**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO**

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RE: IN THE MATTER OF ADVICE NO. 1797-ELECTRIC OF PUBLIC SERVICE COMPANY OF COLORADO TO REVISE ITS COLORADO P.U.C. NO. 8-ELECTRIC TARIFF TO IMPLEMENT RATE CHANGES EFFECTIVE ON THIRTY-DAYS' NOTICE.	**) PROCEEDING NO. 19AL-______E**

<u>DIRECT TESTIMONY AND ATTACHMENT OF JACK W. IHLE</u>

ON

BEHALF OF

PUBLIC SERVICE COMPANY OF COLORADO

May 20, 2019

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

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RE: IN THE MATTER OF ADVICE NO.	**)**	
1797-ELECTRIC OF PUBLIC SERVICE	**)**	
COMPANY OF COLORADO TO REVISE	**)**	
ITS COLORADO P.U.C. NO. 8-	**)**	**PROCEEDING NO. 19AL-______E**
ELECTRIC TARIFF TO IMPLEMENT	**)**	
RATE CHANGES EFFECTIVE ON	**)**	
THIRTY-DAYS' NOTICE.	**)**	

DIRECT TESTIMONY ATTACHMENT OF JACK W. IHLE

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GLOSSARY OF ACRONYMS AND DEFINED TERMS

Acronym/Defined Term	Meaning
BESS	Battery Energy Storage System
CCOD	City and County of Denver
CEO	Colorado Energy Office
Commission	Colorado Public Utilities Commission
CRP	Certified Renewable Credit
DG	Distributed Generation
DIA	Denver International Airport
DR	Demand Reduction
EFC	Energy Future Collaborations
EFCA	Energy Freedom Coalition of America
EPRI	Electric Power Research Institute
ESIC	Energy Storage Integration Council
ICT	Innovative Clean Technology
ICT Projects or Projects	Panasonic and Stapleton Projects
ICT Settlement	Decision No. C16-0196
OCC	Office of Consumer Counsel
O&M	Operations and Maintenance
Panasonic	Panasonic Enterprise Solutions Company
Project Application	Proceeding No. 15A-0847E

Acronym/Defined Term	**Meaning**
Public Service or the Company	Public Service Company of Colorado
PV	Photovoltaic
REC	Renewable Energy Certificate
RES	Renewable Energy Standard
RFP	Request for Proposal
Staff	Staff of the Colorado Public Utilities Commission
WRA	Western Resource Advocates
Xcel Energy	Xcel Energy Inc.
XES	Xcel Energy Services Inc.

**BEFORE THE PUBLIC UTILITIES COMMISSION
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DIRECT TESTIMONY AND ATTACHMENT OF JACK W. IHLE

I. INTRODUCTION, QUALIFICATIONS, PURPOSE OF TESTIMONY, AND RECOMMENDATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Jack W. Ihle. My business address is 1800 Larimer Street, Denver, Colorado 80202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT POSITION?

A. I am employed by Xcel Energy Services Inc. ("XES") as Director, Regulatory and Strategic Analysis. XES is a wholly-owned subsidiary of Xcel Energy Inc. ("Xcel Energy"), and provides an array of support services to Public Service Company of Colorado ("Public Service" or the "Company") and the other utility operating company subsidiaries of Xcel Energy on a coordinated basis.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THE PROCEEDING?

A. I am testifying on behalf of Public Service.

Q. PLEASE SUMMARIZE YOUR RESPONSIBILITIES AND QUALIFICATIONS.

A. As Director, Regulatory and Strategic Analysis, I am responsible for overseeing the Company's regulatory filings and strategy as they pertain to resource planning, renewable energy policy, retail product policy, electric vehicles, and other policy-driven issues. A description of my qualifications, duties, and responsibilities is set forth after the conclusion of my testimony in my Statement of Qualifications.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my Direct Testimony is to provide background information on the approved projects that are under research in the Innovative Clean Technology ("ICT") program, and the financial interaction of those projects with this electric rate review. In addition, my Direct Testimony supports the recovery of ICT actual deferred capital additions and Operations and Maintenance ("O&M") expenses for the Stapleton and Panasonic projects through 2018, as supported by Company witness Ms. Deborah A. Blair. Pursuant to the terms of the ICT Settlement Agreement ("Settlement Agreement"),[1] the Company will continue deferred accounting treatment for future (2019 forward) costs associated with the Stapleton and Panasonic projects.

My Direct Testimony also describes our Certified Renewable Percentage ("CRP") offering, where the Company intends to retire Renewable Energy Certificates ("RECs") on behalf of all customers to reflect the level of renewable

[1] Colorado Public Utilities Commission Decision No. C16-0196. This Decision and Settlement Agreement are described in more detail later in this Direct Testimony.

generation delivered to retail customers. This offering will be particularly attractive to commercial and industrial customers as well as our community based customers, allowing them to clearly claim the renewable energy delivered from the Company in order to help meet their sustainability goals.

Q. ARE YOU SPONSORING ANY ATTACHMENTS AS PART OF YOUR DIRECT TESTIMONY?

A. Yes, I am sponsoring Attachment JWI-1, which is the 2018 Certified Renewable Percentage calculation.

Q. WHAT RECOMMENDATIONS ARE YOU MAKING IN YOUR DIRECT TESTIMONY?

A. With respect to the Panasonic and Stapleton Projects in the ICT program, I recommend approval of the recovery of the Company's deferred and prudently-spent capital and O&M expenses through 2018. Consistent with the ICT Settlement, we will continue to defer capital costs and O&M expenses from 2019 through the completion of the projects expected battery system lives in 2027. I also recommend approval of our proposed CRP offering.

