons of Storage (Ref 34)

	$/BTUH
Fast Food Restaurant	$0.0326
Sit-Down Restaurant	$0.0056
Elementary School	$0.0056
Junior High School	$0.0085
Motel	$0.0056
Apartment Building	$0.0340
Fitness Center	$0.0085
Other	$0.0144

Table 10: Incremental Cost per Nameplate Input BTUH for Tankless Water Heater

	$/BTUH
Fast Food Restaurant	$0.0105
Sit-Down Restaurant	$0.0044
Elementary School	$0.0044
Junior High School	-$0.0049
Motel	-$0.0080
Apartment Building	$0.0105
Fitness Center	$0.0037
Other	$0.0029

Table 11: Incremental Cost (Reference 2)

	Standard Unit Cost	High Efficient Unit Cost	Incremental Cost
New Energy Star Furnace => 90% AFUE, < 9	$1,866.40	$3,120.70	$1,254.30
New Energy Star Furnace => 92% AFUE, < 9	$1,866.40	$3,208.29	$1,341.89
New Energy Star Furnace => 94% AFUE, < 9	$1,866.40	$3,295.88	$1,429.48
New Energy Star Furnace => 94% AFUE	$1,866.40	$3,383.47	$1,517.07

2. The average baseline and high efficiency costs are based on the California DEER database & estimated incremental installation cost for high efficient furnaces.

Table 7: Pipe Insulation polynomial equation coefficients and incremental cost

Pipe Nominal Diameter (inches)	Insulation Thickness (Inches)	Heat Loss (BTU/Hr) at Specified Temperature Difference				Polynomial Coefficients				Cost Per Foot	Cost Per 3' Materials
		5	70	135	200	Coef0	Coef1	Coef2	Coef3	Total	(Ref 28)
0.50	-	1.73000	35.90	81.40	136.0	-0.516993042	0.432767085	0.001310573	-2.82203E-07	$ -	$ -
0.50	0.5	0.64500	10.10	21.20	34.4	-0.020554913	0.132795641	0.000150494	2.291E-07	$ 6.18	$ 6.18
0.50	1	0.46300	7.07	14.80	23.9	-0.005067924	0.093143865	0.000102935	1.44743E-07	$ 7.47	$ 7.47
0.50	1.5	0.37900	5.75	12.00	19.4	0.003984993	0.07518613	8.91729E-05	9.74056E-08	$ 14.18	$ 14.18
0.50	2	0.33700	5.10	10.60	17.1	0.000608336	0.067400189	6.8221E-05	1.1015E-07	$ 22.02	$ 22.02
0.50	2.5	0.29500	4.45	9.28	14.9	-0.00747838	0.059744424	4.96359E-05	1.22895E-07	$ 26.02	$ 26.02
0.50	3	0.27800	4.18	8.72	14.0	-0.006305586	0.056116414	4.66467E-05	1.15916E-07	$ 31.44	$ 31.44
0.50	3.5	0.26400	3.97	8.28	13.3	-0.001850367	0.052723779	5.22687E-05	8.37506E-08	$ 36.87	$ 36.87
0.50	4	0.25300	3.80	7.92	12.7	-0.0060451	0.051105544	4.13115E-05	1.05295E-07	$ 42.29	$ 42.29
0.50	4.5	0.24200	3.64	7.59	12.2	-0.000563522	0.048200035	4.96014E-05	7.22E-08	$ 47.71	$ 47.71
0.50	5	0.23500	3.53	7.34	11.8	-0.003366019	0.047319386	3.88419E-05	9.86193E-08	$ 53.14	$ 53.14
0.50	5.5	0.23400	3.51	7.31	11.8	0.005221094	0.045902204	5.38618E-05	5.64406E-08	$ 58.56	$ 58.56
0.50	6	0.22700	3.41	7.10	11.4	-0.003540178	0.045661627	3.91228E-05	8.89091E-08	$ 63.98	$ 63.98
0.75	-	2.09000	43.40	98.50	165.0	-0.641016191	0.52569402	0.001536569	-8.79988E-08	$ -	$ -
0.75	0.5	0.75300	11.80	24.90	40.4	-0.02396278	0.154265394	0.000194013	2.26673E-07	$ 7.00	$ 7.00
0.75	1	0.55600	8.51	17.80	28.8	-0.00762203	0.112369747	0.000117924	2.01487E-07	$ 8.17	$ 8.17
0.75	1.5	0.43900	6.66	13.90	22.4	-0.008498524	0.08880715	8.10579E-05	1.76301E-07	$ 14.24	$ 14.24
0.75	2	0.38300	5.80	12.10	19.5	-0.002610027	0.076775636	7.83555E-05	1.26536E-07	$ 22.77	$ 22.77
0.75	2.5	0.32900	4.97	10.40	16.7	-0.0040483	0.065832705	6.97763E-05	9.43711E-08	$ 26.39	$ 26.39
0.75	3	0.30800	4.64	9.66	15.5	-0.009461577	0.062664109	4.6068E-05	1.43226E-07	$ 31.73	$ 31.73
0.75	3.5	0.29100	4.38	9.12	14.7	0.002692685	0.057657531	6.2664E-05	8.16265E-08	$ 37.07	$ 37.07
0.75	4	0.27700	4.17	8.69	14.0	0.001543377	0.054974131	5.90396E-05	7.98058E-08	$ 42.40	$ 42.40
0.75	4.5	0.26600	3.99	8.32	13.4	0.003691319	0.052371762	5.99558E-05	6.4937E-08	$ 47.74	$ 47.74
0.75	5	0.25600	3.85	8.02	12.9	0.000585786	0.050883434	5.32258E-05	7.40404E-08	$ 53.08	$ 53.08
0.75	5.5	0.25300	3.80	7.92	12.7	-0.0060451	0.051105544	4.13115E-05	1.05295E-07	$ 58.42	$ 58.42
0.75	6	0.24500	3.68	7.67	12.3	-0.004914104	0.049356493	4.19306E-05	9.55849E-08	$ 63.76	$ 63.76
1.00	-	2.52000	52.60	120.00	201.0	-0.728366214	0.624723758	0.002067703	-7.0399E-07	$ -	$ -
1.00	0.5	0.88700	13.90	29.40	47.8	-0.022272215	0.180671207	0.000242842	2.467E-07	$ 7.22	$ 7.22
1.00	1	0.57800	8.83	18.50	29.8	-0.015207075	0.117310055	0.000117809	2.06949E-07	$ 8.77	$ 8.77
1.00	1.5	0.47600	7.22	15.10	24.3	-0.009419026	0.096051889	9.35275E-05	1.71142E-07	$ 15.25	$ 15.25
1.00	2	0.41300	6.24	13.00	21.0	0.005230275	0.081790418	9.32915E-05	1.11364E-07	$ 24.21	$ 24.21
1.00	2.5	0.37300	5.63	11.70	18.9	0.00381926	0.074149847	7.78159E-05	1.17433E-07	$ 28.23	$ 28.23
1.00	3	0.34500	5.21	10.90	17.5	-0.002010924	0.068712866	7.74465E-05	8.34471E-08	$ 33.97	$ 33.97
1.00	3.5	0.32400	4.88	10.20	16.4	0.001685103	0.06407339	7.52741E-05	7.16128E-08	$ 39.72	$ 39.72
1.00	4	0.30700	4.63	9.64	15.5	-0.002917771	0.06161312	5.81228E-05	1.07116E-07	$ 45.46	$ 45.46
1.00	4.5	0.29200	4.40	9.16	14.7	-0.007199584	0.059166006	4.73061E-05	1.23805E-07	$ 51.21	$ 51.21
1.00	5	0.26800	4.02	8.37	13.5	0.0071897	0.052385938	6.46778E-05	5.21924E-08	$ 56.95	$ 56.95
1.00	5.5	0.27500	4.13	8.61	13.8	-0.007331946	0.055629289	4.39788E-05	1.16826E-07	$ 62.70	$ 62.70
1.00	6	0.26600	4.00	8.33	13.4	0.001648014	0.052737954	5.69907E-05	7.10059E-08	$ 68.44	$ 68.44
1.00	6.5	0.25800	3.88	8.08	13.0	-0.001520359	0.051606845	4.87015E-05	9.16401E-08	$ 74.19	$ 74.19
1.00	7	0.25100	3.78	7.87	12.7	0.0040483	0.049530214	5.68509E-05	6.34198E-08	$ 79.93	$ 79.93
1.00	7.5	0.24500	3.69	7.67	12.3	-0.005652253	0.049631391	3.93036E-05	1.01654E-07	$ 85.68	$ 85.68
1.00	8	0.24000	3.60	7.50	12.1	0.006196242	0.046927845	5.77671E-05	4.85511E-08	$ 91.42	$ 91.42
1.00	8.5	0.23500	3.53	7.35	11.8	-0.004671175	0.047410679	3.85038E-05	9.86193E-08	$ 97.17	$ 97.17
1.00	9	0.23000	3.46	7.20	11.6	0.003090708	0.045439517	5.10371E-05	5.76544E-08	$ 102.91	$ 102.91
1.00	9.5	0.22600	3.40	7.07	11.4	0.004308785	0.044519345	5.15157E-05	5.27993E-08	$ 108.66	$ 108.66
1.00	10	0.22200	3.34	6.95	11.2	0.004221705	0.043690465	5.16562E-05	4.79442E-08	$ 114.40	$ 114.40
1.25	-	3.11000	64.80	147.00	248.0	-0.818940893	0.767967466	0.002475005	-4.58201E-07	$ -	$ -
1.25	0.5	1.01000	15.80	33.40	54.2	-0.031513883	0.206374602	0.000264133	3.0041E-07	$ 7.71	$ 7.71
1.25	1	0.73700	11.30	23.70	38.4	-0.001419104	0.147521133	0.000181817	2.01183E-07	$ 9.48	$ 9.48
1.25	1.5	0.53100	8.05	16.80	27.1	-0.002577359	0.106352439	0.000111172	1.7266E-07	$ 16.60	$ 16.60
1.25	2	0.48900	7.41	15.50	24.9	-0.009713167	0.098536218	9.81917E-05	1.61129E-07	$ 25.56	$ 25.56
1.25	2.5	0.43300	6.55	13.70	22.0	-0.008124039	0.087122646	8.65811E-05	1.41708E-07	$ 30.01	$ 30.01
1.25	3	0.39700	5.98	12.50	20.1	-0.001061994	0.078960628	8.58034E-05	1.1015E-07	$ 36.07	$ 36.07
1.25	3.5	0.36900	5.56	11.60	18.7	0.006159386	0.072610714	8.88153E-05	7.61645E-08	$ 42.14	$ 42.14
1.25	4	0.34700	5.23	10.90	17.5	-0.005578542	0.069831729	6.35978E-05	1.25322E-07	$ 48.21	$ 48.21
1.25	4.5	0.32800	4.94	10.30	16.5	-0.009947435	0.066555736	5.29215E-05	1.37157E-07	$ 54.27	$ 54.27
1.25	5	0.31400	4.72	9.83	15.8	-0.000838598	0.062614323	6.21848E-05	9.89228E-08	$ 60.34	$ 60.34
1.25	5.5	0.30300	4.55	9.47	15.2	-0.005033331	0.060996088	5.12276E-05	1.20467E-07	$ 66.41	$ 66.41
1.25	6	0.29200	4.39	9.14	14.7	0.000448248	0.058090578	5.95175E-05	8.73919E-08	$ 72.47	$ 72.47
1.50	-	3.50000	73.10	167.00	280.0	-1.089467456	0.8782643	0.002727811	-3.94477E-07	$ -	$ -
1.50	0.5	1.18000	18.70	39.40	64.1	-0.041432863	0.243931118	0.00030924	3.70202E-07	$ 8.88	$ 8.88
1.50	1	0.74800	11.50	24.00	38.8	-0.011669003	0.151852526	0.000158962	2.58534E-07	$ 10.23	$ 10.23
1.50	1.5	0.59900	9.11	19.00	30.7	-0.000571611	0.119949509	0.000129735	1.88439E-07	$ 17.36	$ 17.36

1.50	2	0.47800	7.23	15.10	24.3	-0.003649756	0.095659969	0.000100122	1.4626E-07	$ 26.68	$ 26.68
1.50	2.5	0.43400	6.54	13.60	22.0	0.011069068	0.085292433	0.000101654	1.04992E-07	$ 30.92	$ 30.92
1.50	3	0.40100	6.04	12.60	20.3	0.001635399	0.079606921	8.63392E-05	1.15005E-07	$ 36.97	$ 36.97
1.50	3.5	0.37500	5.65	11.80	19.0	0.001530008	0.07434559	8.34742E-05	9.86193E-08	$ 43.03	$ 43.03
1.50	4	0.35300	5.31	11.10	17.8	-0.005170401	0.070673765	6.97919E-05	1.11364E-07	$ 49.08	$ 49.08
1.50	4.5	0.33700	5.06	10.50	17.0	0.010881306	0.06598783	7.70382E-05	8.58747E-08	$ 55.13	$ 55.13
1.50	5	0.32300	4.85	10.10	16.3	0.005816529	0.06357831	7.23994E-05	8.4054E-08	$ 61.19	$ 61.19
1.50	5.5	0.32100	4.82	10.00	16.1	-0.001186631	0.06432578	5.53879E-05	1.27143E-07	$ 67.24	$ 67.24
1.50	6	0.30900	4.64	9.68	15.6	0.003362065	0.060986204	6.84368E-05	8.22333E-08	$ 73.29	$ 73.29
2.00	-	4.30000	90.00	205.00	346.0	-1.168942064	1.063995275	0.003504974	-6.97921E-07	$ -	$ -
2.00	0.5	1.43000	22.70	48.00	78.1	-0.071199428	0.297777814	0.0003583	5.37096E-07	$ 9.48	$ 9.48
2.00	1	0.87700	13.40	28.20	45.5	-0.018896703	0.176816709	0.000198555	2.80079E-07	$ 11.07	$ 11.07
2.00	1.5	0.68300	10.40	21.70	35.0	-0.005820899	0.137369953	0.000144615	2.17569E-07	$ 19.13	$ 19.13
2.00	2	0.58000	8.79	18.30	29.6	0.008893686	0.114918113	0.000134157	1.51722E-07	$ 28.12	$ 28.12
2.00	2.5	0.51600	7.80	16.30	26.2	-0.004204383	0.103155168	0.000110122	1.46867E-07	$ 32.95	$ 32.95
2.00	3	0.47000	7.09	14.80	23.8	-0.00454724	0.094122765	9.37057E-05	1.54756E-07	$ 39.34	$ 39.34
2.00	3.5	0.43600	6.56	13.70	22.0	-0.005550114	0.08732423	8.44242E-05	1.46867E-07	$ 45.74	$ 45.74
2.00	4	0.40500	6.10	12.70	20.4	-0.00569777	0.081471325	7.28949E-05	1.50205E-07	$ 52.14	$ 52.14
2.00	4.5	0.38400	5.78	12.00	19.4	0.007290669	0.075888636	8.20756E-05	1.14095E-07	$ 58.54	$ 58.54
2.00	5	0.36600	5.51	11.50	18.5	-0.0004715	0.072832824	7.6901E-05	1.07419E-07	$ 64.94	$ 64.94
2.00	5.5	0.35600	5.35	11.10	17.9	0.000920268	0.071099876	6.48261E-05	1.34729E-07	$ 71.33	$ 71.33
2.00	6	0.34900	5.25	10.90	17.6	0.00518377	0.069114539	7.26374E-05	1.06509E-07	$ 77.73	$ 77.73
2.50	-	5.12000	107.00	244.00	412.0	-1.364233305	1.261115807	0.00422519	-9.46746E-07	$ -	$ -
2.50	0.5	1.65000	26.20	55.40	90.0	-0.078113011	0.342732839	0.00043244	5.31027E-07	$ 9.94	$ 9.94
2.50	1	1.01000	15.50	32.40	52.4	-0.0121108	0.204126948	0.000223103	3.30754E-07	$ 12.60	$ 12.60
2.50	1.5	0.70300	10.70	22.30	35.9	-0.011116692	0.142114518	0.000138841	2.41845E-07	$ 20.55	$ 20.55
2.50	2	0.61000	9.24	19.30	31.0	-0.015685025	0.123574723	0.000111288	2.33652E-07	$ 30.28	$ 30.28
2.50	2.5	0.54700	8.26	17.20	27.8	0.008994837	0.108095141	0.000125032	1.43529E-07	$ 35.59	$ 35.59
2.50	3	0.50100	7.56	15.80	25.4	-0.000838364	0.099632627	0.000111516	1.27143E-07	$ 42.48	$ 42.48
2.50	3.5	0.46200	6.96	14.50	23.3	-0.006182873	0.092860459	8.46622E-05	1.69322E-07	$ 49.38	$ 49.38
2.50	4	0.43400	6.54	13.60	21.9	0.001038507	0.086510545	8.76741E-05	1.35336E-07	$ 56.28	$ 56.28
2.50	4.5	0.41200	6.20	12.90	20.8	0.004368659	0.081620608	8.79719E-05	1.17736E-07	$ 63.17	$ 63.17
2.50	5	0.38900	5.85	12.20	19.6	-0.002697627	0.077698322	7.67599E-05	1.24716E-07	$ 70.07	$ 70.07
2.50	5.5	0.39000	5.86	12.20	19.6	-0.00663112	0.078566725	6.53814E-05	1.60825E-07	$ 76.97	$ 76.97
2.50	6	0.36100	5.42	11.30	18.2	0.005261903	0.071073509	8.23987E-05	8.46609E-08	$ 83.86	$ 83.86
3.00	-	6.12000	128.00	292.00	493.0	-1.713059627	1.51885905	0.004913792	-6.43301E-07	$ -	$ -
3.00	0.5	1.97000	31.30	66.30	108.0	-0.062350218	0.404796042	0.000578041	4.94614E-07	$ 11.11	$ 11.11
3.00	1	1.18000	18.20	38.10	61.5	-0.035458482	0.241337755	0.000245777	4.30891E-07	$ 13.47	$ 13.47
3.00	1.5	0.90300	13.80	28.80	46.4	-0.020650471	0.18354569	0.000176359	3.32878E-07	$ 21.50	$ 21.50
3.00	2	0.75600	11.50	23.90	38.6	-0.001247623	0.151944426	0.000153453	2.56107E-07	$ 32.08	$ 32.08
3.00	2.5	0.66100	10.00	20.90	33.6	-0.010802601	0.132954082	0.000131023	2.24245E-07	$ 37.28	$ 37.28
3.00	3	0.59500	8.98	18.70	30.1	-0.007821705	0.119807562	0.000107338	2.32135E-07	$ 44.37	$ 44.37
3.00	3.5	0.53900	8.13	16.90	27.3	0.007359204	0.106832835	0.000115989	1.58094E-07	$ 51.46	$ 51.46
3.00	4	0.50200	7.56	15.80	25.4	0.000265661	0.099608189	0.000111673	1.2684E-07	$ 58.56	$ 58.56
3.00	4.5	0.47300	7.12	14.80	23.9	0.006580948	0.093656035	0.000100275	1.41708E-07	$ 65.65	$ 65.65
3.00	5	0.44200	6.65	13.90	22.3	-0.005880122	0.088441164	8.79914E-05	1.38977E-07	$ 72.75	$ 72.75
3.00	5.5	0.42300	6.36	13.30	21.3	-0.010249015	0.085165171	7.73152E-05	1.50812E-07	$ 79.84	$ 79.84
3.00	6	0.40600	6.10	12.70	20.4	-0.004593745	0.081446886	7.30516E-05	1.49901E-07	$ 86.93	$ 86.93
3.50	-	6.92000	145.00	331.00	559.0	-1.930431367	1.716468344	0.005630873	-8.86057E-07	$ -	$ -
3.50	0.5	2.18000	34.60	73.30	119.0	-0.142304181	0.457370223	0.000510683	9.16401E-07	$ 13.37	$ 13.37
3.50	1.0	1.11000	17.00	35.70	57.6	-0.020428636	0.223915621	0.000255225	3.30754E-07	$ 14.60	$ 14.60
3.50	1.5	0.89900	13.70	28.50	46.0	-0.010053892	0.181792217	0.000174042	3.34092E-07	$ 23.58	$ 23.58
3.50	2.0	0.76700	11.60	24.30	39.1	-0.007137031	0.153221655	0.000167467	2.22425E-07	$ 34.83	$ 34.83
3.50	2.5	0.67900	10.30	21.40	34.5	-0.00525488	0.13683459	0.000128317	2.49128E-07	$ 39.94	$ 39.94
3.50	3.0	0.60900	9.19	19.20	30.9	-0.001478562	0.121293961	0.000131484	1.73267E-07	$ 47.27	$ 47.27
3.50	3.5	0.56200	8.47	17.70	28.4	-0.007918486	0.112611266	0.000112466	1.75391E-07	$ 54.61	$ 54.61
3.50	4.0	0.52400	7.90	16.50	26.5	-0.00736386	0.105116067	0.000102467	1.74784E-07	$ 61.94	$ 61.94
3.50	4.5	0.52600	7.92	16.50	26.6	0.003398452	0.104398877	0.000111507	1.5597E-07	$ 69.28	$ 69.28
3.50	5.0	0.48800	7.34	15.30	24.6	-0.005339333	0.097846891	9.01541E-05	1.79639E-07	$ 76.62	$ 76.62
3.50	5.5	0.46500	6.99	14.60	23.4	-0.012405618	0.093924605	7.89421E-05	1.86618E-07	$ 83.95	$ 83.95
3.50	6.0	0.44400	6.68	13.90	22.4	0.004144041	0.087998873	9.44041E-05	1.26233E-07	$ 91.29	$ 91.29
4.00	-	7.72000	162.00	369.00	624.0	-2.117593081	1.917129419	0.006241966	-8.25368E-07	$ -	$ -
4.00	0.5	2.32000	36.70	77.80	126.0	-0.156914234	0.486030084	0.000540165	9.34608E-07	$ 14.12	$ 14.12
4.00	1.0	1.42000	21.90	45.80	74.1	-0.008294688	0.286131955	0.000349321	3.58064E-07	$ 17.83	$ 17.83
4.00	1.5	1.09000	16.60	34.70	55.9	-0.018592106	0.220043458	0.000224585	3.67167E-07	$ 24.48	$ 24.48
4.00	2.0	0.90100	13.70	28.50	46.0	-0.007845842	0.18174334	0.000174355	3.33485E-07	$ 37.48	$ 37.48
4.00	2.5	0.78100	11.80	24.70	39.7	-0.015664035	0.157192329	0.000151844	2.78865E-07	$ 42.66	$ 42.66
4.00	3.0	0.68800	10.40	21.70	34.9	-0.006031966	0.137847931	0.000140326	2.16052E-07	$ 50.33	$ 50.33
4.00	3.5	0.62800	9.48	19.80	31.8	-0.011439599	0.126406008	0.000119272	2.22121E-07	$ 58.01	$ 58.01
4.00	4.0	0.58200	8.77	18.30	29.4	-0.007483087	0.116755662	0.000111764	1.99666E-07	$ 65.68	$ 65.68
4.00	4.5	0.53700	8.09	16.90	27.1	-0.01195737	0.108218339	9.82229E-05	1.95115E-07	$ 73.35	$ 73.35

4.00	5.0	0.50800	7.64	15.90	25.6	-0.000604565	0.101373345	9.83601E-05	1.7357E-07	$ 81.03	$ 81.03
4.00	5.5	0.48400	7.29	15.20	24.4	-0.008774875	0.097475497	8.69914E-05	1.80853E-07	$ 88.70	$ 88.70
4.00	6.0	0.46300	6.96	14.50	23.3	-0.005078848	0.092836021	8.48189E-05	1.69018E-07	$ 96.37	$ 96.37
4.50	-	8.52000	178.00	408.00	689.0	-2.404449184	2.105609381	0.00699286	-1.06812E-06	$ -	$ -
4.50	0.5	2.55000	40.30	85.30	139.0	-0.058585084	0.520385482	0.000748911	6.2206E-07	$ 15.84	$ 15.84
4.50	1.0	1.33000	20.30	42.50	64.7	-0.574813447	0.339228277	-0.000598459	2.78258E-06	$ 18.42	$ 18.42
4.50	1.5	1.06000	16.10	33.60	54.3	0.002667794	0.211535644	0.00023601	3.15582E-07	$ 25.56	$ 25.56
4.50	2.0	0.89700	13.60	28.40	45.8	-0.003291267	0.179379511	0.000193236	2.7401E-07	$ 40.36	$ 40.36
4.50	2.5	0.77800	11.80	24.60	39.5	-0.01738693	0.157553049	0.000144611	2.79775E-07	$ 45.22	$ 45.22
4.50	3.0	0.70300	10.60	22.10	35.6	-0.003424384	0.140576056	0.000138841	2.41845E-07	$ 53.29	$ 53.29
4.50	3.5	0.64500	9.73	20.30	32.6	-0.013335718	0.130154572	0.000115563	2.47307E-07	$ 61.36	$ 61.36
4.50	4.0	0.59000	8.89	18.50	29.8	-0.002088302	0.118048248	0.000112836	2.09376E-07	$ 69.43	$ 69.43
4.50	4.5	0.59100	8.90	18.60	29.9	-0.00044406	0.117375588	0.000129873	1.54453E-07	$ 77.50	$ 77.50
4.50	5.0	0.55500	8.36	17.40	28.0	-0.004195201	0.111274151	0.000103397	2.0179E-07	$ 85.57	$ 85.57
4.50	5.5	0.52800	7.95	16.60	26.6	-0.013958879	0.106705573	9.16497E-05	2.03914E-07	$ 93.64	$ 93.64
4.50	6.0	0.50300	7.56	15.80	25.3	-0.012960244	0.101419804	8.89414E-05	1.87225E-07	$ 101.71	$ 101.71
5.00	-	9.49000	199.00	454.00	768.0	-2.639988816	2.357830483	0.007642948	-7.55576E-07	$ -	$ -
5.00	0.5	2.90000	46.00	97.40	158.0	-0.196291046	0.609342393	0.000662657	1.24412E-06	$ 17.71	$ 17.71
5.00	1	1.76000	27.20	57.00	92.2	-0.053032837	0.360286538	0.000369179	6.79715E-07	$ 20.14	$ 20.14
5.00	1.5	1.32000	20.10	42.10	68.0	-0.011601795	0.264789648	0.00029262	4.18753E-07	$ 27.40	$ 27.40
5.00	2	1.08000	16.40	34.20	55.1	-0.01265856	0.21749832	0.000216256	3.70202E-07	$ 42.88	$ 42.88
5.00	2.5	0.90700	13.70	28.70	46.2	-0.007263697	0.180986356	0.000196493	2.70976E-07	$ 47.73	$ 47.73
5.00	3	0.80600	12.20	25.40	40.9	-0.010080447	0.162440232	0.000150235	3.01623E-07	$ 56.00	$ 56.00
5.00	3.5	0.73100	11.00	23.00	37.1	0.009459835	0.143922177	0.000172879	1.7266E-07	$ 64.28	$ 64.28
5.00	4	0.66100	9.97	20.80	33.5	0.003031589	0.13119868	0.000146122	1.75694E-07	$ 72.56	$ 72.56
5.00	4.5	0.61700	9.29	19.40	31.2	-0.00033867	0.122636918	0.000132737	1.70839E-07	$ 80.83	$ 80.83
5.00	5	0.58100	8.74	18.20	29.3	0.000947708	0.11564264	0.000117798	1.81763E-07	$ 89.11	$ 89.11
5.00	5.5	0.55200	8.31	17.30	27.9	0.007803212	0.109042265	0.00012328	1.42012E-07	$ 97.39	$ 97.39
5.00	6	0.52700	7.92	16.50	26.6	0.004502477	0.104374439	0.000111663	1.55667E-07	$ 105.66	$ 105.66
6.00	-	11.20000	234.00	535.00	905.0	-3.089098121	2.76905087	0.009072892	-9.71021E-07	$ -	$ -
6.00	0.5	3.53000	56.30	119.00	194.0	-0.157084076	0.734636301	0.000932785	1.23502E-06	$ 19.84	$ 19.84
6.00	1	2.09000	32.20	67.70	109.0	-0.121710644	0.433383727	0.000363801	1.0044E-06	$ 21.37	$ 21.37
6.00	1.5	1.54000	23.50	49.20	79.4	-0.022131998	0.310347443	0.000333273	5.03717E-07	$ 28.93	$ 28.93
6.00	2	1.22000	18.50	38.70	62.3	-0.020105599	0.245575785	0.000246973	4.18753E-07	$ 44.19	$ 44.19
6.00	2.5	1.04000	15.80	32.90	53.1	-0.000477794	0.208296595	0.000221042	3.21651E-07	$ 48.74	$ 48.74
6.00	3	0.92000	13.90	29.00	46.7	-0.005274985	0.184050762	0.000187932	2.97375E-07	$ 56.80	$ 56.80
6.00	3.5	0.81000	12.20	25.50	41.0	-0.00868535	0.162037302	0.00016146	2.70065E-07	$ 64.86	$ 64.86
6.00	4	0.74500	11.20	23.40	37.7	0.0052322	0.14727491	0.000166165	1.98756E-07	$ 72.92	$ 72.92
6.00	4.5	0.69200	10.40	21.70	35.0	0.008414695	0.136532068	0.000154933	1.84494E-07	$ 80.98	$ 80.98
6.00	5	0.64500	9.70	20.20	32.5	-0.003800897	0.129017112	0.000121754	2.291E-07	$ 89.04	$ 89.04
6.00	5.5	0.61600	9.27	19.30	31.1	0.003054607	0.122416737	0.000127236	1.89349E-07	$ 97.10	$ 97.10
6.00	6	0.58600	8.82	18.40	29.6	0.000251824	0.116509114	0.000123835	1.68108E-07	$ 105.16	$ 105.16
7.00	-	12.70000	267.00	611.00	1034.0	-3.557321022	3.151328652	0.010491384	-1.42619E-06	$ -	$ -
7.00	0.5	4.01000	64.00	136.00	221.0	-0.221965798	0.835039664	0.001116074	1.21074E-06	$ 39.14	$ 39.14
7.00	1	2.43000	37.60	79.00	128.0	-0.014918785	0.488496326	0.000649086	5.37096E-07	$ 43.13	$ 43.13
7.00	1.5	1.68000	25.60	53.60	86.5	-0.009360557	0.336258318	0.000389024	4.61235E-07	$ 47.13	$ 47.13
7.00	2	1.36000	20.70	43.20	69.6	-0.033502308	0.27642001	0.000247584	5.58337E-07	$ 51.12	$ 51.12
7.00	2.5	1.16000	17.60	36.60	59.1	0.001981143	0.232222078	0.000240172	3.76271E-07	$ 55.11	$ 55.11
7.00	3	0.98900	15.00	31.20	50.2	-0.015148371	0.199941099	0.000182163	3.67471E-07	$ 59.11	$ 59.11
7.00	3.5	0.89400	13.50	28.10	45.3	-0.001621224	0.178819711	0.000177095	3.05265E-07	$ 63.10	$ 63.10
7.00	4	0.82000	12.40	25.80	41.5	-0.005709344	0.16455708	0.000161337	2.67031E-07	$ 67.10	$ 67.10
7.00	4.5	0.76000	11.40	23.90	38.4	-0.005211782	0.150915968	0.000161298	2.24549E-07	$ 71.09	$ 71.09
7.00	5	0.71100	10.70	22.30	35.9	-0.002284492	0.141919013	0.000140094	2.39417E-07	$ 75.08	$ 75.08
7.00	5.5	0.67400	10.20	21.20	34.0	-0.01884445	0.1372366	0.000108482	2.80989E-07	$ 79.08	$ 79.08
7.00	6	0.63900	9.62	20.00	32.3	0.010120892	0.126339023	0.000138448	1.8237E-07	$ 83.07	$ 83.07
8.00	-	14.30000	300.00	687.00	1163.0	-3.915141427	3.531162624	0.011925548	-1.9117E-06	$ -	$ -
8.00	0.5	4.56000	72.80	155.00	252.0	-0.236558424	0.945864274	0.001334781	1.22591E-06	$ 44.73	$ 44.73
8.00	1	2.60000	40.20	84.50	137.0	-0.006213668	0.521114507	0.000708629	5.46199E-07	$ 49.29	$ 49.29
8.00	1.5	1.86000	28.40	59.40	95.9	-0.02920684	0.375704099	0.000389921	6.4937E-07	$ 53.86	$ 53.86
8.00	2	1.50000	22.80	47.70	76.9	-0.00512257	0.29957171	0.000345731	3.94477E-07	$ 58.42	$ 58.42
8.00	2.5	1.23000	18.60	38.90	62.6	-0.012458287	0.246251924	0.000257448	3.85374E-07	$ 62.99	$ 62.99
8.00	3	1.08000	16.40	34.20	55.1	-0.008359191	0.216880378	0.000225164	3.39857E-07	$ 67.55	$ 67.55
8.00	3.5	0.97700	14.80	30.80	49.5	-0.018743247	0.197757602	0.000175211	3.71112E-07	$ 72.12	$ 72.12
8.00	4	0.89400	13.50	28.10	45.3	0.002678146	0.178201769	0.000186003	2.7492E-07	$ 76.68	$ 76.68
8.00	4.5	0.82700	12.50	26.00	41.8	-0.009972846	0.166542417	0.000153526	2.95251E-07	$ 81.24	$ 81.24
8.00	5	0.77200	11.60	24.20	39.0	0.005703466	0.1527867	0.00016656	2.20907E-07	$ 85.81	$ 85.81
8.00	5.5	0.73100	11.00	22.90	36.9	0.002450276	0.145445467	0.0001483	2.33349E-07	$ 90.37	$ 90.37
8.00	6	0.69300	10.40	21.70	35.0	0.00951872	0.136507629	0.00015509	1.84191E-07	$ 94.94	$ 94.94
9.00	-	15.90000	333.00	762.00	1291.0	-4.285745497	3.9202278	0.01316464	-1.79032E-06	$ -	$ -
9.00	0.5	4.69000	74.60	158.00	257.0	-0.244902009	0.977189783	0.001212621	1.67198E-06	$ 50.32	$ 50.32
9.00	1	2.85000	44.00	92.40	150.0	0.004233045	0.570310272	0.000765362	6.52405E-07	$ 55.46	$ 55.46

