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BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of Rocky Mountain Power's Application to Establish Export Credits for Customer Generated Electricity	**DOCKET NO. 17-035-61**

DIRECT TESTIMONY OF KATE BOWMAN

ON BEHALF OF

UTAH CLEAN ENERGY

DATED this 22nd day of March, 2018

Kate Bowman

Kate Bowman
Utah Clean Energy

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Kate Bowman. My business address is 1014 2nd Ave, Salt Lake City, Utah 84103.

Q. By whom are you employed and in what capacity?

A. I am the Solar Project Coordinator for Utah Clean Energy, a non-profit and non-partisan public interest organization whose mission is to lead and accelerate the clean energy transformation with vision and expertise. We work to stop energy waste, create clean energy solutions, and build a smart energy future.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Utah Clean Energy.

Q. Please review your professional experience and qualifications.

A. I have worked for Utah Clean Energy for six years as a project coordinator with a focus on the development and implementation of programs that provide education about, expand access to, and facilitate the installation of solar photovoltaic energy. I hold a bachelor's degree in government with a focus on environmental policy from Dartmouth College.

Q. Have you previously filed testimony with this Commission?

A. Yes. I, have filed testimony in Docket No. 17-035-40, in the matter of Rocky Mountain Power's Application for Approval of a Significant Energy Resource Decision and Request to Construct Wind Resource and Transmission Facilities; in Docket No. 17-035-37/T07, in the matter of Rocky Mountain Power's 2017 Avoided Cost Input Changes Quarterly Compliance Filing; and in Phase II of Docket No. 16-035-36, in the matter of

Rocky Mountain Power's STEP Act Initiatives. I have also participated in and filed comments in dockets relating to Rocky Mountain Power's clean energy programs, including the 2016 Blue Sky annual report (Docket No. 17-035-19), the 2014, 2015, and 2016 Solar Incentive Program annual reports (Dockets No. 14-035-71, 15-035-57 and 16-035-21), and the Subscriber Solar program, tariff, and annual report (Dockets No. 15-035-61, 16-035-T04).

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your direct testimony?

A. I will address and make recommendations regarding the Company's proposed Utah Customer Generator Load Research and Analysis Plan and direct testimony of Kenneth Lee Elder, Jr. on behalf of Rocky Mountain Power ("Company"), filed February 15, 2018.

A Why is the Company proposing to conduct a Load Research Study?

A. The Load Research Study is a component of the first phase of Docket 17-035-61, also known as the "Export Credit Proceeding," the purpose of which is to "determine a just and reasonable rate for export credits for customer generated electricity."[1] The Export Credit Proceeding is described in the Settlement Stipulation, approved by the Public Service Commission on September 29, 2017, in Docket No. 14-35-114.

[1] Docket No. 14-035-114, In the Matter of the Investigation of the Costs and Benefits of PacifiCorp's Net Metering Program, Settlement Stipulation, filed August 28, 2017 and approved September 29 2017, paragraph 30.

Q. How will the Commission determine a just and reasonable rate for export credits for customer generated electricity through the Export Credit Proceeding?

A. As described in the Commission-approved Settlement Stipulation, following the Commission's Order approving the Stipulation, "the Company will promptly file an application to initiate the Export Credit Proceeding to determine the compensation rate for exported power from customer generation systems..." and "The Parties agree to support a procedural schedule that will allow the Commission to conclude the Export Credit Proceeding no later than three (3) years after the Export Credit Proceeding is initiated." [2] During this proceeding, "Parties may present evidence addressing reasonably quantifiable costs or benefits or other considerations they deem relevant, but the Party asserting any position will bear the burden of proving its assertion."[3] That is to say, the parties participating in this proceeding are responsible for presenting evidence that demonstrates the costs and benefits of, or other relevant considerations related to, customer generated electricity.