II. INNOVATIVE CLEAN TECHNOLOGY PROGRAM

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR DIRECT TESTIMONY?

A. The purpose of this section of my Direct Testimony is to provide background and updates on the Company's ICT projects, the associated Settlement Agreement, and project implementation planning. In particular, I describe the two ICT projects at issue in this rate review, which are the Panasonic microgrid project ("Panasonic Project") and the Stapleton battery storage project ("Stapleton Project").

A. Background and Project Description

Q. PLEASE BRIEFLY DESCRIBE THE ICT PROGRAM.

A. The Company's ICT program is designed to provide a regulatory mechanism to demonstrate newly emerging technologies that are intended to further the development, deployment, and commercialization of new power generation and other technologies environmentally superior to technologies currently in use. The Company initiated the program in 2009, vis-à-vis Proceeding No. 09A-015E, where it first sought approval of the ICT program concept, and its first ICT project. The first project was a concentrating solar thermal power project at the Company's Cameo Generating Station site near Palisade, Colorado.

Q. HAS THE COMMISSION ESTABLISHED ANY ICT PROGRAM GUIDELINES?

A. Yes. In Proceeding No. 09A-105E, the Commission approved the overall ICT Program and provided guidelines for future ICT project applications in Decision

No. C09-0889. The Commission provided that the Company files an application for approval of each proposed ICT project in the future.

Q. HAS THE COMPANY FILED AN APPLICATION FOR APPROVAL OF EACH OF THE ICT PROJECTS AT ISSUE IN THIS RATE CASE?

A. Yes. On October 29, 2015, the Company filed an application in Proceeding No. 15A-0847E ("Project Application") asking the Commission to approve two new ICT projects, the Panasonic Project and the Stapleton Project (the "ICT Projects" or the "Projects"). Both Projects involve the evaluation of energy storage technology installed on distribution feeders that have relatively high penetrations of distributed solar generation.

Q. WHAT IS THE COMPANY STUDYING THROUGH THESE ICT PROJECTS?

A. Over the next 10 years, the Company expects to learn how battery systems can mitigate the impacts of highly distributed solar energy on a feeder and potentially increase distribution feeders' abilities to accommodate more solar energy than it can without these systems. As customer-sited installation of solar PhotoVoltaic ("PV") systems continues, we may find that more feeders are reaching the tipping point where additional amounts of solar energy on the feeder could introduce voltage issues or other problems. We are also studying what other capabilities battery systems may have as additional value propositions to make the systems more cost-effective, such as providing energy arbitrage, Demand Reduction ("DR"), frequency response, and back-up power. We see battery systems playing a larger role in the grid of the future and are therefore learning how to integrate these devices into our existing and planned systems.

B. The Panasonic Project

Q. PLEASE DESCRIBE THE PANASONIC PROJECT IN MORE DETAIL.

A. The Panasonic Project is a partnership between Public Service and Panasonic Enterprise Solutions Company ("Panasonic"), developed to test and demonstrate certain energy storage capabilities of a utility-scale battery in conjunction with a PV solar system. The goal of the Panasonic Project is to test a number of the potential capabilities of such a battery energy storage system, including the opportunities for: (1) mitigating voltage fluctuations on the distribution grid stemming from operation of grid-installed solar generation; (2) reducing system peak demand and demand on the feeder; (3) reducing energy costs; (4) enabling frequency response; and (5) providing backup or "microgrid" service. The Panasonic Project consists of three primary components:

- A single 1 MW / 2MWh lithium ion Battery Energy Storage System ("BESS") owned by Xcel Energy and installed on a commercial distribution feeder at the Panasonic Denver facility;
- A single 1.3 MW solar installation on a carport adjacent to the Panasonic facility. Xcel Energy owns the PV system and the City and County of Denver ("CCOD")/Denver International Airport ("DIA") owns the carport; and
- Xcel Energy-owned switching and control systems used to operate the BESS and microgrid functionality.

The battery system is interconnected on the utility side and during normal operations it supports the grid through voltage management, peak demand reduction, energy arbitrage, and frequency response. For the first two years of the Panasonic Project, from approximately 2018 through early 2020, these scenarios will be operated as defined in the test plan filed with the Commission on May 9, 2016 in Proceeding No. 15A-0847E.

The Panasonic Project will be installed for 10 years and operated in two phases: two years of testing and demonstration as described above, and eight years of operation at optimal settings (as established by the demonstrations). During the two-year demonstration period, the capabilities noted above will be tested and the performance of the system will be measured and monitored. After the demonstration is complete and the collected data analyzed, the battery will operate at its established optimal settings for the remaining eight years of its life, from 2020 through 2027. The PV system is expected to remain on the carport for an additional 10 years after the BESS is removed, and the Company may evaluate in the future whether to maintain the system beyond the initial 20 years.

Q. WHAT IS THE CURRENT STATUS OF THE PANASONIC PROJECT?

A. The Company filed test plans for the Panasonic Project on May 9, 2016, and began implementation in October 2016, when designs for the carport PV system and BESS were completed. The PV system was placed in-service in March 2017. All systems were fully installed and commissioned by the end of 2017. Testing began in January 2018, and once the BESS was completely commissioned and all its functions were operational, the Company began to perform each of the planned Project tests.