9.00	1.5	2.04000	31.20	65.20	105.0	-0.049049223	0.414478618	0.000411236	7.16128E-07	$ 60.59	$ 60.59
9.00	2	1.57000	23.80	49.70	80.2	-0.0047678	0.313916921	0.000336283	4.94614E-07	$ 65.73	$ 65.73
9.00	2.5	1.34000	20.30	42.40	68.3	-0.009047922	0.268265384	0.00028392	4.12684E-07	$ 70.86	$ 70.86
9.00	3	1.18000	17.80	37.20	59.9	-0.005963717	0.235435767	0.000246687	3.70202E-07	$ 76.00	$ 76.00
9.00	3.5	1.06000	16.00	33.40	53.8	-0.001102282	0.21119752	0.000225866	3.15582E-07	$ 81.13	$ 81.13
9.00	4	0.96800	14.60	30.50	49.0	-0.01201649	0.193977502	0.000193308	3.13154E-07	$ 86.27	$ 86.27
9.00	4.5	0.89300	13.50	28.10	45.2	-0.004157071	0.178826376	0.000180774	2.75224E-07	$ 91.40	$ 91.40
9.00	5	0.83300	12.50	26.20	42.1	-0.00365951	0.165185263	0.000180735	2.32742E-07	$ 96.53	$ 96.53
9.00	5.5	0.78800	11.90	24.70	39.8	0.003311945	0.157316254	0.000158468	2.46397E-07	$ 101.67	$ 101.67
9.00	6	0.75100	11.30	23.60	37.9	-0.005866519	0.149884854	0.000153125	2.2728E-07	$ 106.80	$ 106.80
10.00	-	17.70000	370.00	847.00	1435.0	-4.775020482	4.360195721	0.014570323	-1.72963E-06	$ -	$ -
10.00	0.5	5.68000	91.00	193.00	315.0	-0.230640224	1.17751696	0.001668431	1.61432E-06	$ 55.91	$ 55.91
10.00	1	3.35000	51.90	109.00	177.0	-0.044118603	0.678250536	0.000823688	1.04688E-06	$ 61.62	$ 61.62
10.00	1.5	2.18000	33.30	69.60	112.0	-0.093601405	0.448404968	0.000355017	1.03778E-06	$ 67.32	$ 67.32
10.00	2	1.76000	26.80	56.00	90.2	-0.050608752	0.358344062	0.00031755	7.40404E-07	$ 73.03	$ 73.03
10.00	2.5	1.49000	22.60	47.30	76.2	-0.006509396	0.297339337	0.000339092	3.97512E-07	$ 78.73	$ 78.73
10.00	3	1.31000	19.80	41.30	66.5	-0.007849145	0.262193792	0.000267384	4.21787E-07	$ 84.44	$ 84.44
10.00	3.5	1.17000	17.70	36.90	59.4	-0.007722479	0.234429092	0.000238358	3.73236E-07	$ 90.14	$ 90.14
10.00	4	1.06000	16.10	33.50	53.9	-0.015804149	0.214259271	0.000201287	3.76271E-07	$ 95.85	$ 95.85
10.00	4.5	0.97800	14.70	30.70	49.5	0.007093205	0.193453302	0.000213927	2.79775E-07	$ 101.56	$ 101.56
10.00	5	0.91000	13.70	28.60	46.0	-0.002362442	0.181200446	0.000190201	2.70065E-07	$ 107.26	$ 107.26
10.00	5.5	0.85900	12.90	27.00	43.4	-0.004292269	0.170721493	0.000180973	2.55196E-07	$ 112.97	$ 112.97
10.00	6	0.81000	12.20	25.40	40.9	0.002934391	0.161106596	0.000168678	2.39721E-07	$ 118.67	$ 118.67
12.00	-	20.80000	435.00	997.00	1691.0	-5.466828793	5.10092117	0.017473698	-2.67031E-06	$ -	$ -
12.00	0.5	6.02000	95.60	203.00	330.0	-0.253354835	1.241314563	0.001737707	1.57184E-06	$ 67.10	$ 67.10
12.00	1	3.51000	54.10	114.00	184.0	-0.10928747	0.713735288	0.000813128	1.11971E-06	$ 73.94	$ 73.94
12.00	1.5	2.53000	38.60	80.80	130.0	-0.098635542	0.517971801	0.000442636	1.11364E-06	$ 80.79	$ 80.79
12.00	2	2.04000	30.90	64.70	104.0	-0.061952533	0.413848105	0.00036715	8.37506E-07	$ 87.63	$ 87.63
12.00	2.5	1.72000	26.10	54.40	87.7	-0.02054776	0.346655396	0.00033339	6.31164E-07	$ 94.48	$ 94.48
12.00	3	1.50000	22.70	47.30	76.3	0.01147929	0.29800789	0.000337278	3.94477E-07	$ 101.33	$ 101.33
12.00	3.5	1.34000	20.20	42.10	67.9	0.005964757	0.266414158	0.000282229	4.12684E-07	$ 108.17	$ 108.17
12.00	4	1.21000	18.30	38.20	61.4	-0.015603875	0.243012875	0.00024248	3.91443E-07	$ 115.02	$ 115.02
12.00	4.5	1.11000	16.80	34.90	56.2	-0.007286039	0.223224202	0.000210358	3.91443E-07	$ 121.87	$ 121.87
12.00	5	1.03000	15.50	32.40	52.1	-0.007223877	0.205438693	0.000211022	3.24685E-07	$ 128.71	$ 128.71
12.00	5.5	0.97200	14.60	30.50	49.1	0.002430171	0.192661638	0.000207915	2.81596E-07	$ 135.56	$ 135.56
12.00	6	0.91400	13.80	28.70	46.1	-0.012648209	0.184164445	0.000166249	3.2954E-07	$ 142.41	$ 142.41

Table 7: Measure Lives

Hot Water Boilers (Non Condensing)	Product Life (yrs)	Source of Information
Hot Water Boiler - Non-condensing 175 MBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 500 MBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 1MMBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 2 MMBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 4 MMBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 6 MMBTUH	20	Reference 3
Hot Water Boiler - Non-condensing 8, MMBTUH	20	Reference 3
Hot Water Boilers (Condensing)		
Hot Water Boiler - Condensing 175 MBTUH	20	Reference 3
Hot Water Boiler - Condensing 500 MBTUH	20	Reference 3
Hot Water Boiler - Condensing 1 MMBTUH	20	Reference 3
Hot Water Boiler - Condensing 2 MMBTUH	20	Reference 3
Hot Water Boiler - Condensing 4 MMBTUH	20	Reference 3
Hot Water Boiler - Condensing 6 MMBTUH	20	Reference 3
Hot Water Boiler - Condensing 8 MMBTUH	20	Reference 3
Low Pressure Steam Boilers		
Low Pressure Steam Boiler - 300 MBTUH	20	Reference 3
Low Pressure Steam Boiler - 1 MMBTUH	20	Reference 3
Low Pressure Steam Boiler - 10 MMBTUH	20	Reference 3
High Pressure Steam Boilers		
High Pressure Steam Boiler - 300 MBTUH	20	Reference 3
High Pressure Steam Boiler - 1 MMBTUH	20	Reference 3
High Pressure Steam Boiler - 10 MMBTUH	20	Reference 3
Custom Boiler		
Heating System Optimization Custom Measures	20	Set equal to prescriptive boiler life
Other Custom Boiler Measures	20	Set equal to prescriptive boiler life
Boiler Tune up		
Gas Boiler less than or equal to 300 MBTUH (assumed an average of 1-HW boiler at 80% eff, 250 MBTUH, 1-LP steam boiler at 80% eff, 250 MBTUH, 1-HP steam boiler at 80% eff, 250 MBTUH)	2	D.O.E
Gas Boiler greater than 300 MBTUH or less than 1 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 540 MBTUH, 1-LP steam boiler at 80% eff, 540 MBTUH, 1-HP steam boiler at 80% eff, 540 MBTUH)	2	D.O.E
Gas Boiler greater than or equal to 1 MMBTUH less than 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 2.2 MMBTUH, 1-LP steam boiler at 80% eff, 2.2 MMBTUH, 1-HP steam boiler at 80% eff, 2.2 MMBTUH)	2	D.O.E
Gas Boiler greater than or equal to 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 20 MMBTUH, 1-LP steam boiler at 80% eff, 20 MMBTUH, 1-HP steam boiler at 80% eff, 20 MMBTUH)	2	D.O.E
Outdoor Air Reset		
Gas Boiler less than or equal to 300 MBTUH (assumed an average of 1-HW boiler at 80% eff, 250 MBTUH, 1-LP steam boiler at 80% eff, 250 MBTUH, 1-HP steam boiler at 80% eff, 250 MBTUH)	20	2011 Tetratech Program Evaluation
Gas Boiler greater than 300 MBTUH or less than 1 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 540 MBTUH, 1-LP steam boiler at 80% eff, 540 MBTUH, 1-HP steam boiler at 80% eff, 540 MBTUH)	20	2011 Tetratech Program Evaluation
Gas Boiler greater than or equal to 1 MMBTUH less than 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 2.2 MMBTUH, 1-LP steam boiler at 80% eff, 2.2 MMBTUH, 1-HP steam boiler at 80% eff, 2.2 MMBTUH)	20	2011 Tetratech Program Evaluation
Gas Boiler greater than or equal to 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 20 MMBTUH, 1-LP steam boiler at 80% eff, 20 MMBTUH, 1-HP steam boiler at 80% eff, 20 MMBTUH)	20	2011 Tetratech Program Evaluation
Stack Dampers		
Gas Boiler less than or equal to 300 MBTUH (assumed an average of 1-HW boiler at 80% eff, 250 MBTUH, 1-LP steam boiler at 80% eff, 250 MBTUH, 1-HP steam boiler at 80% eff, 250 MBTUH)	12	2011 Tetratech Program Evaluation
Gas Boiler greater than 300 MBTUH or less than 1 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 540 MBTUH, 1-LP steam boiler at 80% eff, 540 MBTUH, 1-HP steam boiler at 80% eff, 540 MBTUH)	12	2011 Tetratech Program Evaluation
Gas Boiler greater than or equal to 1 MMBTUH less than 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 2.2 MMBTUH, 1-LP steam boiler at 80% eff, 2.2 MMBTUH, 1-HP steam boiler at 80% eff, 2.2 MMBTUH)	12	2011 Tetratech Program Evaluation
Gas Boiler greater than or equal to 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 20 MMBTUH, 1-LP steam boiler at 80% eff, 20 MMBTUH, 1-HP steam boiler at 80% eff, 20 MMBTUH)	12	2011 Tetratech Program Evaluation

Modulating Burners		
Gas Boiler less than or equal to 300 MBTUH (assumed an average of 1-HW boiler at 80% eff, 250 MBTUH, 1-LP steam boiler at 80% eff, 250 MBTUH, 1-HP steam boiler at 80% eff, 250 MBTUH)	20	Reference 3
Gas Boiler greater than 300 MBTUH or less than 1 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 540 MBTUH, 1-LP steam boiler at 80% eff, 540 MBTUH, 1-HP steam boiler at 80% eff, 540 MBTUH)	20	Reference 3
Gas Boiler greater than or equal to 1 MMBTUH less than 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 2.2 MMBTUH, 1-LP steam boiler at 80% eff, 2.2 MMBTUH, 1-HP steam boiler at 80% eff, 2.2 MMBTUH)	20	Reference 3
Gas Boiler greater than or equal to 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 20 MMBTUH, 1-LP steam boiler at 80% eff, 20 MMBTUH, 1-HP steam boiler at 80% eff, 20 MMBTUH)	20	Reference 3
Turbulators		
Gas Boiler less than or equal to 300 MBTUH (assumed an average of 1-HW boiler at 80% eff, 250 MBTUH, 1-LP steam boiler at 80% eff, 250 MBTUH, 1-HP steam boiler at 80% eff, 250 MBTUH)	20	Reference 3
Gas Boiler greater than 300 MBTUH or less than 1 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 540 MBTUH, 1-LP steam boiler at 80% eff, 540 MBTUH, 1-HP steam boiler at 80% eff, 540 MBTUH)	20	Reference 3
Gas Boiler greater than or equal to 1 MMBTUH less than 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 2.2 MMBTUH, 1-LP steam boiler at 80% eff, 2.2 MMBTUH, 1-HP steam boiler at 80% eff, 2.2 MMBTUH)	20	Reference 3
Gas Boiler greater than or equal to 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 20 MMBTUH, 1-LP steam boiler at 80% eff, 20 MMBTUH, 1-HP steam boiler at 80% eff, 20 MMBTUH)	20	Reference 3
O2 Trim Control		
Gas Boiler less than or equal to 300 MBTUH (assumed an average of 1-HW boiler at 80% eff, 250 MBTUH, 1-LP steam boiler at 80% eff, 250 MBTUH, 1-HP steam boiler at 80% eff, 250 MBTUH)	20	2011 Tetratech Program Evaluation
Gas Boiler greater than 300 MBTUH or less than 1 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 540 MBTUH, 1-LP steam boiler at 80% eff, 540 MBTUH, 1-HP steam boiler at 80% eff, 540 MBTUH)	20	2011 Tetratech Program Evaluation
Gas Boiler greater than or equal to 1 MMBTUH less than 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 2.2 MMBTUH, 1-LP steam boiler at 80% eff, 2.2 MMBTUH, 1-HP steam boiler at 80% eff, 2.2 MMBTUH)	20	2011 Tetratech Program Evaluation
Gas Boiler greater than or equal to 10 MMBTUH (assumed an average of 1-HW boiler at 80% eff, 20 MMBTUH, 1-LP steam boiler at 80% eff, 20 MMBTUH, 1-HP steam boiler at 80% eff, 20 MMBTUH)	20	2011 Tetratech Program Evaluation
Steam Traps		
Gas Boiler - Steam Traps - Low Pressure - average of 10 and 15 PSI	5	Reference 4
Gas Boiler - Steam Traps - High Pressure - average of 50 PSI and 65 PSI	5	Reference 4
Pipe Insulation		
Insulation - Hot Water System	13	2011 Tetratech Program Evaluation
Insulation - Steam System	13	2011 Tetratech Program Evaluation
Heating System Optimization Study		
Heating System Optimization Study	0	
Implementation - Boiler measures	7	Past Recommissioning projects
Implementation - Steam System measures	7	Past Recommissioning projects
Implementation - Heat Recovery measures	7	Past Recommissioning projects
High Efficiency Furnace	18	Source: Draft Technical Support Document: Energy Conservation Standards for Residential Furnaces and Boilers, Efficiency Standards for Consumer Products: Residential Central Air Conditioners And Heat Pumps, Prepared for US DOE, September 2006.

Product: Lighting Efficiency

Description:

Prescriptive rebates will be offered for replacement lighting equipment. New Construction rebates will be offered for new facilities or spaces overhauled for a new purpose. Prescriptive rebates will be offered for replacement lighting equipment with integral occupancy sensors and photo cells. Custom rebates are available for lighting-related improvements that are not prescriptive.

Algorithms:

Electrical Demand Savings (Customer kW)	= (kW_Base - kW_EE) x HVAC_cooling_kWsavings_factor
Electrical Energy Savings (Customer kWh/yr)	= (kW_Base - kW_EE) x Hrs x HVAC_cooling_kWhsavings_factor
Natural Gas Savings (Dth)	= (kW_Base - kW_EE) x Hrs x HVAC_heating_penalty_factor
Lighting Controls -Electrical Energy Savings (Customer kWh/yr)	=(kW connected) x (1-PAF) x Hrs x HVAC_cooling_kWhsavings_factor
Lighting Controls -Electrical Demand Savings (Customer kW)	=(kW connected) x (1-PAF) x HVAC_cooling_kWsavings_factor
Lighting Controls -Natural Gas Savings (Dth)	=(kW connected) x (1-PAF) x Hrs x HVAC_heating_penalty_factor
Stairwell Fixtures w/Controls -Electrical Energy Savings (Customer kWh/yr)	=(kW_saved) x Hrs x HVAC_cooling_kWhsavings_factor
Stairwell Fixtures w/ Controls -Electrical Demand Savings (Customer kW)	=(kW_saved) x HVAC_cooling_kWsavings_factor
Stairwell Fixtures w/ Controls -Natural Gas Savings (Dth)	=(kW_saved) x Hrs x HVAC_heating_penalty_factor
kW_saved	=kW_Base - kW_EE
Hrs_Base	=Hrs *HVAC_cooling_kWhsavings_factor/HVAC_cooling_kWsavings_factor
Hrs_EE	=Hrs *HVAC_cooling_kWhsavings_factor/HVAC_cooling_kWsavings_factor

Variables:

Hrs	= Annual Operating Hours. Hours to be obtained from Table 2. The type of facility is to be supplied by the customer.
kW_Base	= Baseline fixture wattage (kW per fixture) determined from deemed fixture table.
kW_EE	= High Efficiency fixture wattage (kW per fixture) determined from deemed fixture table
Hrs_full_power	=263 per year
Hrs_dimmed	=8497 per year
kW_saved	=base wattage minus the energy efficient wattage.
HVAC_cooling_kWhsavings_factor	= Cooling system energy savings factor resulting from efficient lighting from Table 1. Reduction in lighting energy results in a reduction in cooling energy, if the customer has air conditioning.
HVAC_cooling_kWsavings_factor	= Cooling system demand savings factor resulting from efficient lighting from Table 1. Reduction in lighting demand results in a reduction in cooling demand, if the customer has air conditioning. Existence of air conditioning to be provided by customer.
HVAC_heating_kWsavings_factor	= Heating system penalty factor resulting from efficient lighting. Reduction in lighting demand results in an increase in heating usage, if the customer has air conditioning. A value of -0.000683 Dth/kWh given by (Reference 4).
CF	= Coincidence Factor, the probability that peak demand of the lights will coincide with peak utility system demand. CF will be determined based on customer provided building type in table 2. CF for Stairwell Fixtures with Occupancy Sensors calculated at 91.7 %
Measure Life	= Length of time the lighting equipment will be operational, see Table 3 for Measure Lifetimes
Baseline Cost	= Cost of the baseline technology. For Retrofit, the cost is 0 since the baseline is to continue to operate the existing system. For New Construction, the cost is given in the deemed fixture table. (Reference 5)
High Efficiency Cost	= Cost of the High Efficiency technology. Costs given in Deemed Fixture Table (Reference 4)
kW connected	Total connected fixture load, determined as the sum of stipulated fixture wattages from Deemed Fixture Table.
PAF	Stipulated power adjustment factor based on control type from Table 4.
Incremental operation and maintenance cost	= Other annual savings or costs associated with the electrical savings. For Lighting, this consists of additional natural gas for heating. Methodology given by (Reference 4).

Inputs:

Number of Fixtures
Lighting equipment type
Building type
Existence of air conditioning
Confirmation equipment is a DesignLights Consortium Qualified Product

Assumptions:

- Each replacement lighting fixture is going in on a one-for-one basis for existing fixtures. New construction fixtures are put in on a one-for-one basis instead of lower efficiency options.
- In the Technical Assumptions, one will note that the Operating Hours does not appear, but rather a modified version. The methodology defines kW Savings on the basis of difference in kW with the HVAC Cooling demand factor. The Annual Energy Savings takes into account any heating that has to be added.
- The control device in question (occupancy sensor, photo cell, or combo) is installed on a 1-for-1 basis per fixture.
- For fixtures with a combination of photo cell and occupancy sensor, it is assumed that half of the occupancy sensor energy savings rate can be applied to the savings realized from a stand-alone photo cell with on/off control.

- Each LED fixture is required to be listed on the DesignLights Consortium Qualified Products list, and therefore must meet their minimum specification.
- We account for lighting level reductions based on custom projects and use the DOE data fact sheet for efficacy of existing fixtures (Reference 10)
- The efficacy ratings and incremental cost for the New Construction baseline fixtures is based on fixtures that meet the DOE CBEA Lighting Troffer Requirement. (Reference 9)

Table 1: HVAC Interactive Factors (Reference 2)

HVAC system	HVAC_cooling_kWhsavings_factor	HVAC_cooling_kW savings_factor
Heating only	1.00	1.00
Heating and cooling	1.11	1.33
Weighted Population Average	1.08	1.25
LED Refrigerated Case Door	1.44	1.44
LEDFreezer Case Door	1.70	1.70

Table 2: Coincident Peak Demand Factors and Annual Operating Hours by Building Type (Reference 1 and 3)

Building Type	CF	Annual Operating Hours
24-Hour Facility	100%	8766
College	81%	3540
Cooler Door Retrofit to LED	87%	8760
Elementary School	71%	2422
Secondary School	58%	4311
Freezer Door Retrofit to LED	87%	8760
Grocery (All) / Big Box Retail (larger than 50,000 SF)	90%	5802
Health	75%	5095
Hospital	75%	6038
Hotel/Motel	21%	3044
Manufacturing	92%	5200
Night Time Exterior	0%	4903
Office	70%	4439
Other/Misc.	66%	4576
Restaurant	80%	3673
Retail	83%	4719
Safety or Code Required (Including Exit Signs)	100%	8760
Traffic Signals	50%	4380
Warehouse	70%	4746
Company Owned Street Lights	0%	4140

Table 3: Measure Lifetimes in Years (Reference 4, 17, 18)

Measure	Lifetime in Years
LED Interior Lamps	8.13
LED Interior Fixtures	20
LED Exterior Fixtures	20
Low Wattage T8 Lamps	4.88
Ballasted CFLs	20
Integrated 25W Ceramic Metal Halide	7
T8 Lighting Systems	20
T5 Lighting Systems	20
Lighting Controls	8
Stairwell Fixtures with Occupancy Sensors	14.4
LED Tubes (Insta-fit type only)	8.13
HID Fixture	20
Low Wattage T8 Lamps (Parking Garages)	4.11
LED High-bay Lamps	8.13

Table 4: Stipulated Power Adjustment Factors (Reference 1 and 7)

Control Type	PAF
no controls	1.00
Occupancy Sensor - Wall Mount	0.70
Occupancy Sensor - Ceiling Mount	0.70
Daylighting - Continuous Dimming	0.57
Daylighting - Multiple Step Dimming	0.65
Daylighting - On/Off	0.73
Daylighting - Occupancy Combo	0.61

Table 5: Coincidence Factors For Traffic Signals (Reference 8)

LED Lamp Type	CF
Red Balls, always changing or flashing	0.55
Red Arrows	0.90
Green Arrows	0.10
Green, always changing or flashing	0.43
Flashing Yellow	0.50
Yellow	0.02
"Hand" Don't Walk Signal	0.75
"Man" walk Signal	0.21

Table 6: Incandescent Lamp Wattages

Year	100W	75W	60W	40W
2017-2019	0.0720	0.0530	0.0430	0.0290

References

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4. Deemed Savings Database, Minnesota Office of Energy Security, 2008. kW, Measure life
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12. LED Fixture measure life based on Xcel Energy Minnesota Lighting Efficiency Program average replacement fixture lifetime
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14. CBEA High-Efficiency Troffer Lighting Specification, DOE Energy Efficiency & Renewable Energy
15. DOE LED Lighting Facts, Recommended Product Performance Scale (Commercial)
16. 2012 Commercial Building Energy Consumption Survey (CBECS)
17. LED Fixture measure life based on Xcel Energy Minnesota Lighting Efficiency Program average replacement fixture lifetime
18. LED lamp lifetimes based on assumption of 50,000 hours of life and dividing that by the annual portfolio hours of operation. 50,000 comes from a survey of manufacturer data sheets on a variety of lamps
19. Schedule SL, Tariff Sheet No. 85; Decision Nos. R15-1251/C15-1318. Hours

Product: Motor & Drive Efficiency

Description:

Prescriptive rebates will be offered for new motors up to 500 HP, replacement of currently operating motors up to 500 HP, installation of new variable frequency drives (VFD) up to 200 HP, installation of new VFD's on previously throttled water well pumps up to 200 HP, and installation of constant speed motor controllers (CSMC) up to 500 HP.

