Office of the Secretary
Service Date
April 14, 2022

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION OF ROCKY MOUNTAIN POWER FOR AUTHORITY TO IMPLEMENT A BATTERY DEMAND RESPONSE PROGRAM	)))))	**CASE NO. PAC-E-21-16** **ORDER NO. 35370**

On July 15, 2021, PacifiCorp dba Rocky Mountain Power ("Company") applied to the Commission for an Order approving a new and flexible "Schedule No. 114 load management tariff within the demand side management ("DSM") portfolio." Application at 1, 2, and 12. The new tariff would fund implementation of a "battery demand response program ("Program")." *Id.* at 1. The Company requested an October 15, 2021, effective date and asked that the case be processed by Modified Procedure. *Id.* at 12.

On August 19, 2021, the Commission issued a Notice of Application, Notice of Intervention Deadline, and Notice of Suspension of Proposed Effective Date. Order No. 35139. Pursuant to *Idaho Code* § 61-622, the proposed effective date was suspended for 30 days and five months or until the Commission enters an order accepting, rejecting, or modifying the proposed rate increases.

Idaho Irrigation Pumpers Association, Inc., intervened. Order No. 35164.

On October 15, 2021, the Commission issued a Notice of Modified Procedure establishing deadlines for public comments and the Company's reply.

Staff filed comments to which the Company replied. No other comments were received.

Having reviewed the record, we now issue this final Order modifying the Company's Application to implement a battery demand response program to a five-year pilot as discussed below.

APPLICATION

The Company seeks a flexible tariff so that it can "adjust Program details without advance Commission approval if the Company informally obtains Staff input and resolves any Staff concerns before implementing the change." Application at 2. The Company states the flexible tariff would allow the Company to manage and publish Program details on the Company's website, while allowing for adequate Staff input. *Id.* After any Staff concerns are resolved, the Company proposes to post the final changes at least 45 days before the changes go into effect. *Id.*

The Company intends for the Program to provide incentive for customers to install individual batteries that will be integrated into the Company's grid and used for grid management. *Id.* at 3. The Company states that this will benefit customers and the grid and create opportunities in utility grid management, load shaping, and utility integration of behind-the-meter batteries. *Id.* at 3-4.

The Company believes that initial participation will be residential customers with installed solar generation. *Id.* at 4. The Company proposed to compensate customers who install eligible battery equipment and allow the Company to use the battery for the grid with enrollment incentives and annual credits to their bills. *Id.* The Company will also allow customers who already have eligible batteries to participate in the Program. *Id.* at 5.

The Company projects that by 2029, the Program will provide about 10 megawatts of battery demand response ("DR"). *Id.* at 7. The Company estimated Program costs in 2022 at $315,000, $630,000 in 2023, and $1,006,000 in 2024. *Id.*

To participate, customers must have a reliable internet connection, a Wi-Fi network, and eligible battery-related equipment to facilitate communication with the grid. *Id.* at 8.

The Company will require the right to dispatch the battery system based on certain criteria. *Id*. It may establish a qualified Trade Ally Network to promote the Program, educate customers, and install battery equipment. *Id.* at 9-10.

The Company provided cost-effective analysis data with its Application. *Id.* at 11.

THE COMMENTS

1. Staff's Comments

Staff examined the Company's Application, workpapers, and subsequently filed information. Staff Comments at 2. Staff recommended that the Program proposed by the Company be implemented as a pilot program for five years with incentive payouts for nine years from the effective date of a Commission order. *Id.* at 2-3. Staff recommended that the Company update Schedule No. 114 to reflect the Program's pilot status. *Id.* at 3. If the Company intends to proceed with the Program permanently, Staff recommended the Company later apply to request approval to make the Program permanent. *Id.*

a. Program Specifications

Staff stated that under the Company's proposal, Program customers would have the potential to receive multiple incentives over the life of the battery. *Id.* Staff noted that:

> Enrollment incentives will be based on the [kilowatt ("kW")] capacity of the enrolled battery, multiplied by the commitment term. For example, if a residential customer enrolls a 5kW battery with a commitment term of 4 years, their enrollment incentive will be $3,000 (5kW x $150 x 4 years). During the commitment period for years 2 to 4, the program participation annual incentive would be $75 (5kW x $15). If the same customer continues to participate beyond the 4-year commitment term, their annual participation incentive could be up to $250 (5kW x $50). If a customer opts out of participating after their commitment term, their annual participation incentive will be pro-rated."

