Exh. JLB-1T
Dockets UE-190529 and UG-190530
UE-190274/UG-190275 (*consolidated*)
Witness: Jason L. Ball

BEFORE THE WASHINGTON
UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**DOCKETS UE-190529 and UG-190530 *(Consolidated)***
In the Matter of the Petition of **PUGET SOUND ENERGY** **For an Order Authorizing Deferral Accounting and Ratemaking Treatment for Short-life UT/Technology Investment**	**DOCKETS UE-190274 and UG-190275 (*consolidated*)**

TESTIMONY OF

Jason L. Ball

STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION

Cost of Service
Rate Spread
Rate Design
Pricing Pilots

November 22, 2019

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Jason L. Ball, and my business address is 621 Woodland Square Loop SE, Lacey, Washington, 98503. My business mailing address is P.O. Box 47250, Olympia, Washington, 98504-7250. My business email address is jason.ball@utc.wa.gov.

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

A. I am employed by the Washington Utilities and Transportation Commission (Commission) as the Deputy Assistant Director in the Energy Section of the Regulatory Services Division.

Q. How long have you been employed by the Commission?

A. I have been employed by the Commission since June 2013.

Q. Please provide your educational background.

A. I earned a degree from New Mexico State University in 2010 with a dual major in Economics and Government. In 2013, I graduated with honors from New Mexico State University with a Master of Economics degree specializing in Public Utility Policy and Regulation.

Q. Have you testified previously before the Commission?

A. Yes. I testified on cost of service, rate spread, and rate design for both electric and natural gas in Puget Sound Energy's ("PSE" or "Company") 2017 general rate case (GRC) (UE-170033 and UG-170034) and the general rate case filed by Avista Corporation d/b/a Avista Utilities (Avista) in Docket UE-190335. I sponsored testimony on overall policy, revenue requirement, decoupling, and a proposed rate plan in the general rate case of Pacific Power & Light Company (Pacific Power) in Docket UE-152253. I presented power supply and load forecasting testimony in Avista's GRC in Docket UE-140188. I presented an economic feasibility study relating to line extensions for PSE in Docket UE-141335.

Q. Have you worked on any major projects at the Commission for which you have not provided testimony?

A. Yes. I am the lead staff for inquiries into reliability reporting and the lead negotiator for Washington in the Pacific Power & Light Company's (Pacific Power) multi-state process.[1] I am also a team member developing cost-of-service rules through the ongoing rulemakings in Dockets UE-170002 and UG-170003.

II. SCOPE AND SUMMARY OF TESTIMONY

Q. Please summarize your recommendations.

[1] *See generally In re Reliability Reporting Inquiry*, Docket UE-190027, Staff Findings and Recommendations (Jan. 15, 2019).

A. *Electric and Natural Gas Cost of Service*

- I recommend the Commission accept, for the purposes of this case, the Company's Electric and Natural Gas Cost of Service Studies (COSS) as directionally accurate.

Electric and Natural Gas Rate Spread

- I recommend the Commission accept Staff's proposed electric and natural gas rate spreads, which assigns all customer classes some amount of the proposed rate increase. Staff's proposal more appropriately balance the principles of rate spread while helping to address the issue of cross-class subsidization.

Electric Rate Design

- I recommend the Commission reject the Company's proposal to confine the rate increase for residential customers to the tail-block of energy usage.
- I recommend the Commission accept the remainder of the Company's proposed electric rate design changes for all classes.

Natural Gas Rate Design

- I recommend the Commission accept the Company's proposed natural gas rate design changes.
- I recommend the Commission require PSE to perform an updated economic bypass study for all special contract customers by July 1, 2021.

Pricing Pilots

- I recommend the Commission direct PSE to refile its proposed Demand Aggregation Pilot Program based on Staff's proposed pricing pilot design and evaluation criteria.

- I recommend the Commission require PSE to prepare pricing pilots for both time-of-use and critical-peak-pricing rates.
- I recommend the Commission encourage PSE to engage with local resources such as Pacific Northwest National Laboratory to evaluate the potential for a real time pricing pilot.
- I recommend the Commission entertain deferred accounting treatment for expenses associated with developing and administering pricing pilots.

III. ELECTRIC AND NATURAL GAS COST OF SERVICE

A. Background for Understanding Cost of Service Studies

Q. What is a cost of service study?

A. A cost of service study (COSS) identifies the costs a utility incurs to serve the customers of each schedule and compares those costs to the total revenue provided by each schedule. This allows rates to be set properly for individual customer groups, called customer classes. The utility's rate base, revenue, and expenses are divided proportionally to customer classes based on the service provided.

A COSS principally relies on cost causation for assigning costs. However, multiple methodologies exist for assigning costs to individual customer classes. Each of these methodologies has a variety of strengths and weaknesses. Due to this and other ongoing issues with COSS's, the Commission is currently engaged in a rulemaking to address cost of service in Dockets UE-170002 and UG-170003.

Q. Please provide the status of the cost of service rulemaking.

A. The cost of service rulemaking is progressing well due to collaborative efforts of participating stakeholders, including Puget Sound Energy. Most recently, the Commission held a workshop on September 25, 2019, to discuss informal draft rules and other concepts with the stakeholders.