Algorithms:

Motor Electrical Energy Savings (Customer kWh)	= HP x LF_Motors x Conversion x (1/Standard_Eff - 1/ High_Eff) x Hrs x Refrigeration_Factor
Motor Electrical Demand Savings (Customer kW)	= HP x LF_Motors x Conversion x (1/Standard_Eff - 1/ High_Eff) x Refrigeration_Factor
VFD Drive Electrical Energy Savings (Customer kWh)	= HP x LF_Drives x Conversion x (1/Standard_Eff) x Hrs x %_Savings_Drives x Refrigeration_Factor
VFD Drive Electrical Demand Savings (Customer kW)	= HP x LF_Drives x Conversion x (1/Standard_Eff) x %_Savings_Drives x Refrigeration_Factor
CSMC Electrical Energy Savings (Customer kWh)	= HP x kW_per_HP x Hrs
CSMC Electrical Demand Savings (Customer kW)	= HP x kW_per_HP

Water Well Pump VFD Algorithms:

Well Pump VFD Electrical Energy Savings (Customer kWh)	= (Base_kW - VFD_kW) x Well Hours
Well Pump VFD Electrical Demand Savings (Customer kW)	= Base_kW - VFD_kW
VFD_kW	= VFD_BHP / Standard_Eff / VFD_Eff x Conversion
Base_ kW	= Base_BHP / Standard_Eff x Conversion
VFD_BHP	= (Flow x VFD_Head) / (3960 x Design_Pump_Eff)
Base_BHP	= (Flow x Base_Head) / (3960 x Base_Pump_Eff)
Base_Pump_Eff	= -0.40205 x (%_Flow)^2 + 1.00876 x %_Flow + 0.20113
VFD_Head	= Static_Head + Flow_Coeff x (Flow)^2
Base_Head	= %_Design_Head x Design_Head
Static_Head	= %_Flow x (Max_Well_Depth - Average_Well_Depth) + Average_Well_Depth
Flow_Coeff	= Peak_Dynamic_Head / (Design_Flow)^2
%_Design_Head	= -0.11656 x (%_Flow)^2 - 0.34465 x %_Flow + 1.46170
%_Flow	= Flow / Design_Flow
Peak_Dynamic_Head	= Design_Head - Max_Well_Depth

Variables:

Variable ID	Value	Description
Hrs	See Tables 1, 2, & 3	Annual operational hours per year of the motor. Deemed values are used for hours based on the type and use of the motor. The customer provides the following information on the rebate form: HP, industrial/non-industrial, building type, and compressor/pump/fan/other.
LF_Motors	75%	Motor load factor as a percentage.[3]
LF_PumpDrives	75%	Pump drive load factor as a percentage.[5] Excludes water well pump VFD's.
LF_FanDrives	65%	Fan drive load factor as a percentage. [5]
HP	Customer Input	Rated motor horsepower.
High_Eff	See Table 6	Efficiency of high efficiency replacement motor as a percentage. New Enhanced and Upgrade Enhanced are NEMA Premium plus 1%. Upgrade is NEMA Premium. The customer will provide the model and serial number of the motor along with actual nameplate efficiency from the new motor. If the actual efficiency is not provided by the customer, it will be determined from specification sheet.
Standard_Eff	See Table 6	Efficiency of standard replacement motor as a percentage. New Enhanced is NEMA Premium. Upgrade and Upgrade Enhanced are EPACT. Based on customer provided motor size, speed, and enclosure type.
%_Savings_Drives	33%	Average savings achieved by installing a VFD on a fan or pumping motor. [5]
kW_per_HP_Escalator	0.066	Demand savings per HP for CSMC's on escalators.[9, 18]
kW_per_HP_Other	0.016	Demand savings per HP for CSMC's for all other qualifying applications.[7, 8, 9, 10]
Refrigeration_Factor	1+1/COP	Multiplier to include interactive effects of refrigeration or cooling energy to remove heat from the motor. Reduction in motor energy results in a reduction in refrigeration/cooling energy.
COP	See Table 4	Coefficient of Performance = Refrigeration/Cooling Capacity (BTU/hr) / Energy Input (BTU/hr)

Well Pump VFD Variables

Well Hours	See Table 5	Number of hours per year the well pump will operate. Deemed values are used for hours based on the well pump application that will be provided by the customer.
VFD_Eff	97%	Drive efficiency of a VFD, deemed to be 97% using a table of drive efficiency versus percent of rated power using the motor rated power.[13]
3960	3960	Pump power equation constant used to convert units of feet of water and gallons per minute to HP.
Base_Pump_Eff	Calculated	Percent efficiency of the water well pump at a given percent of design flow rate. The algorithm is defined above and comes from a linear regression of a second-order polynomial on pump curve data (normalized to design head and flow) from Xcel well pump custom rebate projects.[14]
Design_Pump_Eff	80.8%	Pumping efficiency at given conditions (%_Flow). This algorithm comes from a second-order polynomial curve fit of acheivable pump efficiency versus flow rate from custom rebates and their associated pump curves. The design pump efficiency is a constant value used at all flow rates for VFD driven pumps.[14]
Design_Flow	Customer Input	Flow rate (in GPM) of well pump at design conditions.
Design_Head	Customer Input	Total head (in feet of water) of well pump at design conditions.
Flow	Customer Input	Flow rate (in GPM) of well pump at proposed operating conditions. If there are multiple flow rates at which the pump will operate, this is the time-weighted average of those flow rates.
Average_Well_Depth	Customer Input	Average water level in well, i.e. vertical distance (in feet), between the pump discharge and the water level.
Max_Well_Depth	Customer Input	Minimum level in well at design flow rate, i.e. how far below the pump discharge the water level is (in feet), when the pump is operating at design flow.
%_Design_Head	Calculated	Percent of design total pump head occuring at a given percent of design flow rate. The algorithm is defined above and comes from a linear regression of a second-order polynomial on pump curve data (normalized to design head and flow) from seven Xcel well pump custom rebate projects.[14]

Other Variables:

Conversion	0.746	Standard constant used to convert from HP to kW.
Coincidence Factor	78%	Probability that peak demand of the motor will coincide with peak utility system demand. Excludes water well pump VFD's.[2]
Coincidence Factor VFD on Well Pump	38%	Probability that peak demand of well pump motor will coincide with peak utility system demand.[14]
Measure Life_Motors	20	Length of time the motor will be operational.[2, 3, 11]
Measure Life_VFD	15	Length of time the VFD will be operational.[3, 11] Includes water well pump VFD's.
Measure Life_CSMC	20	Length of time the controller will be operational.[2, 11]
Incremental O&M Costs or Savings	$0.00	
Incremental Cost_Motors	See Table 6	
Incremental Cost_VFD	See Table 7	All VFD's including water well pumps.
Incremental Cost_CSMC	See Table 3	

Inputs provided by customer:	**Verified during M&V:**
For Motors:	
New motor model and serial number (HP, efficiency, type, and speed can then be looked up in a database)	Yes
Application of motor (Industrial/non-industrial)	Yes
Building type where motor is installed for non-industrial motors	Yes
Use of motor (pump, fan, other) for non-industrial motors	Yes
Equipment is installed	Yes
For VFD's:	
Size, speed, type and use of motor drive is connected to (if speed & enclosure information is not available we will deem 1800 RPM, and the average between TEFC and ODP for the given motor HP)	Yes
Application of motor (Industrial/non-industrial)	Yes
Building type where motor is installed for non-industrial motors	Yes
Use of motor (pump, fan, other) for non-industrial motors	Yes
Equipment is installed	Yes
For Constant Speed Motor Controllers:	
Size of motor	Yes
Application of motor (Escalator/Other that qualify)	Yes
For Well Pump Variable Frequency Drives (VFD):	
Pump Rated HP	Yes
Design Flow (GPM)	Yes
Design Head (ft)	Yes
Well Depth (ft)	No
Max Well Depth at design flow (ft)	No
Average Flow Rate (GPM)	No
Application of well pump (agriculture, golf course, municipal, etc.)	Yes

Assumptions:

- Each motor is replaced with the same size on a 1 for 1 basis. Motors replaced with different sizes can participate in the Custom Efficiency product.
- Prescriptive rebates are only given for motors put into service, rebates are not given for backup motors.
- Prescriptive rebates are only given to VFD's installed on centrifugal pump or fan applications.
- Rebates do not apply to rewound or repaired motors.
- Constant speed motor controllers are only eligible if installed on escalators, or industrial/commercial applications that cannot be shut of or slowed down during normal business operation, and operate at a load factor of less than 20% more than 65% of the time.
- COP for Low Temperature Applications and Medium Temperature Applications are from our anti-sweat heater projects, EC Motor custom projects, and are consistent with custom projects from various custom refrigeration applications.
- COP for Data Center Applications based on custom projects from various custom data center applications.

Well Pump VFD Assumptions:

- Existing system is controlled by a throttling valve.
- Pump efficiency for the proposed VFD case is constant at all flows and equal to the design pump efficiency. The baseline pump efficiency depends on flow rate.
- Static head varies linearly with flow rate and ranges from static water level to max well depth.
- Backup well pumps do not qualify, only primary pumps.
- On-Peak operation (pump will operate below 100% speed during 9a-9p, M-F in summer).

Table 1: Operating Hours by Motor Size, Industrial Applications[5]

HP	Fans	Pumps	Air Compressor	Other
1	4,550	3,380	1,257	2,435
1.5	4,550	3,380	1,257	2,435
2	4,550	3,380	1,257	2,435
3	4,550	3,380	1,257	2,435
5	4,550	3,380	1,257	2,435
7.5	4,316	4,121	2,131	2,939
10	4,316	4,121	2,131	2,939
15	4,316	4,121	2,131	2,939
20	4,316	4,121	2,131	2,939
25	5,101	4,889	3,528	3,488
30	5,101	4,889	3,528	3,488
40	5,101	4,889	3,528	3,488
50	5,101	4,889	3,528	3,488
60	6,151	5,667	4,520	5,079
75	6,151	5,667	4,520	5,079
100	6,151	5,667	4,520	5,079
125	5,964	5,126	4,685	5,137
150	5,964	5,126	4,685	5,137
200	5,964	5,126	4,685	5,137
250	7,044	5,968	6,148	6,102
300	7,044	5,968	6,148	6,102
350	7,044	5,968	6,148	6,102
400	7,044	5,968	6,148	6,102
450	7,044	5,968	6,148	6,102
500	7,044	5,968	6,148	6,102

Table 2: Operating Hours by Application for all products other than motor controllers. Non-Industrial[3]

Building Type	Operating Hours
Office HVAC Pump	2,000
Retail HVAC Pump	2,000
Hospitals HVAC Pump	2,754
Elem/Sec Schools HVAC Pump	2,190
Restaurant HVAC Pump	2,000
Warehouse HVAC Pump	2,241
Hotels/Motels HVAC Pump	4,231
Grocery HVAC Pump	2,080
Health HVAC Pump	2,559
College/Univ HVAC Pump	3,641
Office Ventilation Fan	6,192
Retail Ventilation Fan	3,261
Hospitals Ventilation Fan	8,374
Elem/Sec Schools Ventilation Fan	3,699
Restaurant Ventilation Fan	4,155
Warehouse Ventilation Fan	6,389
Hotels/Motels Ventilation Fan	3,719
Grocery Ventilation Fan	6,389
Health Ventilation Fan	2,000
College/Univ Ventilation Fan	3,631
Office Other Application	4,500
Retail Other Application	4,500
Hospitals Other Application	4,500
Elem/Sec Schools Other Application	4,500
Restaurant Other Application	4,500
Warehouse Other Application	4,500
Hotels/Motels Other Application	4,500
Grocery Other Application	4,500
Health Other Application	4,500
College/Univ Other Application	4,500
Data Center Pump	8,760
Data Center Fan	8,760
Low Temperature Case Fan	8,629
Medium Temperature Case Fan	8,629

Table 3: Operating Hours & Incremental Cost for Motor Controllers by Application, Non-Industrial[10]

Building Type & Motor Application	Escalator	Industrial	Incremental Cost
5	4,500	2,435	$918
7.5	4,500	2,939	$918
10	4,500	2,939	$918
15	4,500	2,939	$918
20	4,500	2,939	$933
25	4,500	3,488	$1,012
30	4,500	3,488	$1,091
40	4,500	3,488	$1,300
50	4,500	3,488	$1,497
60	4,500	5,079	$1,796
75	4,500	5,079	$1,943
100	4,500	5,079	$2,389
125	4,500	5,137	$3,087
150	4,500	5,137	$3,784
200	4,500	5,137	$4,555
250	4,500	6,102	$4,655
300	4,500	6,102	$4,755
350	4,500	6,102	$4,855
400	4,500	6,102	$4,955
450	4,500	6,102	$5,055
500	4,500	6,102	$5,155

Table 4: Coefficient of Performance

Application	COP
Low Temperature	1.43
Medium Temperature	2.28
Data Center	4.00

Table 5: Operating Hours by Application for Well Pumps[14, 15, 16, 17]

Application	Operating Hours
Agricultural Irrigation	1,954
Golf & Landscape Irrigation	1,941
Municipal Water Supply	3,177
Other Water Well Pump	3,630

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3. Efficiency Vermont's Technical Reference User Manual, 2004 - Source for operating hours for non-industrial motors (p.15) and source for measure life, source for load factor
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24. RS Mean 2016 Cost Data Book

Stipulated Values

Load Factor[3]	75%
Conversion	0.746
Coincidence Factor[2]	78%
Measure Life New Motors[2, 3, 5]	20
Measure Life Upgrade Motor[2, 3, 5]	20

(1 HP = .746 kW)

Motor Efficiencies

The motor efficiencies listed in this table are derived from the NEMA Premium motor efficiency requirements or the most recent federal standards. NEMA premium +1% efficiencies are calcualted by adding 1% to typical NEMA premium efficiency levels. Orange highlighted motor efficiencies were not specifically specified in the standards, and were calculated by extrapolating the highest defined efficiency in a manner consistent with the other RPM categories of that motor class.

Table 6: Motor Efficiency and Incremental Costs [1, 19, 20]

Motor Tag	HP	Speed	Type	EPACT Motor Efficiency	NEMA Premium Motor Efficiency	NEMA Premium +1% Motor Efficiency	NEMA Premium Installed Cost	NEMA Premium +1% Installed Cost
1 HP 900 RPM ODP	1	900	ODP	74.0%	75.5%	76.5%	$716	$864
1.5 HP 900 RPM ODP	1.5	900	ODP	75.5%	77.0%	78.0%	$829	$1,023
2 HP 900 RPM ODP	2	900	ODP	85.5%	86.5%	87.5%	$941	$1,182
3 HP 900 RPM ODP	3	900	ODP	86.5%	87.5%	88.5%	$1,105	$1,414
5 HP 900 RPM ODP	5	900	ODP	87.5%	88.5%	89.5%	$1,315	$1,711
7.5 HP 900 RPM ODP	7.5	900	ODP	88.5%	89.5%	90.5%	$1,576	$2,079
10 HP 900 RPM ODP	10	900	ODP	89.5%	90.2%	91.2%	$1,802	$2,399
15 HP 900 RPM ODP	15	900	ODP	89.5%	90.2%	91.2%	$2,975	$3,760
20 HP 900 RPM ODP	20	900	ODP	90.2%	91.0%	92.0%	$3,322	$4,252
25 HP 900 RPM ODP	25	900	ODP	90.2%	91.0%	92.0%	$3,736	$4,837
30 HP 900 RPM ODP	30	900	ODP	91.0%	91.7%	92.7%	$4,066	$5,304
40 HP 900 RPM ODP	40	900	ODP	91.0%	91.7%	92.7%	$4,727	$6,238
50 HP 900 RPM ODP	50	900	ODP	91.7%	92.4%	93.4%	$5,424	$7,225
60 HP 900 RPM ODP	60	900	ODP	92.4%	93.0%	94.0%	$6,117	$8,206
75 HP 900 RPM ODP	75	900	ODP	93.6%	94.1%	95.1%	$7,139	$9,651
100 HP 900 RPM ODP	100	900	ODP	93.6%	94.1%	95.1%	$10,345	$13,887
125 HP 900 RPM ODP	125	900	ODP	93.6%	94.1%	95.1%	$10,673	$14,351
150 HP 900 RPM ODP	150	900	ODP	93.6%	94.1%	95.1%	$11,811	$15,960
200 HP 900 RPM ODP	200	900	ODP	93.6%	94.1%	95.1%	$20,313	$27,988
250 HP 900 RPM ODP	250	900	ODP	94.5%	95.0%	96.0%	$33,680	$46,895
300 HP 900 RPM ODP	300	900	ODP	94.5%	95.0%	96.0%	$39,812	$55,569
350 HP 900 RPM ODP	350	900	ODP	94.5%	95.0%	96.0%	$51,565	$72,195
400 HP 900 RPM ODP	400	900	ODP	94.9%	95.1%	96.1%	$54,579	$76,458
450 HP 900 RPM ODP	450	900	ODP	95.3%	95.5%	96.5%	$67,037	$94,081
500 HP 900 RPM ODP	500	900	ODP	95.3%	95.5%	96.5%	$70,242	$98,614
1 HP 1200 RPM ODP	1	1200	ODP	80.0%	82.5%	83.5%	$724	$874
1.5 HP 1200 RPM ODP	1.5	1200	ODP	84.0%	86.5%	87.5%	$759	$924
2 HP 1200 RPM ODP	2	1200	ODP	85.5%	87.5%	88.5%	$784	$960
3 HP 1200 RPM ODP	3	1200	ODP	86.5%	88.5%	89.5%	$900	$1,123
5 HP 1200 RPM ODP	5	1200	ODP	87.5%	89.5%	90.5%	$1,068	$1,361
7.5 HP 1200 RPM ODP	7.5	1200	ODP	88.5%	90.2%	91.2%	$1,230	$1,590
10 HP 1200 RPM ODP	10	1200	ODP	90.2%	91.7%	92.7%	$1,491	$1,960
15 HP 1200 RPM ODP	15	1200	ODP	90.2%	91.7%	92.7%	$2,569	$3,186
20 HP 1200 RPM ODP	20	1200	ODP	91.0%	92.4%	93.4%	$2,893	$3,645
25 HP 1200 RPM ODP	25	1200	ODP	91.7%	93.0%	94.0%	$3,183	$4,055
30 HP 1200 RPM ODP	30	1200	ODP	92.4%	93.6%	94.6%	$3,364	$4,311
40 HP 1200 RPM ODP	40	1200	ODP	93.0%	94.1%	95.1%	$4,411	$5,792
50 HP 1200 RPM ODP	50	1200	ODP	93.0%	94.1%	95.1%	$4,970	$6,583
60 HP 1200 RPM ODP	60	1200	ODP	93.6%	94.5%	95.5%	$5,788	$7,739
75 HP 1200 RPM ODP	75	1200	ODP	93.6%	94.5%	95.5%	$6,601	$8,890
100 HP 1200 RPM ODP	100	1200	ODP	94.1%	95.0%	96.0%	$8,077	$10,679
125 HP 1200 RPM ODP	125	1200	ODP	94.1%	95.0%	96.0%	$8,579	$11,390
150 HP 1200 RPM ODP	150	1200	ODP	94.5%	95.4%	96.4%	$10,301	$13,825
200 HP 1200 RPM ODP	200	1200	ODP	94.5%	95.4%	96.4%	$12,974	$17,606
250 HP 1200 RPM ODP	250	1200	ODP	95.4%	95.8%	96.8%	$18,016	$24,739
300 HP 1200 RPM ODP	300	1200	ODP	95.4%	95.8%	96.8%	$18,737	$25,758
350 HP 1200 RPM ODP	350	1200	ODP	95.4%	95.8%	96.8%	$34,782	$48,454
400 HP 1200 RPM ODP	400	1200	ODP	95.8%	95.9%	96.9%	$37,372	$52,118
450 HP 1200 RPM ODP	450	1200	ODP	96.2%	96.3%	97.3%	$39,216	$54,726
500 HP 1200 RPM ODP	500	1200	ODP	96.2%	96.3%	97.3%	$40,963	$57,198
1 HP 1800 RPM ODP	1	1800	ODP	82.5%	85.5%	86.5%	$677	$809
1.5 HP 1800 RPM ODP	1.5	1800	ODP	84.0%	86.5%	87.5%	$722	$872
2 HP 1800 RPM ODP	2	1800	ODP	84.0%	86.5%	87.5%	$720	$869
3 HP 1800 RPM ODP	3	1800	ODP	86.5%	89.5%	90.5%	$746	$905
5 HP 1800 RPM ODP	5	1800	ODP	87.5%	89.5%	90.5%	$780	$954
7.5 HP 1800 RPM ODP	7.5	1800	ODP	88.5%	91.0%	92.0%	$975	$1,231
10 HP 1800 RPM ODP	10	1800	ODP	89.5%	91.7%	92.7%	$1,107	$1,416
15 HP 1800 RPM ODP	15	1800	ODP	91.0%	93.0%	94.0%	$2,092	$2,511
20 HP 1800 RPM ODP	20	1800	ODP	91.0%	93.0%	94.0%	$2,297	$2,802
25 HP 1800 RPM ODP	25	1800	ODP	91.7%	93.6%	94.6%	$2,560	$3,173
30 HP 1800 RPM ODP	30	1800	ODP	92.4%	94.1%	95.1%	$2,755	$3,449

Table 6: Motor Efficiency and Incremental Costs [1, 19, 20]

Motor Tag	HP	Speed	Type	EPACT Motor Efficiency	NEMA Premium Motor Efficiency	NEMA Premium +1% Motor Efficiency	NEMA Premium Installed Cost	NEMA Premium +1% Installed Cost
40 HP 1800 RPM ODP	40	1800	ODP	93.0%	94.1%	95.1%	$3,116	$3,961
50 HP 1800 RPM ODP	50	1800	ODP	93.0%	94.5%	95.5%	$3,381	$4,336
60 HP 1800 RPM ODP	60	1800	ODP	93.6%	95.0%	96.0%	$4,086	$5,332
75 HP 1800 RPM ODP	75	1800	ODP	94.1%	95.0%	96.0%	$4,714	$6,221
100 HP 1800 RPM ODP	100	1800	ODP	94.1%	95.4%	96.4%	$6,071	$7,841
125 HP 1800 RPM ODP	125	1800	ODP	94.5%	95.4%	96.4%	$7,227	$9,477
150 HP 1800 RPM ODP	150	1800	ODP	95.0%	95.8%	96.8%	$8,301	$10,996
200 HP 1800 RPM ODP	200	1800	ODP	95.0%	95.8%	96.8%	$9,924	$13,292
250 HP 1800 RPM ODP	250	1800	ODP	95.4%	95.8%	96.8%	$10,946	$14,738
300 HP 1800 RPM ODP	300	1800	ODP	95.4%	95.8%	96.8%	$14,796	$20,183
350 HP 1800 RPM ODP	350	1800	ODP	95.4%	95.8%	96.8%	$20,306	$27,977
400 HP 1800 RPM ODP	400	1800	ODP	95.4%	95.8%	96.8%	$21,129	$29,141
450 HP 1800 RPM ODP	450	1800	ODP	95.8%	96.2%	97.2%	$23,659	$32,721
500 HP 1800 RPM ODP	500	1800	ODP	95.8%	96.2%	97.2%	$34,138	$47,544
1 HP 3600 RPM ODP	1	3600	ODP	76.3%	77.0%	78.0%	$606	$709
1.5 HP 3600 RPM ODP	1.5	3600	ODP	82.5%	84.0%	85.0%	$667	$795
2 HP 3600 RPM ODP	2	3600	ODP	84.0%	85.5%	86.5%	$699	$840
3 HP 3600 RPM ODP	3	3600	ODP	84.0%	85.5%	86.5%	$705	$849
5 HP 3600 RPM ODP	5	3600	ODP	85.5%	86.5%	87.5%	$733	$888
7.5 HP 3600 RPM ODP	7.5	3600	ODP	87.5%	88.5%	89.5%	$948	$1,192
10 HP 3600 RPM ODP	10	3600	ODP	88.5%	89.5%	90.5%	$1,039	$1,320
15 HP 3600 RPM ODP	15	3600	ODP	89.5%	90.2%	91.2%	$2,031	$2,426
20 HP 3600 RPM ODP	20	3600	ODP	90.2%	91.0%	92.0%	$2,211	$2,680
25 HP 3600 RPM ODP	25	3600	ODP	91.0%	91.7%	92.7%	$2,488	$3,072
30 HP 3600 RPM ODP	30	3600	ODP	91.0%	91.7%	92.7%	$2,741	$3,430
40 HP 3600 RPM ODP	40	3600	ODP	91.7%	92.4%	93.4%	$3,079	$3,907
50 HP 3600 RPM ODP	50	3600	ODP	92.4%	93.0%	94.0%	$3,285	$4,199
60 HP 3600 RPM ODP	60	3600	ODP	93.0%	93.6%	94.6%	$3,971	$5,169
75 HP 3600 RPM ODP	75	3600	ODP	93.0%	93.6%	94.6%	$4,878	$6,453
100 HP 3600 RPM ODP	100	3600	ODP	93.0%	93.6%	94.6%	$5,918	$7,625
125 HP 3600 RPM ODP	125	3600	ODP	93.6%	94.1%	95.1%	$7,118	$9,323
150 HP 3600 RPM ODP	150	3600	ODP	93.6%	94.1%	95.1%	$8,362	$11,082
200 HP 3600 RPM ODP	200	3600	ODP	94.5%	95.0%	96.0%	$9,715	$12,996
250 HP 3600 RPM ODP	250	3600	ODP	94.5%	95.0%	96.0%	$11,614	$15,682
300 HP 3600 RPM ODP	300	3600	ODP	95.0%	95.4%	96.4%	$14,419	$19,650
350 HP 3600 RPM ODP	350	3600	ODP	95.0%	95.4%	96.4%	$18,745	$25,769
400 HP 3600 RPM ODP	400	3600	ODP	95.4%	95.8%	96.8%	$22,948	$31,714
450 HP 3600 RPM ODP	450	3600	ODP	95.8%	96.2%	97.2%	$25,087	$34,741
500 HP 3600 RPM ODP	500	3600	ODP	95.8%	96.2%	97.2%	$38,470	$53,671
1 HP 900 RPM TEFC	1	900	TEFC	74.0%	75.5%	76.5%	$1,250	$1,620
1.5 HP 900 RPM TEFC	1.5	900	TEFC	77.0%	78.5%	79.5%	$1,468	$1,928
2 HP 900 RPM TEFC	2	900	TEFC	82.5%	84.0%	85.0%	$1,758	$2,337
3 HP 900 RPM TEFC	3	900	TEFC	84.0%	85.5%	86.5%	$1,875	$2,503
5 HP 900 RPM TEFC	5	900	TEFC	85.5%	86.5%	87.5%	$2,772	$3,772
7.5 HP 900 RPM TEFC	7.5	900	TEFC	85.5%	86.5%	87.5%	$3,118	$4,261
10 HP 900 RPM TEFC	10	900	TEFC	88.5%	89.5%	90.5%	$3,577	$4,911
15 HP 900 RPM TEFC	15	900	TEFC	88.5%	89.5%	90.5%	$5,374	$7,154
20 HP 900 RPM TEFC	20	900	TEFC	89.5%	90.2%	91.2%	$5,975	$8,004
25 HP 900 RPM TEFC	25	900	TEFC	89.5%	90.2%	91.2%	$7,193	$9,727
30 HP 900 RPM TEFC	30	900	TEFC	91.0%	91.7%	92.7%	$7,544	$10,223
40 HP 900 RPM TEFC	40	900	TEFC	91.0%	91.7%	92.7%	$8,512	$11,593
50 HP 900 RPM TEFC	50	900	TEFC	91.7%	92.4%	93.4%	$10,239	$14,035
60 HP 900 RPM TEFC	60	900	TEFC	91.7%	92.4%	93.4%	$11,821	$16,274
75 HP 900 RPM TEFC	75	900	TEFC	93.0%	93.6%	94.6%	$14,341	$19,838
100 HP 900 RPM TEFC	100	900	TEFC	93.0%	93.6%	94.6%	$17,279	$23,695
125 HP 900 RPM TEFC	125	900	TEFC	93.6%	94.1%	95.1%	$18,753	$25,780
150 HP 900 RPM TEFC	150	900	TEFC	93.6%	94.1%	95.1%	$21,278	$29,353
200 HP 900 RPM TEFC	200	900	TEFC	94.1%	94.5%	95.5%	$26,523	$36,772
250 HP 900 RPM TEFC	250	900	TEFC	94.5%	95.0%	96.0%	$31,736	$44,146
300 HP 900 RPM TEFC	300	900	TEFC	94.5%	95.0%	96.0%	$37,840	$52,781
350 HP 900 RPM TEFC	350	900	TEFC	94.5%	95.0%	96.0%	$49,541	$69,331
400 HP 900 RPM TEFC	400	900	TEFC	94.5%	95.0%	96.0%	$52,541	$73,575
450 HP 900 RPM TEFC	450	900	TEFC	94.5%	95.0%	96.0%	$64,943	$91,119
500 HP 900 RPM TEFC	500	900	TEFC	94.5%	95.0%	96.0%	$68,133	$95,632
1 HP 1200 RPM TEFC	1	1200	TEFC	80.0%	82.5%	83.5%	$715	$862
1.5 HP 1200 RPM TEFC	1.5	1200	TEFC	85.5%	87.5%	88.5%	$707	$850
2 HP 1200 RPM TEFC	2	1200	TEFC	86.5%	88.5%	89.5%	$868	$1,079
3 HP 1200 RPM TEFC	3	1200	TEFC	87.5%	89.5%	90.5%	$1,011	$1,281