Staff Comments at 3 quoting the Company's Application at 6.

According to Staff the Company later clarified that the participation incentives kW capacity of the enrolled battery is based on the "continuous output of the battery." Staff Comments at 3. Staff said the Company described continuous output as "the output [kWs] of the battery that is accessible to the Company over a continuous timeframe." *Id.*

Staff described that Program eligible batteries must: (1) be able to integrate into the Company's Distributed Battery Grid Management Solution ("DBGMS"); (2) be a utility grade battery with a minimum 4 kW /10 kWh; (3) have a minimum ten-year battery life warranty; (4) have a minimum of 7,500 battery cycle life; (5) be able to charge and discharge multiple times a day; (6) have full dispatch control by the Company; and (7) have proper safety certifications for residential and commercial applications. *Id.*

According to Staff, the Company reported that the Program is cost-effective under the following tests: Utility Cost Test ("UCT"), Total Resource Cost Test ("TRC"), PacifiCorp TRC, and Rate Impact Measure Test. *Id.* at 4.

Staff stated that the Company projected an UCT benefit to cost ratio of [redacted]. *Id.* The Company modeled a 20-year measure life for batteries and used a "Value per kW-Yr" of $[redacted] in the first year of the calculation. *Id.* The Value per kW-Yr of benefit used for the Program is from the Company's Utah Cool Keeper DR program. *Id.* The Company provided a 20-year forward outlook for the Program through 2041. *Id.* The Company anticipates new customer enrollment at 100 new customers annually from 2022 through 2025 and 475 new customer enrollments per year

from 2026 to 2041. *Id.* The Company predicts it will have [redacted] customers by [redacted], accounting for [redacted] kW of battery storage. *Id.*

b. Cost-Effectiveness Concerns

Participation

Staff asserted that during the initial phase of the Program, the Company will only allow batteries paired with solar generation to participate.[1] *Id.* The Company stated "it will be more challenging to get customers with existing solar to participate in the [P]rogram than customers without existing solar, thus requiring a lower incentive for customers who install solar" after the effective date of a final Order.[2] *Id.* The Company indicated it did not know how many existing solar customers would participate, but estimated between 10 to 50 percent or more. *Id.*

In 2019 and 2020, the Company averaged 285 solar installations per year on Residential Service Schedule No. 1.[3] *Id.* The Company projects 100 residential participants in the Program's first year and increasing participation each year thereafter. *Id.* at 4-5. Staff expressed concern that the Company could not support its participation estimates. *Id.* at 5. Staff explained that solar installations involve a substantial financial commitment. *Id.* The additional cost of installing a battery to provide backup power and to shift load makes the investment riskier for customers wanting to potentially recover their investment in a solar plus battery scenario. *Id.* Staff is concerned that because of the high upfront cost to install a battery system, the Company's participation estimates are too high—affecting the cost-effectiveness projections of the Program. *Id.* If costs decrease for residential batteries, participation levels could be achieved, but until then participation in the Program may be inadequate. *Id.*

Staff asserted that the crux of the Program ultimately being cost-effective relies upon future solar installations. *Id.* Potential changes stemming from the results of the on-site generation study currently being conducted pursuant to Order No. 34753 may impact solar growth and the

[1] "Customers who participate in the proposed Wattsmart Battery program will initially be required to be enrolled in the Company's Net Metering Program." Response to Production Request No. 22.

[2] The Company had initially proposed a $100/kW incentive for customers who installed solar after September 1, 2021, and a $150/kW incentive for customers who installed prior to September 1, 2021. Due to the suspension of the effective date in Order No. 35139, the Company stated, "now that the program's effective date has been pushed to what will likely be the first quarter of 2022, the additional $50/kW incentive will be applicable to customers who install solar before the effective date of the program, rather than the previously stated September 1st date." Response to Production Request No. 43(b).