In order to quantify the costs and benefits of customer generated electricity, parties must have access to data necessary to complete analysis of the costs and benefits of customer generated electricity. It is important to note that in most cases, participating parties will rely on the Company to gather or procure this data. The Settlement Stipulation anticipated this need for data and created two avenues for data collection sufficient to

[2] Docket No. 14-035-114, Settlement Stipulation, filed August 28 2017, approved September 29 2017, paragraph 28.

[3] Docket No. 14-034-114, Settlement Stipulation, filed August 28 2017, approved September 29 2017, paragraph 30.

allow the parties participating in the docket to meet the burden of proof established for the Export Credit Proceeding:

> (1) A Company-facilitated workshop with the Parties and other stakeholders soon after the Export Credit Proceeding is initiated to discuss the type and scope of data expected to be considered in determining the appropriate export rate.
>
> (2) Mandatory participation in a Load Research Study by randomly selected net energy metering ("NEM") customers and Transition customers.[4]

The Load Research Study will provide some data about solar customers that can be used by participating parties to "present evidence addressing reasonably quantifiable costs or benefits or other considerations they deem relevant."[5] Because the Load Research Study will provide important information for use in the export credit proceeding, Utah Clean Energy believes that it is critical that parties are able to glean as much useful information from this study as is reasonably possible. Further, it is worth noting that although the Load Research Study is a key opportunity to collect data from solar customers, there are likely to be additional data needs outside of the Load Research Study. It is Utah Clean Energy's hope that this additional information can be obtained through the standard data request process and technical workshops.

[4] The terms "NEM customers" and "Transition customers" are defined in the Docket No. 14-034-114 Settlement Stipulation, filed August 28 2017 and approved September 29 2017.

[5] Docket No. 14-034-114, Settlement Stipulation, filed August 28 2017 and approved September 29 2017, paragraph 30.

Q. Did Utah Clean Energy participate in meetings leading up to the filing of the Company's Proposed Load Research Study?

A. Yes. Utah Clean Energy attended a meeting on January 9, 2018 to review a draft of the Company's proposed Load Research Study, provided informal comments on this draft to the Company on January 24, 2018, and attended a follow up meeting on February 7, 2018 to learn about the Company's revised Load Research Study.

Q. Did the Company make significant changes to the Load Research Study proposal in response to stakeholder comments filed on January 24?

A. No, the only significant difference between the Load Research Study proposal shared on January 9 and the proposal filed on February 15 was an adjustment to the level of confidence the Company plans to use for sample design.

III. SUMMARY OF RECOMMENDATIONS

Q. **Does the Company's proposed Load Research Study gather data sufficient to allow Utah Clean Energy and other parties to present evidence addressing reasonably quantifiable costs or benefits or other considerations they deem relevant, as described in the Settlement?**

A. No.

Q. Are there ways the Company's Load Research Study proposal could be improved?

A. Yes.

Q. **Please summarize your recommendations for improving the Company's Load Research Study**

First, the Load Research Study is a critical opportunity to gather data necessary for the Solar Export Credit proceeding and should be used to gather complete data streams from each customer in the study, including:

- Total energy usage, energy imports, and energy exports from the same set of customers
- Information about orientation, tilt, and shading of each solar installation
- Information that characterizes Load Research Study customers' energy usage
- Relevant information about the Load Research Study customers' location on the distribution system

Second, the Load Research Study should sample and stratify customers in a manner that results in a sample population that is representative of the relevant characteristics of solar customers and does not obscure important information. To do this,

- Residential and commercial customers should be sampled and stratified separately
- Load Research Study customers should be stratified based on total energy usage, not system size

Utah Clean Energy supports the Company's proposed level of confidence for the Load Research Study, if applied in addition to the recommended changes to the Load Research Study and stratification proposal that we have recommended herein.

Utah Clean Energy is also supportive of evaluating options for obtaining additional useful information from solar inverters.

Finally, Utah Clean Energy supports using technical conferences and data requests to obtain additional information necessary for the export credit proceeding.