Table 6: Motor Efficiency and Incremental Costs [1, 19, 20]

Motor Tag	HP	Speed	Type	EPACT Motor Efficiency	NEMA Premium Motor Efficiency	NEMA Premium +1% Motor Efficiency	NEMA Premium Installed Cost	NEMA Premium +1% Installed Cost
5 HP 1200 RPM TEFC	5	1200	TEFC	87.5%	89.5%	90.5%	$1,167	$1,501
7.5 HP 1200 RPM TEFC	7.5	1200	TEFC	89.5%	91.0%	92.0%	$1,605	$2,121
10 HP 1200 RPM TEFC	10	1200	TEFC	89.5%	91.0%	92.0%	$1,817	$2,421
15 HP 1200 RPM TEFC	15	1200	TEFC	90.2%	91.7%	92.7%	$3,063	$3,885
20 HP 1200 RPM TEFC	20	1200	TEFC	90.2%	91.7%	92.7%	$3,610	$4,659
25 HP 1200 RPM TEFC	25	1200	TEFC	91.7%	93.0%	94.0%	$4,008	$5,221
30 HP 1200 RPM TEFC	30	1200	TEFC	91.7%	93.0%	94.0%	$4,495	$5,911
40 HP 1200 RPM TEFC	40	1200	TEFC	93.0%	94.1%	95.1%	$5,492	$7,321
50 HP 1200 RPM TEFC	50	1200	TEFC	93.0%	94.1%	95.1%	$6,293	$8,454
60 HP 1200 RPM TEFC	60	1200	TEFC	93.6%	94.5%	95.5%	$7,322	$9,909
75 HP 1200 RPM TEFC	75	1200	TEFC	93.6%	94.5%	95.5%	$8,390	$11,420
100 HP 1200 RPM TEFC	100	1200	TEFC	94.1%	95.0%	96.0%	$11,167	$15,051
125 HP 1200 RPM TEFC	125	1200	TEFC	94.1%	95.0%	96.0%	$12,670	$17,176
150 HP 1200 RPM TEFC	150	1200	TEFC	95.0%	95.8%	96.8%	$14,267	$19,436
200 HP 1200 RPM TEFC	200	1200	TEFC	95.0%	95.8%	96.8%	$17,680	$24,262
250 HP 1200 RPM TEFC	250	1200	TEFC	95.0%	95.8%	96.8%	$23,882	$33,036
300 HP 1200 RPM TEFC	300	1200	TEFC	95.0%	95.8%	96.8%	$24,943	$34,538
350 HP 1200 RPM TEFC	350	1200	TEFC	95.0%	95.8%	96.8%	$48,574	$67,964
400 HP 1200 RPM TEFC	400	1200	TEFC	95.0%	95.8%	96.8%	$52,388	$73,359
450 HP 1200 RPM TEFC	450	1200	TEFC	95.0%	95.8%	96.8%	$55,104	$77,201
500 HP 1200 RPM TEFC	500	1200	TEFC	95.0%	95.8%	96.8%	$57,677	$80,841
1 HP 1800 RPM TEFC	1	1800	TEFC	82.5%	85.5%	86.5%	$691	$828
1.5 HP 1800 RPM TEFC	1.5	1800	TEFC	84.0%	86.5%	87.5%	$714	$860
2 HP 1800 RPM TEFC	2	1800	TEFC	84.0%	86.5%	87.5%	$736	$891
3 HP 1800 RPM TEFC	3	1800	TEFC	87.5%	89.5%	90.5%	$777	$951
5 HP 1800 RPM TEFC	5	1800	TEFC	87.5%	89.5%	90.5%	$829	$1,024
7.5 HP 1800 RPM TEFC	7.5	1800	TEFC	89.5%	91.7%	92.7%	$1,021	$1,295
10 HP 1800 RPM TEFC	10	1800	TEFC	89.5%	91.7%	92.7%	$1,130	$1,449
15 HP 1800 RPM TEFC	15	1800	TEFC	91.0%	92.4%	93.4%	$2,209	$2,676
20 HP 1800 RPM TEFC	20	1800	TEFC	91.0%	93.0%	94.0%	$2,458	$3,030
25 HP 1800 RPM TEFC	25	1800	TEFC	92.4%	93.6%	94.6%	$2,817	$3,537
30 HP 1800 RPM TEFC	30	1800	TEFC	92.4%	93.6%	94.6%	$3,126	$3,974
40 HP 1800 RPM TEFC	40	1800	TEFC	93.0%	94.1%	95.1%	$3,754	$4,862
50 HP 1800 RPM TEFC	50	1800	TEFC	93.0%	94.5%	95.5%	$4,152	$5,425
60 HP 1800 RPM TEFC	60	1800	TEFC	93.6%	95.0%	96.0%	$5,520	$7,361
75 HP 1800 RPM TEFC	75	1800	TEFC	94.1%	95.4%	96.4%	$6,476	$8,713
100 HP 1800 RPM TEFC	100	1800	TEFC	94.5%	95.4%	96.4%	$8,477	$11,245
125 HP 1800 RPM TEFC	125	1800	TEFC	94.5%	95.4%	96.4%	$10,087	$13,523
150 HP 1800 RPM TEFC	150	1800	TEFC	95.0%	95.8%	96.8%	$11,475	$15,485
200 HP 1800 RPM TEFC	200	1800	TEFC	95.0%	96.2%	97.2%	$13,766	$18,726
250 HP 1800 RPM TEFC	250	1800	TEFC	95.0%	96.2%	97.2%	$17,586	$24,129
300 HP 1800 RPM TEFC	300	1800	TEFC	95.4%	96.2%	97.2%	$24,941	$34,534
350 HP 1800 RPM TEFC	350	1800	TEFC	95.4%	96.2%	97.2%	$27,741	$38,495
400 HP 1800 RPM TEFC	400	1800	TEFC	95.4%	96.2%	97.2%	$36,483	$50,861
450 HP 1800 RPM TEFC	450	1800	TEFC	95.4%	96.2%	97.2%	$43,985	$61,473
500 HP 1800 RPM TEFC	500	1800	TEFC	95.8%	96.2%	97.2%	$46,222	$64,638
1 HP 3600 RPM TEFC	1	3600	TEFC	75.5%	77.0%	78.0%	$626	$737
1.5 HP 3600 RPM TEFC	1.5	3600	TEFC	82.5%	84.0%	85.0%	$681	$814
2 HP 3600 RPM TEFC	2	3600	TEFC	84.0%	85.5%	86.5%	$753	$916
3 HP 3600 RPM TEFC	3	3600	TEFC	85.5%	86.5%	87.5%	$810	$997
5 HP 3600 RPM TEFC	5	3600	TEFC	87.5%	88.5%	89.5%	$894	$1,115
7.5 HP 3600 RPM TEFC	7.5	3600	TEFC	88.5%	89.5%	90.5%	$1,003	$1,269
10 HP 3600 RPM TEFC	10	3600	TEFC	89.5%	90.2%	91.2%	$1,118	$1,432
15 HP 3600 RPM TEFC	15	3600	TEFC	90.2%	91.0%	92.0%	$2,123	$2,555
20 HP 3600 RPM TEFC	20	3600	TEFC	90.2%	91.0%	92.0%	$2,521	$3,119
25 HP 3600 RPM TEFC	25	3600	TEFC	91.0%	91.7%	92.7%	$2,802	$3,516
30 HP 3600 RPM TEFC	30	3600	TEFC	91.0%	91.7%	92.7%	$3,238	$4,133
40 HP 3600 RPM TEFC	40	3600	TEFC	91.7%	92.4%	93.4%	$3,961	$5,156
50 HP 3600 RPM TEFC	50	3600	TEFC	92.4%	93.0%	94.0%	$4,476	$5,883
60 HP 3600 RPM TEFC	60	3600	TEFC	93.0%	93.6%	94.6%	$5,737	$7,667
75 HP 3600 RPM TEFC	75	3600	TEFC	93.0%	93.6%	94.6%	$6,700	$9,029
100 HP 3600 RPM TEFC	100	3600	TEFC	93.6%	94.1%	95.1%	$9,151	$12,198
125 HP 3600 RPM TEFC	125	3600	TEFC	94.5%	95.0%	96.0%	$10,916	$14,695
150 HP 3600 RPM TEFC	150	3600	TEFC	94.5%	95.0%	96.0%	$12,772	$17,321
200 HP 3600 RPM TEFC	200	3600	TEFC	95.0%	95.4%	96.4%	$15,315	$20,918
250 HP 3600 RPM TEFC	250	3600	TEFC	95.4%	95.8%	96.8%	$20,353	$28,044
300 HP 3600 RPM TEFC	300	3600	TEFC	95.4%	95.8%	96.8%	$25,795	$35,742
350 HP 3600 RPM TEFC	350	3600	TEFC	95.4%	95.8%	96.8%	$33,302	$46,362

Table 6: Motor Efficiency and Incremental Costs [1, 19, 20]

Motor Tag	HP	Speed	Type	EPACT Motor Efficiency	NEMA Premium Motor Efficiency	NEMA Premium +1% Motor Efficiency	NEMA Premium Installed Cost	NEMA Premium +1% Installed Cost
400 HP 3600 RPM TEFC	400	3600	TEFC	95.4%	95.8%	96.8%	$43,069	$60,177
450 HP 3600 RPM TEFC	450	3600	TEFC	95.4%	95.8%	96.8%	$47,589	$66,571
500 HP 3600 RPM TEFC	500	3600	TEFC	95.4%	95.8%	96.8%	$48,685	$68,122

VFDs
460V, 3 phase, normal duty
HP rated as constant torque
All NEMA 1 enclosure or less

Table 7: VFD Costs[21, 22, 23, 24]

HP	Avg. Motor MSRP	Motor less discount plus mark-up and inflation	Installed Loaded
1	$782	$760	$1,140
1.5	$1,234	$741	$1,203
2	$1,299	$779	$1,266
3	$1,433	$1,710	$2,564
5	$1,689	$1,893	$2,839
7.5	$2,075	$2,041	$3,061
10	$2,352	$2,204	$3,306
15	$2,969	$2,940	$4,411
20	$3,804	$3,736	$5,604
25	$4,664	$4,683	$7,024
30	$5,504	$4,985	$7,478
40	$6,770	$5,618	$8,428
50	$8,386	$8,053	$12,080
60	$10,094	$9,883	$14,825
75	$11,814	$11,146	$16,719
100	$15,433	$12,496	$18,745
125	$19,836	$13,439	$20,158
150	$25,897	$15,839	$23,758
200	$35,992	$20,563	$30,844

Average % savings [5]	33%
Measure Life (years)	15
Pumping Load Factor	75%
Fan Load Factor	65%
Average Load Factor	70%

Product: Multifamily Building Efficiency

Description:

Multifamily buildings that are electric customers and either Xcel Energy or CenterPoint Energy natural gas customers can receive an energy assessment and direct-install measures they are eligible for based on the assessment at no-cost. Those customers will also be eligible to participate in larger, capital-intensive projects that will offer them increasing rebates for higher-levels of whole building savings achieved.

Program References:

Measure "Direct Install - CFL"	Refer to Product "MN Home Energy Squad" formulas (Customer kW, Customer kWh, Customer PCkW, etc.) and values (hours and wattages) for the "Replace incandescent lamps with CFLs" measure.
Measure "Direct Install - LED"	Refer to Product "MN Lighting Efficiency" formulas for (Customer kW, Customer kWh, Customer PCkW, etc.) and values (hours and wattages) for the "Replace incandescent lamps with LEDs" measure.
Measure "Direct Install - LED Exit Sign"	Refer to Product "MN Lighting Efficiency" formulas for (Customer kW, Customer kWh, Customer PCkW, etc.) and values (hours and wattages) for the "Exit sign retrofit and replacement" measure.
Measures "Showerhead", "Aerator Kitchen", and "Aerator Bathroom"	Refer to Product "MN Energy Efficient Showerhead" analyses for assumptions on water temperatures and flows and energy savings calculations. Savings values are adjusted for multi-family water usage in Table 2.
Measure "Water Heater Blanket"	Refer to Product "MN Home Energy Squad" formulas (Customer kW, Customer kWh, Customer PCkW, etc.) and values (Efficiencies, Temperatures, R-Values) for the "Install Water Heater Blanket" measure. Savings have been adjusted for average multi-family water heater size.

Performance Building Measure Description:

This is a custom measure for buildings including electric and gas measures. Customers will be encouraged to pursue energy-efficiency opportunities identified through the energy assessment process with the Implementer. These opportunities don't have to be existing prescriptive measures, but they must be identified as energy-saving measures. Xcel Energy & CenterPoint (as needed) will review and approve proposed opportunities and savings levels before projects begin at Customer buildings. The rebate amounts paid to the Customers will depend upon the savings tier reached, which is dependent upon the amount of whole-building savings (BTU) achieved.

Equations:

Water Heater Blanket Electrical Energy Savings (Customer kWh)	= (HLF before_MF - HLF with blanket_MF) x 8760 / HE_Elec / 3412 = 527 kWh
Water Heater Blanket Electrical Demand Savings (Customer kW)	= (HLF before_MF - HLF with blanket_MF) x 8760 / HE_Elec / 3412 / Hr Operation = 0.060 kW
Water Heater Blanket Gas Savings	= (HLF before_MF - HLF with blanket_MF) x 8760 / HE_Gas / 1,000,000 = 2.1 Dth

Variables:

HLF_before	227	Heat Loss Factor of water heater based on a water heater tank without fiberglass insulation and constant water temperature of 125 F and a room temperature of 60 F. This has been adjusted by the ratio of the multi-family (2-4) units average tank size from RECS 2009 data for Minnesota's region to the average size using all homes in the region. This ratio is 40.45/42.21 for Minnesota. This accounts for the fact that multi-family homes have smaller water heaters.
HLF_with_blanket	132	Heat Loss Factor of water heater with an added 2.5" fiberglass insulation on a water heater tank with 2" fiberglass insulation and constant water temperature of 125 F and a room temperature of 60 F. This has been adjusted by the ratio of the multi-family (2-4) units average tank size from RECS 2009 data for Minnesota's region to the average size using all homes in the region. This ratio is 40.45/42.21 for Minnesota. This accounts for the fact that multi-family homes have smaller water heaters.

Table 1 - Typical Lighting Hour Usage by Common Area Space Type

Common-Area Space Type	Hours of Use	Coincidence Factor
Hallway	7,884	0.86
Stairway	7,884	0.86
Lobby/Atrium	7,884	0.86
Management Office	3,317	0.70
Laundry Room	4,154	0.72
Community/Event Room	2,431	0.72
Fitness Area	2,366	0.72
Storage Area	3,441	0.72
Mechanical Rooms	2,692	0.72
Safety or Code Required	8,760	1.00
Pool/Spa Area	4,468	0.72
Parking Lot/Exterior	4,903	0.00

Table 2	Showerhead	Kitchen Aerator	Bathroom Aerator
GPY_DHW_Savings	3,383	547	407
Total Water Savings/Year - Gallons	4,656	637	560
O&M Savings	$39.46	$5.40	$4.75
Incremental Costs	$2.97	$1.36	$0.46

*Note that these incremental costs are estimates. Actual incremental costs will be used when they are known.

References:

1. "Minnesota Multifamily Rental Characterization Study", Prepared for Minnesota Department of Commerce, Division of Energy Resources, Prepared by
2. Residential Energy Consumption Survey, 2009, US Energy Information Administration.

Product: Process Efficiency

Description:

The Process Efficiency Business Program targets energy intensive processes at large industrial facilities Customers who implement identified upgrades may receive rebates for large process changes that are not completed through Custom Efficiency or the prescriptive programs.

Algorithms:

Electrical energy savings, electrical demand savings and gas savings will be calculated based on the methodologies presented in each of the end use programs. Please consult the Deemed tabs of the other end uses for more details.

Product: Recommissioning

Description:

Recommissioning is a program that involves a Study phase and an Implementation phase. The customer may apply for rebate under the Recommissioning Program. Each Recommissioning project will be analyzed individually by Xcel Energy. A qualified engineering vendor will perform the study and provide a report and technical calculations to Xcel Energy for review. Analysis will be based on standard engineering methodologies. Customer may also submit for implementation a proposed "Fast Track" project without going through the Recommissioning Study phase, as long as they have performed a study. Recommissioning projects do not need to pass a Societal cost benefit test on a project by project basis.

Building Operator Certification (BOC) program offers customers a rebate for completing the BOC Level 1 or Level 2 training.

Algorithms (Recommissioning):

For Recommissioning projects, electric and gas energy savings and electrical demand savings will be calculated by a study vendor based on the project specific details. Each project will undergo an engineering review by Xcel Energy in accordance with standard engineering practices.

Algorithms (Building Operator Certification):

Customer_kWh	= BOC_Electric x Building_Area
Customer_kW	= Customer_kWh / Hours
Peak_Coincident_kW	= Customer_kW * CF
Customer_Therms	= BOC_Gas x Building_Area

Variables (Building Operator Certification):

BOC_Electric	0.121	kWh/sqft of attributable savings (Reference 1)
BOC_Gas	0.00806	Therms/sqft of attributable savings (Reference 1)
Building_Area	Customer Input	Area of building
Hours	8760	Annual hours of operation
Measure Lifetime (years)	5	(Reference 6)
Unit Participant Incremental Cost	$1,200	Cost of course per participant
CF	51%	Average CF from Recommissioning program

References:

1. Department of Energy Resource Technical Resource Manual 2017 Version 2 (Draft)
2. Arkansas Deemed Savings Quick Start Program Draft Report Commercial Measures Final Report, Nexant. CF and hours
3. Technical Reference User Manual No. 2004-31, Efficiency Vermont, 12/31/04. CF and Hours
4. ENERGY STAR Challenge for Industry - Quick Converter
5. U.S Energy Administration Information Commercial Buildings Energy Consumption Survey 2003
6. BOC-Expansion Initiative Market Progress Evaluation Report #1; http://theboc.info/pdf/Eval-BOC-expansion-initiative-market-progress-0414.pdf

Product: Self-Direct

Description:

The Self-Direct program will provide large commercial and industrial customers in Minnesota the opportunity to self-fund electric energy conservation projects at their facilities. Customers who engineer, implement, and commission qualifying projects will receive rebates to offset their costs to implement efficient projects.

Algorithms:

Electrical energy savings and electrical demand savings will be calculated based on the actual savings from a project.
Measure life and operation and maintenance savings will be calculated for each project.

Product: Turn Key Services

Description:

Turn key is a program that involves an Assessment or Study phase and an Implementation phase. The customer may apply for direct impact rebates based on the existing program portfolio offerings under the Turn Key Program. Each Turn Key project will receive implementation assistance through Xcel Energy. A qualified project management vendor will assist the customer with the implementation of the project. Customer may also submit for implementation a project that was identified through a previous study. Turn Key prescriptive measures do not need to pass a Societal cost benefit test on a project by project basis.

Algorithms:

Prescriptive or Custom Basis	Electrical energy savings, electrical demand savings and gas savings will be calculated based on the methodologies presented in each of the end use products.

Variables:

Lifetime	Persistence of the Turn Key product (product life) will use the prescriptive product life for any prescriptive measures and determine the product life for any Custom measures on a project by project basis.
CF	Coincidence Factor = Probability that the measure peak demand reduction will occur at the same time as the grid peak demand. We will use the prescriptive CF for any prescriptive measures and determine the CF for any Custom measures on a project by project basis.

Program: Interrupted Rates

Description:

Participants receive a monthly discount on their demand charges in return for reducing electric loads when notified by Xcel Energy.

Algorithms:

Electrical Demand Savings (Customer kW)	= I_Contract_Interrupt_Load
Electrical Energy Savings (Customer kWh)	= I_Contract_Interrupt_Load * P_LM_Hours
Peak Coincident kW at the Customer (PC_KW_CUST)	= I_Contract_Interrupt_Load * P_LM_CF

Variable ID	Value	Description
I_Contract_Interrupt_Load	Customer Input	Contracted Demand Reduction. Amount of electric load reduction pledged by the customer. Assumed average for forecasting is 200 kW (Reference 1)
P_LM_Hours	17.7	Full Load Hours of Operation. The equivalent full load hours during a typical year that a customer achieves energy savings at the Contracted Demand Reduction by controlling their electric load. (Reference 2)
P_LM_CF	47.5%	Coincidence Factor. Percentage of the kW savings that occur during the annual hour of system peak (Reference 1)
Life of Product	5	Length of contract period

Inputs:

Contracted Demand Reduction
Rate Group

References:

(1) Market Operations Peak Control goals
(2) Control Period history along with customer survey data

Changes from 2013-2015 Filing

None

Program: Saver's Switch for Business

Description:

Prescriptive rebates will be offered to business customers who install a Smart Saver's Switch on their air conditioning (AC) system.

Algorithms:

Electrical Demand Savings (Customer kW)	= Eq.Baseline_Efficiency * I_Equipment_Tons
Electrical Energy Savings (Customer kWh)	= Eq.Baseline_Efficiency * I_Equipment_Tons * Eq.Hours
Peak Coincident kW at the Customer (PC_KW_CUST)	= Eq.Baseline_Efficiency * I_Equipment_Tons * Eq.Coincidence_Factor

Variable ID	Value	Description
I_Equipment_Tons	Customer Input	AC unit tons.
Eq.Baseline_Efficiency_Single	1.091	Single stage AC unit efficiency in kW/ton.
Eq.Baseline_Efficiency_Multi	1.091	Multi stage AC unit efficiency in kW/ton.
Eq.Hours_Single	0.57	Full Load Hours of Operation for a single-stage smart switch.
Eq.Hours_Multi	0.40	Full Load Hours of Operation for a multi-stage smart switch.
Eq.Coincidence_Factor_Single	22.31%	Single Stage Coincidence Factor. Percentage of the kW savings that occur during the annual hour of system peak. Based on analysis of metered data for actual historical Business Saver's Switch customers.
Eq.Coincidence_Factor_Multi	16.24%	Mutli-Stage Coincidence Factor. Percentage of the kW savings that occur during the annual hour of system peak. Based on analysis of metered data for actual historical Business Saver's Switch customers.
Life_BusSS	15	Length of time the switch will be operational.
NTG	100%	Net-to-Gross factor for Saver's Switch will be 100% as customers would not have the ability to install a switch without the program.

Inputs:

Provided by Customer:	Verified during M&V:
AC unit tons	Yes
Air conditioner single-stage or multi-stage	Yes
Stage 1 and stage 2 tons (Multi-stage units only)	Yes

References:

(1) Xcel Energy, January 2016. Typical MN Business Single Stage Smart Switch Load Relief 2011-2015.
(2) Xcel Energy, January 2016. Typical MN Business Dual Stage Smart Switch Load Relief 2011-2015.

Changes from 2013-15 Filing:

1. Updated PC kW & kWh savings per unit per event for smart switches. As a result other values such as coincidence factor and hours also updated.
2. Updated algorithms to match current practices.

Program: Efficient New Home Construction

Description:

The Efficient New Home Construction product provides free inspection and testing services to regular home builders who construct homes to ENERGY STAR standards. Residential homebuilders receive an incentive to build new single-family, small multi-family and town homes that are at least 20% more energy-efficient than what local building codes require. Subsidized home builders receive the same services listed and are eligible for a rebate if the house meets an air tightness threshold of 0.15 CFM/surface area. Builders are encouraged to consider a “whole-house” approach and have the flexibility to install any combination of efficient technologies and building techniques to meet the program requirements and qualify for rebate. The product utilizes Performance testing per Residential Energy Services Network (RESNET) Home Energy Rating System (HERS) and each home will be modeled by a certified RESNET energy rater using the widely adopted REM/Rate™ software application. Additionally, prescriptive electric rebates are offered to regular and subsidized builders for installing ENERGY STAR appliances and energy efficient lighting. Single-family, duplex, triplex, fourplex, town homes or condo units that have individual heating systems and residential meters that receive electric and gas service or gas only service from Xcel Energy are eligible to participate in the program. Similar homes that receive electric only service from Xcel Energy are eligible to participate only if the REM/Rate™ modeling has positive kWh savings. Credit for single fuel customers will only be calculated for the fuel served by Xcel Energy.
Individual prescriptive electric rebates are available to regular and subsidized builders for installing any of the items from the following list: ENERGY STAR clothes washer, ENERGY STAR refrigerator.

Program References:

Energy Star Refrigerator	Refer to Program "Refrigerator Recycling" to find formulas for (Customer kW, Customer kWh, Customer PCkW, Lifetime, etc.) for the "Energy Star Refrigerator" measure.
LEDs, CFLs	Refer to the MN Home Lighting program to find all applicable formulas and assumptions for prescriptive measures savings claimed through the LED and CFL measures.

Algorithms:

Envelope Measures Electric Energy Savings (kWh), Electric Demand Savings (kW) and Natural Gas Savings (Dth)	The subject home will be modeled and tested to determine whether it meets the ENERGY STAR standards, and quantify the level of energy savings are achieved. The Electric Energy Savings (kWh), Electric Demand Savings (kW) and Natural Gas Savings (Dth) for the envelope measures be determined from the modeled savings of the individual home.
Efficient Lighting Electric Energy Savings (Customer kWh)	= Number_of_Bulbs x (kW_base - kW_EE) x Lamp_Hrs
Efficient Lighting Electric Demand Savings (Customer kW)	= Number_of_Bulbs x (kW_base - kW_EE)
10 LED/CFLs Electric Energy Savings (kWh) and Electric Demand Savings (kW)	Energy and demand savings and annual hours of operation for compact fluorescent lamps are based on ten (10) LED/CFL installed so the home has 100% energy efficient bulbs. For bulb wattages and operating hours see Table 2.
Gross kW Saved at Customer Envelope Measures	= The maximum of (summer peak kW savings ; winter peak kW savings) Data for the summer and winter peak kW savings are included in the REM/Rate model for each individual home as provided by the Home Rating Agent.
Gross Coincident kW Saved at Customer Envelope Measures	= (summer peak kW savings) x 90% Coincidence Factor
Gross Annual kWh Saved at Customer Envelope measure	= Total Reference Home kWh - Total As-bult Home kWh Data for The Reference Home and As-Built Home kWh are included in the REM/Rate model for each individual Home As provided by the Home Rating Agent and based on Local codes.
Gross Dth/Yr Envelope Measures	= Total Reference Home kWh - Total As-bult Home kWh Data for The Reference Home and As-Built Home kWh are included in the REM/Rate model for each individual Home As provided by the Home Rating Agent and based on Local codes.
Gross kW Saved at Customer	= Gross Annual kWh / Hours
Gross Coincident kW Saved at Customer	= Gross kW Saved at Customer * CF
Baseline_HERS	= (Ref_Home_MMBTU / (IECC2004_MMBTU) x 100
As-Built_Home_MMBTU	As-Built Home's annual energy use calculated by the Home Rater using the REMRate software modeling tool, in units of MMBTU. = (As-Built Heating (kWh) + As-Built Cooling (kWh) + As-Built Water Heating (kWh) + As-Built Lights & Appliances (kWh)) x 3412 / 1000000 + (As-Built Heating (therms) + As-Built Water Heating (therms) + As-Built Lights & Appliances (therms)) / 10
Ref_Home_MMBTU	Rference Home's annual energy use calculated by the Home Rater using the REMRate software modeling tool, in units of MMBTU. = (Reference Heating (kWh) + Reference Cooling (kWh) + Reference Water Heating (kWh) + Reference Lights & Appliances (kWh)) x 3412 / 1000000 + (Reference Heating (therms) + Reference Water Heating (therms) + Reference Lights & Appliances (therms)) / 10
%_Improvement	As-built Home's Percent Improvement over local energy code requirements. = (Ref_Home_MMBTU - As-Built_Home_MMBTU) / Ref_Home_MMBTU
IECC2004_MMBTU	HERS Index Scores are all based on the IECC 2004 code and assumes that a home built to IECC2004 receives a HERS score of 100. = As-Built_Home_MMBTU / (As-Built_HERS / 100)
HERS_ICC_Adj_Factor	= Incremental Capital Cost Adjustment Factor for Envelope HERS Index based Measures = 1 + (-0.817361291444 * LN(Home_Size) + 6.658377405746)
As-built_HERS_ICC/SF	= As-built Incremental Capital Cost per Square Foot for Envelope HERS Index based Measures. As-Built_HERS_ICC/SF = (-0.097807269549 x Baseline_HERS + 5.884617188802) x HERS_ICC_Adj_Factor
Baseline_HERS_ICC/SF	= Baseline Incremental Capital Cost per Square Foot for Envelope HERS Index based Measures. Baseline_HERS_ICC/SF = (-0.097807269549 x Baseline_HERS + 5.884617188802) x HERS_ICC_Adj_Factor
HERS_ICC	Envelope measure Incremental Capital Cost, based on HERS Index achieved and adjusted for home size. = (As-built HERS_ICC/SF - Baseline_HERS_ICC/SF) * Home_Size
summer peak kW savings	= Summer Peak kW (Reference) - Summer Peak kW (As Built)
winter peak kW savings	= Winter Peak kW (Reference) - Winter Peak kW (As Built)

Variables:

CF	Coincidence Factor = the probability that peak demand of the lights will coincide with peak utility system demand from Table 1
kW_EE	Average (kW) for the energy efficient lights LED/CFL's installed. See Table 3.
kW_Base	Average (kW) for the incandescent bulbs that the energy efficient lights LED/CFL's will replace. See Table 3.
Lamp_Hrs	Annual Operational Hours of the LED/CFL's or other energy efficient lamp installed. See Table 3.
Envelope O&M savings	Operation and Maintenance electric envelope savings for gas or electric only customers will be custom calculated. Envelope O&M savings for combo gas and electric customers is assumed to be 0.