[3] *See* Response to Production Request No. 11.

potential participation in the Program. *Id.* Through a pilot program, Staff believed the Company could obtain relevant data to design a long-term successful program. *Id.*

Battery Technology

According to Staff, the Company acknowledged "battery storage technology is still relatively new and continuous innovation is expected to occur in the short- and long-term." *Id.* Staff said the Company also expected costs to decrease and options for additional batteries to become available in the next 1 to 3 years." *Id.* Staff believed the battery storage industry remains immature making the industry trend difficult to predict. *Id.* According to Staff, operating the Program as a pilot will allow the industry to mature and provide the Company with sufficient data to validate its assumptions. *Id.*

Staff asserted that if the Company's projection that "additional batteries [will] be available in the next 1 to 3 years" holds, a five-year pilot program would allow ample time for additional battery manufacturers to join the Program, thus creating greater opportunities and options for customers to pair batteries with their home and allowing the Company, Commission, and interested parties the ability to reassess key Program characteristics with multiple battery manufacturers that can potentially participate in the Program. *Id.* at 5-6.

Measure Life

The Company was unable to support the proposed 20-year measure life for the batteries. *Id*. at 6. The Company stated, "battery technology is expected to last beyond the manufacturer's warranty." *Id.* Staff did not believe the Company's unsupported assertions justify a measured life twice the minimum warranty. *Id.* Staff was concerned about over-estimating measure life for the Program absent supporting documentation for the assumption to bolster the Company's cost-effectiveness calculations. *Id.* According to Staff, the Program would be cost-effective using a 15-year measure life; however, if the battery life did not extend beyond the manufacturer's ten-year warranty, the Program would not be cost-effective. *Id.*

Additionally, Staff believed the Company's cost-effectiveness calculations indicate the Program is not cost-effective until [redacted]. *Id.* In [redacted], the Company projected the Program to have a benefit-to-cost ratio of [redacted]. *Id.*

Staff was also concerned that the Company used the Utah Cool Keeper's [redacted] to model the Program. *Id.* Staff believed the Program should be modeled

using Idaho specific values. *Id.* The Company described the Program as an advanced DR program [4] with the ability to provide multiple utility grid management practices including:

> [T]raditional demand response, frequency reserve, contingency reserve, regulation reserves, regional grid management, backup power, and other ancillary benefits in addition to reducing peak load on the electric system…Initially, batteries will be used to offset customers' load, but as the Program evolves and matures, the Company intends to add other capabilities.

Id.

Staff asserted that the Company could provide grid management capabilities outside of traditional DR so it would need to evaluate the "value per kW year" based on the benefits that it can provide in totality. *Id.* This is something that can be conducted during the pilot it proposed. *Id.* Through the pilot, Staff believed the Company should evaluate the "value per kW year" for the additional grid management capabilities the Program can provide specifically to Idaho. *Id.*

Battery Degradation

Staff expressed concern that battery degradation may impact Program performance. *Id.* Staff asserted that the Company would use the batteries for load shifting and multiple utility grid management practices 24 hours per day/365 days per year. *Id.* Staff believed that with the Program's ability to provide multiple utility grid management practices beyond a traditional DR program, batteries would be used frequently—potentially resulting in accelerated rates of battery degradation over the life of the battery. *Id.*

Staff said that to help protect against battery degradation concerns, the Company has established criteria for batteries, including a minimum ten-year battery warranty and a minimum of 7,500 battery cycling life for eligible equipment to qualify. *Id.* at 8. Staff believed this did not quell all concerns with battery degradation. *Id.* A battery may be able to cycle beyond the minimum 7,500 battery cycle life required by the Company, but due to battery degradation, batteries may not be able to provide continuous output of the original enrolled amount and as specified by the battery manufacturers for a new battery. *Id.*

Staff anticipated that due to battery degradation, the Company's enrolled participant's continuous output would decline with the age of the battery—resulting in fewer kWs available

