EXH. WTE-1CT
DOCKETS UE-___/UG-___
2019 PSE GENERAL RATE CASE
WITNESS: WILLIAM T. EINSTEIN

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-19____** **Docket UG-19____**

PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF

WILLIAM T. EINSTEIN

ON BEHALF OF PUGET SOUND ENERGY

REDACTED VERSION

JUNE 20, 2019

PUGET SOUND ENERGY

PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF WILLIAM T. EINSTEIN

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is William T. Einstein, and my business address is 355 110th Ave. NE, Bellevue, Washington, 98004-5591. I am employed by Puget Sound Energy ("PSE") as Director of Product Development and Growth.

Q. Have you prepared an exhibit describing your education, relevant employment experience, and other professional qualifications?

A. Yes. Please see the First Exhibit to the Prefiled Direct Testimony of William T. Einstein, Exh. WTE-2, for an exhibit describing my education, relevant employment experience, and other professional qualifications.

Q. What is the purpose of your testimony?

A. My testimony addresses three primary subject matters. First, I address PSE's proposal regarding the future of its water heater and gas conversion rental services. Second, I address the prudency of the generation resources that supply PSE's Green Direct product. Finally, I address several pilot and demonstration projects that PSE has either just begun or projects on the horizon that PSE anticipates implementing over the next few years.

II. WATER HEATER AND GAS CONVERSION BURNER RENTAL SERVICES

A. Overview

Q. Can you describe the history and origins of PSE's water heater and gas conversion burner rental services?

A. PSE and its predecessor companies have offered equipment rental services to customers as a regulated service for more than half a century. In the 1940s, one of PSE's predecessor companies, Puget Power & Light Co. ("Puget Power"), began providing customers an optional "Storage Water Heating Service," which for a monthly charge, the company would furnish a time switch that connected to the customer's water heater and would activate the water heater. In 1961, Washington Natural Gas ("WNG") began offering customers natural gas conversion burners for rent. WNG later expanded its rental options to customers to include gas circulating heaters, furnaces, and water heaters, all as regulated services. In 1965, Puget Power began offering electric water heaters for rent. In 1997, WNG and Puget Power merged, forming PSE. PSE discontinued the electric heater leasing service but continued the WNG equipment rental service. It has operated continuously since that time.

Q. What is the current status of PSE's water heater and gas conversion burner rental services?

A. In 2000, PSE closed the services to new customers. While there are currently about 29,000 participating customers, that number continues to decline each year.

As of December 31, 2018, the number of customers under Schedules 71, 72, and 74 are shown in Table 1.

Table 1. Total Customer Count
December 31, 2018

Schedule	Customers
Schedule 71 - Residential Water Heater Rental Service	24,028
Schedule 72 - Commercial Water Heater Rental Service	2,428
Schedule 74 - Gas Conversion Burner Rental Service	2,661
Total Water Heater and Conversion Burner Customers	**29,117**

The annual revenue from the rental services for the year ending December 31, 2018, is $5,837,290. The net book value on assets is $7,901,031. Approximately 50 percent of the customer base has fully depreciated equipment as shown in Table 2.

Table 2. Fully Depreciated Equipment
December 31, 2018

Equipment Type	Count
Residential Water Heaters	10,955
Commercial Water Heaters	973
Conversion Burners	2,586
Total Fully Depreciated Assets	14,514
Total Assets	29,117
% of Total Assets Fully Depreciated	49.85%

Q. Was PSE's water heater and gas conversion burner rental services addressed by the parties in PSE's 2017 general rate case in Dockets UE-170033/UG-170034?

A. Yes. In that case, Commission Staff raised a series of concerns with PSE's services and recommended that the services to existing customers eventually be terminated. I addressed Commission Staff's concerns in my Prefiled Rebuttal Testimony in that case, Exh. WTE-1T, Dockets UE-170033/UG-170034.

Q. How did the parties agree to resolve Commission Staff's concerns?

A. The parties entered into a Multiparty Settlement Stipulation and Agreement whereby PSE agreed to enter into a collaborative with Commission Staff and other interested stakeholders to address the future of these services.

Q. Has PSE engaged in a collaborative with Commission Staff and other interested stakeholders?

A. Yes. PSE has had discussions with Commission Staff, Public Counsel and The Energy Project regarding the future of the services to existing customers. These discussions are ongoing.

B. Future of the Water Heater and Gas Conversion Burner Rental Services

Q. What are PSE's plans for the future of the water heater and gas conversion burner rental services?

A. For the past several years, Commission Staff has recommended that PSE progressively exit the water heater and conversion burner rental business. Given that the services are currently closed to new customers, PSE agrees that the services should end. Ending the services will allow PSE, the Commission, and other stakeholders the opportunity to focus on providing new and emerging products and services to customers, including other rental products that benefit customers. While PSE plans to discontinue its water heater and conversion burner rental services, it is currently exploring opportunities to provide customers options to continue their water heater rental service with a third-party provider.

Q. What is PSE's specific proposal for ending the water heater and gas conversion burner rental services?

A. PSE proposes to sell the water heater rental service to a third-party service provider and end the conversion burner rental service. Selling the water heater rental service to a third-party service provider would include a sale of the water heater assets and an assignment of the customer agreements for the service.