Q. How does a COSS affect rates?

A. The Commission considers the COSS results, along with other factors, when determining the appropriate rate spread and reviewing proposed rate designs. With regard to rate spread, a COSS helps the Commission determine a rate spread that allows the Company to recover the appropriate level of revenue from each customer class. The principle outputs of a COSS, the revenue-to-cost (RTC) ratio and parity ratio, are important inputs into developing appropriate rate spreads. In rate design, the breakdown of a class's assigned revenue requirement into basic, demand, and volumetric charges is informed by the division of costs into each functional category when performing the COSS.

Q. Please describe the revenue-to-cost ratio and parity ratio.

A. The RTC ratio and parity ratio provide a roadmap for how to spread the change in revenue requirement amongst customers.

1) The RTC ratio shows how much of a class's revenue requirements, as identified in the COSS, are recovered through current rates. The RTC ratio describes the relationship between costs and revenues *as they exist today*.

When the RTC ratio does not equal one a subsidy is occurring between customer classes.

2) The parity ratio adjusts the RTC ratio to reflect the new proposed revenue requirement. This is done by dividing a class's RTC by the system's RTC. The parity ratio thus describes the relationships between costs and revenue *as they may exist in the upcoming rate year*. As discussed further below, parity serves as a starting point for assigning class responsibility for the proposed revenue requirement increase.

B. Summary of PSE's Electric COSS

Q. Please describe the Company's Electric COSS.

A. The Company filed an electric COSS that uses the same methodology from PSE's 2017 GRC. This includes elements from the 2014 Electric Cost of Service and Rate Design Collaborative.[2]

The Company uses a "peak credit" methodology, which classifies costs as energy- or demand-related based on the ratio of operating costs of two types of natural gas plants: a "baseload" Combined Cycle Combustion Turbine and a "Peaker" Combustion Turbine. The Company updated its COSS to use cost data from its 2017 Integrated Resource Plans. As discussed below, PSE also proposes to

[2] *See generally Wash. Utils. & Transp. Comm'n v. Puget Sound Energy, Inc.*, Docket UE-141368, Order 03 (Jan. 29, 2015). Note however, that the Commission did not explicitly accept the use of a 4-CP allocator in PSE's 2017 GRC. *See Id.* at 6-7 ¶ 17. Nevertheless, the Company relied on this factor to allocate production and transmission costs.

use the social cost of carbon (SCC) in the peak credit calculation. With this data, PSE calculated a demand/energy allocation ratio of 11 percent demand and 89 percent energy. For reference, this ratio was 18 percent demand and 82 percent energy in PSE's 2017 GRC.

1. Incorporating the Social Cost of Carbon into the Peak Credit Ratio

Q. Has the Company made any changes in its COSS methodology?

A. Yes. The Company proposes to incorporate a SCC price in the calculation of the peak-credit ratio. Without this change, the peak credit methodology would result in a 19 percent demand and 81 percent energy split, similar to the results of the 2017 GRC.

Q. Does Staff support the Company's proposal to include the SCC in the calculation of a peak credit ratio?

A. For the purposes of this case, yes. However, I recommend that any permanent change to the peak-credit methodology be considered in the ongoing cost-of-service rulemaking and not in this case.

Q. Why do you support the Company's proposal to include the SCC?

A. In general, this modification appears to comply with recent legislation passed by Washington, known as the Clean Energy Transformation Act (CETA).[3] Under RCW 19.280.030, as amended by CETA:

> (3)(a) An electric utility shall consider the social cost of greenhouse gas emissions, as determined by the commission for investor-owned utilities pursuant to RCW 80.28.405 and the department for consumer-owned utilities, when developing integrated resource plans and clean energy action plans. An electric utility must incorporate the social cost of greenhouse gas emissions as a cost adder when:
>
> (i) Evaluating and selecting conservation policies, programs, and targets;
>
> (ii) Developing integrated resource plans and clean energy action plans; and
>
> (iii) Evaluating and selecting intermediate term and long-term resource options.

The planning assumptions that a utility is required to engage in by CETA should translate to its real world expenses. By extension, these assumptions impact the peak credit methodology, which is essentially a ratio of operating expenses. Therefore, incorporating the SCC into the peak credit calculation aligns the COSS with legal planning requirements.

2. Net Metering Customers

Q. Did the Company include load research related to net metering customers?

A. No. In the 2017 GRC, at Staff's request, the Company committed to researching the load characteristics of net metering customers.[4] As discussed by PSE witness Piliaris, and supplemented in discovery, the Company has begun collecting this information.[5]

[3] *See generally* Laws of 2019, ch. 288, §§ 1-13, 26, *codified as* chapter 19.405 RCW.
[4] Piliaris, Exh. JAP-1T at 20:1-2.
[5] *Id*. at 20:13 - 22:14.

However, due to issues with poor sampling, the Company did not begin the collection process until mid-2018.[6] Further the Company is adopting new software for load research purposes.

Q. Are you concerned that this element was not included in this case?

A. No. Although Staff would have preferred to address this issue in the present case, accurate data for net metering customers is critical. Absent accurate load information, it is not possible to address or even identify the cost allocation issues that may exist with net metering customers. Staff is hopeful the Company will be able to complete its research next year and present the information outside of a litigated forum.