IV. IMPORTANCE OF GATHERING COMPLETE SET OF RELEVANT INFORMATION FROM LOAD RESEARCH CUSTOMERS

A) The Load Research Study should gather total energy usage, energy import, and energy export data from the same set of customers

Q. What types of data is the Company proposing to collect through this Load Research Study plan and why?

A. According to Mr. Elder's direct testimony, the Company is proposing to collect three data streams, from two different sets of customers, including:

1) customer-exported energy from all Transition Program customers

2) customer-delivered energy from all Transition Program customers

3) a sample of solar energy generation from a separate set of grandfathered net energy metering ("NEM") customers. (Direct testimony of Mr. Elder lines 133 – 136)

All Transition Program customers will be equipped with bi-directional meters that are capable of gathering data about customer exports and deliveries on a 15 minute basis, so the Company will have a complete set of export and delivery data for all Transition Program customers. According to Mr. Elder's testimony, the purpose of gathering generation data, in addition to customer export and delivery data, is "To further supplement the body of data available and to better understand the intertemporal relationship between PG[6], delivered energy, exported energy, and full requirements energy." (Direct testimony of Mr. Elder lines 166 – 170).

Q. Do you agree with the Company that it is important to understand the intertemporal relationship between solar generation, delivered energy, exported energy, and total electricity usage?

A. Yes. The amount of energy exported by a customer is a direct function of that customer's generation and the characteristics of their behind-the-meter usage. Under the current 15-minute netting scheme in effect for Transition Customers, a solar customer's exports are equal to their solar generation minus their behind-the-meter usage during a 15 minute interval. While solar generation for a system of a given size, orientation, location, and tilt is fairly predictable, behind-the-meter usage can vary significantly for a given customer

[6] The term "private generation" or "PG" is used throughout the Company's direct testimony. The terms "private generation" and "private solar" are recommended in the Edison Electric Institute's April 12, 2016 Communications Handbook. However the term private generation is confusing and unspecific; it is not referenced or defined in the Settlement Stipulation, it could refer to a privately-owned utility-scale solar project, and it does not seem an appropriate descriptor for a rooftop solar installation located on a publically-owned facility. For the purpose of clarity we have used the more common terms "rooftop solar" or "solar generation."

or between customers (which directly affects solar electricity exports). Additionally, the value of customer-exported electricity can vary significantly depending on the time and location at which it is produced. In order to provide a comprehensive understanding of the value of exported electricity, it is important to understand the relationship between generation, delivered energy, exported energy, and total electricity usage for each customer participating in the study and to consider a variety of customer types with different energy demand profiles.

Q. Does the Company's proposed Load Research Study provide sufficient information about generation, delivered energy, exported energy, and total energy usage for a given customer?

A. No. It appears that the Company's Load Research Study relies on delivery and export data from one set of customers (Transition Program customers) and solar generation data from a different set of customers (a set of 36 Net Metering Customers who already have production meters as part of the 2014 Load Research Study, plus 34 additional customers).[7] The Company proposes to estimate behind-the-meter consumption and total energy usage based on data sets from these two different, mismatched sets of customers. This approach will not allow parties to draw informed conclusions about the intertemporal relationship between these data streams for actual customers. In order to understand the intertemporal relationship between these data streams, it is important to

[7] Docket No. 17-35-114, Exhibit Accompanying Direct Testimony of Kenneth Lee Elder, Jr. February 15 2018. "Draft Utah Customer Generator Load Research Study," Page 3.

gather each of these data streams (solar generation, delivered energy, and exported energy) from the same set of customers. Critically, the Load Research Study is the only opportunity for the Company to gather this data set.

Q. Do you have concerns about the Company's proposal to gather and use generation data from certain solar customers in isolation from the other data streams, described above?