Q. Will selling the water heater rental service benefit participating customers?

A. Yes. Selling the service to a third party provides participating customers the option to continue their service with a third party, which could provide additional

benefits to customers. This may include more choice in water heater equipment and potentially other home ancillary services.

Q. How does PSE intend to move forward with selling the water heater rental service and when does it anticipate starting that process?

A. In June 2019, PSE issued a Request for Interest in purchasing the water heater rental service. Following that process, PSE will issue a Request for Offer to interested parties. PSE will then evaluate the offers it receives. Once a potential buyer is identified and secured, PSE will file an application requesting Commission approval to sell the water heater rental service under Chapter 80.12 RCW and Chapter 480-143 WAC.

Q. How would PSE notify customers about the sale of the water heater rental service?

A. PSE will provide notice to customers of the intent to sell the water heater rental service and their future options consistent with WAC 480-143-210 and WAC 480-90-194, concurrently or prior to filing the application requesting Commission approval. Once the Commission approves the sale of the water heater rental service, PSE will communicate with current rental service customers announcing the planned transfer of ownership and their options. This customer communication process will be detailed in the application requesting Commission approval to sell the water heater rental business.

Q. What options will PSE provide to customers who have water heaters that have a remaining depreciation balance?

A. Customers who rent equipment that is not fully depreciated would have the following options upon notification:

1) Transfer the rental agreement to the new owner and continue to make monthly payments;

2) Request to end the current rental agreement, pay any residual balance and take ownership of the equipment; or

3) Request to end the current rental agreement and that the equipment be removed by PSE.

Q. What options will PSE provide for customers who have water heaters that are fully depreciated?

A. PSE will provide these customers with the same options as customers who do not have fully depreciated equipment:

1) Transfer the rental agreement to the new owner and continue to make monthly payments;

2) Request to end the current rental agreement and take ownership of the equipment; or

3) Request to end the current rental agreement and that the equipment be removed by PSE.

Q. Why is PSE ending the conversion burner service?

A. The gas conversion burner rental service was introduced decades ago as an option for customers to retrofit their existing oil or coal-fired boilers and furnaces to natural gas. At the time, and for years, this program served an important and helpful service for customers to economically convert to natural gas. However,

the number of customers with rented conversion burners declines every year with nearly 98 percent of conversion burners fully depreciated. As of December 31, 2018, PSE had 2,661 conversion burner customers and the annual revenue from the conversion burner rental service for 2018 was $507,296.

Given the size and decline in the program, PSE can better serve customers by ending the conversion burner rental service and monthly rental fees, transferring ownership of the equipment to the customer, and offering them programmatic energy efficiency rebates for upgrades of their home heating equipment when the customers desires to replace their conversion burner and vintage boilers and furnaces with conventional HVAC systems.

Q. How would PSE end the conversion burner service?

A. PSE proposes to withdraw Schedule 74 Gas Conversion Burner Rental Service. PSE will end the rental agreement with customers through notification consistent with WAC 480-90-194, will transfer ownership of the conversion burner equipment to the home or business owner, will provide customers referrals for other third-party maintenance, if available, and offer existing programmatic rebates on applicable energy efficient HVAC replacement equipment.

Q. When does PSE plan to end the conversion burner service?

A. PSE plans to file with the Commission a tariff filing to discontinue the conversion burner service at the same time as, or before, PSE submits the application to sell the water heater rental service.

Q. How has PSE reflected the potential sale of the water heater rental service and termination of the conversion burner rental service in this general rate case?

A. As discussed in the Prefiled Direct Testimony of John D. Taylor, Exh. JDT-1T, PSE has currently proposed rates for these customers at a level equivalent to their cost of service. This reduces the relatively sizeable amount of over-collection reflected in current rates and begins to reflect the costs that will continue to be borne by PSE's remaining gas customers when these services end. When it files its application requesting approval to sell its water heater service under Chapter 80.12 RCW, PSE anticipates consolidating that filing with this general rate case filing. At that time, PSE would propose fully reflecting the removal of all costs and revenues associated with these services from the revenue requirement determination in this case

Q. What are PSE's plans if a buyer for the water heater rental service is not secured?

A. PSE will proceed with ending the conversion burner rental service and continue to operate the water heater rental service to a specific future date of no more than five additional years, phase out the operation of the service, and collaborate with Commission Staff on operational guidelines during the interim period.

III. GREEN DIRECT

A. Overview

Q. What is the Green Direct product?

A. "Green Direct" is the marketing brand for PSE's Voluntary Long Term Renewable Energy Purchase Rider product created to meet the renewable energy needs of PSE's governmental and large corporate customers who consume at least 10,000 megawatt-hours (MWh) annually. The primary purpose of the product is to provide large existing customers a direct link to an affordable renewable energy option for up to 20-year contract terms.

Q. How did PSE determine its need for Green Direct?

A. In communications with customers regarding their needs, PSE determined that several of PSE's large corporate and government customers desired a renewable energy product supplied by known resources, that provided a cost hedge over time, and that would allow them to achieve their carbon reduction goals. Customers were also interested in new projects that provided additional renewable energy for our state and regional energy grid. To obtain this additionality, customers were willing to sign long term agreements ahead of the project development. Ultimately, customers signed agreements ranging in term from 10 to 20 years.