3. Schedule 40

Q. Is Schedule 40 included in the COSS results?

A. No, but the customers are. The parties to PSE's 2017 GRC agreed to close Schedule 40 in the settlement that resolved that case.[7] However, the actual end date of Schedule 40 coincides with the effective date of rates in the present case. Therefore these customers are still receiving service under the terms of Schedule 40. PSE, however, included the costs incurred to serve these customers in the costs incurred to

[6] *Id*. at 21:11-12.
[7] *Wash. Utils. & Transp. Comm'n v. Puget Sound Energy*, Dockets UE-170033 & UG-170034, Order 08, 113-14 ¶¶ 338 & 115-16, ¶ 343 (Dec. 5, 2017) (2017 PSE GRC Order).

serve the classes they will transition to for purposes of its COSS. Staff agrees that that this is the correct approach.

4. PSE's Supplemental Filing

Q. Did the Company provide updated models consistent with its supplemental filing on September 17, 2019?

A. Yes. The Company provided, through data request, updated workpapers that reflected the revisions made in the supplemental filings.[8] The table below summarizes the differences between the Company's initial filing and the most up-to-date results.

Table 1 - Updated Electric Parity Ratios (PSE Revenue Requirement)

Rate Schedule	**Parity Ratio** *(Initial Filing)*	**Parity Ratio** *(Corrected/Supplemental Filing)*
Residential, Sch 7	0.97	0.97
Secondary Voltage		
Sch 24 (kW < 50)	1.05	1.05
Sch 25 (kW < 350)	1.06	1.06
Sch 26 (kW > 350)	1.06	1.06
Primary Voltage		
Sch 31	1.02	1.02
Sch 35 (Irrigation)	0.55	0.55
Sch 43 (Primary Svc)	0.88	0.88
High Voltage, Sch 46 & 49	1.06	1.06
Lighting, Sch 50 – 59	0.93	0.94

[8] These revisions also corrected for relatively minor errors created by improperly linked workpapers.

C. Summary of PSE's Natural Gas COSS

Q. Please describe the Company's Natural Gas COSS

A. The Company filed its natural gas COSS using a modified version of the COSS methodology from its 2017 GRC.[9] In the last rate case, the Commission deferred any decision on methodology to the ongoing generic proceedings, which became the rulemaking described above.[10]

1. Changes to PSE's Natural Gas Cost of Service Methodology

Q. Please describe the changes the Company made to it natural gas COSS.

A. The Company made three primary modifications its natural gas COSS:

1. Gas Demand Purchased Gas Adjustment (PGA) Costs – The Company removed treatment for these costs from the COSS and presented a separate methodology for the use in the PGA.
2. Interruptible and Special Contract Study – The Company performed an analysis for the purposes of directly assigning costs for customers on schedules 85, 85T, 87, 87T, and Special Contracts. However, the Company did not update its economic bypass studies in support of its Special Contract. I discuss this in more detail below.

[9] *See* 2017 PSE GRC Order at 123-26, ¶¶ 370-78 (discussing disputed natural gas cost-of-service study issues in PSE's 2017 general rate case).
[10] *Id.* at 126, ¶ 378.

3. Allocation of Gas Mains – The Company updated its methodology for allocating mains based on the sizes of the pipeline.

For the purposes of this case, Staff supports the Company's proposed changes because PSE designed them to appropriately allocate costs to cost causers.

2. PSE's Supplemental Filing

Q. Did the Company provide updated models consistent with its supplemental filing on September 17, 2019?

A. Yes. The Company provided updated models in their supplemental filing as well as through data request.[11] The table below summarizes the differences between the Company's initial filing and the most up-to-date results.

Table 2 - Updated Natural Gas Parity Ratios (PSE Revenue Requirement)

Rate Schedule	**Parity Ratio** *(Initial Filing)*	**Parity Ratio** *(Corrected/Supplemental Filing)*
Residential, Sch 16/23/53	1.04	1.03
Comm. & Ind., Sch 31/31T	0.87	0.89
Large Volume, Sch 41,41T	1.09	1.12
Interruptible, Sch 85, 85T	1.06	1.08
Limited Inter., Sch 86, 86T	1.39	1.41
Non-Excl. Inter., Sch 87, 87T	0.88	0.88

[11] The Company provided updated models on October 23, 2019, and November 14, 2019, to correct for non-linked workpapers related to labor costs.

D. PSE's COSS's are Directionally Accurate

Q. Do you recommend the Commission rely on the electric and natural gas COSSs presented by PSE?

A. For the purposes of this case, yes. Based on the above discussion, I believe PSE's COSSs are "directionally accurate." With the cost-of-service rulemaking actively investigating these issues, and preparing to enter its next phase, I do not believe the Commission needs to provide direct guidance in this case. Further, as discussed in the next section of my testimony, a COSS is not the sole factor used by the Commission in setting rates.

IV. ELECTRIC AND NATURAL GAS RATE SPREAD

A. COSS Results and Principles of Rate Spread

Q. How should the Commission use the parity ratios from a COSS to allocate revenues?

A. As mentioned above, parity ratios reflect the relationship between revenue and costs for each customer class in the rate year. They are therefore an important tool for ensuring an equitable rate spread. For example, a rate schedule with a parity ratio well below 1.00 means that schedule receives a subsidy from at least one other rate schedule; this is referred to as cross-class subsidization.