A. Yes. Generation data from solar arrays is relatively easy to model based on array size, location, aspect, tilt, and shading. Gathering this data in isolation from a set of customers is not likely to yield interesting or surprising results. The Company agrees that "solar panel production is fairly predictable." (Direct testimony of Mr. Elder line 216.) If the purpose of this study were solely to determine generation, it would be a waste of time and resources to install meters on customer solar systems, especially considering the Company's anticipated cost of $2,306 per meter.[8] On the other hand, the Company does not currently have data about the intertemporal relationship between solar generation, exported energy, delivered energy, and total energy consumption for a given customer. These data streams are likely to vary considerably from customer to customer. Collecting generation data from specific customers is useful only to the extent that the data provides insight into the intertemporal relationship between exported energy, delivered energy, and total energy usage, which requires that all three data streams (generation, exports, and deliveries) are gathered from the same customer. This allows parties to accurately

[8] Rocky Mountain Power Response to Workshop Data Request 13.

estimate the fourth variable (total energy usage) for each customer and to evaluate and understand the temporal relationship between generation, exports, deliveries, and total usage for actual customers in a holistic manner.

Q. Might there be other ways to gather generation data from solar customers?

A. Yes, the vast majority of solar customers install monitoring software that reports the output of the solar inverters. While the data from inverters may not be accurate to +/- 0.2%, as is the case for the companies' proposed revenue grade production meters,[9] the inverter data is likely to be accurate enough given that Company's study is designed to achieve a minimum accuracy of plus or minus +/-10 percent at the 95 percent confidence level. Utilizing data from customer-sited inverters, in addition to generation data from revenue grade meters, may provide significantly more data at a much lower cost. The Company provided a list of considerations to be addressed in order to use data gathered from solar inverters in their response to Workshop Data Request 9. Utah Clean Energy supports further exploration of the option to use solar inverter data in addition to data collected using revenue grade meters through the Load Research Study.

<u>B) The Load Research Study should gather information about the customer's solar installation, including orientation, tilt, and shading</u>

[9] Rocky Mountain Power Response to Workshop Data Request 9.

Q. Does the orientation and tilt of the PV system impact the total electricity output and temporal output of the PV system?

A. Yes. Tilt and orientation impacts the timing of generation as much or more than the geographic location of a system, and timing of energy exports affects the value of the exported energy to the utility. For example, a south-facing system in Cedar City, Utah is estimated to produce approximately 11% more energy annually than a south-facing system in Salt Lake City. On the other hand, that south-facing system in Salt Lake is estimated to produce 20% more energy annually than an east-facing system in Salt Lake City.[10] Further, the timing of the generation profile changes with the aspect. For example, west-facing systems produce power later in the day as compared to south-facing systems, and east-facing system produce power earlier in the morning. For this reason, it is important to have information about the orientation and tilt of the systems included in the Load Research Study, in addition to information about the system's location, so that parties can understand how solar exports differ for customers who have systems of different tilts and orientations.

Q. What is your recommendation regarding, tilt and orientation for the Load Research Study?

Utah Clean Energy recommends that the Company collect information about orientation, tilt, and degree of shading of systems by visually inspecting the systems when meters are

[10] This analysis used PVWatts estimates for solar generation, assuming a 6 kW system at 40.7 degree tilt.

read or installed and/or issuing a survey to customers participating in the Load Research Study.

C) The Load Research Study should gather information that characterizes a customers' energy usage

Q. Is there additional data that is important to understanding the value of solar export credits?

A. Yes. Characterization of and information about a customer's energy usage is important to understand the interplay between customer generation, deliveries, and exports. This is another reason residential customers should be stratified separately from commercial customers, as described below.

Q. How do you propose that the Company modify the proposed Load Research Study to obtain key load characteristics for customers?

A. We suggest that key load characteristics can be derived from a questionnaire provided to customers participating in the Load Research Study that asks about their appliances, including (but not limited to) whether the customer has air conditioning, evaporative cooling, an electric vehicle, LED lighting, battery storage, smart thermostats, or other relevant appliances or devices. This information should also be collected from the current load research customers that are not associated with the solar Load Research Study. Understanding the nature and controllability of customer loads, how customer loads are changing, and the interplay between customer loads and onsite generation will provide important information for this docket and beyond.