Q. Has the Commission approved Green Direct?

A. Yes. Green Direct was approved by the Commission as Schedule 139 in Docket UE-160977.[1] PSE held extensive conversations with Commission Staff leading up to an initial filing in July 2016, which was then approved by the Commission in September 2016. Initial launch customers expressed their strong support for this product during the approval process for Schedule 139. The Commission authorized PSE to subscribe up to 75 average megawatts (aMW) under the tariff, before conducting a review of the product's impacts. Under the first filing, the Commission also approved PSE's proposed pricing for the Skookumchuck Wind Energy Project ("Skookumchuck") to be built in Lewis County, Washington, which would account for the first 43 aMW (137 megawatts (MW)). In July 2018, PSE received Commission approval for a second offering which would blend the pricing for Skookumchuck with the 42 aMW (150 MW) Lund Hill Solar Project ("Lund Hill") in Klickitat County, Washington. Then, in October 2018, the Commission approved a 10 aMW expansion of the product, to accommodate additional customer demand by utilizing the full build-out potential of the Lund Hill project.

Q. Are participating customers covering the cost of Green Direct?

A. Green Direct was filed pursuant to RCW 19.29A.090, which requires electric utilities to offer "retail electricity customers qualified alternative energy

[1] *In the Matter of Tariff Revisions Filed by Puget Sound Energy*, Docket UE-160977, Order 01 (Sept. 28, 2016).

resources," as well as ensuring that "all costs and benefits associated with any option offered by an electric utility under this section must be allocated to the customers who voluntarily choose that option." Under Green Direct, participating customers will be charged a fixed annual kilowatt rate that covers the full cost of the power purchase agreement ("PPA") executed for the dedicated resources, as well as any administrative costs associated with the Schedule 139 tariff, including losses, taxes, billing and tracking. In addition, customers will receive an Energy Charge Credit for the energy-related production costs allocated to them in their rates. The credit calculation is the product of two numbers: what has traditionally been PSE's Power Cost Adjustment baseline rate, inclusive of both fixed and variable production costs, adjusted for revenue sensitive items (primarily the State Utility Tax), and their share of PSE's production costs classified as being related to the supply of energy.[2] The Schedule 139 customers will continue to pay their share of the numerous costs that go into paying for the electric system including demand-related power, delivery and administrative costs through the existing base tariff schedule.

Q. What is the status of Green Direct?

A. In accordance with the Commission's approval of a total of 85 aMW, to meet this threshold, Green Direct was executed in two Open Seasons, each phase bringing on a new renewable energy project through a PPA. For the first Open Season,

[2] Currently, this is 75 percent of PSE's overall production costs, with the remaining 25 percent being classified as demand-related. See the Prefiled Direct Testimony of Birud D. Jhaveri, Exh. BDJ-1T, for further discussion of the classification of PSE's production costs.

PSE sourced the Skookumchuck project, as described above. For the second Open Season, PSE sourced the Lund Hill project. Skookumchuck was forecast to begin serving customers in the first quarter of 2019, but due to unanticipated delays in obtaining federal and local permits, the project is now forecast to begin energy transmission in late 2019. It is anticipated that Lund Hill will begin energy transmission in 2021.

Q. How have customers responded to Green Direct?

A. Customer support for the product has been very strong. Since the initial approval of the rate schedule by the Commission, more than 40 customers have subscribed to participate, representing 85 aMW of load, indicating the product is fully subscribed. In addition, PSE has since heard from several other customers indicating their interest in the product. In designing the product, PSE took care to listen to customer needs. As noted above, customers requested a product that allowed them to meet their carbon reduction and renewable energy goals through specific projects that could also demonstrate additionality. Customers like Starbucks have informed PSE that Green Direct is an example of what they would like to see in other green tariffs. PSE has also received positive recognition for Green Direct from three national organizations: the National Renewable Energy Lab's 21st Century Power Partnership cited it as an "Innovative Utility Offering at the Distribution Edge"; the Center for Resource Solutions recognized PSE as a "Leader in Green Power Market Development" for Green Direct; and lastly,

Smart Energy Decisions gave PSE its 2019 Innovation Award for the development of Green Direct.

Q. What action is PSE requesting with respect to Green Direct?

A. PSE requests a Commission determination that the Skookumchuck and Lund Hill PPAs that PSE has sourced for Green Direct are prudent. As previously discussed, the Commission and stakeholders have already reviewed information related to the cost and need for these PPAs in the Green Direct tariff filings. However, because these are new resources in PSE's power portfolio, PSE is requesting a determination from the Commission that the acquisition of the Skookumchuck and Lund Hill resources are prudent.

B. Skookumchuck and Lund Hill Resource Acquisitions

Q. Describe the resources utilized to provide the resource options under Green Direct.

A. For the first Open Season, PSE selected the Skookumchuck project, in development by RES America Developments, Inc. PSE executed a 20-year PPA with Skookumchuck Wind Energy Project, LLC, for the full output of the facility in April 2017. Please see the Second Exhibit to the Prefiled Direct Testimony of William T. Einstein, Exh. WTE-3C, for a copy of the Skookumchuck PPA.