Given the importance of parity ratios, I propose that the Commission adopt specific ranges for judging parity ratios. It should consider a parity ratio falling outside of a specified target range unreasonable or unfair. Historically, the Commission has considered plus or minus five percent of parity as acceptable,[12] although the Commission has also emphasized balancing rate spread with other principles like gradualism and rate stability.[13] Taking all of this into consideration I propose the following ranges for judging parity ratios:

Table 3 - Parity Ranges

Parity Ratio Range	Category
+/- 5 (i.e. 0.95 to 1.05)	Error range
+/- 10 (i.e. 0.90 to 1.10)	Range of reasonableness
+/- 20 (i.e. 0.80 to 0.90 or 1.10 to 1.20)	Unreasonable cross-class subsidization
+/-30 (i.e. 0.70 to 0.80 or 1.20 to 1.30)	Excessive cross-class subsidization
+/-40 (i.e. <0.70 or >1.30)	Grossly excessive cross-class subsidization

Q. Is it important to achieve a parity ratio of 1.00 for all rate schedules?

A. No. The results of any given COSS, and its associated parity ratios, should inform the Commission's judgment when it assigns to a utility's customer classes a change in revenue requirement.[14] However, the Commission should pay particular attention

[12] *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, Docket UE-152253, Order 12, 74-75, n.350 (Sept. 1, 2016) (2015 Pacific Power GRC Order).
[13] *See* 2017 PSE GRC Order at 4, n.10.
[14] The Commission has repeatedly emphasized this point. *E.g.*, 2017 PSE GRC Order at 4, n.10; *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, UE-140762, Order 08, 84, ¶ 197 (Mar. 25, 2015) (2014 Pacific Power GRC Order); *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, Docket UE-100749, Order 06, 108-09, ¶¶ 314-17 (Mar. 25, 2011) (2010 Pacific Power GRC Order).

to schedules that do not fall within the range of reasonableness (meaning parity ratios that are below 0.90 or greater than 1.10). Overall, I recommend the Commission set a rate spread to start alleviating any cross-class subsidization already in effect.

Q. Why is addressing cross-class subsidization important?

A. First, cross-class subsidization violates the regulatory principles of cost-causation and benefit follows burden. These principles state that individuals causing costs should pay for those costs and that the benefits related to certain costs should flow to those who pay those costs.[15]

Second, the Commission should consider cross-class subsidization when weighing fairness and perceptions of equity, two factors used in establishing rate spread.[16] Addressing cross-class subsidization is especially important when customer class parity ratios are in the excessive or grossly excessive ranges because such ratios indicate fundamentally unfair rates.

Q. What principles guide the Commission in setting rate spread?

A. The Commission has laid out several important factors that should be considered in establishing rate spread, including:[17]

- Cost-causation
- Fairness

[15] For a more detailed explanation see Ball, Exh. JLB-2, Excerpts from Ball Testimony in 2017 PSE GRC.
[16] 2014 Pacific Power GRC Order at 84, ¶ 197; *Wash. Utils. & Transp. Comm'n v. Puget Sound Energy*, Dockets UE-111048 & UG-111049, Order 08, 124-25, ¶ 350 (May 7, 2012) (2011 PSE GRC Order); 2010 Pacific Power GRC Order at 109, ¶ 315; *Wash. Utils. & Transp. Comm'n v. Puget Sound Energy*, Dockets UE-072300 & UG-072301, Order 12, 24, ¶ 68 (Oct. 8, 2008) (2007 PSE GRC Order).
[17] 2014 Pacific Power GRC Order at 84, ¶ 197; 2011 PSE GRC Order at 124-25, ¶ 350; 2007 PSE GRC Order at 24, ¶ 68.

- Perceptions of equity
- Economic conditions in the service territory
- Gradualism
- Avoidance of rate shock
- Rate stability

Q. How have you applied these principles to this case?

A. In general, I focus on the first, second, and third factors. The electric COSS results show that only one customer class has a parity ratio within the grossly-excessive range. Therefore, I propose a rate spread which addresses this issue while fairly and equitably spreading the results of the overall increase to the appropriate cost-causers. Natural gas COSS results are similar, with only one class in the grossly-excessive range. I propose that all customer receive at least some share of the proposed rate increase.

However, I cannot and do not ignore the other factors. Like the Company, I take into account economic conditions, gradualism, and rate shock. These last two require tempering the level of increase applied to those classes or schedules that have parity outside the reasonable range. Further, considerations of fairness and perceptions of equity require that all customers share some part of a proposed rate increase.