[4] The Company describes advanced demand response as "providing a flexible resource which is automatically dispatched real-time to respond to large grid events with frequency response." Whereas "traditional demand response events are typically pre-scheduled day ahead or several hours in advance when system load is expected to peak." Response to Production Request No. 38.

than projected. *Id*. Staff iterated that operating the Program as a pilot would provide the Company an opportunity to study the impact of battery degradation on the Program's cost-effectiveness. *Id.*

c. Pilot Proposal

Staff recommended the Program be conducted as a pilot to help create a long-term, successful battery DR program. *Id.* Staff believed a pilot will provide necessary data to inform decisions and improve the assumptions used by the Company. *Id.*

In Attachment A, Staff provided identified Program changes, specifications, and annual reporting requirements for its proposed pilot program. Staff expected that the Company would actively manage the Program as it would its other DSM programs, make its best efforts to increase cost-effectiveness, and increase participation in the Program when necessary. *Id.*

Staff recommended that the Program be implemented as a pilot, allowing enrollment in the Program for five years with a potential incentive payout of nine years from the effective date of a Commission final order. *Id.* Staff argued five years of enrollment in the Program would provide sufficient data to inform a future decision on rates of participation, eligible battery types, new battery manufacturers, cost-effectiveness, and the effectiveness of the grid management practices used by the Company. *Id.* at 8-9. Staff recommended enrollment in the Program at the end of the fifth year, and that customers enrolled during the first five years be able to receive incentives until the end of the ninth year. *Id.* at 9. An incentive payout until the end of the ninth year will allow customers enrolled in the Program in year five, the ability to fulfill their four-year commitment. *Id.*

Staff recommended minor changes to the incentive structure proposed by the Company. *Id.* Staff recommended the Company eliminate the custom incentive option during the pilot. *Id.* The custom incentive option will be difficult to evaluate until more data and cost-effectiveness calculations can be validated during the pilot period. *Id.*

During the pilot period, Staff recommended the Company make changes to the Program through the flexible tariff process described in the Application. *Id.* However, Staff recommended the changes occur on an annual basis and that changes to incentive structures be locked for a 12-month period. *Id.* Annual changes will provide ample data to identify trends that will be used to direct the establishment of a permanent Program according to Staff. *Id.*

Staff also recommended that no Company operated lease options should be offered during the pilot. *Id.* Staff opined that if the Company wished to offer a lease option after the pilot

period ends, the Company should provide a proper lease proposal to the Commission at that time. *Id.*

Staff recommended the Company file annual reports until the end of the five-year pilot. *Id.* At the end of the pilot period, Staff suggested the Company should file a final report to the Commission. *Id.* Staff provided specific information to be included in the reports in Attachment A. *Id.* In the final report, Staff requested the Company provide "a Study or Literature Review of other reputable studies on battery life, battery degradation, and battery cycle usage." *Id.* Staff stated a study or review of the areas outlined will be necessary for Staff to support the measure life and validate the cost-effectiveness of the Program. *Id.* The batteries studied or reviewed need to include, but not be limited to, the types of batteries being used by the Company during the pilot period. *Id.* at 10. Other residential or commercial batteries that could be used for a battery DR program should be evaluated based on battery cell chemistry, usable capacity, continuous output ratings, and other key specifications unique to batteries used for the Program. *Id.*

Staff asserted that if the pilot proposal presented by Staff is approved, the Company should file an updated Schedule No. 114 to reflect the five-year pilot Program being offered in Idaho. *Id.* On the Company's website and in the updated Tariff, Staff recommended that the Company provide a clear and concise definition of continuous output or the per kW used for the incentive structure to alleviate any customer confusion. *Id.*

Staff said that if the Company wanted to continue the Program after the five-year pilot period, the Company should apply to the Commission requesting authority to continue the Program—including any modifications—along with the final report and studies requested by Staff. *Id.* Staff said that if the Company did not wish to proceed with the Program beyond the pilot, the Company should continue to provide incentives until the end of the ninth year when the pilot will end. *Id.*

2. Company's Reply Comments

The Company noted that Staff's comments were generally in support of the Company's Application. Company Reply at 1.