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

Variables:	Value	Description
As-Built_HERS	Customer Input	As-Built Home's HERS Index Score calculated by the Home Rater using the REMRate software modeling tool and provided under HERS Index (Final) = (As-Built Home MMBTU / IECC2004 MMBTU) x 100
Home_Size	Customer Input	As-Built Home's conditioned square footage provided by the Home Rater
Summer Peak kW (As Built) Winter Peak kW (As Built)	Customer Input	As-Built Home's peak kW usage calculated by the Home Rater using the REMRate software modeling tool.
Summer Peak kW (Reference) Winter Peak kW (Reference)	Customer Input	Reference Home's peak kW usage calculated by the Home Rater using the REMRate software modeling tool.
As-Built Home Electric Energy: As-Built Heating (kWh) As-Built Cooling (kWh) As-Built Water Heating (kWh) As-Built Lights & Appliances (kWh)	Customer Input	As-Built Home's Electric Energy Consumption by categories of As-Built Heating (kWh), As-Built Cooling (kWh), As-Built Water Heating (kWh), As-Built Lights & Appliances (kWh) calculated by the Home Rater using the REMRate software modeling tool.
As-Built Home Gas Energy: As-Built Heating (therms) As-Built Water Heating (therms) As-Built Lights & Appliances (therms)	Customer Input	As-Built Home's Electric Energy Consumption by categories of As-Built Heating (therms), As-Built Water Heating (therms), As-Built Lights & Appliances (therms) calculated by the Home Rater using the REMRate software modeling tool.
Reference Home Electric Energy: Reference Heating (kWh) Reference Cooling (kWh) Reference Water Heating (kWh) Reference Lights & Appliances (kWh)	Customer Input	As-Built Home's Electric Energy Consumption by categories of Reference Heating (kWh), Reference Cooling (kWh), Reference Water Heating (kWh), Reference Lights & Appliances (kWh) calculated by the Home Rater using the REMRate software modeling tool.
Reference Home Gas Energy: Reference Heating (therms) Reference Water Heating (therms) Reference Lights & Appliances (therms)	Customer Input	Reference Home's Gas Energy Consumption by categories of Reference Heating (therms), Reference Water Heating (therms), Reference Lights & Appliances (therms) calculated by the Home Rater using the REMRate software modeling tool.
Clothes washer electric energy savings (Gross Annual kWh)	See Table 2	Energy savings for the clothes washer are based on the ENERGY STAR Clothes Washer Savings Calculator: http://www.energystar.gov/index.cfm?c=clotheswash.pr_clothes_washers. This will vary based on source for domestic hot water heat; gas or electric.
Clothes washer Hours	295	Assumed Hours of operation for a clothes washer, based on number of duty cycles and a duty cycle of 1 hour.
Clothes washer natural gas savings (Gross Dth/Yr)	0.12	Energy savings for the clothes washer are based on the ENERGY STAR Clothes Washer Savings Calculator: http://www.energystar.gov/index.cfm?c=clotheswash.pr_clothes_washers. For homes with gas domestic hot water heat.
Non-energy O&M savings	See Table 2	Water Savings per year for an ENERGY STAR Clothes Washer.
Incremental Capital Cost	See Table 1	Incremental capital cost for ENERGY STAR Appliances.
CF	See Table 1	Coincidence Factor for ENERGY STAR Appliances
Measure Life As-built Home	20 Years	Envelope Measures (Reference 1)
Measure Life Clothes Washer	11	Life of an energy star Clothes Washer (Reference 1)

Inputs:

Home As-built energy model and the reference home energy model are developed by the Home Rater using REM/Rate modeling software. The model output represents the total home's thermal envelope influence on energy use including secondary impacts from lights and appliances. A full list of the data that will be used as calculator inputs are as follows:

Reference Summer Peak kW
As-Built Summer Peak kW
Reference Winter Peak kW
As-Built Winter Peak kW
Home Size (Square Footage)
HERS Index (Final)
Reference Heating (therms)
Reference Heating (kWh)
Reference Cooling (kWh)
Reference Water Heating (therms)
Reference Water Heating (kWh)
Reference Lights & Appliances (therms)
Reference Lights & Appliances (kWh)
As-Built Heating (therms)
As-Built Heating (kWh)
As-Built Cooling (kWh)
As-Built Water Heating (therms)
As-Built Water Heating (kWh)
As-Built Lights & Appliances (therms)
As-Built Lights & Appliances (kWh)
Water Heater Fuel
Clothes Washer Installed
Refrigerator Installed
Were Energy Efficient Lights Installed?

Assumptions:

Electric Only Homes must have positive kWh savings to participate.

Table 1. Measure Life, Cost, and Coincidence Factor

Type of measure	Measure life	Incremental cost	Coincidence factor
Energy Star New Homes Envelope Measures	20.00	Calculated from achieved HERS Index	90.00%
Prescriptive Measures			
LED/CFLs-Quantity of 10 (Required)	16.04	$2.57	8.00%
Energy Star Clothes Washer	11.00	$30.00	3.37%
Energy Star Refrigerator	18.00	$26.04	63.84%

Table 2	Clothes Washer
Total Water Savings/Year - Gallons	1,180
kWh Savings in home with electric water heater	32
kWh Savings in home with gas water heater	6
Dth Savings in home with gas water heater	0.12
Non-Energy O&M Savings	$10.00

Table 3. Deemed Watts for Efficient CFL/LED Replacement

	Quantity	Baseline Watts per Bulb	Baseline Watts	Energy Efficient LED/CFL Watts	Energy Efficient Watts	Operational Hours
2013 Efficient LED/CFLs	10	29	290	14	137	854
2014 Efficient LED/CFLs	10	29	290	14	137	854
2015 Efficient LED/CFLs	10	29	290	14	137	854

References:

1. California Measurement Advisory Committee (CALMAC) Protocols, Appendix F (www.calmac.org/events/APX_F.pdf).
2. 2006 Residential Energy Use Colorado Service Area - Xcel: Bruce Neilson
3. American Housing Survey for Denver - US Census Bureau
4. Xcel Energy CO DSM Potential 2006 - prepared by Kema

5. National Energy Efficiency Best Practices Study - Residential Single-Family Comprehensive Weatherization Best Practices Report from December 2004.
6. RS Means Repair and Remodeling 2007 at a cost of $0.028 per square foot per increase in R-value.
7. National Energy Audit Tool (NEAT) and Frontier estimates.
8. EEBP web site - Tacoma Residential Weatherization program.
9. Cost information from "2010 - 2012 W0017 Ex Ante Measure Cost Study Final Report.", Itron, May 2014.
10. MEEA/ES Change A Light campaign info
11. Xcel Energy estimate
12. Draft Technical Support Document: Energy Conservation Standards for Residential Furnaces and Boilers, Efficiency Standards for Consumer Products. Prepared for US DOE, September 2006
13. California Energy Commission's Database for Energy Efficient Resources (DEER)
14. www.energystar.gov
15. DOE 2007
16. Savings Calculator for ENERGY STAR Qualified Appliances, www.energystar.gov
17. Not used
18. Not used
19. Incremental cost data are estimates from Residential Science Resources
20. Center for Energy and Environment Comments to Docket Number EERE-2010-BT-STD-0011-0022, July 27, 2010

Program: Energy Efficient Showerhead

Description:

Residential customers are eligible to receive a free kit containing a high-efficiency showerhead, kitchen aerator, and bathroom aerator to reduce energy and water use.

Algorithms:

Showerhead or Aerator Natural Gas Savings (Gross Dth/unit)	= GPY_DHW_Savings x Water_Heater_Delta_T x 8.33 / Gas_Water_Heater_Efficiency / 1,000,000 x Gas_Split_Factor
Showerhead or Aerator Energy Savings (Customer kWh/unit)	= GPY_DHW_Savings x Water_Heater_Delta_T x 8.33 / Electric_Water_Heater_Efficiency / 3,412 x (1 - Gas_Split_Factor)
Water_Heater_Delta_T	= Water_Heater_Temperature - City_Mains_Temperature
Showerhead or Aerator Demand Savings (Customer kW)	= Customer_kWh / 8,760
Showerhead or Aerator Demand Savings (Gross Generator kW)	= Customer_kW * Coincidence_Factor

Variables:

GPY_DHW_Savings	See Table 1	Gallons per year of hot water saved with high-efficiency showerhead or aerator.
Water_Heater_Temperature	120	Water heater setpoint temperature °F. (Reference 1)
City_Mains_Temperature	51.9	Water temperature of city water entering the water heater °F. (Reference 2)
Gas_Water_Heater_Efficiency	80%	Assumed gas water heater efficiency without standby losses. This only includes combustion efficiency.
Electric_Water_Heater_Efficiency	100%	Assumed electric water heater efficiency without standby loses.
Gas_Split_Factor	See Table 2	Gas_Electric_Split_Factor is based on customer response to showerhead post card. The customer selects from three options for water heating fuel.
Coincidence_Factor	See Table 1	Amount of Customer_kW demand that will coincide with peak utility system demand.

Inputs:

Showerhead received by customer	Yes
Showerhead installed by customer	Yes
Water Heating Fuel provided by Customer	Yes

Assumptions:

Baseline Flowrates	Baseline showerhead flowrate is assumed to be 2.5GPM per federal minimum standards. Kitchen and bathroom aerator baseline flowrates are assumed to be 2.2GPM per federal minimum standards.	
Heat content of 1 gallon water	8.34	Btu/gal °F
Conversion from Btu to kWh	3,412	1 kWh = 3,412 Btuh
Conversion from Btu to Dth	1,000,000	1 Dth = 1,000,000 Btuh
Measure Life	10	Lifetime of showerhead and aerator measures. (Reference 3)
Incremental Costs	See Table 1	Actual costs provided by vendor; cost per showerhead is assumed for the material costs for cost/benefit calculation purposes.

Table 1	Showerhead	Showerhead 2nd	Kitchen Aerator	Bathroom Aerator	Bathroom Aerator 2nd
GPY_DHW_Savings	3,070	2,064	444	385	385
Total Water Savings/Year - Gallons	3,937	2,647	492	494	494
Coincidence_Factor (Reference 8)	64%	64%	124%	124%	124%
O&M Savings	$ 33.37	$ 22.44	$ 4.17	$ 4.19	$ 4.19
Incremental Costs 2017	$ 3.10	$ 3.10	$ 1.50	$ 0.48	$ 0.48
Incremental Costs 2018	$ 3.21	$ 3.21	$ 1.56	$ 0.52	$ 0.52
Incremental Costs 2019	$ 3.32	$ 3.32	$ 1.61	$ 0.55	$ 0.55

*Note that these incremental costs are estimates. Actual incremental costs will be used when they are known.

Table 2	Gas_Split_Factor
Gas Water Heater	100%
Electric Water Heater	0%
Unknown Water Heater	88%

References:

1. Development of Standardized Deomestic Hot Water Event Schedules for Residential Buildings; R. Hendron and J. Burch; NREL/CP-550-40874
2. United States Department of Energy. *DHW Event Schedule Generator* . (365 day average water main temperature for Minneapolis-St Paul Intl AP, MN). http://energy.gov/eere/buildings/downloads/dhw-event-schedule-generator
3. DEER Database for Energy Efficient Resources version 2014; www.deeresources.com
4. St Paul 2015 Water Rate Schedule - http://mn-stpaul.civicplus.com/DocumentView.asp?DID=3493
5. Xcel Energy New Mexico Residential Shower Use Study
6. The Effect of Efficiency Standards on Water Use and Water Heating Energy Use in the U.S.: A Detailed End-use Treatment; J Koomey, C Dunham, J Lutz; LBL-35475
7. Residential Energy Consumption Survey 2009; http://www.eia.gov/consumption/residential/

Product: Energy Feedback Residential

Description:

Program will deliver energy use feedback via print, email and online web portal access to customer groups and measure the difference in energy use between Participants and an appropriately sized Control Group that does not receive energy use feedback. Program will include residential customers with both gas and electric service from Xcel Energy.

Algorithms:

Monthly Electrical Energy Savings (Gross_Treatment_Monthly_kWh)	The development of the savings by each variable group (Print, Email, Online) follow this basic formula: = (Control_kWh_usage_post_treatment - Group_Rebate_Product_Participation) - (Treatment_kWh_usage_post_treatment - Group_Rebate_Product_Participation)
Electrical Energy Savings (Gross_Annual_kWh)	= sum of each month of Monthly Electrical Energy Savings
Electrical Demand Savings (Gross_Coincident_kW)	= Gross_kW * CF
Electrical Demand Savings (Gross_kW)	= Customer_kW_Max = Customer_Daily_kWh * Treatment_Percent_Savings * Peak_Factor * Daily_Usage_at_Peak
Coincidence Factor (CF)	= Customer_kW_Peak_Month / Customer_kW_Max
Monthly Natural Gas Energy Savings (Gross_Treatment_Monthly_Dth)	The development of the savings by each variable group (Print, Email, Online) follow this basic formula: = (Control_Dth__usage_post_treatment - Group_Rebate_Product_Participation) - (Treatment_Dth_usage_post_treatment - Group_Rebate_Product_Participation)
Natural Gas Energy Savings (Gross_Annual_Dth)	= Sum of each month of the Monthly Natural Gas Energy Savings
Behavioral Adjustment	= -2/3 * Gross_kW; This adjustment is applied to reduce the first year savings to 1/3 of the actual savings in compliance with ordered treatment.

Variables:

Treatment_Print	= Group of electric and gas customers receiving periodic paper reports providing feedback on their energy use.
Treatment_Email	= Group of electric and gas customers receiving internet delivered reports that provide feedback on their energy use.
Treatment_Online	= Group electric and gas customers (unknown size) who choose to opt-in to a web feedback portal that provides feedback on their energy use.
Control_Print	= Group of electric and gas customers who are similar in structure (demographics, life stage, house size, geography) to the participant Group, but receive no contact from Xcel or its contractors.
Control_Email	= Group of electric and gas customers who are similar in structure (demographics, life stage, house size, geography) to the participant Group, but receive no contact from Xcel or its contractors.
Control_Online	= Group of electric and gas customers who are similar in structure (demographics, life stage, house size, geography) to the participant Group, but receive no contact from Xcel or its contractors
Treatment_kWh_usage_post_treatment	= Electrical energy use of the Treatment Group after the treatment as determined through multi-variate regression analysis.
Control_kWh_usage_post_treatment	= Electrical energy use of the Control Group after the treatment as determined through multi-variate regression analysis.
Treatment_Dth_usage_post_treatment	= Natural gas energy use of the Treatment Group after the treatment as determined through multi-variate regression analysis.
Control_Dth_usage_post_treatment	= Natural gas energy use of the Control Group after the treatment as determined through multi-variate regression analysis.
Group_Rebate_Product_Participation	= Energy savings generated by participation in Xcel's rebate products for both Treatment and Control groups, kWh and Dth. Rebated product participation from other products, (e.g. new furnace), are savings that will be included in the regression analysis and deducted from the EFP results if statistically significant.

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

Variables:

Gross_Treatment_Monthly_kWh_Saved	Provided by Vendor	= monthly MWh savings provided by the vendor for all homes in the treatment group.
Customer_kW_Peak_Month	Provided by Vendor	= Average electrical demand savings per household achieved in the month, day, and hour that contained the peak demand on Xcel Energy's system. Actual value calculated each year.
Customer_kW_Max	Provided by Vendor	= The maximum of the peak electrical demand savings per household achieved in the summer months: June, July, August, and September. Actual value calculated each year.
Gross_Treatment_Monthly_Dth_Saved	Provided by Vendor	= monthly therm savings provided by the vendor for all homes in the treatment group.
Peak_Factor	Provided by Vendor	= The ratio of energy usage in peak hour to average hourly energy use. Actual value calculated each year.
Daily_Usage_at_Peak	Provided by Vendor	= Percentage of Energy usage in peak hour to daily total Energy use. Actual value calculated each year.
Measure Life	= Assumed to be 1.0 year since there is no equipment purchase - just behavior changes.	
Measure Life (Behavioral Adjustment)	=is set to zero in order to not affect the lifetime net benefits	
Incremental Cost	= Assumed to be zero since the program induces behavior change which has no capital cost.	
Operation & Maintenance (O&M) Savings	= Assumed to be zero.	
Net-to-Gross Factor (NTG)	= 100%	

Needed from Customer/Vendor/Administrator for Calculations:

Results of ongoing muti-variate regression analysis from vendor for Participant and Control groups

Product: Home Energy Squad Services

Description:

Residential natural gas and electric customers can have energy efficiency measures installed while paying for the material costs.

Program References:

LEDs, CFLs	Refer to the MN Home Lighting program to find all applicable formulas and assumptions for prescriptive measures savings claimed through the LED and CFL measures.
Showerheads and Faucet Aerators	Refer to the MN Showerhead program to find all applicable formulas and assumptions for prescriptive measures savings claimed through the Showerhead, Kitchen Aerator, and Bath Aerator measures.
Door Weatherstripping	Refer to the MN Insulation Rebate program to find all applicable formulas and assumptions for prescriptive measures savings claimed through the Door Weatherstripping measures.

Algorithms:

Efficient Lighting Electrical Energy Savings (Customer kWh)	=Number_of_Bulbs x (kW_Savings_per_Bulb) x lamp_Hours	
Efficient Lighting Electrical Demand Savings	=Number_of_Bulbs x (kW_Savings_per_Bulb)	
Lighting Measure Life (Years)	= Bulb_Life / CFL_Hours	
TV Controller Electrical Energy Savings (Customer kWh)	= (Measured_Watts_WO - Measured_Watts_WITH) / 1000 x Controller_Hours	
TV Controller Electrical Demand Savings (Customer kW)	= (Measured_Watts_WO - Measured_Watts_WITH) / 1000	
Programmable Thermostat Electrical Energy Savings (Customer kWh)	=Cooling_Delta_T x kWh_Savings_per_Degree	
Programmable Thermostat Electric Demand Savings (Customer kW)	=Customer kWh/ Cooling_Hours	
Programmable Thermostat Gas Savings (Customer Dth)	=Heating_Delta_T x Dth_Savings_per_Degree	
Water Heater Blanket Electrical Energy Savings (Customer kWh)	254.1	= Volume / 45 x (HLF before - HLF with blanket) x 8760 / HE_Elec / 3412
Water Heater Blanket Electrical Demand Savings (Customer kW)	0.03	= Volume / 45 x (HLF before - HLF with blanket) x 8760 / HE_Elec / 3412 / Hr Operation
Water Heater Blanket Gas Savings (Customer Dth)	1.08	= Volume / 45 (HLF before - HLF with blanket) x 8760 / HE_Gas / 1,000,000
Water Heater Temperature Setback Gas Savings (Gross Dth/Yr)	0.40	= (WH_S_Baseline - WH_S_Proposed) / 10
Weatherstripping two exterior doors (Customer Dth)	3.4	Calculated by reduction in air infiltration. Door leakage is reduced from 0.55 to 0.18 cfm/linear ft of crack = 3.1 Dth (Reference 2)
Weatherstripping a third exterior door (Customer Dth)	1.7	Calculated by reduction in air infiltration for 3rd door sealed in house. Door leakage is reduced from 0.55 to 0.18 cfm/linear ft of crack = 1.5 Dth (Reference 2)

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

Variables:

Showerhead	Vendor Input	= Number of low flow showerheads installed
Aerator	Vendor Input	= Number of low flow aerators installed
Measured_Watts_WO	Vendor Input	= Measured demand for appliances that will be connected to controller before controller is
Measured_Watts_WITH	Vendor Input	= Measured demand for controller with appliances connected when controller is in off state
Controller_Hours	Vendor Input	= Hours of operation for the controller determined for each customer based on interview
Hot water energy source	Vendor Input	= electric or gas
Volume	Vendor Input	= Volume of the new storage tank water heater provided by the customer
HGE_Elec	100%	Steady state efficiency of electric water heater
HGE_Gas	80%	Steady state efficiency of gas water heater
	8760	Annual water heater "on" time
HLF_before	237	Heat Loss Factor of water heater based on 45 gallon tank with 2" fiberglass insulation and constant water temperature of 125 F and a room temperature of 60 F.
HLF_with_blanket	138	Heat Loss Factor of water heater with an added 2.5" fiberglass insulation on a 45 gallon tank with 2" fiberglass insulation and constant water temperature of 125 F and a room temperature of 60 F
WH_S_Baseline	28	Baseline gas water heater shell losses, Therms/year
WH_S_Proposed	24	Proposed gas water heater shell losses, with -10F adjustment of setpoint, Therms/year
Cooling_Delta_T	Vendor Input	Average difference between normal operation and cooling setback temperature in degrees F based on information provided by the customer during the interview.
kW_Savings_per_Degree	0.102	kW per degree F of setback (Reference 1, 2)
kWh_Savings_per_Degree	62.642	kWh per degree F of setback (Reference 1, 2)
kW_Savings_per_Degree_2	0.051	kW per degree F of setback for second thermostat = half of savings for first thermostat
kWh_Savings_per_Degree_2	31.321	kWh per degree F of setback for second thermostat = half of savings for first thermostat
Heating_Delta_T	Vendor Input	Average difference between normal operation and heating setback temperature in degrees F based on information provided by the customer during the interview.
Dth_Savings_per_Degree	2.094	Dth per degree F of setback (Reference 1, 2)
Dth_Savings_per_Degree_2	1.047	Dth per degree F of setback for second thermostat = half of savings for first thermostat
Air_Gap_Base	0.39	Effective Air Leakage Area per foot of door gap for door without weatherstripping. (Reference 5)
Air_Gap_Eff	0.13	Effective Air Leakage Area per foot of door gap for door with weatherstripping. (Reference 5)
Gap_Length	Vendor Input	Length of weatherstripping installed. Provided by contractor.
Air_Density	0.0725	Density of air, Lbm / ft^3.
LAF	0.0791	Leakage Area Factor calculated from formula below for use in calculating CFM50 from a gap area in the building envelope. = 0.186 X SQRT (Air_Density / (2 X Ref_Pressure)) / Discharge_Coefficient
Ref_Pressure	0.201	Reference pressure, inches WC, equivalent to 50 Pa
Discharge_Coefficient	1.0	Discharge coefficient for opening, dimensionless
Controller_Hours	Vendor Input	Hours of operation for the controller determined for each customer based on interview results.
Cooling_Hours		= Full load cooling hours based on average equipment in an average house = 490 hours
1,000,000		Conversion from BTU to Dth
Number_of_Bulbs	Vendor Input	= Number of CFL or LED bulbs installed, provided by vendor
kW_Savings_per_bulb		= sum of differences between installed CFL wattage and incandescent equivialent wattage as listed in Table 1.
Total_hours_existing		=Total hours for the existing efficient lighting bulbs. Vendor will provide number of existing. Hours will be determined from total hours column of Table 4.
Splt of Incremental cost for Thermostat	Assumes 25% electric and 75% gas	
Conversion Factor from btu to kWh or kW	1 kWh = 3412 Btu	

Inputs:

Size of newly installed CFL bulbs
Room in which new CFLs are installed
Was a water heater blanket installed?

Assumptions:

All homes have at least one door weather sealed and 55% of the homes will have a second exterior door weather sealed.
Residential heating loads and hours of operation were based on model simumlations using the Building Energy Optimization (BEOpt) software version 2.5.0.0. This software was developed by NREL in support of DOE's Build America program for new and existing homes. The values used in this model are based on existing home simulations in three CO climate areas. References to model assumptions are provided in the Residential Model tab.

Table 1: Existing lighting wattage for residential lights

CFL Wattage	Replaced Incandescent Bulb Wattage	LED Wattage
9	29.0	7.00
13	43.0	10.00
17	53.0	15.00
23	72.0	18.00
31 - 52	150.0	n/a

Table 2: Measure Life, Coincidence Factor, and Hours (Reference 6, 11)

Type of measure	Measure Life	Coincidence Factor	Hours of Operation
CFLs	16.5	8%	909
TV cluster power controller	5	19%	Varies
Programmable thermostat (Cooling)	10	76%	490
Programmable thermostat (Heating)	10	na	na
Weatherstripping	10	na	na
Water heater blanket elec HW	6.50	100%	8,760

Table 3: Measure Costs / Allocations to Gas/Elec

	Vendor CEE Cost ($/Unit)	Vendor NEC Cost ($/Unit)	Cost Allocation
Dimmable CFL's	5.00	5.00	Electric
LED Lights	5.00	5.00	Electric
TV Smart Controller	20.00	20.00	Electric
Programmable Thermostat	35.00	30.00	25% Electric 75% Gas
Weatherstripping	N/A	10.00	Gas

References:

1. Energy Information Administration's (EIA) 2009 Residential Energy Consumption Survey (RECS)
2. Bin analysis using RECS data for thermostat operation and typical CO home cooling and heating conditions.
3. Door leakage estimate taken from Colorado Energy Office website: http://www.coloradoenergy.org/procorner/stuff/window_air_leakage.htm
4. Lifetime of 10 years for programmable T-Stats from "Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures" June 2007 by GDS Associates.
5. Lifetime of 10 years for door weatherstripping taken from California Measurement Advisory Committee (CALMAC) Protocols Appendix F (www.calmac.org/events/APX_F.pdf).
6. Consumer Electronics Characteristics http://standby.lbl.gov/summary-table.html
7. Draft Technical Support Document: Energy Conservation Standards for Residential Furnaces and Boilers, Efficiency Standards for Consumer Products. Prepared for US DOE, September 2006
8. California Energy Commission's Database for Energy Efficient Resources (DEER)
9. www.energystar.gov
10. Lifetime of 5 years for TV controller/timer based on DEER database from READI v2.3.0 for Res-Plug-AdvPwrStrip Ex Ante 2015
11. Building Energy Optimization (BEOpt) software version 2.5.0.0 model results run Jan 2016. See "REF Model Data Existing" tab for assumptions.
12. TV usage data taken from 2009 census data. https://www.eia.gov/consumption/residential/data/2009/

Product: Home Lighting & Recycling

Description:

Home Lighting product encourages the purchase of compact fluorescent lamps (CFLs) and Light Emitting Diodes (LEDs) and recycling of all fluorescent lamps.