B. Staff's Proposed Electric Rate Spread

Q. What electric rate spread do you recommend?

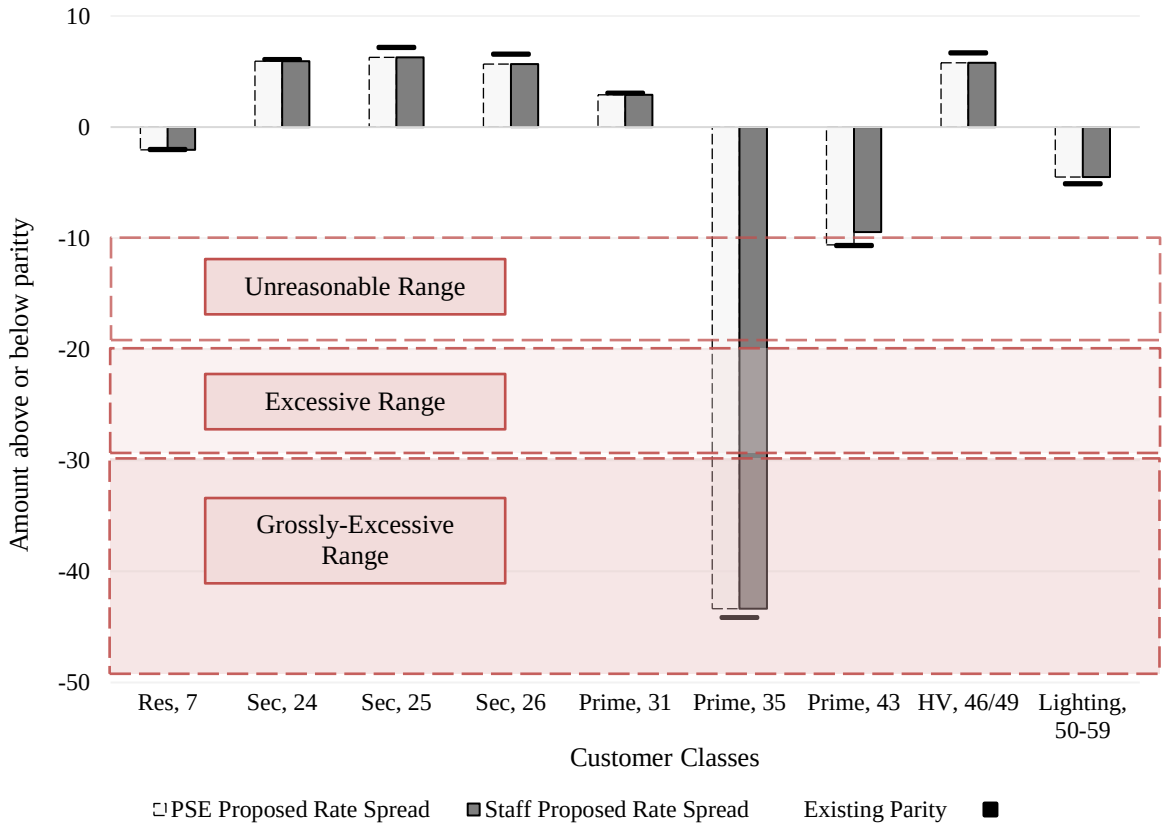
A. I summarize my recommended rate spread in the table below. I do not include the results associated with Special Contracts or Retail Wheeling since those classes are not affected by rate spread.

Table 4 - Staff Recommended Electric Service Rate Spread

Rate Schedule	**PSE** *(Supplemental Filing)*	**STAFF**
Residential, Sch 7	100%	100%
Secondary Voltage		
Sch 24 (kW < 50)	100%	100%
Sch 25 (kW < 350)	75%	75%
Sch 26 (kW > 350)	75%	75%
Primary Voltage		
Sch 31	100%	100%
Sch 35 (Irrigation)	150%	150%
Sch 43 (Interruptible Schools)	125%	150%
High Voltage, Sch 46 & 49	75%	75%
Lighting, Sch 50 – 59	125%	125%

I designed my proposed rate spread to maintain rate classes at or near their current parity levels which, are generally all within the reasonable range. However there are two classes outside this range: Primary Schedule 35, Irrigation, and Schedule 43, Interruptible Schools. As the figure below shows, with these two as exceptions, both PSE's and Staff's proposed electric rate spreads result in electric parity ratios within the reasonable range.

Figure 1 - Comparison of Staff and PSE Parity Ratios (Staff Revenue Requirement)



Q. Does your proposed rate spread address the issue of cross-class subsidization for electric customers?

A. Yes. Both PSE's and Staff's proposed rate spreads make meaningful movement for those classes with a parity ratio outside of the reasonable range and appropriately balance the principles that guide rate spread. However, Staff's proposed rate spread adjusts the rate increase for schedule 43, Interruptible Schools. This customer class is outside the reasonable range and should receive a higher proportional allocation to bring it closer to parity. Because of this, I recommend that the Commission accept

Staff's proposed electric rate spread because it better incorporates the principles of cost-causation, fairness, and perceptions of equity.

C. Staff's Proposed Natural Gas Rate Spread

Q. What natural gas rate spread do you recommend?

A. I summarize my recommended rate spread in the table below. I do not include the results associated with the special contracts class since its rates are not affected by rate spread. Further, I do not include the rental program class since the Company proposes setting the rates the rental class at the cost of service.