Q. HAVE THERE BEEN ANY SCOPE CHANGES TO THE PANASONIC PROJECT SINCE THE COMMISSION APPROVED THE ICT SETTLEMENT?

A. No.

Q. WHAT PROJECT WORK REMAINS THROUGH THE LIFE OF THE PANASONIC PROJECT?

A. Panasonic testing began in January 2018, and most of the work going forward will be monitoring the installation and collecting data. The BESS and switching gear will be removed in approximately 2027 and the carport PV system in 2037. Public Service will determine the necessary steps and costs for equipment removal at that time and seek recovery after removal.

C. <u>The Stapleton Project</u>

Q. PLEASE DESCRIBE THE STAPLETON PROJECT IN MORE DETAIL.

A. The Stapleton Project is a pilot program designed to assess how battery storage could potentially be used to integrate higher amounts of PV solar energy on the distribution system. We are examining how battery systems can operate to mitigate the impacts of high amounts of solar energy on the feeder, reduce peak demand on the feeder, and reduce the marginal cost of energy by storing power at a lower cost of energy and discharging when energy costs are high.

The Stapleton Project involves installation of 12 batteries strategically placed on a residential feeder in the Stapleton neighborhood of Denver, an area experiencing high penetration of rooftop solar. Six batteries have been installed on the utility side of the distribution system, and six on the customer side of the meter. The Stapleton Project will be operated for 10 years in two phases. The customer-sited systems were installed over the course of several months with completion in November 2017, while the utility-sited systems were installed by April 2018. A two-year testing period is analyzing system performance in the various operating modes to determine how they can provide the most value to the grid. After the two-year demonstration period, the utility-sited batteries will continue to operate in the established optimal modes for their remaining eight years of life. Customers participating in the pilot have the option to continue to utilize the customer-sited battery system after the two-year testing period or have it removed.

Q. WHAT IS THE CURRENT STATUS OF THE STAPLETON PROJECT?

A. We selected vendors for both systems through an open Request for Proposals ("RFP") process that included considering comment from ICT stakeholders. After completing the final commissioning of both the customer-sited and utility-sited systems, the Company began testing the systems as described below.

The Company awarded the customer-side system contract to Sunverge Energy, Inc. and entered into agreements with six customers to participate in the pilot. We worked with customers to install and commission the Sunverge BTM units between May and November 2017, and testing began on the available units in July 2017.

Project construction of the utility-sited battery systems began in September 2017, the majority of the utility-sited units were installed and commissioned by April 2018, and testing began the same month. The final sixth system came online in December 2018, so all six systems are now fully online and producing research data.

Q. HAVE THERE BEEN ANY SCOPE CHANGES TO THE STAPLETON PROJECT SINCE THE COMMISSION APPROVED THE ICT SETTLEMENT?

A. There are some changes to both the customer-sited and utility-sited aspects of the Stapleton Project. For Stapleton customer systems, the Company found through the RFP process that most vendors' battery systems have the capability to power a customer's home in the event of a power outage. Therefore, Public Service thought it would be important to test and demonstrate this standard back-up power option. This scenario was not included in the original scope of the Stapleton Project, but after learning of the option and discussing with vendors, we decided to pursue it. The scope of customer-side installation has changed to reflect that battery vendors will install the customer system with the intent to power a portion of the customer's load during a grid outage.

There have been two changes to the scope of the utility-sited systems: reduced battery size and addition of a radial loop. First, we are using smaller battery sizes for all six systems due to space constraints. Second, we originally planned to have a set of utility-sited batteries serve each of the three radial loops chosen for the Stapleton Project but ran into siting issues with a system proposed to be located on private land, and have moved that battery system to a new fourth radial loop.

Q. HAS THE COMPANY LEARNED FROM ITS INVESTMENT IN THESE PROJECTS?

A. Yes. One of our objectives for these projects was to learn more about the technology by working through the procurement, design, construction, implementation, and testing process. We are pleased with the results and have experienced lessons learned in each step that will form our future proposals. Further, the experience and insights we have gained from these projects will be informative to helping us integrate solar and storage on the distribution system. More details are available in the two semi-annual reports that the Company files for the projects in February and August, and also in the Annual ICT Program Report that we most recently filed in Proceeding No. 09A-015E on April 30, 2019.

III. ICT SETTLEMENT AGREEMENT AND PROJECT COSTS

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR DIRECT TESTIMONY?

A. The purpose of this section of my Direct Testimony is to discuss the ICT Settlement Agreement ("ICT Settlement") in Decision No. C16-0196, concerning the Panasonic and Stapleton projects. I explain how the ICT Settlement addressed project cost projections, accounting treatment, and rate recovery issues associated with both Projects. I then identify the Company's actual capital and O&M costs through 2018 for which it is seeking recovery in this proceeding.

Q. PLEASE DESCRIBE THE SETTLEMENT AGREEMENT RELATED TO THE PANASONIC AND STAPLETON PROJECTS.

A. The Company settled with six intervenors and the Commission approved the ICT Settlement by Decision No. C16-0196. Parties to the ICT Settlement included Public Service, the Staff of the Colorado Public Utility Commission ("Staff"), the Office of Consumer Counsel ("OCC"), the Colorado Energy Office ("CEO"), Western Resource Advocates ("WRA"), and the Energy Freedom Coalition of America ("EFCA"). As part of the ICT Settlement, parties agreed to the projects as proposed, along with set deadlines for milestones and reporting.

Q. DOES THE ICT SETTLEMENT CONTAIN ANY PROVISIONS CONCERNING ACCOUNTING TREATMENT FOR THE PROJECTS?

A. Yes. With respect to capital costs, the Commission-approved ICT Settlement grants a rebuttable presumption of prudence for up to $9.1 million in capitalized costs for both projects combined.[2] The Commission also authorized the Company to defer accounting for its future capital expenditures.