The Company agreed with Staff's recommendation to implement the Program as a pilot for five years. *Id.* The Company iterated that the proposed Program is an expansion of the already established Wattsmart Batteries program offered in Utah. *Id.* at 1-2. The Company attached an updated Schedule No. 114 Tariff sheet to its reply comments reflecting the pilot status of the

Program. *Id.* at 2. The Company also attached updated flexible tariff materials to include a definition for continuous output and remove the custom incentive option per Staff's recommendations. *Id.*

The Company acknowledged Staff's concerns and recommendation for cost effectiveness assumptions that are more Idaho specific but stated that the established Wattsmart Batteries program was designed and operated as a PacifiCorp system resource. *Id.* The Company intends to bring the Wattsmart Battery program to multiple PacifiCorp states and to manage, report on, and value it with continuity. *Id.* The Company acknowledged the cost effectiveness and system benefits will evolve with new technology. *Id.* The Company stated it will share results in reporting and discuss the results during DSM update meetings. *Id.*

The Company agreed to adjust incentives and the Program's structure on an annual basis. *Id.* The Company said that mid-year adjustments may also be made if necessary, in response to market conditions (e.g. changes in materials costs, product availability, price competition, etc.) to remain aligned with the Program's targets and budget. *Id.* The Company agreed to work with Staff if mid-year adjustments were needed beyond the planned annual timeframe. *Id.*

The Company agreed to report Program details as part of the Company's annual DSM report every May 1st. *Id.* at 3. The Company asserted that some of the key deliverables and metrics mentioned in Attachment A to Staff's comments may not be practicable to track and report on due to the limitations of the Company's systems, but stated it would work with Staff to determine what must be reported. *Id.*

The Company requested that the Commission approve the Company's Application to implement a battery DR program on a pilot basis as discussed in its reply comments and as supported by Staff. *Id.*

COMMISSION DISCUSSION AND FINDINGS

The Company is an electric utility subject to the Commission's regulation under the Public Utilities Law. *Idaho Code* §§ 61-119 and 61-129. The Company's rates, charges, classifications, and contracts for electric service in the State of Idaho are subject to the Commission's jurisdiction. The Commission has jurisdiction over this matter under *Idaho Code* §§ 61-501, 61-502, and 61-503. The Commission is empowered to investigate rates, charges, rules, regulations, practices, and contracts of public utilities and to determine whether they are just,

reasonable, preferential, discriminatory, or in violation of any provision of law, and to fix the same by order. *Idaho Code* §§ 61-502 and 61-503.

We have reviewed the record, including the Company's Application, Staff's comments and the Company's reply comments. Based on our review, we find the Company's proposal to implement a pilot battery DR program is fair and reasonable offering customers an innovative and proactive way to participate in DR activities. We appreciate the Company being proactive and continuing to look for ways to offer cost-effective DSM programs to its customers.

We find the suggestion to offer the Program as a pilot is most reasonable at this time. This will provide the Company and interested parties an opportunity to collect and review data, assess new battery technology, and refine the incentives offered annually. We understand that battery DR is a new DSM program and the technology that is the crux of its ultimate success or failure remains expensive and is still an uncommon installation for residential, industrial, and commercial customers. While we cannot predict rates of adoption of deployable battery storage technology in the future, this Program—on a pilot basis—offers the Company a way to begin planning for a future battery DR program and educating customers.

Pursuant to the suggestions made by Staff and subsequently acknowledged by the Company, the Company must file annual reports during each year of the pilot. Upon completion of the fifth year, the Company must file a final report detailing the data it collected and analyzed during the pilot period. The report must include a Study or Literature Review of other reputable studies on battery life, battery degradation, and battery cycling usage, and all other key metrics described in Attachment A. After, if the Company wishes to continue the Program permanently, it should apply to do so. We believe the pilot will provide the Company sufficient time to understand the benefits the Program can provide and support its proposal with data. We believe the battery storage market and battery technology will evolve during the pilot period. We think five years will give the Company adequate time to review Program offerings, refine incentive amounts, and properly educate customers to achieve its goals.