For the Second Open Season, PSE selected the Lund Hill project, in development by Avangrid Renewables, LLC. PSE executed a 20-year PPA with Lund Hill Solar, LLC, for the full output of the facility in November 2018. Please see the

Third Exhibit to the Prefiled Direct Testimony of William T. Einstein, Exh. WTE-4C, for a copy of the Lund Hill PPA.

Q. How did PSE determine that Skookumchuck and Lund Hill were appropriate resource acquisitions for Green Direct?

A. In discussion with potential product customers, PSE identified several project attributes that helped guide the resource acquisition process. Potential customers expressed preference for renewable energy projects that: (1) were new projects, thereby providing additionality; (2) were located in proximity to customer load; and (3) represented comparative cost effectiveness. Along with these customer-driven considerations, the resource acquisition process attempted to identify projects that were sized appropriately relative to customer demand and approved product sizing (85 aMW), and were located on, or delivered to PSE's transmission system in order to ensure deliverability to potential customers. As a new wind energy project located in western Washington on PSE's system, Skookumchuck met all of these considerations. Likewise, Lund Hill offered additionality as a new project located in Washington with deliverability to PSE's system, as well as being a solar complement to Skookumchuck.

Q. Please describe the evaluation of alternatives performed by PSE.

A. PSE sought formal offers for renewable resources to meet the needs of both phases of Green Direct. PSE evaluated the proposals in a manner generally consistent with prior electric resource acquisitions, based on applicable criteria set forth in Exhibit A to the 2017 RFP for Renewable Energy (provided as the Fourth

Exhibit to the Prefiled Direct Testimony of William T. Einstein, Exh. WTE-5), and consistent with the customer preferences previously described in this testimony. PSE's evaluation criteria have been designed and tested over the course of numerous competitive procurement processes. The criteria form the basis of PSE's evaluation, which considers a variety of quantitative and qualitative factors to compare the costs, risks and merits of individual proposals. At a high level, PSE's analysis included consideration of capital costs, transmission costs, ability to meet voluntary product subscriber need, project feasibility, developer experience, acceptable offer terms, and alignment with customer preferences for the product, among other factors.

Q. What alternatives did PSE consider before entering into the Skookumchuck PPA?

A. For the first Open Season, PSE issued a Request for Information ("RFI") for resources that could meet the needs of a potential new voluntary customer product. At the time, there were only a few customers inquiring, so the focus was on projects in the 5-10 MW range. In response to the RFI, PSE received 18 discrete proposals from eight respondents. Resource types included wind, solar and hydro projects ranging in size from less than 1 MW to a little more than 100 MW. While most proposed projects were sized below 20 MW, three proposals offered projects at approximately 100 MW in size. In addition to the RFI proposals, PSE received two unsolicited offers for wind resources larger than 100 MW around the same time.

Q. What were the results of the Green Direct first Open Season cost analysis performed by PSE?

A. PSE's analysis determined that the RFI proposal costs (between $[redacted]/MWh and more than $[redacted]/MWh levelized) were higher than what customers were willing to pay. However, two large unsolicited proposals offered economies of scale that made them comparatively more cost effective and resulted in approximately half the cost of the alternative smaller projects. At $[redacted]/MWh levelized, the Skookumchuck PPA offered the lowest cost option for customers compared to alternatives. The Fifth Exhibit to the Prefiled Direct Testimony of William T. Einstein, Exh. WTE-6HC, contains a listing of the RFI proposal costs prior to PSE receiving the Skookumchuck proposal.

Q. What alternatives did PSE consider before entering into the Lund Hill PPA?

A. For Phase II, PSE issued an RFP for Renewable Energy to acquire sufficient resources to meet expected incremental product need. In response to the RFP, PSE received 45 discrete proposals from 31 respondents. Resource types included wind and solar projects ranging in size from less than 20 MW to 600 MW. Most proposals offered between 100 and 200 MW.

Q. What were the results of the Green Direct second Open Season cost analysis performed by PSE?

A. The second Open Season evaluation was conducted in late 2017 and in the first quarter of 2018 at a time when renewable prices had begun to drop. By the end of

the evaluation, several respondents had further lowered their pricing. PSE selected the Lund Hill PPA with a levelized cost of $[redacted]/MWh, which represented the lowest cost option for customers compared to alternatives. The Sixth Exhibit to the Prefiled Direct Testimony of William T. Einstein, Exh. WTE-7HC, contains a listing of the RFP submissions, showing Lund Hill was the lowest cost option.

Q. Please describe the internal approval process for entering into the Skookumchuck and Lund Hill PPAs.

A. For both the Skookumchuck PPA and the Lund Hill PPA, PSE convened an array of internal subject matter experts to vet relevant aspects of the PPAs prior to seeking management approval. Relevant subject matter experts include but are not limited to legal (inside and outside counsel), risk control, insurance, IT, accounting, power costs, trade floor, energy delivery, transmission contracts, permitting, real estate and environmental compliance. Engaging a wide array of subject matter experts ensures that the contractual terms of the PPAs are fair and minimize risk to all customers.

Q. Did PSE involve executive management in its resource acquisition process?

A. Yes. The PPAs for the Skookumchuck and Lund Hill projects were approved by the Energy Management Committee ("EMC") and signed by David Mills as Senior Vice President of Energy Supply. The evaluation team presented several updates to the EMC during the course of PSE's resource alternatives analyses for Green Direct.