With respect to O&M, the ICT Settlement provides:

> [A]ny ongoing O&M expenses associated with the Stapleton and Panasonic projects incurred after the project reaches testing status be recorded in a separate deferred accounting mechanism for each project such that Public Service will be allowed to seek recovery in a future rate proceeding.

Q. DID THE ICT SETTLEMENT CONTAIN COST ESTIMATES FOR EACH PROJECT?

A. Yes. The total cost estimates set forth in the Settlement were $6,720,000 for the Panasonic Project and $4,012,000 for the Stapleton Project, for a total of $10.7 million in total costs. Please see Table JWI-D-1 below for capital, O&M, and total cost data as originally set forth in the ICT Settlement.

Q. PLEASE IDENTIFY THE CAPITAL EXPENDITURES FOR WHICH THE COMPANY IS SEEKING RECOVERY IN THIS PROCEEDING.

A. As of December 31, 2018, the Company is seeking to recover $6,418,694 in capital costs for the Panasonic Project and $2,350,473 in capital costs for the Stapleton Project.

Q. HAVE THE TOTAL COSTS FOR IMPLEMENTING THE ICT PROJECTS CHANGED SINCE THE COMMISSION APPROVED THE ICT SETTLEMENT?

A. Yes, as expected for emerging technology-related projects, some costs are different than originally estimated. The total costs for both ICT Projects are

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[2] See Decision No. C16-0196, Attachment A, page 5, FN 1, Proceeding No. 15A-0847E.

below the total project cost estimates presented in the ICT Settlement. In the case of the Panasonic Project, the actual capital costs have exceeded the estimated capital costs, but the actual O&M expense is below the estimated O&M expense, as explained later in my Direct Testimony. Please see Table JWI-D-1 below.

Table JWI-D-1: ICT Capital and O&M (Total Company)

Description	Estimated, as outlined in ICT Settlement	Actual, through 12/31/2018
Panasonic capital	$5,720,000	$6,418,694
Panasonic O&M	$1,000,000	$1,125
Panasonic, total	$6,720,000	$6,419,819
Stapleton capital	$3,412,000	$2,350,473
Stapleton O&M	$600,000	$12,681
Stapleton, total	$4,012,000	$2,363,154
Both projects, total	$10,732,000	$8,782,973

Note: Estimated O&M expenses are shown as 10-year total estimates, per the ICT Settlement. Actual O&M expenses are shown as spent through 12/31/2018.

Q. HOW HAVE THE CAPITAL COSTS CHANGED FROM THE ORIGINAL PROJECTIONS?

A. For the Panasonic Project, the final capital costs increased by approximately 12 percent due to higher costs of construction, integration, and testing of the islanding switch gear. This was the first application of this type of equipment in a microgrid by the Company. The final capital costs for Stapleton Project decreased by approximately 31 percent because the battery systems were smaller than originally estimated, as previously discussed in the scope changes sections of this testimony.

Q. DO YOU BELIEVE IT IS APPROPRIATE TO INCLUDE THE CAPITAL COST THROUGH 2018 ASSOCIATED WITH THE ICT PROJECTS IN RATES?

A. Yes, I do. The projects are being implemented and managed in a prudent manner, consistent with the ICT Settlement approved by the Commission. Ms. Blair discusses the Company's proposal to include the capital and O&M costs associated with ICT in the HTY.

Q. PLEASE IDENTIFY THE O&M EXPENSE THE COMPANY IS SEEKING TO RECOVER IN THIS PROCEEDING.

A. As explained below, Panasonic is covering the O&M expense for the first three years of the Panasonic Project, so the Company's O&M expenses through 2018 were only $1,125. As of December 31, 2018, O&M for the Stapleton Project is $12,681.

Q. HAVE THE O&M COSTS CHANGED FROM THE COMPANY'S ORIGINAL PROJECTIONS?

A. Yes. For both projects, our O&M expenses to date and forecasted are significantly less than the projections provided in the ICT Settlement. When we prepared the ICT filing in 2015, we did not have firm O&M or warranty costs. We had not run any RFPs nor finalized O&M agreements with Panasonic. The market for these types of batteries was at an early stage of development, so we utilized high-level industry battery O&M estimates to develop the costs set forth in the Settlement.

After the filing, we worked with Panasonic to develop O&M agreements for the battery and PV systems and were able to negotiate lower O&M costs based on the partnership. Overall, we are pleased that we were able to effectively manage total project costs. In 2017, we negotiated with Panasonic to develop an energy storage O&M agreement for the Panasonic BESS. This agreement ends in July 2020. Under this contract, Public Service has no fixed service fees. Public Service has not yet developed a contract with Panasonic to establish the O&M costs for the BESS from July 2020 through the remaining useful life of the battery. While we do not have a precise estimate for the BESS O&M expenses from 2020 on, we believe these expenses will be lower than originally projected.

Also during 2017, Panasonic and Public Service finalized the O&M service agreement extending through 2027 for the PV system. This service agreement, like the O&M agreement for the BESS, also has no fixed services fee. Public Service is responsible for any corrective maintenance on the PV system should issues arise. Those costs are less predictable; however, we anticipate they will be in line with or less than our original estimate of approximately $100,000 per year. Again, we are only seeking recovery for O&M expenses through 2018 for the ICT projects in this proceeding.