Algorithms:

Electrical Energy Savings (Gross Annual kWh Saved at Customer per unit)	=Number_of_Bulbs x (kW_Savings_per_Bulb) x Hours
Electrical Demand Savings (Gross kW Saved at Customer per unit)	=Number_of_Bulbs x (kW_Savings_per_Bulb)
Electrical Energy Savings (Gross Generator kWh)	= Customer kWh / (1-TDLF)
Electrical Demand Savings (Gross Coincident kW Saved at Customer per Unit)	= Customer kW x CF / (1-TDLF)
Electrical Energy Savings (Net Generator kWh)	= Gross Generator kWh x NTG x Realization Rate
Electrical Demand Savings (Net Coincident kW Saved at Generator per Unit)	= Gross Generator kW x NTG x Realization Rate

Variables:

Number_of_Bulbs	= Number of bulbs sold
kW_Savings_per_Bulb	= kW savings per replaced bulb. We will subtract the manufacturer provided wattage for each CFL/LED from the wattage of the halogen bulb it replaces. The halogen wattages will be determined based on the CFL/LED wattage as seen in Table 1.
Hours of operation	= Hours of operation per year for the bulb. Hours of operation for residential installations is assumed to be LED - 2.49 hours per day (909 hrs) and CFL - 2.34 hours per day (854 hrs) Hours of operation for non-residential purchases are 6,148 hours 94% of all bulbs purchased are assumed to be residential and 6% are assumed to be non-residential. Reference 4, 5
Measure Life	= Measure life for the average bulb sold will be equal to the lifetime hours divided by the annual hours of operation. CFL lifetime hours = 10,000 LED lifetime hours = 20,000 for 2017, 15,000 for 2018/2019 Value LED lifetime hours = 10,000 Reference 1
CF	= Probability that peak demand of the bulb will coincide with peak utility system demand. 0.08 will be used for all residential CFLs\LEDs 0.730 will be used for all non residential CFLs\LEDs. (From business program) Reference 1, 5
TDLF	= Total Distribution Loss Factor, Residential = 7.69%, Non-residential = 6.51%
Incremental Cost of Bulbs	= See Table 2
Net-to-Gross Factor	= We will use 100% for CFLs, LEDs, and Value LEDs
Realization Rate	= Future savings for bulbs purchased and put in storage and installed in later years. The net present value of the saving for all bulbs purchased = 99% of the savings if all bulbs are installed when purchased
O&M savings	= Operation and Maintenance savings are assumed to be zero.

Provided by product Vendor:	**Verified during M&V:**
Number and type of bulbs purchased	Yes

Assumptions:

The baseline bulb is a blend between the EISA standards (Halogen bulbs) and available incandescent bulbs The baseline bulb cost is deemed as stated in table 2 below The efficient LED bulb cost and wattage will be tracked and updated at the end of the year to account for the rapidy evolving market and cost for LED bulbs. Non EISA impacted lights will use incandescent baseline

Table 1 - Baseline wattage for residential lights

Lumens	EISA Baseline Wattage (halogen)	Non-EISA Baseline Wattage (incandescent)
310-749	29	40
750-1049	43	60
1050-1489	53	75
1490-2600	72	100

Table 2 - Average Cost Table

	CFLs	LEDs 2017*	LEDs 2018*	LEDs 2019*	Value LEDs 2017*	Value LEDs 2018*	Value LEDs 2019*
Gross Retail (per bulb)	$ 2.36	*$ 9.07*	*$ 8.16*	*$ 7.35*	*$ 3.46*	*$ 3.11*	*$ 2.80*
Baseline (per bulb)	$ 1.30	$ 1.90	$ 1.90	$ 1.90	$ 1.24	$ 1.24	$ 1.24
Incremental	$1.06	$ 7.17	$ 6.26	$ 5.44	$ 2.22	$ 1.87	$ 1.56
Rebate	$ 1.26	$ 2.73	$ 2.73	$ 2.73	$ 1.50	$ 1.50	$ 1.50
Net Retail	-$0.20	$4.44	$3.53	$2.71	$ 0.72	$ 0.37	$ 0.06

* = See note above on LED costs throughout the program year.

Table 3 - Baseline Costs

	EISA Baseline Wattage (halogen)			Non-EISA Baseline	
Lumens	LED Watts	CFL Watts	Baseline Cost	LED Watts	Baseline Cost
310-749	5-7	9	$1.24	5-8	$2.32
750-1049	8-12	13	$1.24	9-12	$3.32
1050-1489	13-15	17	$1.49	14-15	$8.97
1490-2600	18-22	23	$1.49	16-23	$9.97

* = See note above on LED wattage throughout the program year.

References:

1. Michaels Tech Assumptions Review 2013
2. 2013 Program Results compiled by WECC (program administrator)
3. Market survey 2015 (homedepot.com, lowes.com, samsclub.com, target.com, walmart.com, etc)
4. Illinois 2015 Technical Reference Manual, ComEd PY5/PY6 Residential Lighting Program Evaluation conducted by Navigant in 2015
5. MN Lighting Efficiency Program

Changes from Recent Filing:

Imported new data from WECC and used to average calculate wattage and costs.
Updated residential hours of use based in Illinois 2015 TRM
Updated commercial hours of use based on total commercial business hours
Added 2018 Costs for LEDs

Product: Insulation Rebates

Description:

Residential natural gas and electric customers receive a cash rebate for installing insulation in their existing single-family home or one-to-four unit property.

Wall Insulation Equations:

Customer Dth	= (1 / R_Wall_Base - 1 / R_Wall_Proposed) * Wall_Area * HDD * 24 / 1,000,000 / Heating_Eff_Gas
Cooling_kWh	= (1 / R_Wall_Base - 1 / R_Wall_Proposed) * Wall_Area * CDD * 24 / 3,412 / Cooling_Eff
Heating_kWh	= (1 / R_Wall_Base - 1 / R_Wall_Proposed) * Wall_Area * HDD * 24 / 3,412 / Heating_Eff_Elec
Gross Annual kWh Saved at Customer	= Cooling_kWh + Heating_kWh
Customer kW (Gross kW)	= Gross Annual kWh Saved at Customer / (Cooling_Hours + Heating_Hours)
Customer PCkW	= Cooling_kWh / Cooling_Hours

Attic Insulation Equations:

Customer Dth	= (1 / (2 + R_Attic_Base) - 1 / (2 + R_Attic_Proposed)) * Attic_Area * HDD * 24 / 1,000,000 /
Cooling_kWh	= (1 / (2 + R_Attic_Base) - 1 / (2 + R_Attic_Proposed)) * Attic_Area * CDD * 24 / 3,412 / Cooling_Eff
Heating_kWh	= (1 / (2 + R_Attic_Base) - 1 / (2 + R_Attic_Proposed)) * Attic_Area * HDD * 24 / 3,412 / Heating_Eff_Elec
Gross Annual kWh Saved at Customer	= Cooling_kWh + Heating_kWh
Customer kW (Gross kW)	= Gross Annual kWh Saved at Customer / (Cooling_Hours + Heating_Hours)
Customer PCkW	= Cooling_kWh / Cooling_Hours

Air Sealing Equations:

Customer Dth	= (CFM50_Baseline - CFM50_Proposed) / N_Winter * ATF * HDD * 24 / Heating_Eff_Gas / 1,000,000
Cooling_kWh	= (CFM50_Baseline - CFM50_Proposed) / N_Summer * ATF * CDD * 24 / Cooling_Eff / 3,412
Heating_kWh	= (CFM50_Baseline - CFM50_Proposed) / N_Winter * ATF * HDD * 24 / Heating_Eff_Elec / 3,412
Gross Annual kWh Saved at Customer	= Cooling_kWh + Heating_kWh
Customer kW (Gross kW)	= Gross Annual kWh Saved at Customer / (Cooling_Hours + Heating_Hours)
Customer PCkW	= Cooling_kWh / Cooling_Hours

Variables:

R_Wall_Base	4.4	R-Value for baseline wall insulation, calculated assuming no cavity insulation
R_Wall_Proposed	13.0	R-Value for proposed wall insulation, calculated assuming R-11 cavity insulation
Heating_Efficiency_Gas	See Table 1	Heating Efficiency is determined based on the customer's heating system type
Cooling_Eff	See Table 2	Cooling Efficiency is determined based on the customer's cooling system type
Heating_Efficiency_Elec	See Table 1	Heating Efficiency is determined based on the customer's heating system type
N_Winter (Reference 2)	See Table 3	Conversion factor used to relate actual measured CFM leakage rate (taken at a reference pressure of 50 pascals) to a natural CFM of infiltration
N_Summer (Reference 2)	See Table 3	Conversion factor used to relate actual measured CFM leakage rate (taken at a reference pressure of 50 pascals) to a natural CFM of infiltration
CFM50_Baseline	3,109	Air leakage rate at 50 pascals maintained pressure, measured in cubic feet per minute. Numbers based on CO program data
CFM50_Proposed	2,215	Air leakage rate at 50 pascals maintained pressure, measured in cubic feet per minute. Numbers based on CO program data
ATF	1.04	Air Transfer Factor is a conversion factor for calculating BTU/hour from airflow in CFM
HDD	7,856	Heating Degree Days base 65, based on TMY3 data
CDD	891	Cooling Degree Days base 65, based on TMY3 data
Conversion from Btu to Dth	1,000,000	1 Dth = 1,000,000 Btuh
Conversion from Btu to kWh	3,412	1 kWh = 3,412 Btuh
Cooling_Hours	490	Full load cooling hours per Residential Heating program
Heating_Hours	1,261	Full load heating hours per Residential Heating program
Measure Lifetime	See Table 5	(Reference 1)

Inputs:

Wall_Area	Customer Input	Square footage of wall insulation added, provided by customer
R_Attic_Base	Customer Input	R-Value for baseline attic insulation, provided by customer
R_Attic_Proposed	Customer Input	R-Value for proposed attic insulation, provided by customer
Attic_Area	Customer Input	Square footage of attic insulation added, provided by customer
Incremental Cost	Customer Input	Cost of the insulation or air sealing is provided by the customer

Table 1	Heating_	Heating_
Air Source Heat Pump		2.26
Electric Resistance		1.00
Ground Source Heat Pump		3.30
Natural Gas	0.78	

Table 2	Cooling_Eff
AC/Air Source Heat Pump	3.93
Evap or None	0.00
Ground Source Heat Pump	4.13

Table 3

Stories	N_Winter	N_Summer
1	11.384	15.379
2	9.016	12.964
3	7.788	11.676

Table 4

HDD	7,856
CDD	891

Table 5

	Lifetime	
Wall Insulation	20	Reference 1
Attic Insulation	20	Reference 1
Air Sealing	10	Reference 1

References:

1. California Measurement Advisory Committee (CALMAC) Protocols, Appendix F (www.calmac.org/events/APX_F.pdf).
2. ASHRAE 2013 Fundamentals, Chapter 16, Equations (41) defining Equivalent Air Leakage Area and (48) defining airflow rate from infiltration.
3. 2013 ASHRAE Fundamentals; Page 16.23 Table 4 Defining Stack Coefficient C_s
4. Field Assessment of Energy Audit Tools for Retrofit Programs. An evaluation of 154 existing homes in Apple Valley and Minneapolis.
5. 2013 ASHRAE Fundamentals; Page 16.24 Table 6, defining basic model Wind Coefficient, C_w
6. Estimates for air density in Minnesota based on altitude at airport. http://www.engineeringtoolbox.com/air-altitude-density-volume-d_195.html

Changes from Recent Filing

The overall methodology was changed from using a energy model approach to a calculation based approach.

Product: Refrigerator Recycling

Description:

Rebates will be offered for pickup of a working refrigerator or freezer that will be demanufactured and re-cycled. Program will be offerd only during select periods throughout the year.

Algorithms:

Refrigerator Electrical Energy Savings (Customer kWh)	= Base kWh - Efficient kWh
Refrigerator Electrical Demand Savings (Customer kW)	= Customer kWh / Hours_of_operation

Variables:

Baseline Product Consumption - Base kWh	= Baseline Product Consumption is the predicted future consumption of refrigerator being removed as seen in Table 1 based on the year of manufacture which will be provided by the vendor for each refrigerator. (Reference 4) Freezer base kWh is 85% of that for refrigerators
Efficient Product Consumption - Efficient kWh	= Efficient Product Consumption is 0 kWh when unit has been demanufacturered.
Measure Life	= Measure life is assumed to be the remaining service life of the existing refrigerators that are removed under this program. = 8.5 years. Freezers = 6.2 years (Reference 2)
Incremental Costs	$0.00
O&M savings	= Operation and Maintenance savings are assumed to be zero for refrigerator recycling.
CF	= Coincidence Factor = 63.84%; probability that refrigerator will be operating during the peak period. (Reference 6)
Hours of Operation	= 5592 hr/yr (Reference 6)

Needed from Customer/Vendor/Administrator for Calculations:

Confirm removal of working refrigerator Year of manufacture for the working refrigerator

Assumptions:

Rebates are available only for working units. Refrigerators and standalone freezers.

Table 1
Deemed Savings by Age of Refrigerator (Reference 1)

Year of Manufacture	Deemed Savings kWh
1970	2,288
1971	2,274
1972	2,261
1973	2,189
1974	2,153
1975	2,069
1976	1,949
1977	1,882
1978	1,835
1979	1,707
1980	1,598
1981	1,477
1982	1,469
1983	1,423
1984	1,389
1985	1,282
1986	1,293
1987	1,167
1988	1,148
1989	1,105
1990	1,103
1991	1,097
1992	1,090
1993	778
1994	773
1995	769
1996	772
1997	774
1998	776
1999	779
2000	781
2001	540
2002	539
2003	538
2004	526
2005	515
2006	528
2007	521
2008	512
2009	505
2010	518
2011	515
2012	517
2013	504
2014	419

References:

1. Baseline kWh and Average to peak kW ratio from 1995 and 2012 versions of Residential Energy Data Sourcebook for the U.S. Residential Sector. Berkeley, CA: Lawrence Berkeley National Laboratory. LBNL-40297
2. 9th year Persistence Study for Southern California Edison KEMA - Xenergy; 2004
3. Coincidence factor is Average load factor from Appliance Recycling Centers of America (ARCA)
4.Estimate for annual energy use for freezers as percent of refrigerator use. See Table Final Estimates on page 6-15 of report by KEMA-XENERGY (2004). "Final Report, Measurment and Evaluation Study of 2002 Statewide Residential Appliance Recycling Program." February 13, 2004
5. Cost information from "2010 - 2012 W0017 Ex Ante Measure Cost Study Final Report.", Itron, May 2014.
6. Data to support CF of 63.8% from "Domestic Refrigerators: Field Studies and Energy Efficiency Improvement", M. Siddhartha Bhatt, CPRI, July 2001.
7. Data on Efficiency Standards, "Technical Support Document Refrigerators and Freezers", DOE, 2014.
8. Shipment Weighted Efficiencies from Residential Energy Databook, Years 1950 - 1995, http://enduse.lbl.gov/Projects/RED.html
9. Refrigerator-Freezer Sizes and Energy Factors (Shipment-Weighted Averages), Residential Energy Databook, Years 1972 - 2010, http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=5.7.5
10. California Measurement Advisory Committee (CALMAC) Protocols, Appendix F (www.calmac.org/events/APX_F.pdf).
11. Energy Star Program Requirements for Refrigerators. https://www.energystar.gov/ia/partners/product_specs/program_reqs/refrig_prog_req.pdf
12. Actual program data on age of recycled units were used to create weighted average energy consumption of units recycled.

Changes from Recent Filing:

Recycle all refrigerators

Program: Residential Cooling (High Efficiency Air Conditioning)

Description:

equipment efficiency and size. Rebate for GSHP is based on equipment size. For new Mini-Split Heat Pumps (MSHP) it is assumed that the MSHP is being installed in either new construction or to supplement an existing heating and cooling system. The MSHP rebate is intended to incent customers to install a high efficiency MSHP rather than the code level baseline unit.

Algorithms:

Seasonal Energy Efficiency Ratio (SEER)	= Total seasonal cooling output (kBtuh) / Total electrical input (kWh); for estimating seasonal performance. For GSHP EER is typically provided so SEER will be calculated. SEER = (1.12 - SQRT(1.2544-0.08 x EER))/0.04
Energy Efficiency Ratio (EER)	= Rated cooling output (kBtuh) / Rated electrical input (kW) for equipment tested at 95F estimating peak cooling performance; EER = -0.02 x SEER^2 + 1.12 x SEER. This equation relating EER to SEER applies to all equipment in this program, and will be used if EER rating is not available. (Reference 1) For forecasting purposes the EER for MSHPs will be determined by the following empirical formula based on AHRI information: = (-0.0003*(SEER/ton)^3 + 0.0101*(SEER/ton)^2 + 0.5264*(SEER/ton) - 0.0233)*tons
Heating Seasonal Performance Factor (HSPF)	= 3.412 x Heat Energy Output (Btu) / Energy Input to Compressor (Btu)
kW/ton	= 12 / Energy Efficiency Ratio
Energy Efficiency Ratio	= 3.413 x Coefficient of Performance

For Split System Air Conditioners and Air Source Heat Pumps and Ground Source Heat Pumps

kW_No_QI_Standard	= Size x 12/(EER_Standard x (1 - Sizing_Loss))
kW_No_QI_Eff	= Size x 12/(EER_Eff x (1 - Sizing_Loss))
kW QI_Standard	= Size x (1 - Sizing_Loss_QI) x 12/EER_Standard
kW QI_Eff	= Size x (1 - Sizing_Loss_QI) x 12/EER_Eff
kWh_No_QI_New_Home_Standard	= Size x EFLH_New x 12/(SEER_Standard x (1 - Loss_No_QI))
kWh_No_QI_New_Home_Eff	= Size x EFLH_New x 12/(SEER_Eff x (1 - Loss_No_QI))
kWh_No_QI_Existing_Home_Standard	= Size x EFLH_Existing x 12/(SEER_Standard x (1 - Loss_No_QI))
kWh_No_QI_Existing_Home_Eff	= Size x EFLH_Existing x 12/(SEER_Eff x (1 - Loss_No_QI))
kWh QI New Home_Standard	= Size x EFLH_New x 12/(SEER_Standard x (1 - Uncorr_Loss_New))
kWh QI New Home_Eff	= Size x EFLH_New x 12/(SEER_Eff x (1 - Uncorr_Loss_New))
kWh QI Existing Home_Standard	= Size x EFLH_Existing x 12/(SEER_Standardf x (1 - Uncorr_Loss_Exist))
kWh QI Existing Home_Eff	= Size x EFLH_Existing x 12/(SEER_Eff x (1 - Uncorr_Loss_Exist))
New Equipment Electrical Energy Savings_New_Home (Customer kWh)	= kWh_No_QI_New_Home_Standard - kWh_No_QI_New_Home_Eff
New Equipment Electrical Energy Savings_Existing_Home (Customer kWh)	= kWh_No_QI_Existing_Home_Standard - kWh_No_QI_Existing_Home_Eff
New Equipment Electrical Demand Savings (Customer kW)	= kW_No_QI_Standard - kW_No_QI_Eff
Quality Install Electrical Energy Savings New Home_Standard (Customer kWh)	= kWh_No_QI_New_Home_Standard - kWh QI New Home_Standard
Quality Install Electrical Energy Savings New Home_Eff (Customer kWh)	= kWh_No_QI_New_Home_Eff - kWh QI New Home_Eff
Quality Install Electrical Energy Savings Existing Home_Standard (Customer kWh)	= kWh_No_QI_Existing_Home_Standard - kWh QI Existing Home_Standard
Quality Install Electrical Energy Savings Existing Home_Eff (Customer kWh)	= kWh_No_QI_Existing_Home_Eff - kWh QI Existing Home_Eff
Quality Install Electrical Demand Savings (Customer kW)	= kW_No_QI_Eff - kW_QI_Eff
Electrical Energy Savings (Gross Generator kWh)	= Customer kWh / (1-TDLF)
Electrical Demand Savings (Gross Generator kW)	= Customer kW x CF / (1-TDLF)
Electrical Energy Savings (Net Generator kWh)	= Gross Generator kWh x NTG
Electrical Demand Savings (Net Generator kW)	= Gross Generator kW x NTG
Quality Install Incremental Cost	= Quality_Install_Cost_Existing_Home - Size x AC_Cost_Per_Ton x Sizing_Loss_QI (or minimum value of $75)
Present Value ($)	=Future Value * (1+rate) ^ (number of periods * -1)

For Cooling by Mini-Split Heat Pumps (MSHP)

New Equipment Electrical Energy Savings (Gross Annual kWh Saved at Customer)	=(Size x EFLH x (12/SEER_Standard - 12/SEER_Eff))/(1-Loss_No_QI_MSHP)
New Equipment Electrical Demand Savings (Gross kW Saved at Customer)	= Size x (12/EER_Standard - 12/EER_Eff)

For Heating by Mini-Split Heat Pumps (MSHP)

New Equipment Electrical Energy Savings (Gross Annual kWh Saved at Customer)	=(Size_Heat / 1000 x MSHP_EFLHH x (1/HSPF_Standard - 1/HSPF_Eff))(1-Loss_No_QI_MSHP)

For Both Heating and Cooling by Mini-Split Heat Pumps (MSHP)

New Equipment Electrical Energy Savings (Gross Annual kWh Saved at Customer)	= Cooling Electrical Energy Savings + Heating Electrical Energy Savings

Variables:

Size	= The equipment capacity in tons, provided by customer
EFLH_New	= The Equivalent Full Load Hours of cooling load. We will use 491 for new homes which is the cooling load of a 2600 SF new home in Minneapolis. All homes were modeled with a 2 ton SEER 13 AC unit. (Reference 5)
EFLH_Existing	= The Equivalent Full Load Hours for existing homes. We will use 465 for an existing home which is the average cooling load for two 1800 SF homes- one with weatherization and one without weatherization. All homes were modeled with a 2 ton SEER 13 AC unit. (Reference 5)
SEER_Standard	= Seasonal Energy Efficiency Ratio of baseline equipment, based upon the minimum Federal standard for efficiency as manufactured. For residential AC units we will use 13 SEER. For ASHP and MSHP we will use 14 SEER. For GSHP we will us a 13 SEER AC unit.
SEER_Eff	= Seasonal Energy Efficiency Ratio of High Efficiency equipment that the customer will install, provided by the customer. For GSHP the this may be provided as EER and will have to be converted to SEER.
EER_Standard	= EER of standard equipment, based upon the minimum Federal acceptable efficiency. We will use 11.18 based on the federal standard 13 SEER and the conversion listed above.
EER_Eff	= EER of High Efficiency that the customer will install, provided by customer. If value is not provided by the customer we will use the conversion listed above. For GSHP the unit must have an EER of 14.1 or greater. For forecasting purposes the EER for MSHPs will be determined by the following empirical formula based on AHRI information: = (-0.0003*(SEER/ton)^3 + 0.0101*(SEER/ton)^2 + 0.5264*(SEER/ton) - 0.0233)*tons
Sizing_Loss_New	= Specific losses from non-QI that affects peak load = 0%
Sizing_Loss_Existing	= Specific losses from non-QI that affects peak load = 2.5%
Sizing_Loss_QI	= Reduction in equipment size due to quality install = 10%
Uncorr_Loss_New	= Uncorrectable duct leakage losses. For new homes = 0 %
Uncorr_Loss_Exist	= Uncorrectable duct leakage losses. For existing homes = 3.7%
Loss_No_QI_New	= Efficiency of average unit lost due to improper installation. We will use 9% which is the summation of the following losses: Equipment sizing =0% Refrigeration Charge = 7% Improper air flow = 2% Duct leaks = 0%
Loss_No_QI_Exist	= Efficiency of average unit lost due to improper installation. We will use 19.8% which is the summation of the following losses: Equipment sizing =2.5% Refrigeration Charge = 7% Improper air flow = 2% Duct leaks = 8.3%
MSHP_EFLHH	= Mini-Split Heat Pump Equivalent Full Load Hours Heating: The equivalent number of hours that MSHP equipment would be running at Full Load over the course of the year for heating. We will use 1014 EFLH, from the Residential Heating program for an existing home that is the average of a weatherized and non-weatherized home
EFLH	= Mini-Split Heat Pump Equivalent Full Load Hours Cooling: The equivalent number of hours that MSHP equipment would be running at Full Load over the course of the year for cooling. We will use 536 EFLH, which comes from the assumptions for air conditioners and uses the size of the modeled air conditioner and the model ton-hours for an existing home to calculate the full-load hours.
Size_Heat	= Heating Capacity of Mini Split Heat Pump, in BTU/h, provided by customer
HSPF_Standard	= Heating Seasonal Performance Factor (HSPF) of standard equipment, based upon the minimum Federal standard for efficiency as manufactured. For MSHP we will use 8.2 HSPF.
HSPF_Eff	= Heating Seasonal Performance Factor (HSPF) of High Efficiency equipment that the customer will install, provided by the customer
Loss_No_QI_MSHP, Loss_QI_MSHP	Loss_No_QI_MSHP and Loss_QI_MSHP will be equal to 0%.
3.412	= Conversion between BTU/h and Watts
3412	= Conversion between BTU/h and kilowatts
12000	= Conversion between BTU/h and tons
CF	= Coincidence Factor, the probability that peak demand savings will coincide with peak utility system demand. 0.90 will be used for prescriptive rebates. GSHP and MSHP heating CF values will be 0
Measure Life	Measure life for AC and ASHP is 15 years (Reference 2); Measure life for GSHP is 20 years (Reference 16), Measure life for MSHP is 18 years (Reference 11)
Equipment Costs	See Table 1
Quality_Install_Cost_Existing Home	See Table 1
AC_Cost_Per_Ton	See Table 1
Incremental operation and maintenance cost	= 0 - conservative approach, taking no credit for improved mean time between failure.

Needed from Customer/Vendor/Administrator for Calculations:

Cooling equipment type
Cooling equipment size (tons)
Cooling equipment efficiency (SEER, EER)
Type of home (Existing or New Construction)
MSHP heating efficiency (HPSF)
Primary use, cooling or heating (MSHP)

Table 1 - Incremental Costs

SEER	AC Cost per Ton	AC Incremental Cost per Ton	ASHP Cost per Ton	ASHPIncremental Cost per Ton	GSHP Baseline Cost per Ton	GSHP Incremental Cost per Ton*
13 SEER	$ 423				$ 423	
14/14.5 SEER	$ 515	$ 92	$ 778			$ 584
15 SEER	$ 607	$ 184	$ 960	$ 183		
16 SEER	$ 699	$ 276	$ 1,143	$ 366		
17 SEER	$ 791	$ 369	$ 1,326	$ 548		

Quality Installation Measures	New Home	Existing Home*
	$ 117	$ 273

*note the above equation (Quality Install Incremental Cost) regarding Existing Homes

Mini-Split Heat Pump	Current Year Purchase Price	Incremental cost per ton Cooling
Mini-Split Heat Pump (15-20 SEER, 9-12 HSPF)	$ 3,303	$ 375
Mini-Split Heat Pump (21-26 SEER, 9-12 HSPF)	$ 3,536	$ 608

Minisplit Costs from Reference 14

Incremental costs for unit installed will be taken from the above table or will be calculated using a ratio from the above table if not given in the

* Total incremental costs for ground source heat pumps are higher. Because we are not claiming heating savings we only consider the portion of the incremental cost attributed to the cooling. Likewise, the additional incremental costs for air source heat pumps due to the reversing valve were not considered.

Assumptions:

Baseline equipment meets applicable minimum Federal standards for efficiency
High efficiency equipment exceeds minimum Federal standards for efficiency
Installed equipment does not operate at optimum efficiency until a Quality Installation is completed
To qualify for a rebate, all AC equipment must meet the minimum EER and SEER requirements, all ASHP equipment must meet SEER requirement and the GSHP equipment must meet EER requirement. The customer should provide EER and/or SEER values as applicable for the particular piece of equipment. If the customer is unable to provide both values, the value(s) not provided will be calculated using the equations shown above. If a value is not provided by the customer, the calculated value still must meet the minimum requirement.
Ground Source Heat Pumps are limited to less than or equal to 5 tons.
No Heating kW saving are claimed for MSHP during winter, only summer cooling kW savings are claimed.