Q. Were customers aware of Green Direct costs and the Skookumchuck and Lund Hill power sources prior to entering into contracts?

A. Yes. As I explained above, Green Direct is a completely voluntary product and has been met by overwhelming customer interest. Following Commission approval of Schedule 139, customers were able to fully review the product pricing for the term options they selected prior to signing their customer commitment agreements. This is the case for each phase of Green Direct. PSE met with customers multiple times, ahead of open enrollment, to explain the product and pricing models. Customers were provided resources with usage and pricing information that allowed them to adjust their projections for future energy prices and evaluate the cost impacts corresponding to those projections.

Q. Did PSE make any commitments in conjunction with the Commission's approval of Green Direct?

A. Yes. PSE committed to track all costs and benefits of Schedule 139 separately and identifiably in its Power Cost Adjustment ("PCA") mechanism; to seek a prudency determination for and recovery of the costs associated with the acquisition of any PPA in a general rate case or Power Cost Only Rate Case; to file its National Renewable Energy Laboratory ("NREL") annual reports in Docket UE-160977; and to engage interested parties in advance of acquiring the

next set of resources or filing a tariff revision to assure that the best-priced resources are acquired through a more transparent and competitive process.[3]

Q. What is the status of those commitments?

A. PSE has fulfilled, or is in the process of fulfilling, the commitments it made in that case, as follows:

- PSE will track all costs and benefits of Schedule 139 separately and identifiably in its PCA mechanism when the projects come on line;
- PSE is seeking a prudency determination for the PPAs entered into under Schedule 139 in this general rate case;
- The NREL report is related to all of PSE's voluntary renewable programs and PSE completed and filed its first NREL report on July 31, 2018, in Docket UE-160977. Since Green Direct has not yet begun generating electricity, there is no information to report for the product. PSE will add Green Direct to its future NREL reports, when Green Direct generation information becomes available; and
- As described above, in entering into the Lund Hill PPA, PSE followed a comprehensive and competitive RFP process which resulted in the lowest cost option for customers compared to alternatives. To the extent PSE seeks to further expand Green Direct in the future, it will follow a similar process soliciting input from interested parties through a transparent and competitive process.

[3] *In the Matter of Tariff Revisions Filed by Puget Sound Energy*, Docket UE-160977, Order 01 at ¶ 10 (Sept. 28, 2016).

IV. ONGOING AND ANTICIPATED PILOTS AND DEMONSTRATION PRODUCTS AND SERVICES

A. Overview

Q. What ongoing or anticipated products and services are you addressing in your testimony?

A. PSE is operating several pilot and demonstration products and services, one of which has already initiated, and others which PSE anticipates will begin in either 2019 or early 2020. Each of these products and services are focused on the development or implementation of new technologies that could provide additional new energy solutions and potential optional products and services for PSE customers. These products and services include:

1) Electric transportation products and services under Schedules 551, 552, 553, 554 and 583;

2) Smart lighting service;

3) Energy storage project; and

4) Community solar product.

Q. Why is PSE providing testimony about these projects now?

A. Since most of these products and services will be implemented primarily during the rate year and beyond, my testimony provides support for the expenses that will be incurred during those years. For products and services that have not yet gone into service, my testimony describes PSE's anticipated plans for these products and services and their future role in PSE's customer optional product

offerings. PSE will continue to work with the Commission and stakeholders to gain approval to implement these products and services at the appropriate time.

B. Electric Vehicle Charging Products and Services

Q. What are PSE's Electric Vehicle Charging products and services?

A. PSE's Electric Vehicle ("EV") Charging products and services are a portfolio of pilot products that provide a balanced portfolio of services to customers and support market transformation. The services include:

- Education and Outreach;
- Single-Family Residential and Off-Peak Charging;
- Multi-Family Residential Charging;
- Workplace/Fleet Charging;
- Public Charging; and
- Direct Service to Low Income Customers.

This portfolio of services was designed to balance several factors:

- Improving access to electric vehicle charging in multi-family residences, workplaces, and fleets, which have been identified as challenging areas of market development that need improved access;
- Focusing on load management in the area where most energy for electric vehicle charging is delivered today—single-family homes—and building a baseline for potential future load management in multi-family, workplace, and fleet settings; and
- Providing additions to the network of fast charging sites to improve its availability to customers.

In addition, the portfolio provides for education and outreach on transportation electrification to all customers and direct service to low-income customers.

Q. How were PSE's Electric Vehicle Charging products and services initiated?

A. EV services build off of (i) PSE's previous work to establish a baseline load shape for residential electric vehicle charging in Dockets UE-131585 and UE-140626, (ii) research on industry trends and utility programs in Washington and other states, and (iii) RCW 19.28.360 and the related Interpretive Statement Concerning Commission Regulation of Electric Vehicle Charging Services under Docket UE-160799 ("Policy Statement"), which provided clarification regarding the Commission's jurisdiction and policy direction regarding the role of investor-owned utilities in the electrification of Washington's transportation system.