Regarding the Stapleton Project, we originally estimated the system O&M expenses to be $600,000, or approximately $60,000 per year. Although some O&M proposals we received were close to this number, ultimately the service proposal we chose came in significantly lower. We negotiated an annual price of

$11,400 through the year 2021, at which point we will evaluate the future needs and requirements. Here again, this is far less than the original cost estimates. We note that this does not cover any equipment or labor costs for corrective maintenance. We will address any potential costs of that nature in a future rate review.

Q. DO YOU AGREE THAT THE CHANGES TO THE PROJECT COSTS ARE REASONABLE?

A. Yes, I do. With emerging technologies such as those deployed in the ICT Program, costs are not always certain. A main point of the ICT Program and associated projects is to explore such new technologies at smaller scale before deploying them at larger scale, where unexpected cost changes could have a larger impact on customers. Together, these projects are on track to come in under their 10-year total estimated project costs. The Panasonic Project experienced higher-than-projected capital costs, but as explained earlier, this is due primarily to newness of the technology and its application. The increase in the Panasonic capital cost is more than offset by the decrease in the capital cost of the Stapleton Project. Further, we expect total O&M expenses over the 10-year time frame to be lower than projected.

Q. WHAT IS THE COMPANY PROPOSING WITH RESPECT TO PROJECT COSTS FOR THE PANASONIC AND STAPLETON PROJECTS FROM 2019 FORWARD?

Consistent with the ICT Settlement, the Company will to continue to record ongoing O&M expense associated with the Stapleton and Panasonic Projects incurred in 2019 and going forward in a separate deferred accounting mechanism such that Public Service will be allowed to seek recovery in a future rate review proceeding. To the extent the Company incurs any additional capital costs for either project, it will likewise continue to record such in a separate deferred accounting mechanism. This deferral is also supported by Ms. Blair.

Q. WHAT ARE THE KEY ASPECTS OF THE DISTRIBUTION OPERATIONS PROCESS USED TO ENSURE SUCCESS AND PRUDENT SPENDING RELATED TO THE ICT PROJECTS GOING FORWARD?

A. Project success and prudent spend aspects include: (1) establishing specifications; (2) streamlined project management; and (3) monitoring system performance.

First, it is important to make sure the battery system specifications at the outset are clear and precise. At the beginning of both the Panasonic and Stapleton Projects, we worked with EPRI to review the project specifications. We also utilized draft specifications prepared by Energy Storage Integration Council (“ESIC”), an industry working group facilitated by EPRI created to identify gaps and approaches for integration of energy storage, including applications of energy storage connected to utility distribution systems. We worked with EPRI to develop use cases for the Panasonic system and the Stapleton utility-sited systems to help ensure the battery systems were designed to operate the way we intended them to, and shared that information with our selected vendors.

On the project management side, we have and will continue to work closely across business systems, distribution operations, vendors, distribution engineering, and other key areas to make sure personnel fully understand Project requirements and management of timelines and budgets.

Finally, now that testing is underway, we will monitor battery performance to make sure that the systems continue to operate as intended and that they are not operated in a manner that causes excessive degradation of the battery systems.

IV. CERTIFIED RENEWABLE PERCENTAGE

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR DIRECT TESTIMONY?

A. In this section of my Direct Testimony, I describe our CRP proposal relating to retirement of RECs, in order to allow retail customers to better account for and meet their renewable energy goals.

Q. WHAT IS THE CRP?

A. The CRP is a proposal for the Company to retire RECs above its Renewable Energy Standard ("RES") compliance requirements, so that the total RECs retired in each calendar year will be equal to the total renewable energy delivered to retail customers from the Company's system. This incremental retirement in each calendar year would allow retail customers to better account for and claim the renewable energy delivered from the Company's system in their efforts to satisfy their specific renewable energy goals.

Q. IS THE CRP THE SAME AS THE PHYSICAL GENERATION MIX?

A. No. The CRP, under our proposal, would represent the renewable energy attributes that customers can claim. The CRP is calculated by dividing RECs retired by total retail sales. The physical generation mix represents the share of electricity physically generated from renewable resources. The physical generation mix is calculated by dividing renewable generation by total generation.

Q. WHY IS THE COMPANY PROPOSING A CRP?

A. Communities and corporations are increasingly setting renewable energy targets. For example, over 160 companies globally have joined RE100,[3] a group of companies pledging to source their energy supply entirely from renewable energy, and more than 200 mayors have joined the Sierra Club's "Mayors for 100% Clean Energy" campaign.[4] Many companies with a Colorado presence have set their own 100 percent renewable energy goals such as Vail Resorts, IKEA, Wells Fargo, Equinix, Google, Starbucks, vf corporation, Visa, Marriott, and Nestle. In addition, many Colorado communities have also set 100 percent renewable energy goals for their municipal energy usage and/or their entire community such as Boulder, Breckenridge, Denver, Fort Collins, Lafayette, Lakewood, Longmont, Nederland, Garfield County, Pueblo County, and Summit County.

Q. HAVE CUSTOMERS HISTORICALLY COUNTED UTILITY DELIVERED RENEWABLE ENERGY TOWARDS THEIR GOALS?

A. No. Historically, when there were low penetrations of renewable energy on the grid and utilities were working to comply with RES, customers set their renewable energy goals outside of the utility context. And typically those goals were modest, e.g., 10 or 20 percent renewable energy supply. The theory was that utilities were required to meet their RES, so customers' goals should be outside of that context and be incremental to utility action. In the new era of proliferating

[3] http://there100.org/companies
[4] https://www.sierraclub.org/ready-for-100/mayors-for-clean-energy

100 percent renewable energy goals and utility systems that are planned to reach on the order of 50 percent renewable supply in the coming years, however, that logic begins to break down. Customers are challenged by the lack of clarity around how they can account for utility system renewables as they strive to meet their individual renewable goals.