References:

1. Building America, Research Benchmark Definitions, 2010. (see p. 10) http://www.nrel.gov/docs/fy10osti/47246.pdf
2. ASHRAE, 2007, Applications Handbook, Ch. 37, table 4, Comparison of Service Life Estimates
3. DOE Appliance Standards Website, Residential Central Air Conditioners and Heat Pumps. https://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/75
4. Neme, Proctor, Nadel, ACEEE, 1999. Energy Savings Potential From Addressing Residential Air Conditioner and Heat Pump Installation Problems, http://aceee.org/research-report/a992
5. Building Energy Optimizaiton model results run Nov. 2015. See "Model Data" file for assumptions.
6 ENERGY STAR Quality Installation. https://www.energystar.gov/index.cfm?c=hvac_install.hvac_install_index
7. NREL 2011 Measure Guideline Sealing and Insulating Ducts in Existing Homes. http://www.nrel.gov/docs/fy12osti/53494.pdf
8. Geothermal Heat Pumps Key Product Criteria. https://www.energystar.gov/index.cfm?c=geo_heat.pr_crit_geo_heat_pumps
9. For explanation of duct sealing requirements for new homes see "Significant Changes to the 2015 Minnesota Residential Codes (MR 1303, 1309 and 1322)". http://www.ci.minneapolis.mn.us/www/groups/public/@regservices/documents/webcontent/wcms1p-142763.pdf
10. Incremental costs for MSHPs were determined from the NEEP Incremental Cost Study Phase 2 Report
11. MSHP equipment life is from Measure Life Report Residential and Commercial/Industrial Lighting and HVAC Measures; http://library.cee1.org/content/measure-life-report-residential-and-commercialindustrial-lighting-and-hvac-measures
12. For estimated life of GSHP see http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12640 (indoor components up to 25 years; ground loop =50 years)
13. Costs obtained from "2010-2012 WO017 Ex Ante Measure Cost Study Final Report", by Itron, May 2014. These are used in the DEER 2016 database.
14.For assumptions on losses related to overcharge or undercharge on refrigerant see "Sensitivity Analysis of Installation Faults on Heat Pump Performance", by P. Domanski, et. al., Sept 2014, http://www.acca.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=f02c1f61-4d1d-4a24-971d-cc9ea3e626b2&forceDialog=0

Product: Residential Heating (Heating System Rebate)

Description:

Residential natural gas customers receive a cash rebate for purchasing high-efficiency heating equipment. Residential electric customers can receive an additional cash rebate for purchasing an electronically commutated motor (ECM) furnace fan with their heating system.

Algorithms:

New Furnace Savings (Gross Dth)	= ((BTUH x EFFp / EFFb) - BTUH) x Hours / 1,000,000
ECM Furnace Fan Efficiency Electric Demand Savings (Gross kW saved at Customer)	= ECM_Baseline_kW - ECM_Proposed_kW
ECM Furnace Fan Efficiency Electric Demand Savings (Gross Generator kW)	= ECM_Customer_kW * Coincidence_Factor
ECM Furnace Fan Efficiency Electric Energy Savings (Gross Annual kWh Saved at Customer)	= ECM_Customer_kW x ECM_Operating_Hours
ECM Heating O&M Penalty	= ECM_Heating_Penalty

Variables:

BTUH	Customer Input	Rated new furnace or boiler Input BTUH nameplate data provided by customer on rebate form.
EFFb	See Table 5	Efficiency of baseline code minimum furnace or boiler
EFFp	Customer Input	Efficiency for higher efficiency furnace will be provided by the customer on the rebate form.
Hours	See Table 5	Equivalent Full Load Heating Hours assumed for installed high efficiency furnace equipment
Conversion from Btu to Dth	1,000,000	1 Dth = 1,000,000 Btuh
Incremental Cost	See Table 1 and 3	Incremental costs of efficient equipment
ECM_Baseline_kW	See Table 2	Average PSC furnace fan kW (Reference 5, 6)
ECM_Proposed_kW	See Table 2	Average ECM furnace fan kW (Reference 5, 6)
ECM_Heating_Penalty	See Table 2	O&M Dollars spent in additional gas use to offset heating done by fan during winter
ECM_Operating_Hours	See Table 2	ECM furnace fan hours of operation
Coincidence_Factor	See Table 3	Percentage of Customer_kW savings that will coincide with peak summer kW savings

Inputs:	**Verified during M&V:**
Furnace Efficiency EFFp)	Yes
Furnace Nameplate Capacity of new unit at sea level (BTUH, Input)	Yes
Was ECM on a new furnace or retrofit?	Yes
Does residence have central air conditioning?	Yes
Will furnace be installed on new home or existing home?	Yes

Table 1	Incremental Cost New Home	Incremental Cost Existing Home	Lifetime
95% Furnace	$164.93	$736.33	18
96% Furnace	$378.85	$950.25	18
97% Furnace	$476.84	$1,048.24	18
84% Boiler	$1,445.68		20
90% Boiler	$2,379.12		20
95% Boiler	$3,001.42		20

Table 2	ECM_Baseline_kW	ECM_Proposed_kW	ECM_Operating _Hours	ECM_Heating_ Penalty
New ECM w/ AC	0.579	0.390	3,556	$ (14.06)
New ECM w/o AC	0.504	0.301	2,783	$ (14.06)
Retrofit ECM w/ AC	0.569	0.357	2,542	$ (9.50)
Retrofit ECM w/o AC	0.501	0.298	2,133	$ (9.50)

Table 3	Measure Life	Incremental Cost	Coincidence _Factor
New ECM w/ AC	18	$212.00	71%
New ECM w/o AC	18	$212.00	27%
Retrofit ECM w/ AC	7	$212.00	63%
Retrofit ECM w/o AC	7	$212.00	27%

Table 5	EFFb	Hours	Lifetime
New Furnace in Existing Home	80%	1,261	18
New Furnace in New Home	90%	970	18
Boilers	82%	1,268	20

References:

1. DOE Appliance Standards Website for Furnaces listing minimum efficiency standard.
https://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/72
2. DOE Appliance Standards Website for Boilers listing minimum efficiency standard.
https://www1.eere.energy.gov/buildings/appliance_standards/product.aspx?productid=89
3. 2015 ASHRAE Handbook - HVAC Applications; Comparison of Service Life Estimates; Page 37.3, Table 4
4. Assumptions on EC fan operating modes. Center for Energy and Environment Comments to Docket Number EERE-2010-BT-STD-0011-0022, July 27, 2010
5. ECM Furnace Impact Assessment Report https://focusonenergy.com/sites/default/files/emcfurnaceimpactassessment_evaluationreport.pdf
6. California Energy Commission's Database for Energy Efficient Resources (DEER) http//www.energy.ca.gov/deer
7. MN Dept of Energy Resources requires that all new homes use a baseline furnace efficiency of 90%.
8. Cost information from "2010 - 2012 W0017 Ex Ante Measure Cost Study Final Report.", Itron, May 2014.

Changes from Recent Filing:

1. Baseline efficiency for boilers increased to 82% per federal standards.
2. Updated calculation for EFLH to use TMY3 data
3. Updated ECM kW, Hours, and CF calculation to account for PSC motor standby time.
4. Updated for 80% furnace efficiency baseline

Product: School Education Kits

Description:

A package of energy efficiency and water conservation classroom activities combined with projects for home that is targeted at sixth grade students. Each student receives a School Education Kit containing a 1.5 gpm low flow showerhead, a 1.5 gpm low flow kitchen sink aerator, a 1.0 gpm low flow bathroom sink aerator, and four LED bulbs (2 each 11W and 2 each 9 Watts) and other educational items such as a thermometer, filter alarm, leak detection tablet, night light and tape measure.

Program References:

Measures "Provide Efficient Showerhead"	Refer to Program "Energy Efficient Showerhead - MN" to find formulas for Customer Dth, Customer kWh, customer kW, customer PCkW, etc. for the "Efficient Showerhead" measures.
Measures "Provide Efficient Kitchen Faucet Aerator"	Refer to Program "Energy Efficient Showerhead - MN" to find formulas for Customer Dth, Customer kWh, customer kW, customer PCkW, etc. for the "Efficient Kitchen Faucet Aerator" measure.
Measures "Provide Efficient Bath Faucet Aerator"	Refer to Program "Energy Efficient Showerhead - MN" to find formulas for Customer Dth, Customer kWh, customer kW, customer PCkW, etc. for the "Efficient Bath Faucet Aerator" measure.
Measures "Replace incandescent lamps with LEDs"	Refer to Program "Home Lighting & Recycling - MN" to find formulas for Customer kW, Customer kWh, Customer PCkW for the "LED" measure.
Measure "Provide Efficient Showerhead"	Refer to Program "Energy Efficient Showerhead - MN" to find reference table for "Gas Split Factor", "Measure Life", "Hours", "Coincidence Factor", etc. values.
Measures "Provide Efficient Kitchen Faucet Aerator"	Refer to Program "Energy Efficient Showerhead - MN" to find reference table for "Gas Split Factor", "Measure Life", "Hours", "Coincidence Factor", etc. values.
Measures "Provide Efficient Bath Faucet Aerator"	Refer to Program "Energy Efficient Showerhead - MN" to find reference table for "Gas Split Factor", "Measure Life", "Hours", "Coincidence Factor", etc. values.
Measures "Replace incandescent lamps with LEDs"	Refer to Program "Home Lighting and Recycling - MN" to find references and tables for "Measure Life", "Hours", "Coincidence Factor", etc. values.
Measure "Provide Efficient Showerhead"	Refer to Program "Energy Efficient Showerhead - MN" to find reference table for Operation and Maintenance cost savings value due to water savings.
Measures "Provide Efficient Kitchen Faucet Aerator"	Refer to Program "Energy Efficient Showerhead - MN" to find reference table for Operation and Maintenance cost savings value due to water savings.
Measures "Provide Efficient Bath Faucet Aerator"	Refer to Program "Energy Efficient Showerhead - MN" to find reference table for "Operation and Maintenance cost savings", value due to water savings.

Algorithms:

Showerhead or Aerator Gas Savings (Gross D	= Customer Dth/Unit x (# kits distributed x Gas_Split_Factor)
Showerhead or Aerator Gas Savings (net Dth	= Customer Dth/Unit x (# kits distributed x Gas_Split_Factor) x NTG x Install Rate x Realization Rate
Showerhead or Aerator Electrical Energy Savings (Net Gen kWh)	= Customer Generator kWh x (# kits distributed x (1 - Gas_Split_Factor)) x NTG x Install Rate x Realization Rate
Showerhead or Aerator Electrical Demand Savings (Net Gen kW)	= Customer Generator kW x (# kits distributed x (1 - Gas_Split_Factor)) x NTG x Install Rate x Realization Rate

Variables:

Incremental Costs	= costs provided by vendor.
Install Rate	= Actual Installation Rates will be collected as part of the M&V exercise. For these assumptions, an install rate of 55% for LEDs, 35% for Showerheads, 30% for Kitchen Aerators, and 25% for Bathroom Aerators has been assumed.

Inputs:

Was 9 W LED #1 installed
Was 9 W LED #2 installed
Was 11 W LED #1 installed
Was 11 W LED #2 installed
Was showerhead installed
Was Kitchen Aerator installed
Was Bathroom Aerator installed

Assumptions:

Savings for water heater measures include homes with either electric or gas water heaters. The Energy Efficient Showerhead - MN program monitors and establishes a gas split factor for use in homes where the water heater type is unknown. School Education Kits will use the Energy Efficient Showerhead - MN program's gas split factor for unknown water heater types to calculate and claim energy savings.

References:

See Reference Programs
Energy Efficient Showerheads
Home Lighting and Recycling

Product: Water Heater Rebate

Description:

Residential natural gas customers receive a rebate for purchasing high-efficiency natural gas water heating equipment.

Equations:

Hot_Water_Energy	= Hot_Water_Demand / Standard_Tank_Size x Water_Heater_Delta_T x 365 x 8.33 x Proposed_Tank_Size
Water_Heater_Delta_T	= Water_Heater_Temperature - City_Mains_Temperature

Gas Equations:

Customer_Dth	= Baseline_Dth - Proposed_Dth
Baseline_Dth	= Hot_Water_Energy / Baseline_Eff_Gas / 1,000,000
Proposed_Dth	= Hot_Water_Energy / Proposed_Eff / 1,000,000
Baseline_Eff_Gas (Reference 4) Tank Size >= 20gal, <=55gal	= 0.675 - 0.0015 x Proposed_Tank_Size

Variable ID

Hot_Water_Demand	64.3	Average gallons per day of hot water use. (Reference 1)
Hot Water Temperature	135	Water heater setpoint temperature °F. (Reference 1)
City_Mains_Temperature	51.9	Water temperature of city water entering the water heater °F. (Reference 2)
Standard_Tank_Size	45	Average hot water tank size of 45 gallons based on program historical data.
Heat content of 1 gallon water	8.33	Btu/gal °F
Conversion from Btu to Dth	1,000,000	1 Dth = 1,000,000 Btuh
Proposed_Tank_Size	Customer Input	Storage capacity for tank type water heaters.
Type of Proposed Water Heater	Customer Input	Type of proposed water heater. (i.e. Storage, Tankless)
Proposed_Eff	Customer Input	Efficiency Factor for proposed water heater.
Measure Life	See Table 1	Lifetime of water heaters. (References 3 and 5)
Incremental Costs	See Table 1	Incremental cost of efficient technology over baseline technology.

Table 1

Water Heater Type	Equipment Cost	Incremental Cost	Lifetime
0.62 EF Gas Storage	$ 932		13
0.67 EF Gas Storage	$ 1,155	$ 222.82	13
0.82 EF Gas Storage	$ 1,334	$ 401.66	13
0.90 EF Tankless	$ 1,540	$ 607.60	20

References:

1. Energy Conservation Program for Consumer Products: Test Procedure for Water Heaters; United States Department of Energy; http://www.gpo.gov/fdsys/pkg/FR-1998-05-11/pdf/98-12296.pdf
2. United States Department of Energy. DHW Scheduler. Value is average water main temperature MSP Intl AP. http://energy.gov/eere/buildings/downloads/building-america-standard-dhw-schedules
3. ENERGY STAR Residential Water Heaters Final Criteria Analysis. https://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/water_heaters/WaterHeaterAnalysis_Final.pdf
4. US Department of Energy; Residential Water Heater Standards; http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/27
5. 2010 - 2012 W0017 Ex Ante Measure Cost Study Final Report. http://www.energydataweb.com/cpucFiles/pdaDocs/1100/2010-2012%20WO017%20Ex%20Ante%20Measure%20Cost%20Study%20-%20Final%20Report.pdf

Changes from Recent Filing:

1. Updated incremental costs
2. Updated baseline water heater calculation formula per new standards

Product: Whole Home Efficiency

Description:

Residential natural gas and electric combo customers receive a cash rebate for implementing multiple energy efficiency improvements. Customers must have at least 20 LEDs (new or installed), and complete attic insulation and bypass sealing, and air sealing and weatherization measures to receive rebate.

Algorithms:

Measure "Direct Install - LED"	Refer to Product "Home Lighting & Recycling - MN" formulas for Customer kW, Customer kWh, Customer PCkW, etc. for the "Replace incandescent lamps with LEDs" measure.
Measures "Attic Insulation", "Air Sealing", and "Wall Insulation"	Refer to Program "Insulation Rebates - MN" formulas for Customer kW, Customer kWh, Customer PCkW, etc., and other energy savings calculations for the "Attic Insulation", "Air Sealing", and "Wall Insulation" measures
Measures "Showerhead", "Aerator Kitchen", and "Aerator Bathroom"	Refer to Product "Energy Efficient Showerhead - MN" formulas for Customer kW, Customer kWh, Customer PCkW, and other energy savings calculations.
Measure "Water Heater Blanket"	Refer to Product "Home Energy Squad - MN" formulas for Customer kW, Customer kWh, Customer PCkW, Customer Dth, etc. and other energy savings calcualtions for the "Install Water Heater Blanket" measure.
Measure "Install and Program New Thermostat"	Refer to Product "Home Energy Squad - MN" formulas for Customer kW, Customer kWh, Customer PCkW, Customer Dth, etc. and other energy savings calcualtions for the "Install and Program New Thermostat" measures.
Measures "EC Fan Motor", "New Gas Boiler" and "New Gas Furnace"	Refer to Product "MN Heating System Rebate" formulas for Customer kW, Customer kWh, Customer PCkW, Customer Dth, etc. and other energy savings calcualtions for the "EC Fan Motor", "New Gas Boiler" and "New Gas Furnace" measures.
Measures "Installation of new AC", "Installation of Mini-Split Heat Pump" and "Quality Installation of new AC"	Refer to Product "MN Residential Cooling" formulas for Customer kW, Customer kWh, Customer PCkW, etc. and other energy savings calcualtions for the "Installation of new AC", "Installation of Mini-Split Heat Pump" and "Quality Installation of new AC" measures.
Measures "Energy Star Clothes Washer"	Refer to Product "Energy Star New Homes - MN" formulas for Customer kW, Customer kWh, Customer PCkW, Customer Dth, etc. and other energy savings calcualtions for the "Energy Star Clothes Washer" measures
Measure "Energy Star Refrigerator"	Refer to Program "Refrigerator Recycling - MN" formulas for Customer kW, Customer kWh, Customer PCkW, etc. for the "Energy Star Refrigerator" measure.
Measures "Storage Water Heater" and "Tankless Water Heater"	Refer to Program "MN Water Heater Rebate" formulas for Customer Dth, etc. for the "Storage Water Heater" and "Tankless Water Heater" measures.
Measure "Direct Install - LED"	Refer to Product "Home Lighting & Recycling - MN" formulas for values of hours, efficient wattages by Lumens, baseline wattages, etc. for the "Replace incandescent lamps with LEDs" measure.
Measures "Attic Insulation", "Air Sealing", and "Wall Insulation"	Refer to Program "Insulation Rebates - MN" for variable assumptions used in energy savings calculations for the "Attic Insulation", "Air Sealing", and "Wall Insulation" measures
Measures "Showerhead", "Aerator Kitchen", and "Aerator Bathroom"	Refer to Product "Energy Efficient Showerhead - MN" for variable assumptions used in energy savings calculations, (Hours, Coincidence Factor, etc.).
Measure "Water Heater Blanket"	Refer to Product "Home Energy Squad - MN" values of efficiencies, temperatures, R-Values, hours, etc. used in the energy savings calcualtions for the "Install Water Heater Blanket" measures.
Measure "Install and Program New Thermostat"	Refer to Product "Home Energy Squad - MN" for values and assumptions used in the energy savings calculations for the "Install and Program New Thermostat" measures.
Measures "EC Fan Motor", "New Gas Boiler" and "New Gas Furnace"	Refer to Product "MN Heating System Rebate" for values and assumptions used in the energy savings calcualtions for the "EC Fan Motor", "New Gas Boiler" and "New Gas Furnace" measures.
Measures "Installation of new AC", "Installation of Mini-Split Heat Pump" and "Quality Installation of new AC"	Refer to Product "MN Residential Cooling" for values and assumptions used in the energy savings calcualtions for the "Installation of new AC", "Installation of Mini-Split Heat Pump" and "Quality Installation of new AC" measures.
Measures "Energy Star Clothes Washer"	Refer to Product "Energy Star New Homes - MN" for values and assumptions used in the energy savings calcualtions for the "Energy Star Clothes Washer" measures
Measure "Energy Star Refrigerator"	Refer to Program "Refrigerator Recycling - MN" for values and assumptions used in the energy savings calculations for the "Energy Star Refrigerator" measure.
Measures "Storage Water Heater" and "Tankless Water Heater"	Refer to Program "MN Water Heater Rebate" for the values and assumptions used in the energy savings calculations for the "Storage Water Heater" and "Tankless Water Heater" measures.
Measures "Attic Insulation", "Air Sealing", and "Wall Insulation"	Refer to Program "Insulation Rebates - MN" for Measure Life and other assumptions used in the savings calculations for the "Attic Insulation", "Air Sealing", and "Wall Insulation" measures
Measures "Showerhead", "Aerator Kitchen", and "Aerator Bathroom"	Refer to Product "Energy Efficient Showerhead - MN" for Measure Life and Non-Energy O&M assumptions (water savings and water rates) used in savings calculations.
Measure "Water Heater Blanket"	Refer to Product "Home Energy Squad - MN" values of measure life used in the savings calcualtions for the "Install Water Heater Blanket" measures.
Measure "Install and Program New Thermostat"	Refer to Product "Home Energy Squad - MN" for measure life assumptions used in the savings calculations for the "Install and Program New Thermostat" measures.
Measures "EC Fan Motor", "New Gas Boiler" and "New Gas Furnace"	Refer to Product "MN Heating System Rebate" for measure life, incremental cost, etc. used in the savings calcualtions for the "EC Fan Motor", "New Gas Boiler" and "New Gas Furnace" measures.
Measures "Installation of new AC", "Installation of Mini-Split Heat Pump" and "Quality Installation of new AC"	Refer to Product "MN Residential Cooling" for measure life, incremental cost, etc. used in the savings calcualtions for the "Installation of new AC", "Installation of Mini-Split Heat Pump" and "Quality Installation of new AC" measures.
Measures "Energy Star Clothes Washer"	Refer to Product "Energy Star New Homes - MN" for measure life, Non-Energy O&M (water savings and water rates), and incremental cost for the "Energy Star Clothes Washer" measures
Measure "Energy Star Refrigerator"	Refer to Program "Refrigerator Recycling - MN" for measure life and incremental cost for the "Energy Star Refrigerator" measure.

Algorithms (cont):

Measures "Storage Water Heater" and "Tankless Water Heater"	Refer to Program "MN Water Heater Rebate" for measure life and incremental cost for the "Storage Water Heater" and "Tankless Water Heater" measures.
LED Electric Energy Savings (Customer kWh)	= Number_of_Bulbs x (kW_Base - kW_EE) x LED_Hours
LED Electric Demand Savings (Customer kW)	= Number_of_Bulbs x (kW_Base - kW_EE)

Variables:

Number_of_Bulbs	Provided by Vendor	= Quantity of newly installed LED bulbs provided by the vendor. Quantity will be per wattage size lamp provided.
LED_Hours	909	= average annual hours per lamp within home for LED lamps. Source is the Home Lighting & Recycling - MN Program.
kW_EE	Provided by	= Actual kW for the installed LED bulbs provided by vendor
Cost_per_Lamp	$2.75	LED lamp costs provided by the direct install vendor for this measure.
kW_Base	Provided by Vendor	= Wattage for the incandecent bulb removed by the vendor will used to determine the baseline wattages for each newly installed efficient bulb.
CFM50_Baseline	Provided by Vendor	Air leakage rate at 50 pascals maintained pressure, measured in cubic feet per minute. Vendor provided
CFM50_Proposed	Provided by Vendor	Air leakage rate at 50 pascals maintained pressure, measured in cubic feet per minute. Vendor provided
Cooling_Delta_T	1.20	Deemed average difference between normal operation and cooling setback temperature in degrees F based on information provided by the customer during the interview.
Heating_Delta_T	2.64	Deemed average difference between normal operation and heating setback temperature in degrees F based on information provided by the customer during the interview.
CF	= Coincidence Factor, the probability that peak demand savings will coincide with peak utility system demand. Refer to source programs.	
Measure Life	Measure life will be as referenced in the source programs.	
Incremental Cost	Incremental cost will be as reference in the source program for water heaters, furnaces, EC Motors, Boilers, Clothes Washers, Refrigerators, Air Conditioning, Mini-Split Heat Pumps.	
Incremental Cost Attic insulation & bypass sealing	Provided by Customer	customer cost is an actual invoice amount.
Incremental Cost Air sealing & weather-stripping	Provided by Customer	customer cost is an actual invoice amount.
Incremental Cost Wall insulation	Provided by Customer	customer cost is an actual invoice amount.
Incremental Cost Showerhead	$3.75	The Direct Install Vendor's cost to provide and install the measure
Incremental Cost Aerator Kitchen	$2.00	The Direct Install Vendor's cost to provide and install the measure
Incremental Cost Aerator Bathroom	$1.00	The Direct Install Vendor's cost to provide and install the measure
Incremental Cost Water Heater Blanket	$25.00	The Direct Install Vendor's cost to provide and install the measure

Inputs:

Type of Measures Implemented
Quantity of existing high efficacy bulbs (CFLs or LEDs) in the home
Quantity of installed LEDs in each wattage size (Required Completion for program participation)
Tons, SEER_Eff, EER_Eff of AC
Attic insulation and bypass sealing was completed (Completion Required)
Attic-sf area:Insulated attic space square feet (Completion Required)
R-Value of Existing Attic Insulation (pre-project)
R-Value of Total Final Attic Insulation (Post-project - combined existing plus new insulation)
Air sealing and weather stripping was completed
Blower Door Test results for home; test in and test out CFM50 values.
Number of Stories in the home
Home's total conditioned square footage above grade
Wall insulation was completed
Wall-sf area: Sq Ft wall insulated
BTUH (Rated furnace or boiler Input BTUH)
EFFh (Efficiency for higher efficiency furnace or boiler)
EF_Eff (Energy Factor of the Efficient water heater - Storage Tank/Tankless)
Volume of new water heater
Was ECM furnace fan motor provided

Program: Saver's Switch - Residential

Description:

Prescriptive rebates will be offered to residential customers who install a Smart Saver's Switch on their air conditioning (AC) and/or electric water heating (WH) system.

Algorithms:

AC Electrical Demand Savings (Customer kW)	= I_Qty_Prop_Equip * Eq.kW_Savings_AC
AC Electrical Energy Savings (Customer kWh)	= I_Qty_Prop_Equip * Eq.kWh_Savings_AC
AC Peak Coincident kW at the Customer (PC_KW_CUST)	= I_Qty_Prop_Equip * Eq.PC_kW_Customer_AC
kW_Savings_AC	= tons/EER * 12
Water Heater Electrical Demand Savings	= I_Qty_Prop_Equip * Eq.kW_Savings_WH
Electrical Energy Savings (Customer kWh)	= I_Qty_Prop_Equip * Eq.kWh_Savings_WH
Peak Coincident kW at the Customer	= I_Qty_Prop_Equip * Eq.PC_kW_Customer_WH

Variable ID	Value	Description
I_Qty_Prop_Equip	Customer Input	Quantity of smart saver switches installed.
tons	2.28	Capacity of average residential AC Unit in tons.
EER	11.39	Energy Efficiency Ratio (EER) of average residential AC Unit.
Eq.kWh_Savings_AC	2	kWh savings per year per average residential AC Unit with a smart switch (Reference 1 & 2).
Eq.PC_kW_Customer_AC	0.683	Peak Coincident kW savings per average residential AC Unit with a smart switch (Reference 1).
Eq.kW_Savings_WH	4.500	Average size of residential water heater.
Eq.kWh_Savings_WH	3	kWh savings per year per average residential WH Unit with a smart switch.
Eq.PC_kW_Customer_WH	0.200	Peak Coincident kW savings per average residential WH Unit with a smart switch (Reference 3).
Life_ResSS	15	Length of time the switch will be operational = 15 years
NTG	100%	Net-to-Gross factor for Saver's Switch will be 100% as customers would not have the ability to install a switch without the program.

Inputs:

Provided by Customer:	Verified during M&V:
Number of units with switch installed.	Yes

References:

(1) Xcel Energy, January 2016. Typical MN Residential Smart Switch Load Relief 2011-2015.
(2) Xcel Energy, January 2016. Saver's Switch Control History.
(3) Xcel Energy. January 2006. Residential Saver's Switch 2005 Impact Evaluation.

Changes from 2013-15 Filing:

1. Updated PC kW & kWh savings per unit per event for smart switches. As a result other values such as coincidence factor and hours also updated.
2. Updated algorithms to match current practices.

Product: Low Income Home Energy Savings Program

Description:

Residential natural gas and electric customers can have energy efficiency measures installed while paying for the material costs.

Program References:

Measures for "Refrigerator Recycling", "Freezer Recycling", "Refrigerator Replacement", and "Freezer Replacement"	Refer to the "Refrigerator Recycling - MN" program formulas for Gross kW, Gross Annual kWh, Gross Coincident kW, etc. claimed for the Refrigerator and Freezer measures.
Measures for "EC Fan Motor", "Furnace", and "Boiler"	Refer to the "Heating System Rebates - MN" program formulas for Gross kW, Gross Annual kWh, Gross Coincident kW, Customer Dtherm, etc. for savings claimed through the EC Furnace fan, Boiler and Furnace measures.
Measures for "Water Heater"	Refer to the "Water Heater - MN" program formulas for Customer Dtherm, etc. for savings claimed through the Water Heater Replacement measure.
Measures for "Showerhead" and "Aerator Kitchen", and "Aerator Bathroom"	Refer to Product "Energy Efficient Showerhead - MN" formulas for Gross kW, Gross Annual kWh, Gross Coincident kW, etc. for the "Provide Efficient Showerhead", "Aerator Kitchen", and "Aerator Bathroom" measures.
Measure "Attic Insulation", "Air Sealing", and "Wall Insulation"	Refer to the "Insulation Rebates - MN" program to find all applicable formulas and assumptions for Gross kW, Gross Annual kWh, Gross Coincident kW, Customer Dtherm, etc. for all Insulation and Air Sealing measure calculations.
Measures for "Showerhead" and "Aerator Kitchen", and "Aerator Bathroom"	Refer to Product "Energy Efficient Showerhead - MN" reference tables for "Low-Flow Showerhead" and "Low-Flow Aerator" values.
Measure "Attic Insulation", "Air Sealing", and "Wall Insulation"	Refer to Product "Insulation Rebates - MN" for reference tables of deemed values for N-Factors, ATF, etc.used in the calculations for Insulation and Air Sealing measures
Measures for "Refrigerator Recycling", "Freezer Recycling", "Refrigerator Replacement", and "Freezer Replacement"	Refer to the "Refrigerator Recycling - MN" program reference tables of deemed values, etc. used for the calculation of savings claimed through the Refrigerator and Freezer measures.
Measures for "EC Fan Motor", "Furnace", and "Boiler"	Refer to the "Heating System Rebates - MN" program reference tables of deemed values, etc. for the calcualtion of savings claimed through the EC Furnace fan, Boiler and Furnace measures.
Measures for "Water Heater"	Refer to the "Water Heater - MN" program reference tables of deemed values, etc. for the calculation of savings claimed through the Water Heater Replacement measure.
Measures for "Showerhead" and "Aerator Kitchen", and "Aerator Bathroom"	Refer to Product "Energy Efficient Showerhead - MN" Measure Life, Non-energy O&M savings, etc. for the "Provide Efficient Showerhead", "Aerator Kitchen", and "Aerator Bathroom" measures.
Measure "Attic Insulation", "Air Sealing", and "Wall Insulation"	Refer to the "Insulation Rebates - MN" program to find Measure Life assumptions for the Insulation and Air Sealing measures.
Measures for "Refrigerator Recycling", "Freezer Recycling", "Refrigerator Replacement", and "Freezer Replacement"	Refer to the "Refrigerator Recycling - MN" program Measure Life, etc. for the Refrigerator and Freezer measures.
Measures for "EC Fan Motor", "Furnace", and "Boiler"	Refer to the "Heating System Rebates - MN" program Measure Life for the EC Furnace fan, Boiler and Furnace measures.
Measures for "Water Heater"	Refer to the "Water Heater - MN" program Measure Life, etc. for the Water Heater Replacement measure.