The Policy Statement recommended the formation of a Joint Utility Transportation Electrification Stakeholder Group ("Stakeholder Group"),[4] which PSE joined. As part of the requirements of the Policy Statement, PSE circulated a draft of its proposed pilot services to the Stakeholder Group on June 22, 2018. Following review and feedback from the Stakeholder Group, on October 26, 2018, in Docket UE-180877, PSE filed five new schedules which would establish several new Electric Vehicle Supply Equipment ("EVSE") pilot products and services for customers:

- Schedule 551: Electric Vehicle Non-residential Charging Products and Services

[4] Policy Statement ¶ 91.

- Schedule 552: Electric Vehicle Residential Charging Products and Services
- Schedule 553: Electric Vehicle Education and Outreach
- Schedule 554: Electric Vehicle Low Income Transportation Service
- Schedule 583: Electric Vehicle Charging Products and Services

On December 13, 2018, Commission Staff filed an Open Meeting memorandum where Staff reviewed PSE's proposed EVSE schedules and recommended the schedules be approved by operation of law, on the condition that PSE utilize interoperability and universal payment optionality in its selection process when acquiring EVSE products and services.

In accordance with Commission Staff's recommendation, the proposed schedules went into effect on December 14, 2018.

Q. Please describe each of the EVSE pilot products and services.

A. The EVSE pilot products will provide the following services, as follows:

Schedule 551: Electric Vehicle Non-residential Charging Products and Services – This schedule includes the workplace and public charging products, which allows for the installation of approximately 150 Level 2 EVSE in workplaces and up to eight locations for public fast charging. PSE will collect data from these chargers and participants, including data on usage of the chargers and customer awareness of electric transportation. PSE will also collect revenue

for the use of the public fast chargers at a rate set to the market average and adjusted periodically.

Schedule 552: Electric Vehicle Residential Charging Products and Services – This schedule includes the multi-family residential charging and single-family residential charging and off-peak charging products. Under these products, PSE will install approximately 75 Level 2 chargers in multi-family residential buildings and 500 chargers in single-family residential buildings. PSE will collect data from these chargers and participants, including data on usage of the chargers and customer awareness of electric transportation. PSE will also provide incentives to customers in single-family residential buildings to charge at specified times and measure the customers' performance in charging at those times. Finally, PSE will test alternative technologies, including information from electric vehicles, to measure the times at which customer charge.

Schedule 553: Electric Vehicle Education and Outreach – In this service, PSE will provide general information and education on transportation electrification technologies, charging, and benefits to customers. The information will be provided through a variety of channels, including PSE's website, digital and paper communications, and through in-person events. This work will be completed both through PSE's existing communication channels, new communication channels, and partnerships with other stakeholders in electric transportation.

Schedule 554: Electric Vehicle Low Income Transportation Service – In this service, PSE will test electric transportation in applications that are used by low

income customers. Several potential opportunities, including electrification of medical transportation, shared transportation programs in housing developments, and electrification of services to low income customers were identified in the filing. These were developed in collaboration with agencies serving low income customers. Partnerships with agencies providing transportation services to customers will be part of providing these products.

Schedule 583: Electric Vehicle Charging Products and Services – This schedule provides the terms and conditions of the products and services.

Q. Why is PSE implementing these schedules?

A. Electrification of the transportation sector has been growing in recent years, with approximately 42,542 electric cars currently in Washington. PSE's most recent forecast indicates that there will be approximately 159,000 electric vehicles in PSE's electric service territory by 2030. In addition, there will be electric transit buses and there could be other forms of electric transportation. PSE estimates that in 2030, customers may require over 500,000 MWh per year for electric transportation. Electric transportation offers customers lower and more stable fuel costs, as well as a lower emissions fuel. One concern with the electric load from transportation is that it could increase the peak need on the electric system, which could drive the need for new infrastructure.

The role of utilities in electric transportation has been discussed in Washington and across the country. The Washington Legislature determined that "utilities, who are traditionally responsible for understanding and engineering the electrical grid

for safety and reliability, must be fully empowered and incentivized to be engaged in electrification of our transportation system."[5] The Commission similarly found in the Policy Statement that there was a public benefit to utility engagement in electric transportation and provided a framework for how utilities should provide such services. This includes that utilities should offer a portfolio of products, the need to serve all customers, including direct service to low-income customers, the provision of education and outreach to customers, and focusing on avoiding additional peak demand.[6]

PSE incorporated the legislative direction and the Policy Statement in the design of its pilot products and services.

Q. What are the next steps regarding PSE's transportation electrification products and services?

A. PSE is finalizing the implementation of these products and services in anticipation of enrolling customers starting in July 2019.

C. Smart Street Lighting

Q. Please describe PSE's smart street lighting service.

A. PSE is planning to offer a new smart street light control service where PSE will install smart lighting controls as part of Light Emitting Diode ("LED") upgrades on existing PSE-owned High Pressure Sodium street lights to enhance the

[5] RCW 80.28.360.

[6] Policy Statement ¶¶ 73-77.

operational efficiency, reliability, and performance of PSE's street light system. The smart lighting controls communicate through a secure network to a central operating platform, so PSE can remotely monitor and manage the performance of each light in real time.

Q. Why is PSE planning to offer smart street lighting?

A. Currently, PSE has limited information regarding the status or performance of the approximately 100,000 street lights owned by PSE, except through primarily customer outage calls or in-person inspections. This results in PSE rolling a truck to individual lights in response to an outage call to diagnose a failure, and often a secondary trip is required to fix the problem. Enhanced remote management with a smart street light service means performance issues will be detected automatically, leading to the generation of a detailed work order containing all necessary information for the repair crews to dispatch and complete their work.