Q. DO CUSTOMERS TODAY COUNT UTILITY DELIVERED RENEWABLE ENERGY TOWARDS THEIR GOALS?

A. Not consistently. Some customers do, others do not. There is no consistent national or state standard, and no consistent best practices being encouraged by stakeholders in this space. One particular issue is the appropriate treatment of RECs generated by the utility. RECs serve as the unit of accounting for the utility RES and also, typically, for customer's renewable energy programs and goals. It is accepted best practice that RECs must be retired on behalf of a customer for them to be able to substantiate claims of renewable energy purchases. This ensures that the renewable energy being claimed by one customer is not counted somewhere else. This best practice is especially critical for corporate customers, who risk action from the Federal Trade Commission for deceptive advertising if they make public claims without the associated REC attribution. The treatment of RECs from renewable resources on the utility's system, however, has not always been clear to our customers, leading to uncertainty about renewable energy claims. The CRP will clarify REC treatment and bring needed transparency to this issue.

Q. IF RECS ARE BEING USED FOR COMPLIANCE WITH THE RES, WOULDN'T IT BE DOUBLE-COUNTING FOR CUSTOMERS TO CLAIM THAT RENEWABLE ENERGY?

A. No. The RES and the CRP are not mutually exclusive. The CRP is measuring renewable energy delivered to customers in each calendar year, renewable energy that customers are paying for through their rates. The RES is a minimum threshold of renewable energy generation that we, as the utility, must meet each year. Just because the RES has been met or surpassed as a state policy standard does not mean that customers should not be able to count that same renewable energy that they are paying for as delivered to them, for purposes of meeting their own prescribed individual standards outside any statutory RES requirement imposed on utilities.

Q. DO YOU BELIEVE THAT COMMERCIAL, COMMUNITY, AND INSTITUTIONAL CUSTOMERS WOULD BE INTERESTED IN THE PROPOSED CRP?

A. Yes, our conversations over the last year with multiple customers and communities, particularly those with aggressive renewable energy goals, have shown a strong interest in the CRP approach as a tool to help them meet measure and meet their goals.

Q. WILL CUSTOMERS NEED TO SIGN UP FOR CRP?

A. No, the CRP will be implemented by the Company on behalf of all customers. Customers will not need to sign up separately.

A. <u>Proposed CRP Methodology</u>

Q. HOW WILL THE CRP BE CALCULATED?

A. The formula we propose for calculating the CRP is:

Certified Renewable Percentage (Colorado) =

$$\frac{\text{Total RE generation (MWh)} - \text{Trade margin adjustment} - (\text{REC sales} + \text{Windsource® RECs} + \text{Renewable*Connect RECs} + \text{Wholesale REC transfers})}{\text{Total CO retail sales (MWh)} - (\text{Windsource® sales} + \text{Renewable*Connect sales}) + (\text{Solar*Rewards generation})}$$

Q. WILL THE COMPANY CONTINUE TO SELL RECS?

A. Yes, REC sales bring in revenue that is shared between the Company and all customers, per the trade margin sharing agreement approved in Proceeding No. 17A-0650E. The Company plans to continue REC sales, and any RECs sold will not be retired for the purposes of the CRP and will therefore not be included in the CRP for retail customers. The Company will balance the interests of customers in receiving the revenue from REC sales with receiving the environmental benefits of REC retirements for the CRP.

Q. WHAT IS THE TRADE MARGIN ADJUSTMENT TO THE CRP?

A. The trade margin adjustment is the total renewable energy generation (MWh) multiplied by the ratio of trade margin sales divided by total Colorado (CO) retail sales (MWh) plus trade margin sales (MWh).

$$\text{Trade Margin Adjustment} = \frac{\text{Trade Margin Sales}}{\text{Total CO Retail Sales} + \text{Trade Margin Sales}}$$

This adjustment is included in the CRP to withhold RECs proportional to trade margin sales as a fraction of total sales (excluding wholesale sales with long term contracts and RECs transferred), to avoid preferentially assigning fossil generation to the wholesale market. Trade margin sales generally represent energy trades into the wholesale markets outside of an existing long-term contract. Trade margin sales do not include any sales to retail customers whether residential, commercial or industrial, nor sales under long-term agreements to wholesale requirements customers. They are tracked as "Sales for Resale" under Account 447 in the Federal Energy Regulatory Commission's Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act. This account includes the net billing for electricity supplied to other electric utilities or to public authorities for resale purposes.

Q. WHY IS THERE A TRADE MARGIN ADJUSTMENT TO THE CRP?

A. The purpose of the CRP is to represent renewable energy *delivered* to retail customers. Trade margin sales are generally viewed as a "slice of system" transaction, where the proportional share of renewable energy generation is included in that sale. Therefore, retiring RECs associated with trade margin sales would have the effect of re-allocating renewable energy captured in trade margin sales to retail customers. This would not accurately reflect delivered renewable energy to retail customers. Therefore the trade margin adjustment corrects the accounting to more accurately represent delivered renewable energy to retail customers. This adjustment also has the practical implication of allowing the RECs associated with trade margin sales (which are not conveyed to the wholesale energy buyer) to help grow the REC bank and increase the insurance relative to any future RES changes.