D) The Load Research Study should gather relevant information about the customers' location on the distribution system

Q. Is the location of customer exported electricity relevant to its value?

A. Yes. Customer exported electricity will have a different value depending on its location on the distribution system. For example, customer generation may be able to avoid or defer planned upgrades to a given circuit or substation. As another example, customer generation in the early afternoon may be of more or less value depending upon the nature of the load on the circuit and whether it is largely commercial, largely residential, or mixed. Further other distribution system factors can impact the value of solar exports at that location, including the age and condition of distribution system equipment.

Q. What is your recommendation regarding a customer's location on the distribution system for the Load Research Study?

A. We request that the Company gather relevant data about load research customers' solar system's location on the distribution system, including data about the circuit and substation.

V. SAMPLE DESIGN AND STRATIFICATION

A) Residential and commercial customers should be sampled and stratified separately

Q. What is the purpose of stratifying the sample?

A. As I understand it, the purpose of stratifying the sample is to reduce the sample size necessary to achieve a given level of precision, which reduces the cost required to complete the study. According to the Company, "Stratified-random sampling divides the sample, or customer class, into sub-classes that have like characteristics. The technique has the effect of reducing the overall variance of the class, thus reducing sample size. Stratified-random sampling is a widely used and accepted technique because the statistical precision of a sample can usually be improved by using stratification. Therefore, a smaller sample size can be used with the same degree of precision." (Direct testimony of Mr. Elder, lines 75- 80). Critically, stratification should result in a sample population that is representative of the total population with respect to the intended variable of study and does not obscure important information about that variable.

Q. Do you have concerns about the Company's proposal to include residential and commercial customers in the same sample?

A. Yes. Residential customers are different from commercial customers in important ways. For example, residential and commercial customers typically have different load shapes and cause different system peaks and distribution system peaks. The value of solar exports may be different on a circuit that is largely composed of residential customers compared to a circuit that is largely composed of commercial customers. It is important to understand the difference. Commercial customers are more likely to have limited roof space relative to their electricity usage, and as a result, tend to install smaller systems relative to their load (which can result in minimal or no exports to the grid). Commercial customers are also more likely to have a flat roof, affecting system tilt. All of these

factors could impact the value of exported electricity. The Load Research Study should gather information that makes it possible to understand whether and how the value of residential and commercial solar export credits is different.

Q. How does the Company's proposal to include residential and commercial customers in the same sample affect the four sample strata?

A. The Company's four proposed strata break points are as follows:

Strata 1: 0-6 kW
Strata 2: 6 – 12 kW
Strata 3: 12 – 80 kW
Strata 4: >80 kW[11]

Intuitively, a strata with systems ranging from 12 to 80 kilowatts (Strata 3) or 80 to 2,000 kilowatts (Strata 4) does not seem like it categorizes customers with like characteristics. For example, Strata 3 likely contains many residential installations in addition to medium commercial installations. The wide ranges of the strata are a result of the Company's decision to stratify based on system size and include residential and commercial customers in the same sample. If separated into two samples, the strata for each sample would likely be more representative of the two customer types.

Q. Are there other reasons is it important to separate residential customers and commercial customers into different samples?

[11] Docket No. 17-35-114, Exhibit Accompanying Direct Testimony of Kenneth Lee Elder, Jr. February 15 2018. "Draft Utah Customer Generator Load Research Study," Page 4.