In addition, several large municipal customers are currently asking PSE to convert their existing street lights to energy efficient LED luminaires, and have expressed interest in smart street light controls. This presents an ideal time to install smart street light controls to further improve our customers' experience while increasing our operational cost efficiencies. In fact, several municipalities have already installed, or are planning to install, smart street light controls on their own street light systems, such as Bellingham, Redmond, and Federal Way.

Q. What are the anticipated benefits of deploying a smart street light control service?

A. The primary benefits to a customer of a smart street light control service is that it could provide for meter-grade power consumption measurement, which will, when connected to PSE's billing system, allow PSE to transition away from modeled flat rate wattage billing. That, coupled with enhanced efficiency controls, such as offering a variety of dimming profiles on controlled street lights, could help PSE and its customers better manage the energy performance of its street lighting system.

In addition, the operational benefits of a smart street light control service will result from reduced truck rolls, fewer street light outage calls, and improved asset management, which will reduce operating expenses over time.

Q. Has PSE already advised the Commission regarding the smart street lighting service?

A. PSE detailed in Docket UE-171047 that it would test various smart street lighting control and advanced photocell technologies and may propose future tariff schedule modifications, if appropriate.

Q. Has PSE already tested various smart street lighting controls?

A. Yes, in 2017 and 2018, PSE performed five small-scale trials of leading manufacturers' smart street light control solutions on 80 existing LED fixtures in four neighborhoods in partnership with the City of Bellevue. These technology

demonstrations allowed PSE to assess ease of installation, system reliability, software interface and user experience, reporting capabilities, and potential integration options with PSE's existing enterprise-wide systems.

Q. What are the next steps regarding the smart street lighting service?

A. PSE is conducting an RFI with leading manufacturers to better understand hardware and system capabilities, costs, and references of current installations.

Q. When might PSE implement a smart street light control service?

A. If resource capacity is sufficient to deploy a smart street light control service, PSE could submit a modified or new tariff schedule to the Commission for consideration after the successful completion of the 2019 general rate case.

Q. When would the expense for a smart street light control service cost accrue, and how would those costs be recovered?

A. If a modified or new tariff schedule for smart street light control service was approved by the Commission, the initial costs would cover IT integration and configuration of consumption data with PSE's existing billing engine. If the technology selected required hardware and software to be deployed to establish a secure communication network, those costs would also accrue. Both of these expenses would likely come in year one. All cost for smart street light control node hardware/software and reoccurring network communication and software as a service fees for the smart street lighting central operating platform would accrue

in the year deployed/used. These costs would be incorporated and recovered in rates through subsequent general rate case filings.

Q. How might existing tariff schedules be modified to account for a smart street light control service?

A. A smart street light control service rate would include a flat service rate based on luminaire wattage, and a variable energy rate based on metered kWh consumption per luminaire. Any cost for smart street light control node hardware/software, any accompanying communication hardware/software, and IT cost to integrate and configure any consumption data with PSE's existing billing engine, would be included in the flat service rate based on luminaire wattage. A variable kWh cost for energy and demand charges would be applied based on metered consumption per luminaire. Additionally, depending on the performance management expectations of PSE's customers, optional flat service fee(s) could be offered to provide for the application and management of diverse dimming profiles, system visibility, or reporting capabilities.

D. Customer-Sited Energy Storage Demonstration Project

Q. What is the Customer-sited Energy Storage Demonstration (the "CSES Demo") project?

A. The CSES Demo project is a proposed pilot service where PSE will design, deploy, and operate various small-scale projects to better understand distributed

energy storage technology, including battery energy storage systems ("BESS"), and validate potential utility and customer benefits.

The intent of the CSES Demo is to provide PSE personnel the opportunity to learn about and gain experience with distributed BESS vendors, technology, and operations. Through the CSES Demo, PSE expects to incrementally build best practices in standards, processes, and operations that better prepare PSE for a modernized grid that provides customers with more options for safe, reliable, and flexible services, as discussed in the Prefiled Direct Testimony of Booga K. Gilbertson, Exh. BKG-1T. Further, the best practices established through the CSES Demo will be necessary precursors to developing a customer product or service with intended grid benefits.

Q. Why is PSE planning the CSES Demo project?

A. Customers, including municipal, commercial, and residential, are increasingly interested in the potential for distributed energy resource ("DER") technology and related services, including BESS. Further, PSE's peers and colleagues in Washington are increasingly seeking alternative solutions to ensure the services and reliability of the local distribution grid. While still a developing technology, both in capability and affordability, it is important that PSE develop critical learning and experience, as well as organizational standards and processes, that enable a long-term vision for leading and supporting energy storage technology adoption and deployment.

Q. What will the CSES Demo project do?

A. The CSES Demo will assess the crowded marketplace of DER solution providers in order to evaluate different combinations of brand, technology, and capability. With limited prior BESS project experience, PSE will partner with experienced vendors to accelerate learning and experience that can enhance the performance of demonstration projects on a customer's behalf. Further, partnership with experienced vendors will mitigate risks in the trial of new technology and service models by PSE, ensuring that reliable services and safety are maintained and that intended demonstration results are better realized.