Q. WILL THERE BE ANY NEGATIVE IMPACT TO RES COMPLIANCE?

A. No, the Company will continue to retire RECs on a first in, first out basis for the RES requirement, with any incremental retirements associated with the CRP coming from current calendar year RECs. As such, the first in, first out methodology will result in the current REC bank being maintained into the future. Further, given the CRP is being proposed and would be implemented on a voluntary basis, compliance with the RES in future years will always take priority. One effect of the CRP proposal is that the REC bank will grow at a slower pace than it would absent the CRP, but we anticipate no RES compliance challenges if the CRP is implemented.

Q. ARE THERE ANY NEW LEGISLATIVE REQUIREMENTS CONCERNING RECS THAT ARE SIMILAR TO THE CRP?

A. Yes. Senate Bill 19-236 states:

> THE QUALIFYING RETAIL UTILITY SHALL RETIRE RENEWABLE ENERGY CREDITS ESTABLISHED UNDER SECTION 40-2-124(1)(d), IN THE YEAR GENERATED, BY ANY ELIGIBLE ENERGY RESOURCES USED TO COMPLY WITH THE REQUIREMENTS OF THIS SECTION.

This treatment of RECs, which supports emission reduction targets beginning in 2030, is a conceptually similar approach to the CRP that the Company now proposes. If an eligible energy resource that generates RECs is relied upon to meet the 80 percent emission reduction or "clean energy target" from 2005 levels of carbon dioxide emissions in 2030, or the goal of 100 percent by 2050 also provided for in Senate Bill 19-236, then the RECs must be retired in the year generated. These retired RECs may be used for RES compliance purposes, but a utility that relies on a particular eligible energy resource to meet its clean energy targets (emission reduction targets) and is in a RES overcompliance position may not sell or otherwise use the excess RECs generated by that eligible energy resource for another purpose and must instead retire the RECs generated by the eligible energy resource in the year they are generated.

Q. HOW WILL THE COMPANY TREAT "BONUS" RECS GENERATED AS PART OF THE RENEWABLE ENERGY STANDARD?

A. The Company is not proposing to change any of its RES compliance approaches as a result of the addition of the CRP. "Bonus" RECs are those that are generated from in-state renewables which received a 1.25X multiplier if they came on-line prior to August 11, 2010 for retail Distributed Generation ("DG") and prior to December 31, 2014 for wholesale DG and non-DG renewable sources. Any "bonus" RECs applied as a result of the Renewable Energy Standard will be used to meet the RES. Those "bonus" RECs will not be used for the CRP retirements above the RES. The incremental CRP retirements will come from current calendar year RECs as customers desire that REC vintage be contemporaneous with the reporting year.

Q. WILL THERE BE ANY IMPACT ON CARBON EMISSIONS REPORTING?

A. No, we have confirmed with The Climate Registry, who wrote and oversees the carbon accounting protocol that Xcel Energy follows, that additional REC retirements associated with the CRP will not change the carbon emissions reporting.

Q. WHERE WILL THE COMPANY REPORT ON ITS CRP?

A. The Company proposes to include reporting on the CRP in two distinct places. For purposes of communicating to customers, the Company plans to include the CRP in its annual Carbon and Energy Summary report, which also details the current carbon emissions reporting. For transparency with the Commission and regulatory stakeholders, the Company plans to include reporting on the CRP in its annual RES Report. The Company will also continue to report its physical generation mix in its Corporate Responsibility Report and other reporting venues.

Q. WILL THE CRP BE INDEPENDENTLY VERIFIED?

A. Yes, the Company is in the process of contracting with an outside vendor that will review the methodology, provide feedback, and then review the Company's calculations relative to that methodology.

Q. ARE ANY OTHER UTILITIES TAKING THIS APPROACH?

A. Yes, MidAmerican Energy in Iowa proposed a similar approach in 2017, and the Iowa Utilities Board approved a settlement with stakeholders, including low income advocates and large tech companies, implementing that plan. We have built on this approach in adapting it to the Colorado context, where we have a much higher RES and many more voluntary renewable customer programs.

Q. HAS THE COMPANY REVIEWED THIS APPROACH WITH EXTERNAL STAKEHOLDERS?

A. Yes. The Company discussed this approach with national experts and stakeholders in the renewable energy and REC accounting space, including the Environmental Protection Agency, National Renewable Energy Laboratory, World Resources Institute, World Wildlife Fund, and the Center for Resource Solutions (who manage the Green-e standard). Stakeholders were generally supportive, acknowledging that this approach is breaking new ground, and addressing a key policy issue and concern in this space.

Q. HAS THE COMPANY IMPLEMENTED THIS APPROACH IN OTHER STATES?

A. Yes, the Company has implemented this approach in Wisconsin, and is working on implementing this approach in Minnesota.

Q. IS THERE ANY ADDITIONAL COST TO IMPLEMENTING THE CRP?

A. There is an incremental REC retirement cost with the Western Renewable Energy Generation Informatuin System, the independent renewable energy tracking system for the region covered by WECC, at $0.005/REC. The incremental REC retirement cost attributable to the CRP in 2020 will be approximately $20,000. That cost will be recovered from the RESA in the same way that RES REC retirement costs are today.