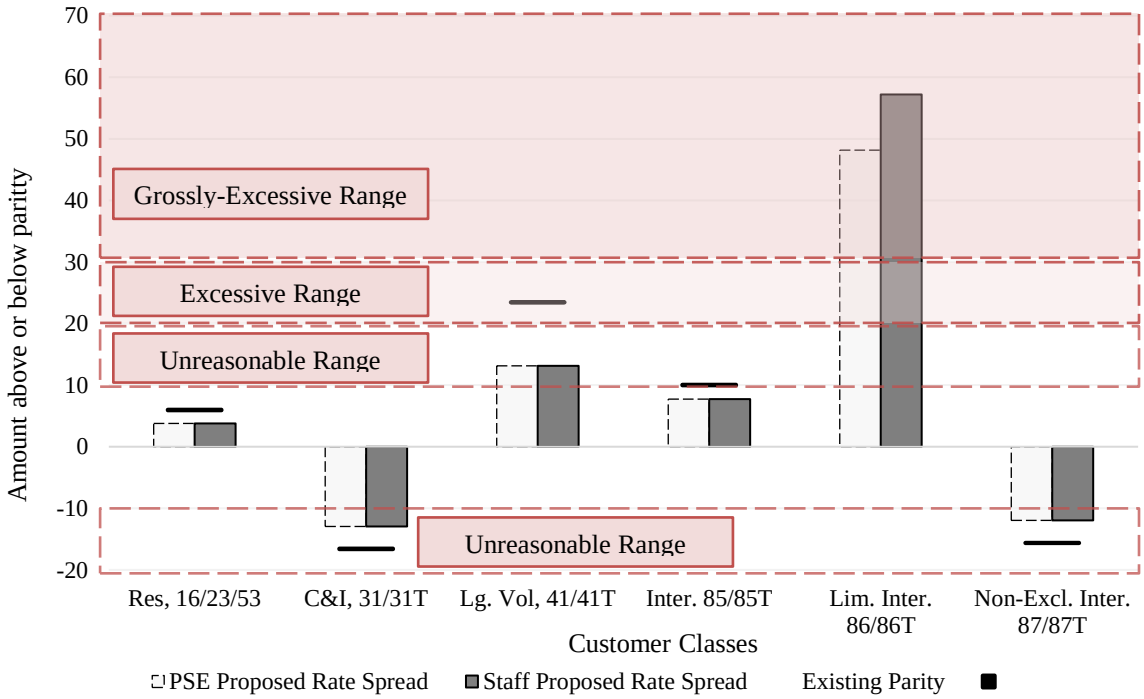
Table 5 - Staff Recommended Natural Gas Service Rate Spread

Rate Schedule	**PSE** *(Supplemental Filing)*	**Staff**
Residential, Sch 16/23/53	100%	100%
Comm. & Ind., Sch 31/31T	150%	150%
Large Volume, Sch 41,41T	50%	50%
Interruptible, Sch 85, 85T	100%	100%
Limited Inter., Sch 86, 86T	0%	25%
Non-Excl. Inter., Sch 87, 87T	150%	150%

In general, I designed my proposed rate spread to maintain rate classes and schedules at or near their current parity levels. My proposal aligns with the Company's for all but one class, Schedule 86/86T, Limited Interruptible. While this schedule currently has a parity ratio in the grossly-excessive range, I do not believe it is appropriate for a customer class to be assigned none of a proposed rate increase. Therefore, I assign this class a small increase to more fairly and equitably spread the overall rate change.

As the figure below shows, both PSE's and Staff's proposed rate spreads make meaningful movement for all customer classes.

Figure 2 - Comparison of Staff and PSE Natural Gas Parity Ratios (Staff Revenue Requirement)



While some classes' parity ratios are still outside the reasonable range, Staff's proposed rate spread results in a fair allocation of costs across classes.

Q. Does your proposed rate spread address the issue of cross-class subsidization for natural gas customers?

A. Yes. Both the Company's and Staff's proposed rate spread make meaningful movement for those classes with a parity ratio outside of the reasonable range. However, I recommend that the Commission accept Staff's because it better balances

the principles of equity and perceptions of fairness by assigning all classes at least some share of the proposed revenue requirement increase.

V. RIDER SCHEDULES 141, 141X, AND 141Y

Q. Please explain what a rider is.

A. A rider is a separate schedule that affects customers' bills. Generally, utilities use riders to collect expenses, or return revenues, in a manner that cannot be accomplished through base rates.

Q. Please summarize the electric and natural gas riders that are incorporated into your analysis.

A There are three riders relevant to my analysis. These are:

1. Schedule 141 – Expedited Rate Filing (ERF) reflects rates from the PSE ERF in Dockets UE-180899 and UG-180900.
2. Schedule 141Y – Temporary Federal Income Tax Credit reflects a temporary portion of the change in federal tax rate.
3. Schedule 141X – Protected-Plus Excess Deferred Income Tax reflects a credit related to a different component of the change in federal tax rate. This schedule is discussed in more detail by Staff witness Christina Steward.[18]

There are additional riders that affect customer bills but are not included here.

[18] Steward, Exh. CSS-1T at 5:8 - 6:12.

Q. How does Staff's rate spread and rate design reflect these riders?

A. Each rider affects *billed* rates. Base rates do not currently include riders since they are additional line items on a customer's bill. PSE has proposed rolling Schedule 141 and 141X into customer base rates. As discussed by Staff witness Christina Steward, Staff recommends that Schedule 141X remain as a separate schedule. Both the Company and Staff recommend Schedule 141Y remain a separate rider for the purposes of billing. My bill impact analysis, discussed in section VIII, takes into account *all* of these schedules. However, my rate spread does not reflect *any of these schedules.* My rate design reflects *only the effects of schedule 141*.