By evaluating a broad range of operation, use case, and performance metrics for distributed BESS technology, the CSES Demo will identify the best models of service and support that PSE can provide to customers interested in distributed BESS technology. The use of a central operating platform to remotely monitor and control a fleet of distributed BESS will create additional options for increasing grid services and resiliency.

Q. How does PSE intend to deploy the CSES Demo?

A. Under the CSES Demo, PSE will remotely monitor and control BESS via secure wireless networks that will communicate with an operating platform and optimize performance. The CSES Demo includes multiple lithium-ion energy storage projects with different scales of deployment to better evaluate different models for customer adoption, interaction, and benefit; these deployments will include:

Residential CSES Demo – PSE's residential project will deploy a half a dozen behind-the-meter ("BTM") BESS, paired with critical load panels, to evaluate how the systems provide backup power and reliability. The BESS installations will be funded, owned, and maintained by PSE and located at the residences of PSE employees, or close relatives, in order to evaluate and understand installation, design and operating considerations for support of future customers' BTM BESS adoption.

Commercial CSES Demo – PSE's commercial project will deploy one BTM BESS at a PSE service building, replicating a commercial customer, with a primary purpose to show the potential for demand charge reductions based on managing the building's peak demand. The BESS will be maintained by PSE and PSE will evaluate the BESS performance of different use cases and operating constraints.

Community CSES Demo – PSE's community project will deploy one grid-side BESS in a residential neighborhood with a high occurrence of customer-owned roof-top solar photovoltaic ("PV") technology with a primary purpose to provide better reliability and integration of excess solar PV electricity back-fed to the grid. The BESS will be funded, owned, and maintained by PSE in order to closely evaluate the customer experience during installation and demonstration, as well as the design and operating conditions that continue to support net metering and customer adoption of roof-top PV technology.

Q. What are the next steps and anticipated schedule regarding the CSES Demo project?

A. Operation, testing, and performance of the residential, commercial, and community projects will inform a subsequent feeder-level project, including increasing the scale and complexity of distributed BESS technology deployment and control by a central operating platform. The feeder-level project will evaluate the potential for grid-scale services, in addition to further refinement of services to customers, as well as integrate the central operating platform with PSE's transition to Smart Grid and the use of an advanced distribution management system. The feeder-level project will continue to support PSE's evaluation and understanding of the cost of distributed BESS technology, as well as the measure and value of benefits and services provided.

The Residential CSES Demo and Commercial CSES Demo projects are scheduled to be fully installed and commissioned by the end of summer 2019. Plans for operation, maintenance, safety, and support will be finalized ahead of operation.

PSE is working to identify a site for the Community CSES Demo. PSE is particularly interested in locations with a high rate of adoption of roof-top PV solar generation by customers, as well as where PSE is potentially seeking further improvement to grid reliability. PSE aims to recommend a site by the end of summer 2019, and the project provides additional opportunity for PSE to learn how location, DERs, grid controls and equipment can integrate to communities and impact the system cost and benefits.

E. Community Solar Product

Q. Please describe PSE's community solar product.

A. PSE is evaluating offering a community solar product that would allow customers to support the development of specific small-scale solar projects in PSE's service territory, sharing in the costs and benefits of those installations. Participating customers would either make an upfront purchase or pay a monthly fee to participate, covering the cost of the solar energy and product administration. They would also receive a credit based on the benefit of the solar generation associated with their share of the project for the duration of their participation purchasing the product.

Q. Why is PSE considering a community solar product?

A. Interest in renewable energy is strong in PSE's service territory. Net metered solar installations have grown dramatically and participation in voluntary renewable products (Schedule 135 – Green Power/Solar Choice; Schedule 136 – Large Volume Green Power; Schedule 139 – Green Direct and Schedule 137 Carbon Balance), continues to increase as well.

Additionally, PSE customers have expressed interest in community solar specifically. However, many customers who are interested in supporting local renewables are unable or unwilling to install rooftop solar due to a variety of factors including but not limited to renting property, upfront cost, credit quality, roof age, and shading. They view community solar as an attractive alternative.

Community solar also gives PSE the option to site projects in areas that minimize negative grid impacts.

Q. How does community solar differ from PSE's existing Solar Choice and Green Power products (Schedule 135)?

A. Community solar differs from PSE's existing Solar Choice and Green Power products (Schedule 135) in that it bundles the purchase of solar energy and renewable energy credits. Depending on the details of product design, community solar participants may have the potential to see net savings over the life of their participation purchasing the product, similar to how the owners of rooftop solar installations can break even on the initial investment due to avoided energy purchases and state incentives.

Q. What are the next steps regarding community solar?

A. PSE is working to identify sites for solar projects to support community solar. PSE is particularly interested in locations with a strong community partner who is interested in serving as a site host, as well as locations where solar has the potential to provide grid benefits, such as on summer peaking circuits. PSE community solar projects could also offer an opportunity for PSE to learn more about how location and smart controls (smart inverters, curtailment/dispatch of solar, co-location with energy storage, etc.) impact the system costs and benefits associated with distributed solar projects through a real-world test.

After developing cost estimates and assessing market size, PSE will evaluate the viability of offering a community solar product.

V. CONCLUSION

Q. Does this conclude your direct testimony?

A. Yes.