B. <u>Customer Use of the CRP</u>

Q. HOW WILL CUSTOMERS BE ABLE TO TAKE ADVANTAGE OF THE CRP?

A. Customers may take the published CRP value for any calendar year and multiply it by their energy usage in that year to calculate the kWh of energy consumed from renewable resources. In addition, customers can look at the range of forecasted CRP values in future years to help develop and meet their renewable purchasing plans. For example, if a customer has a 100 percent renewable energy goal by 2025, and the Company's forecasted CRP in that year was a range of 40 to 55 percent, the customer could use the CRP as their baseline when planning voluntary renewable energy purchases. They could choose options that would allow them to procure the balance of renewable energy (e.g., 60 to 45 percent in my example) needed to reach 100 percent.

Q. HOW DOES THE CRP INTERACT WITH OTHER VOLUNTARY RENEWABLE PROGRAMS?

A. The CRP is intended to form the foundation on which other programs are built, but because different voluntary renewable programs have different REC treatment, those programs are accounted for differently, as set forth below.

Solar*Rewards and Solar*Rewards Community – RECs in these programs are retained by the Company, in exchange for a REC incentive.[5] As a result, the RECs for those programs will already be included in the CRP. Any customer who chooses to count their S*R and S*RC generation towards their sustainability goal will be double counting.

Windsource, Renewable*Connect – RECs in those programs are retired by the Company on behalf of participating customers, and are therefore not included in the CRP. Customers can count their subscriptions incrementally above the CRP towards their renewable energy goals.

Net Metering – interconnected onsite solar outside of Solar*Rewards allow customers to retain the right to the REC. Therefore, customers have the opportunity to count their Net Energy Metering generation incrementally above the CRP. The creation and transfer/retirement of the REC, however, is between the customer and third-party onsite solar developer in that instance.

Q. WILL CUSTOMERS BE REQUIRED TO PAY AN INCREMENTAL COST TO CLAIM THE CRP?

A. No, this is not a voluntary program that customers would need to opt-in to. The costs associated with the CRP will be borne by all customers, estimated at $20,000 in 2020, and all customers will receive the benefit of the CRP.

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[5] House Bill 19-1003, passed in the 2019 Colorado legislative session, directs the Commission to consider whether community solar garden customers can receive the REC. These proceedings have not yet been initiated at the time of this rate review.

Q. WHY IS IT IN THE PUBLIC INTEREST TO RETIRE RECS THROUGH THE CRP, BEYOND THE RETIREMENTS THAT ALREADY TAKE PLACE IN MEETING THE RES?

A. Many customers and communities have aggressive renewable energy goals, and some of those goals are community-wide. Denver's community-wide 100 percent renewable energy goal represents approximately 25 percent of the retail sales from the Company's system. Meeting that goal and other similarly aggressive goals without customers being able to acknowledge renewables being implemented on their behalf in the utility system could result in the construction of a lot of incremental generation that could add cost and risk that all customers might bear. The CRP positions system renewables as the foundation, and allows customers to procure voluntary renewable energy on top of that foundation. The CRP also allows for the environmental value of the investments that the Company has made and plans to make on behalf of all customers to flow through to all customers.

VII. RECOMMENDATIONS AND CONCLUSION

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.

A. With respect to the Panasonic and Stapleton Projects in the ICT program, the Company is seeking recovery of its deferred and prudently-spent capital and O&M expenses through 2018. Consistent with the ICT Settlement, we will continue to defer capital costs and O&M expenses from 2019 through the completion of the projects' expected battery system lives in 2027. I also recommend that the Commission approve our proposed CRP offering as described in my Direct Testimony.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

Statement of Qualifications

Jack W. Ihle

Jack Ihle is Director of Regulatory & Strategy Analysis for Xcel Energy – Colorado. He leads a team responsible for regulatory aspects of resource planning, renewable energy planning, electric vehicles and other policy issues. He has testified before the Colorado Public Utilities Commission on carbon proxy costs and the New Mexico Environmental Improvement Board on climate policy.

Mr. Ihle previously worked in environmental policy for ten years, most recently serving as Director of Environmental Policy while leading Xcel Energy's climate policy, environmental policy and environmental communications efforts across the Company's eight states. Mr. Ihle has also served in energy consulting roles with IHS and Platts, focusing on renewable energy, climate policy and forecasting engagements.

Mr. Ihle has a Master of Science degree in Energy & Resources from the University of California at Berkeley, and a Bachelor of Arts degree in Political Science from Bowling Green State University. He serves on the boards of directors for the Regional Air Quality Council, and Volunteers for Outdoor Colorado, and has previously served on the boards of XPAC, the Solar Technology Acceleration Center and WEST Associates.

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

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RE: IN THE MATTER OF ADVICE NO. 1797-ELECTRIC OF PUBLIC SERVICE COMPANY OF COLORADO TO REVISE ITS COLORADO P.U.C. NO. 8-ELECTRIC TARIFF TO IMPLEMENT RATE CHANGES EFFECTIVE ON THIRTY-DAYS' NOTICE.	**) PROCEEDING NO. 19AL-______E**

AFFIDAVIT OF JACK W. IHLE
ON BEHALF OF
PUBLIC SERVICE COMPANY OF COLORADO

I, Jack W. Ihle, being duly sworn, state that the Direct Testimony was prepared by me or under my supervision, control, and direction; that the Direct Testimony is true and correct to the best of my information, knowledge and belief; and that I would give the same testimony orally if asked under oath.

Dated at Denver, Colorado, this 16th day of May, 2019.

Jack W. Ihle
Director, Regulatory and Strategic Analysis

Subscribed and sworn to before me this 16 day of May, 2019.

Amanda Clark
Notary Public

AMANDA CLARK
Notary Public
State of Colorado
Notary ID # 20164004880
My Commission Expires 02-05-2020

My Commission expires 2/5/20