Q. Why does Staff not include riders in rate spread and one rider in rate design?

A. I do not include riders in my rate spread and 141 in my rate design for three reasons. First, each of these schedules has individual rate spread and rate design components based on their respective application. Rather than confuse the application of rate spread in this proceeding, which is applied solely to base rates, these schedules are treated as separate elements of a customer bill. To present the overall impacts of these changes, inclusive of base rates, I summarize the impacts on customer bills in section VIII.

Second, my presentation style matches the Company's presentation. This enables the Commission to compare "apples-to-apples" Staff and the Company's proposed rate spread and rate design.

Third, Schedule 141 reflects the results of the recent ERF filed by PSE in Dockets UE-180899 and UG-180900. The ERF schedule reflects a rate spread from

PSE's 2017 general rate case. Including this schedule in base rates reduces bill complexity while still reflecting the same overall costs a customer pays.

VI. ELECTRIC RATE DESIGN

A. Overview of Electric Rate Design

Q. Overall, what are the objectives of electric rate design?

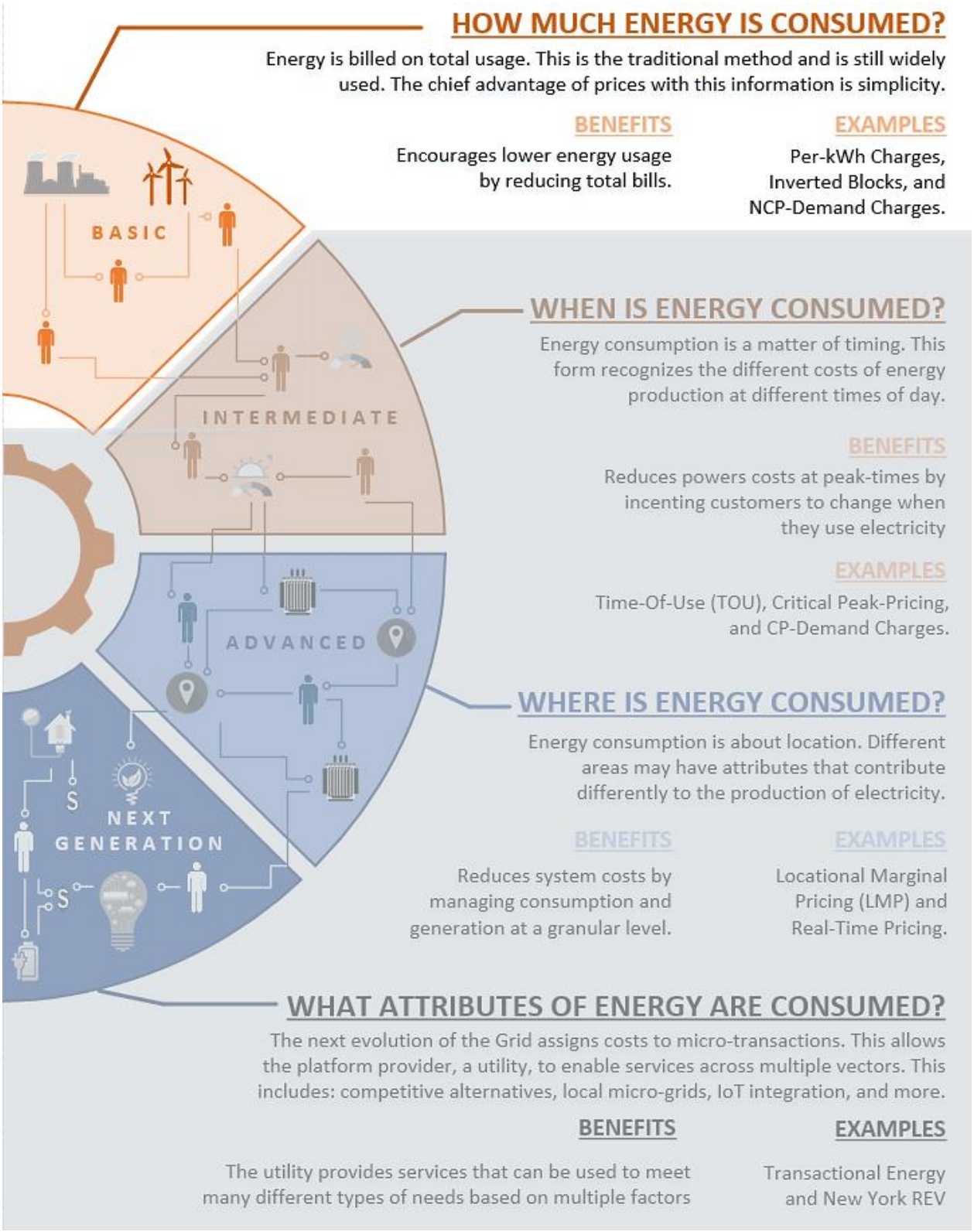
A. There are multiple competing goals regarding electric rate design that vary between classes and region. These goals can sometimes conflict with one another within a class. For instance, encouraging conservation through rate design will generally place some level of fixed-cost recovery at risk. Another example is the mitigation of rate shock, which can mute accurate price signals, since the cost of power varies with multiple other factors.[19]

As I discuss in Section IX, customer expectations are rapidly evolving. Part of this evolution includes demanding options for new and expanded usage to respond to price signals. Taking these into account I believe the objectives of rate design can be reduced to four tiers:[20]

[19] For instance, the weather is a key driver of market prices which varied between $4/MWh and $1000/MWh in 2019. Energy Information Agency, ice_electric-2019.xlsx (last visited Nov. 19, 2019), *available at* https://www.eia.gov/electricity/wholesale/xls/ice_electric-2019.xlsx.