In addition, the Company needs to file conforming tariffs for Schedule No. 114. In the Company's reply Comments, the Company provided updated Schedule No. 114 reflecting the proposed pilot. However, the Company provided the tariffs with language specific to the State of Utah and failed to mention the length of the pilot and the length of the potential payout for the incentives.

ORDER

IT IS HEREBY ORDERED that the Company's Application is approved subject to the Company operating the Program as a five-year pilot with a potential incentive payout for nine years as described in Attachment A.

IT IS FURTHER ORDERED that the Company must file conforming tariffs for Schedule No. 114 to reflect the five-year pilot authorized in this Order.

IT IS FURTHER ORDERED that the Company shall file an annual report during each year the pilot Program runs. At the end of the fifth year, the Company must file a final report that includes the key metrics described in Attachment A.

THIS IS A FINAL ORDER. Any person interested in this Order may petition for reconsideration within twenty-one (21) days of the service date of this Order regarding any matter decided in this Order. Within seven (7) days after any person has petitioned for reconsideration, any other person may cross-petition for reconsideration. *See Idaho Code* § 61-626.

DONE by Order of the Idaho Public Utilities Commission at Boise, Idaho this 14th day of April 2022.

ERIC ANDERSON, PRESIDENT

JOHN CHATBURN, COMMISSIONER

JOHN R. HAMMOND JR., COMMISSIONER

ATTEST:

Jan Noriyuki
Commission Secretary

I:\Legal\ELECTRIC\PAC-E-21-16 Demand Response\orders\PACE2116_final_dh.docx

Attachment A: Battery Demand Response Program ("Program")

Pilot Proposal

PAC-E-21-16

Pilot Objectives:

The pilot program is intended to achieve the following objectives:

- Identify Participation Levels and Trends
  - Is the Program receiving sufficient participation?
  - Are incentive designs driving participation?
- Determine Value of Avoided Cost Based on:
  - Grid Management practices
    - load shifting, contingency reserves, backup power, etc.
  - Is the Program cost-effective from the Utility Cost Test?
- Understand Performance of Batteries and Operations of Battery Demand Response Program
  - By each grid management practice
  - Comparative analysis of battery performances based on year and cycling
  - Determine proper measure life for residential and commercial batteries.
- Understand how this Program is integrated and used efficiently with on-site renewable generation programs.
  - Evaluate how the battery demand response program can be leveraged with the results and outcomes of the PAC-E-19-08 Study, i.e., export credit rates, time of use rates, etc.

Pilot Modifications:

1) **Pilot:** 5 years of Enrollment and 9 years of potential incentive payout
   a) Allow enrollment in Program for up to 5 years from effective date. Customers will remain on Program until: (1) end of 9th year from effective date; (2) customer opts out of Program; (3) or customers battery is no longer operable before the end of the 9th year.

b) Customers enrolled will be able to receive incentives until the end of the 9th year from the pilot Program's effective date. Customers will have the ability to continue in the Program if the Program is extended beyond 5 years.

c) All incentive values are subject to changes (via flexible tariff) and are not granted legacy rates. The changes will be posted on the Company's website and will be communicated electronically at least 45 days prior to the changes

2) Flexible Tariff changes

a) Must be proposed to Commission Staff with sufficient review time to allow the timeframe of the 45 days prior to desired effective date of changes, and changes can occur on a yearly basis if needed. This can occur on a calendar year basis or another yearly timeframe proposed by the Company.

b) Incentive payments should be locked for a 12-month period. This includes enrollment and annual participation incentives.

i) Once historical data is available, continuous output of each battery type should be reevaluated to ensure it is receiving the specified kW enrolled for each specific battery.

b) Other aspects of Flexible Tariff changes would be operated as it currently does with other DSM programs.