A**.** Yes**.** There are relatively few commercial customers compared to residential customers, but there is a wide spread among commercial customer's system sizes. Commercial systems can be as large as 2 MW, and commercial load shape can vary significantly depending on the customer type. As a result, commercial customer exports are expected to vary significantly from customer to customer. On the other hand, residential rooftop solar installations are limited to 25 kilowatts, and the relationship between residential solar generation and load will vary significantly from the relationship between commercial solar generation and load. As of September 2017, 95% of solar net metering customers were residential customers.[12] If this trend continues, the majority of solar customers who are affected by the export credit rate will be residential. It is critical that we separate residential and commercial customers to ensure that we are accounting for the significant differences between these customer classes.

Q. What is your recommendation with regard to residential and commercial customers?

A. The Load Research Study should sample and stratify residential and commercial customers separately. Further, the Load Research Study should stratify residential and commercial customers based on total energy consumption, not system size, as described in more detail below.

[12] Docket No. 17-035-31, In the Matter of Rocky Mountain Power's Customer Owned Generation and Net Metering Report and Attachment A for the Period April 1, 2016 through March 31, 2017, Rocky Mountain Power 2017 UT Interconnection Report-Attachment A, September 29, 2017.

B) Load research customers should be stratified based on their total energy usage

Q. What is the purpose of stratifying a sample based on a variable of interest?

A. The purpose of sample stratification, as I understand it, is to divide a given population into representative subgroups in order to reduce the sample size necessary to achieve a given precision. Sample stratification is based on a variable of interest. Sample stratification based on a variable of interest that is not closely linked with the intended variable of study could obscure important information about the variable of study (in this case, solar exports).

Q. What is the Company's proposed variable of interest?

A. The Company has identified the variable of interest as solar energy production, and notes that "when the variable of interest is not known, as in this case, an auxiliary variable that is highly correlated with the variable of interest should be used." (Direct testimony of Mr. Elder, lines 184-186). The company has identified solar system nameplate capacity as the auxiliary variable of interest.

Q. Do you agree?

A. No, the variable of interest chosen by the Company, system size, will not result in a sample population that is meaningfully representative of solar customers. We already know that as solar systems get larger, they also produce more electricity, and neither system size nor solar energy production are the sole variables influencing solar energy exports. Solar customers choose the capacity of their system based on several variables,

including (1) budget, (2) available roof space, and (3) total energy usage. Consider two 3-kilowatt installations that are south facing, at 30 degrees tilt, in full sun, and located in Salt Lake City. One is located on a smaller home that uses an average of 350 kilowatt-hours per month, and one is located on a larger home that uses an average of 1,200 kilowatt-hours per month. This 3-kilowatt system would produce between 200 and 496 kilowatt-hours per month, depending on the time of year.[13] The smaller home is almost certain to export much more energy than the larger home, where energy consumption on a 15 minute basis is more likely to exceed production from the solar installation. Yet the Company's Load Research Study design proposes to include these two customers in the same strata (Strata 1) despite the obvious difference in the magnitude and timing of their solar exports.

Solar exports are a function of solar energy production (which in turn is influenced by location, orientation, tilt, and shading) and total energy usage. The Load Research Study is the only opportunity to gather data necessary to understand the interplay between solar

[13] According to PVWatts, a 3 kilowatt solar installation in Salt Lake City on a south facing roof with 30 degrees of tilt would produce the following energy on a monthly basis:
January – 242 kWh
February – 299 kWh
March – 385 kWh
April – 412 kWh
May – 496 kWh
June – 467 kWh
July – 493
August – 491
September – 439
October – 389
November – 270
December - 200

generation, energy delivery, energy exports, and total energy usage. Stratifying systems based on capacity will obscure important differences between customers.

Q. Is there a better variable for stratification?

A. Yes**.** First, residential customers should be separated from commercial customers, as described above. Then we recommend stratifying each population based on total energy usage. Stratifying the sample based on this variable will require some additional upfront work, but it is possible with the data the Company has. The Company will have to look at the set of solar customers, identify the annual energy usage for the 12 months prior to the customer's solar installation, and stratify based on this variable. To simplify this process, the Company could start with the set of customers who have installed solar thus far in 2018 and stratify based on those customers' annual usage in 2017.