Algorithms:

Attic Insulation Incremental Cost	= Attic_Cost_Per_SF_Per_dR x Attic_SF x (Attic_Post_R - Attic_Pre_R)
Air Sealing Incremental Cost	= Air_Sealing_Cost_Per_SF x Attic_SF
Wall insulation Incremental Cost	= Wall_Cost_Per_SF x Wall_SF

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

Variables:

ELF	= Energy Loss Factor = 8.40%; energy losses from generator to customer at non-peak times	
DLF	= Demand Loss Factor = 8.80%; energy losses from generator to customer at peak times	
Attic_Cost_Per_SF_Per_dR	$0.06038962	= Insulation cost per square foot per delta R value added for attic projects where insulation is added. This deemed value may be updated through bidding and provided by the selected vendor.
Attic_SF	Vendor Input	Attic Area treated with additional insulation. Provided by the Vendor.
Attic_Post_R	Vendor Input	Attic Insulation total R-Value after new insulation is added. Provided by the Vendor.
Attic_Pre_R	Vendor Input	Attic Insulation R-Value before new insulation is added. Provided by the Vendor.
Air_Sealing_Cost_Per_SF	$0.62606687	= Bypass Air Sealing cost per square foot value added for attic projects where insulation is added. This deemed value may be updated through bidding and provided by the selected vendor.
CFM50_Baseline	Provided by Vendor	Air leakage rate at 50 pascals maintained pressure, measured in cubic feet per minute. Vendor provided from blower door test-in results.
CFM50_Proposed	Provided by Vendor	Air leakage rate at 50 pascals maintained pressure, measured in cubic feet per minute. Vendor provided from blower door test-out results.
Wall_Cost_Per_SF	$3.33078644	= Wall Insulation project cost per square foot of the wall to which insulation was added. This deemed value may be updated through bidding and provided by the selected vendor.
Window Air Conditioner Replacement electric demand savings (Customer kW)	0.032	= (Standard AC kW - New AC kW) = (Reference 1)
Window Air Conditioner Replacement electric energy savings (Customer kWh)	21	= Customer kW Savings x Hours of Operation = .032 x 662 = 21 kWh (Reference 1)
Window Air Conditioner Recycling electric demand savings (Customer kW)	0.917	= Standard AC kW = 0.917 kW (Reference 1)
Window Air Conditioner Recycling electric energy savings (Customer kWh)	607	= Window AC Recycling Customer kW Savings x Hours of Operation = 0.917 x 662 = 607 kWh (Reference 1)
Incremental Cost	See Table 1	Incremental cost of equipment and recycling measures

Table 1: Measure Incremental Costs

Refrigerator Replacements	$616.83
Freezer Replacement	$319.84
Refrigerator Recycling (Removal)	$47.00
Freezer Recycling (Removal)	$42.50
Window/Wall Air Conditioner Replacement	$409.43
Window/Wall Air Conditioner Recycling (Removal)	$62.50
EC Motor	$524.84
Water Heater Replacement	$1,598.26
Furnace Replacement	$3,000.00
Boiler Replacement	$4,635.00

Inputs:

Type of Measures Implemented
Heating System Fuel - gas or electric?
Was attic insulation completed?
Attic insulation square footage
Attic insulation existing R value
Post insulation attic R value
Was bypass air sealing completed?
Blower Door test results in CFM50 Before and CFM50 After Bypass Air Sealing was completed.
Home's conditioned square footage
Number of stories above grade in the home
Was wall insulation completed?
Wall insulation square footage
Was a replacement boiler installed
Was a replacement furnace installed
Did the replacement furnace include an EC Motor

References:

1. www.energystar.gov

Product: Low Income Home Energy Squad

Description:

Residential natural gas and electric customers can have energy efficiency measures installed while paying for the material costs.

Program References:

Measures for "LEDs"	Refer to the Home Lighting & Recycling - MN and Home Energy Squad - MN programs to find all applicable formulas for prescriptive measures savings claimed through the LED measures.
Measure for "TV Timer"	Refer to the Home Energy Squad - MN program to find all applicable formulas for prescriptive measures savings claimed through the TV timer measure.
Measures for "Programmable Thermostats"	Refer to the Home Energy Squad - MN program to find all applicable formulas for prescriptive measures savings claimed through the second thermostat measures
Measures for "Energy Efficiency Showerheads" and "Faucet Aerators"	Refer to the Energy Efficient Showerhead - MN program to find all applicable formulas for prescriptive measures savings claimed through the Showerhead, Kitchen Aerator, and Bath Aerator measures.
Measure for "Door Weatherstripping"	Refer to the Insulation Rebates - MN program to find all applicable formulas for prescriptive measures savings claimed through the Door Weatherstripping measures.
Measure for "Water Heater Blanket"	Refer to the Home Energy Squad - MN program to find all applicable formulas for prescriptive measures savings claimed through the Water Heater Blanket measures.
Measures for "LEDs"	Refer to the Home Lighting - MN program to find all applicable input values and assumptions for prescriptive measures savings claimed through the LED measures.
Measure for "TV Timer"	Refer to the Home Energy Squad - MN program to find all applicable input values and assumptions for prescriptive measures savings claimed through the TV timer measure.
Measures for "Programmable Thermostats"	Refer to the Home Energy Squad - MN program to find all applicable input values and assumptions for prescriptive measures savings claimed through the second thermostat measures
Measures for "Energy Efficiency Showerheads" and "Faucet Aerators"	Refer to the Energy Efficient Showerhead - MN program to find all applicable input values and assumptions for prescriptive measures savings claimed through the Showerhead, Kitchen Aerator, and Bath Aerator measures.
Measure for "Door Weatherstripping"	Refer to the Insulation Rebates - MN program to find all applicable input values and assumptions for prescriptive measures savings claimed through the Door Weatherstripping measures.
Measure for "Water Heater Blanket"	Refer to the Home Energy Squad - MN program to find all applicable input values and assumptions for prescriptive measures savings claimed through the Water Heater Blanket measures.
Measures for all LED lamps	Refer to the "Home Lighting & Recycling - MN" program for lamp measure life assumptions for LED measures.
Measures for "Showerhead" and "Aerator Kitchen", and "Aerator Bathroom"	Refer to Product "Energy Efficient Showerhead - MN" Measure Life, Non-energy O&M savings, etc. for the "Provide Efficient Showerhead", "Aerator Kitchen", and "Aerator Bathroom" measures.
Measure "Weatherstrip Door"	Refer to the "Insulation Rebates - MN" program to find Measure Life assumptions based on the "Air Sealing" measure.
Measure "TV Timer", Programmable Thermostats", and "Water Heater	Refer to the "Home Energy Squad - MN" program to find Measure Life, and Incremental cost assumptions for these measure.

Variables:

Number_of_Bulbs	Vendor Input	= Number of LED bulbs installed by LED wattage, provided by vendor
kW_Base	Vendor Input	= Wattage of actual lamp removed / 1000 . Provided by vendor.
kW_EE	Vendor Input	= Wattage of actual lamp installed / 1000 . Provided by vendor.
Measured_Watts_WO	Vendor Input	= Measured demand for appliances that will be connected to controller before controller is installed
Measured_Watts_WITH	Vendor Input	= Measured demand for controller with appliances connected when controller is in off state
TV_Controller_Hours	Vendor Input	Hours of operation for the controller determined for each customer based on interview results.
Cooling_Delta_T	Vendor Input	Weighted average difference between normal operation and cooling setback temperature in degrees F based on information provided by the customer during the interview.
Heating_Delta_T	Vendor Input	Weighted average difference between normal operation and heating setback temperature in degrees F based on information provided by the customer during the interview.
Showerhead	Vendor Input	= Number of low flow showerheads installed
Aerator	Vendor Input	= Number of low flow aerators installed
Building_Stories	Vendor Input	Number of stories (1, 2 or 3) for door weatherstripping calculation. Provided by contractor.
Gap_Length	Vendor Input	Length of weatherstripping installed. Provided by contractor.

Inputs:

See Vendor Inputs in Variable section above
Wattage of newly installed LED bulbs
Wattage of existing bulb removed for new LED to be installed
Was a water heater blanket installed?
Was a water heater temperature set back?
Was an existing prgrammable thermostat programmed?
Temperature setup/setback pattern for each day of week for heating and cooling seasons.
Was Door Weather stripping measure completed?
Number of low flow showerheads installed
Number of low flow aerators installed
Was a water heater blanket installed?
Water Heater setback starting and ending temperature

Product: Multi-Family Electric Savings Program

Description:

Multi-Family Electric Savings program offers low-income qualified customers products and services that will lower their monthly electric bills. The customers receive a home visit from a qualified auditor who will analyze their electric bill, provide client assessment and education, inspection and evaluation of major appliances, installation of LED bulbs, written energy saving recommendations and Distribution of Energy Conservation Educational Materials.

Program References:

Measures for "LEDs"	Refer to the MN Home Lighting program to find all applicable formulas and assumptions for prescriptive measures savings claimed through the Value LED measure.
Measures for "Refrigerator Recycling", "Freezer Recycling", "Refrigerator Replacement", and "Freezer Replacement"	Refer to the "Refrigerator Recycling - MN" program formulas for Gross kW, Gross Annual kWh, Gross Coincident kW, etc. claimed for the Refrigerator and Freezer measures.
Measures for "Refrigerator Recycling", "Freezer Recycling", "Refrigerator Replacement", and "Freezer Replacement"	Refer to the "Refrigerator Recycling - MN" program reference tables of deemed values, etc. used for the calculation of savings claimed through the Refrigerator and Freezer measures.
Measures for "Refrigerator Recycling", "Freezer Recycling", "Refrigerator Replacement", and "Freezer Replacement"	Refer to the "Refrigerator Recycling - MN" program Measure Life, etc. for the Refrigerator and Freezer measures.
Measures for "Window AC Replacement" or "Window AC Recycling"	Refer to the "Low Income Home Energy Savings - MN" program formulas for Gross kW, Gross Annual kWh, Gross Coincident kW, etc. claimed for the Window Air Conditioning measures.
Measures for "Window AC Replacement" or "Window AC Recycling"	Refer to the "Refrigerator Recycling - MN" program reference tables of deemed values, etc. used for the calculation of savings claimed for the Window Air Conditioning measures.
Measures for "Window AC Replacement" or "Window AC Recycling"	Refer to the "Refrigerator Recycling - MN" program Measure Life, etc. for the Window Air Conditioning measures.

Variables:

Incremental Cost	See Table 1	Incremental cost of equipment and recycling measures

Needed from Customer/Vendor/Administrator for Calculations:

Type of Measures Implemented

Table 1: Measure Incremental Cost

Measure	Incremental Costs
Refrigerator Replacements	520.00
Freezer Replacement	244.00
Refrigerator Recycling (Removal)	33.00
Freezer Recycling (Removal)	33.00
Window/Wall Air Conditioner Replacement	409.43
Window/Wall Air Conditioner Recycling (Removal)	33.00
LEDs	5.20

DEEMED SAVINGS TECHNICAL ASSUMPTIONS

Product: Energy Information Systems Pilot

Description:

This is a custom product including both gas and electric measures. Customers will be selected for participation in the Pilot. Each project will be analyzed individually by Xcel Energy. Technical variables required for the analysis will be obtained from the customer or vendor. Analysis will be based on good engineering practices and standards. The Pilot uses an Energy Information System to assist study providers and the customer in identifying low-cost behavioral and operational measures to reduce waste in the facility. Any capital projects identified by the program will be delivered and claimed through the appropriate end-use program.

Algorithms:

Determined on a case by case basis

Variables:

Measure Life (Behavioral)	1	Lifetime for behavioral measures associated with EIS implementation will be 1 year, with 5 years of monitored persistence
Measure Life (Recommissioning)	7	Lifetime for recommissioning measures will be 7 years, as per Xcel Energy's Recommissioning program

References:

1. 2013-2015 MN Triennial Baseline Consumption for the Recommissioning Program
2. A 2013 Study from LBNL cited a median 17% energy savings for EIS implementation. 10% is assumed for these measures. Note that the total savings projected for each measure do not add up to the total amount listed. The remainder is expected to come from capital projects, which will be counted through the appropriate end-use program.
3. Assumed that 5 years of engagement will be required to meet program savings goals
4. A 2013 Study from LBNL cited a median of 200 metered points per EIS installation. Since this product will be targeted to individual sites and medium-sized customers, 100 points is assumed.
5. As of 7/9/2014, current average costs to customer for installation of additional metering capabilities from Xcel Energy
6. Values derived from 2013 LBNL study

Product: ENERGY STAR Retail Products Platform Pilot

Description:

This program will engage retailers through midstream incentive payments to increase the demand for and supply of the most energy efficient residential plug-load and appliance products on the market driving greater sales of select ENERGY STAR® certified products to customers.

Algorithms:

After comparison to existing products offered in the Company's portfolio as well as the state TRM, the company has elected to adopt assumptions developed by the Cadmus Group on behalf of the ENERGY STAR Retail Products Platform for the purposes of quantifying impacts related to this pilot (See Reference 1). These assumptions have been reviewed by multiple utilities across the country as well as by their respective commissions and the Environmental Protection Agency. See Table 1 for the results of this analysis and accompanying product information sheets for background analysis.

Inputs:

Product Category
Quantity of units purchased per product category
Store Zip Code

Assumptions:

For the purpose of the pilot program period, all purchases are assumed to be made by residential customers.

Tables:

Table 1: Deemed Energy Savings, Costs, and Lifetimes per unit for each product measure (Reference 1)

Measure	Electric Energy Savings (kWh)	Natural Gas Energy Savings (Dth)	Incremental Product Cost ($)	Measure Life (yrs)
Sound Bars	66.0	0.0	$ -	7
Freezers	14.9	0.0	$ 10.11	11
Gas Clothes Dryers	7.7	0.5	$ 270.16	12
Electric Clothes Dryers	160.4	0.0	$ 224.91	12
Air Cleaners	213.9	0.0	$ 56.00	9
Room Air Conditioners	48.7	0.0	$ 114.45	9

Table 2: Demand Savings and Coincidence Factors

Measure	Electric Demand Savings (kW) (Reference 1)	Coincidence Factors (%)
Sound Bars	0.008	100% (Reference 2)
Freezers	0.004	(Reference 3)
Gas Clothes Dryers	0.027	(Reference 4)
Electric Clothes Dryers	0.567	(Reference 4)
Air Cleaners	0.037	100% (Reference 5)
Room Air Conditioners	0.074	(Reference 6)

References:

1. Cadmus Group analysis for the ESRPP team (see Product Information Sheets)
2. Demand savings for Sound Bars are calculated as an average value for all operating hours (8760), which allows a CF value of 100%
3. See Company's assumptions for the Freezer Replacement measure in the Home Energy Savings Program
4. See Company's assumptions for Clothes Washers under the Home Performance with Energy Star product
5. Per Reference 1, Air Cleaners are expected to operate continuously throughout the year
6. See Company's assumptions for Window Air Conditioner Replacement measure in the Home Energy Savings Program

Electric Cost-Benefit Analysis Key

2017/2018/2019 Net Present Cost Benefit Summary Analysis For All Participants

	Participant Test $/kW	Utility Test $/kW	Rate Impact Test $/kW	Total Resource Test $/kW	Societal Test $/kW
Benefits					
Avoided Revenue Requirements					
Generation	N/A	A1	A1	A1	A1
T & D	N/A	A2	A2	A2	A2
Marginal Energy	N/A	A3	A3	A3	A3
Environmental Externality	N/A	N/A	N/A	N/A	A4
Subtotal	N/A	A	A	A	A
Participant Benefits					
Bill Reduction - Electric	B1	N/A	N/A	N/A	N/A
Rebates from Xcel Energy	B2	N/A	N/A	B2	B2
Incremental Capital Savings	B3	N/A	N/A	B3	B3
Incremental O&M Savings	B4	N/A	N/A	B5	B5
Subtotal	B	N/A	N/A	B	B
Total Benefits	C	C	C	C	C
Costs					
Utility Project Costs					
Product Delivery	N/A	D1	D1	D1	D1
Project Administration	N/A	D2	D2	D2	D2
Advertising & Promotion	N/A	D3	D3	D3	D3
Measurement & Verification	N/A	D4	D4	D4	D4
Rebates	N/A	D5	D5	D5	D5
Other	N/A	D6	D6	D6	D6
Subtotal	N/A	D	D	D	D
Utility Revenue Reduction					
Revenue Reduction - Electric	N/A	N/A	E1	N/A	N/A
Subtotal	N/A	N/A	E	N/A	N/A
Participant Costs					
Incremental Capital Costs	F1	N/A	N/A	F2	F2
Incremental O&M Costs	F3	N/A	N/A	F4	F4
Subtotal	F	N/A	N/A	F	F
Total Costs	G	G	G	G	G
Net Benefit (Cost)	H	H	H	H	H
Benefit/Cost Ratio	I	I	I	I	I

Note: Dollar values represent present value of impacts accumulated over the lifetime of the measures.

Explanation of Inputs

N/A = Not applicable
A1 = Generation Avoided
A2 = Transmission and Distribution Avoided
A3 = Marginal Energy Reduced
A4 = Environmental Factors (Emissions) Avoided
A = Total Avoided Revenue Requirements
B1 = Reduced Electric Revenues from Project
B2 = Rebate paid by Xcel Energy
B3 = Incremental Capital Savings
B4 = Incremental Participant Non-Energy O&M Savings plus Natural Gas Savings
B5 = Incremental Participant Non-Energy O&M Savings * Electric Share of Avoided Revenue Requirements
B = Total Benefits realized by Participant
C = Total Benefits = A + B
D1 = Product Delivery Costs
D2 = Project Administration Costs
D3 = Advertising & Promotion Costs
D4 = Measurement & Verification Costs
D5 = Rebate Costs
D6 = Other Costs
D = Xcel Energy's Total Project Costs
E1 = Reduced Electric Revenues from Project = B1
E = Total Reduced Electric Revenues from Project
F1 = Incremental Participant Capital Investment before Rebate
F2 = Incremental Participant Capital Investment before Rebate * Electric Share of Avoided Revenue Requirements
F3 = Incremental Participant Non-Energy O&M Costs plus Natural Gas Costs
F4 = Incremental Participant Non-Energy O&M Costs * Electric Share of Avoided Revenue Requirements
F = Total Costs realized by Participant
G = Total Costs = D + E + F
H = Net Benefit or Cost = C - G
I = Benefit / Cost Ratio = C / G

General Assumptions

Discount Rate = ~7.42%
Inflation Rate = Varies by year and input
Transmission and Distribution Avoided Costs = $36.23/kW-year in 2017 2.36% Escalation
Generation Avoided Capacity Costs = $60.07/kW-year in 2017, 2.24% Escalation
Environmental Externality = $3.63/MWh 2017, $3.63/MWh 2018, $14.03/MWh 2019

➢ General Inputs for the 2017-2019 Gas CIP BENCOST Model

The margins, rates and "costs included in rates" used in the General Inputs of the Gas CIP BENCOST model were approved as part of Xcel Energy's most recent gas rate case (Docket No. G002/GR-09-1153) and went into effect in May 2011. The Company has updated these rates according to the guidelines provided in the Department of Commerce decision filed on February 19, 2016 (Docket No. G999/CIP-16-36)

BENCOST Input 1 (Retail Rate)

The Retail Rate represents the sum of the Company's currently approved tariff rate for each customer class, the Commodity Cost of $4.27 per Dth and a Demand Cost for firm non-demand billed customers of $0.95 per Dth. This value does not include the annual true-up adjustment, the annual CIP Adjustment Factor, or any other riders.

Retail Rate ($/Dth)

Customer Class	Tariff Rate	Commodity Cost	Demand Cost	BENCOST Retail Rate
Residential	$1.86/Dth	$4.27/Dth	$0.95/Dth	$7.08/Dth
Small Commercial Firm	$1.23/Dth	$4.27/Dth	$0.95/Dth	$6.46/Dth
Large Commercial Firm	$1.23/Dth	$4.27/Dth	$0.95/Dth	$6.45/Dth
Small Commercial Demand Billed[1]	$1.16/Dth	$4.27/Dth	$0.48/Dth	$5.92/Dth
Large Commercial Demand Billed[1]	$1.24/Dth	$4.27/Dth	$0.53/Dth	$6.04/Dth
Small Interruptible	$0.96/Dth	$4.27/Dth	N/A	$5.23/Dth
Medium Interruptible	$0.48/Dth	$4.27/Dth	N/A	$4.75/Dth
Large Interruptible	$0.43/Dth	$4.27/Dth	N/A	$4.70/Dth

The rate for Small Commercial Firm / Large Commercial Firm of $6.45/Dth was applied to all Business programs as it is expected that the vast majority of participants would be from these customer classes.

Annual Escalation Rate

The Annual Escalation Rate of 4.00 percent was provided in the DOC decision filing. This value was calculated using the average of escalation rates from five sources of natural gas price projections, Wood Mackenzie, CERA, ICF, EIA and Global Insights.

BENCOST Input 2 (Non-Gas Fuel Retail Rate)

The Non-Gas Fuel Retail Rate represents the non-gas (normally electricity) retail rate paid by a customer or customer class. This value would be used to account for electric savings associated with gas conservation programs. Because the Company has separate electric conservation programs, we did not include any electric benefits in the BENCOST model. Therefore, the Non-Gas Fuel Retail Rate is zero for all of our analyses.

[1] The Demand Billed classes' rates include both the commodity and demand components of their rates. The demand portion was calculated by dividing annual demand revenue by commodity sales.

Annual Escalation Rate

The Annual Escalation Rate of 2.8 percent was provided in the DOC decision filing. This rate was developed using a projected price index entitled "Chained price index-household electricity" for the period 2017 through 2045 which was provided by the Minnesota Management & Budget (Budget).

BENCOST Input 3 (Commodity Cost)

The Commodity Cost, $4.27 per MCF, was provided in the DOC decision filing. This value is the weighted average of CenterPoint Energy, Great Plains Gas, Greater Minnesota Gas, Minnesota Energy Resources Corporation, and Xcel Energy's purchased gas adjustments (i.e. weighted average cost of gas) from January 2014 through December 2015, weighted by each utility's gas sales to non-exempt customers. The Commodity Cost input is also multiplied by the Annual Escalation Rate of 4 percent, which is described above in Input No. 1.

BENCOST Input 4 (Demand Cost)

The Demand Cost equals the Minnesota Total Demand (line 1) divided by the MN State Design Day (line 4) in Schedule A, Page 3 of the Company's January 1, 2016 Derivation of Current PGA Costs. Interruptible customers do not have demand costs. The Demand Cost is multiplied by the Annual Escalation Rate of 4.00 percent discussed in Input 1 above. The resulting 2011 demand cost of $77.15 was escalated one year at 4.00 percent to get a final 2017 BENCOST input value of $80.24

BENCOST Input 5 (Peak Reduction Factor)

The Peak Reduction Conversion Factor, 1 percent, was provided in the DOC decision filing. This value represents an estimate of the percent of energy savings occurring on system peak.

BENCOST Input 6 (Variable O&M)

The Variable O&M input, $0.0408 per MCF, is the Company's estimate of its variable Operations and Maintenance (O&M) costs, and is generally equal to its minimum transportation flexible rate for the Large Firm Transportation class. The Variable O&M input is multiplied by the Annual Escalation Rate of 4.00 percent discussed in Input 1 above.

BENCOST Input 7 (Non-Gas Fuel Cost)

The Non-Gas Fuel Cost, $0.02153 per kWh, represents the added or avoided costs of non-natural gas fuel associated with the Conservation Improvement Program. This value was provided in the DOC decision filing. The Non-Gas Fuel Cost is multiplied by an Annual Escalation Rate of 3.22 percent, as presented in the DOC decision filing.

BENCOST Input 8 (Non-Gas Fuel Loss Factor)

The Non-Gas Fuel Loss Factor, 5.8 percent as provided in the DOC decision filing, represents the transmission and distribution line losses associated with non-natural gas (electric) fuels associated with the Conservation Improvement Program.

BENCOST Input 9 (Gas Environmental Damage Factor)

The Environmental Damage Factor, $0.38 per MCF saved, was provided in the DOC decision filing. This value represents the societal and environmental cost of burning natural gas. It includes the costs of some emissions (SO_2, PM, CO, NO_X, Pb, and CO_2), but not others (methane, propane,

VOCs). The Gas Environmental Damage Factor is multiplied by an Annual Escalation Rate of 2.16 percent as presented in the DOC decision filing.

BENCOST Input 10 (Non-Gas Fuel Environmental Damage Factor)

The Non-Gas Fuel Environmental Damage Factor, $23.22 per MWh, represents the cost to society and the environment for generating electricity. This value was provided in the DOC decision filing. The Non-Gas Fuel Environmental Damage Factor is multiplied by an Annual Escalation Rate of 2.16 percent, as presented in the DOC decision filing.

BENCOST Input 11 (Participant Discount Rate)

The Participant Discount Rate for business customers is represented by the Utility Discount Rate, discussed in Input 12. For residential customers, it is represented by the Societal Discount Rate, discussed in Input 13.

BENCOST Input 12 (Utility Discount Rate)

The Discount Rate of 7.04 percent is Xcel Energy's after-tax weighted average cost of capital from its 2010 rate case (Docket No. G002/GR-09-1153).

BENCOST Input 13 (Societal Discount Rate)

The Social Discount Rate, 2.55 percent, was provided in the DOC decision filing.

BENCOST Input 14 (General Input Data Year)

The General Input Data Year for the 2017-2019 CIP Triennial Plan, 2016, was provided in the DOC decision filing.

BENCOST Input 15, 15a, and 15b (Project Analysis Years 1, 2, and 3)

The Project Analysis Years are the years over which Xcel Energy's CIP Triennial Plan will be effective, 2017, 2018, and 2019, respectively.

➢ Budget Categories

The following chart indicates which expenses are attributed to each CIP budget category in this filing.

Budget Category	Components
Customer Services	• Consulting costs for customer scoping and project management, subsidies for assessments and engineering studies. • Costs to purchase EE equipment and to install efficient equipment at the customer site.
Utility Administration	• Project planning, development and implementation. Marketing and support staff including program managers, marketing assistants, developers, technical support staff, rebate processing, sales and call center representatives, inside contract labor, and other fulfillment associated with delivering a product directly to the customer. • Auditors, installation contractors, vendors, technical consultants, fulfillment contractors and alternative providers that Xcel Energy contracts with to provide DSM services. • Equipment purchase costs and repair; hardware and software; supplies; and other employee expenses.
Advertising & Promotion	• TV, radio, newspaper and print media; direct promotion and sales support materials; postage, promotional events; contracted outbound telephone sales. • Customer education through seminars, pamphlets, videos and computer games. • Communication staff and other supporting labor.
Participant Incentives	Customer rebates and incentives given in the form of subsidized products or equipment.
Measurement & Verification (M&V)	Program evaluation expenses and consultants performing M&V.
Research & Development (R&D)	Internal product development staff, product development external consultants, product development research activities & Market Research potential studies.
Other	• Vendor and trade incentives. • Direct and indirect regulatory fees.