2) Incentive Values will remain as the Company proposed in the original Application except for the Custom option as stated below:

a) Enrollment Incentive for solar installed prior to effective date of Program:

i) *$150 per kW*[1] multiplied by Annual Commitment Term of 4 years.

b) Enrollment Incentive for solar installed after effective date of Program:

i) *$100 per kW* multiplied by Annual Commitment Term of 4 years.

c) Annual Participation Incentive during Commitment term (years 2-4):

i) *$15 per kW.*

[1] Per kW in the incentives is based on the continuous output of the kilowatts (kW) of the battery that is accessible to the Company over a continuous timeframe. Continuous output is determined through the Company's testing.

ii) Once historical data is available, continuous output of each battery type should be reevaluated to ensure it is receiving the specified kW enrolled for each specific battery.

d) Annual Participation Incentive after year 4 (after Commitment Term)

i) *$50 per kW.*

ii) Once historical data is available, continuous output of each battery type and the 4 kWh capacity minimum threshold should be reevaluated to ensure the Company is receiving the specified output (kW) and that the battery operates above the capacity threshold (kWh) enrolled for each specific battery.

e) No Custom Incentive Option will be provided until further evaluation of the Program.

3) Battery will only be controlled by the Company, no dispatchability by customers during the pilot.

4) No Company operated lease programs. If the Company is seeking to continue the Program after the pilot and provide a lease option, the Company should provide a proposal for a lease option for Commission approval.

Key Deliverables and Metrics:

5) Provide Annual Report with key Program metrics. The Annual Report should include:
   a) Actual performance data
      i) Amount of demand response achieved
      ii) Amount of times dispatched and average yearly cycle per battery
      iii) Comparative Analysis of exports and consumption usage between Solar with batteries and solar without batteries (control group)
      iv) Average communication failures per battery
      v) Provide data separated by residential and commercial customers
      vi) Performance of batteries and demand response operation by each grid management practice, i.e., load shifting, frequency reserves, backup power, etc.
   b) Cost-effective calculation for Utility Cost Test
   c) Participation:

i) New customers enrollment and solar installs completed

6) Provide frequent updates on new battery manufacturers with the ability to integrate into the Company's Distributed Battery Grid Management Solution ("DBGMS")
7) Provide a final report at end of year 5 from pilot effective date and year 9 from pilot effective date (if Program is no longer continued). The reports should include:
   a) Yearly and cumulative Program data
   b) Actual Performance Data
      i) Amount of demand response achieved
      ii) Amount of times dispatched and average yearly cycle per battery
      iii) Comparative Analysis of exports and consumption usage between Solar with batteries and solar without batteries
      iv) Average communication failures per battery
      v) Provide data separated and by residential and commercial customers
      vi) Data on new solar installations with and without batteries (control group)
      vii) Performance of batteries and demand response operation by each grid management practice, i.e., load shifting, frequency reserves, backup power, etc.
   c) Cost-effective calculation for Utility Cost Test
   d) Participation:
      i) New customers enrollment and solar installs completed
   e) Provide a Study or Literature Review of other reputable studies on Battery Life, Battery Degradation, and Battery Cycling usage
      i) The batteries studied or reviewed need to be specific, but not limited, to the types of batteries being used by the Company for the pilot program. For example, a lithium iron phosphate battery with a usable capacity of 10 kWh and nominal power rating (continuous output) of 4.8 kW would need to be evaluated[2]. In addition, other residential and commercial batteries that could be used for a battery demand response program should be evaluated based on battery cell chemistry, usable capacity,

[2] These battery specifications are from the SonnenCore battery, which would be a potential battery installed by customers if the Commission approves the Program. Battery specifications were provided to Staff in Response to Production Request No. 37 and can be accessed at https://sonnenusa.com/en/sonnencore/.

continuous output ratings, and other key specifications unique to batteries used for the Program.

f) Evaluation of a lease option program. If the Company is seeking to continue the Program after the pilot and provide a lease option, the Company should provide a proper proposal for a lease option for the Program.

8) At the end of year 5, the Company will provide a final report with key Program metrics described above. If the Company is seeking to continue the Program beyond the pilot, the Company should file a new docket with a final report requesting Commission approval to continue the Program.