Q. What do you recommend regarding the 36 net metering customers who already have production meters?

A. In addition to the recommendations we have made to identify and stratify a new sample of load research customers, we recommend that the Company install bi-directional meters on the 36 grandfathered Net Metering customers who already have production meters from the 2014 Load Research Study. Especially given the Company's stated cost for production meters, which is significant, it seems wise to take advantage of production meters that have already been installed to gather complete data streams from these customers.

Q. How does your proposal compare to the Load Research Study completed 2014 as part of Docket 14-035-114?

A. With respect to sample stratification, our proposal is very similar to the Load Research Study conducted in 2014, except that we propose to stratify customers based on total energy consumption (or gross consumption) instead of net consumption. Further, for this docket it is necessary that commercial customers also be included as a separate sample. Given that there are more solar customers now that there were in 2014, a larger sample size is warranted.

VI. LEVEL OF CONFIDENCE

Q. Do you have comments regarding the level of confidence proposed by the Company?

A. We appreciate the Company's attempt to improve accuracy by designing a sample to achieve a minimum accuracy of plus or minus 10 percent at the 95 percent confidence level, compared to plus or minus 10 percent at the 90 percent confidence level. We appreciate this change and request that the Company apply this accuracy to the recommended changes to the Load Research Study and stratification proposal that we have requested in this testimony.

VII. SUMMARY AND CONCLUSIONS

The data obtained through the Load Research Study will be a critical input into the export credit proceeding. Given that the parties participating in the solar export credit proceeding will bear the burden of proof for any costs or benefits related to solar energy exports they wish to present, it is necessary to design the study such that it collects as much useful information as is reasonably possible. Utah Clean Energy has made the following recommendations with regards to the Load Research Study proposal:

- Gather all data streams from customers included in the Load Research Study, including
    - Total usage, imports, and exports for each customer included in the study, including temporal information for the data sets.
    - In addition to information about system capacity, the study should collect information about a customers' system orientation, tilt and, to the extent possible, shading.
    - Information that characterizes the customer's energy usage, including (but not limited to) whether the customer has air conditioning, evaporative cooling, an electric vehicle, LED lighting, battery storage, smart thermostats, or other relevant appliances or devices. This information could be collected through a simple survey.
    - Geographic information for the Load Research Study participants, including information about the participant's location on the distribution system, and whether the location is primarily commercial, primarily industrial, primarily residential or a mixture of these categories.
- Improve sample stratification by:
    - Separating residential customers from commercial customers
    - Stratifying customers based on total energy usage, rather than system size
- Apply the Company's proposed level of confidence to the recommended changes to the Load Research Study and stratification proposal that we have requested in this testimony.

- Utah Clean Energy supports evaluating options for obtaining additional useful information from solar inverters.
- Finally, Utah Clean Energy supports using technical conferences and data requests to obtain additional information necessary for the export credit proceeding.

Q. Are the changes you have proposed to the Load Research Study Plan sufficient to allow parties to meet the burden of proof established in the Settlement Stipulation?

A. Not entirely, other information will still be required. The intent of this testimony is to recommend changes to the Load Research such that we can gather the data that can reasonably be acquired through a Load Research Study and used to inform parties' analysis of reasonably quantifiable costs or benefits related to solar exports. Although the Load Research Study is one way to gather data to inform analysis for the Export Credit Proceeding, parties may wish to introduce evidence or analysis that requires additional data from the utility. For this reason, the Settlement Stipulation provides for a workshop during which Parties and other stakeholders discuss the type and scope of data expected to be considered in determining the appropriate export credit rate. There may be certain data that is currently only visible to the utility, and participating parties will need access to this data. We anticipate that parties will need to work with the Company to gather information through data requests, and we are supportive of using meetings, workshops, or collaborative processes to improve the efficiency and efficacy of the data gathering process for all parties.

Q: Does that conclude your testimony?

A: Yes.