[20] A recent NARUC resolution substantiates this approach: *"Whereas as customer demands and resource options change, electric utilities also need to operate in a manner that is more flexible [How Much], granular [When], and locational [Where], while still safely, reliably and effectively delivering electric service."* Ball, Exh. JLB-3, NARUC Resolution on Modeling Energy Storage and Other Flexible Resources, at 1.

Figure 3 - Tiers of Energy Consumption



As this graphic illustrates, there are four tiers of energy consumption: how much, when, where, and what. Unfortunately, PSE's current rate structures are almost universally limited to the "basic" tier. This is reflected in the graphic with the remaining elements greyed-out. As discussed in Section IX, Staff recommends the Commission directs PSE engage in pricing pilots to evaluate the benefits of pricing from the "intermediate" and "advanced" tier.

Q. Please provide an overview of the Company's proposed electric rate design.

A. *Residential Schedule 7*

- Basic Charge – No Change
- Energy Charge – No Increase to Block 1

Secondary Voltage Schedule 24 (kW<50)

- No Changes

Secondary Voltage Schedule 25 (kW<350)

- No Changes

Secondary Voltage Schedule 26 (kW>350)

- Basic Charge – No Changes
- Demand Charge – Set Match Schedule 31

Secondary Voltage Schedule 29 (Irrigation)

- No Changes

Primary Voltage Schedule 31

- No Changes

Primary Voltage Schedule 35 (Irrigation)

- No Changes

Primary Voltage Schedule 43 (Interruptible Schools)

- No Changes

High Voltage Schedules 46 & 49

- No Changes

Street and Area Lighting Schedules 50-59

- Updated Using Cost Study

Choice/Retail Wheeling Schedules 448-449

- No Changes

Special Contract

- Updated Using Contract Rates

Q. Overall, do you agree with PSE's proposed changes to electric rate design?

A. Yes, except for the proposed allocation of the entire rate increase to the second block of energy usage for residential customers. For all other non-residential customer classes, PSE has proposed rational and reasonable rate design changes based on the current understanding of the cost to serve customers.

B. Residential Rate Design

Q. Please describe the Company's proposed electric residential rate structure.

A. The Company proposes to keep the current residential Schedule 7 rate structure, with two blocks separated at 600 kWh, regardless of timing. The Company also proposes applying the entire class-assigned increase in revenue requirement to the second block, or tail block, of energy usage.

Q. Do you support the Company's proposal to confine the increase to the tail block?

A. No. For reasons I discuss below, the Company's proposal fails to balance the goals of residential rate design for rates in the "basic" tier. Therefore, I recommend that the Commission require PSE to apply the increase equally across both blocks of energy usage.

1. Concerning the Goals of Residential Rate Design

Q. What are the goals of residential rate design?

A. As I discussed above, rate design goals can vary by schedules, as well as region and commission. Based on this Commission's orders and policy statements, the residential rate design structure should accomplish five goals:

1. Appropriately reflect the cost of kWh use during peak periods;[21]
2. Send proper price signals about long-term portfolio supply costs;[22]
3. Actively encourage conservation;[23]
4. Allow the company some certainty of fixed cost recovery;[24] and,
5. Minimize rate shock to individual customers.[25]

While these goals do not inherently conflict with each other, they are challenging to balance.

[21] *Wash. Utils. & Transp. Comm'n v. Wash. Nat'l Gas Co.*, Dockets UE-940034 & UG-940814, Fifth Supplemental Order, 5 (Apr. 1 1995).
[22] *Wash. Utils. & Transp. Comm'n v. Wash. Water Power Co.*, Docket UG-901459, Third Supplemental Order, 5 (Mar. 9, 1992).
[23] *Wash. Utils. & Transp. Comm'n v. Avista Corp.*, Dockets UE-140188 and UG-140189, Order 05, 11, n.22 & 13-14, ¶ 28 (Nov. 25, 2014).
[24] *See In re WUTC Investigation into Energy Conservation Incentives*, Docket U-100522, Report and Policy Statement on Regulatory Mechanisms, including Decoupling, To Encourage Utilities to Meet or Exceed Their Conservation Targets, 6-7, ¶¶ 9-10, ¶ 15 (Nov. 4, 2010).
[25] 2011 PSE GRC Order at 124-25, ¶ 350.

Q. Have you previously testified about these goals in relation to PSE's residential rate design?

A. Yes. In the previous PSE general rate case, I noted what I believe to be substantial problems with PSE's overall residential rate design structure. I recommended that the Commission require PSE to implement a minimum bill and seasonal rate structure to address those issues.[26] However, the Commission did not adopt my recommendations.[27]

Q. Are you proposing to revisit these issues?

A. No. As I discuss in section IX, the Company should begin deploying Pricing Pilots to examine different price structures in the "intermediate" and "advanced" tiers. Absent unusual circumstances, I recommend the structure of PSE's residential rates remain unaltered until PSE deploys and evaluates these pricing pilots.

Q. Does the Company's electric residential rate structure adequately balance your summary of the goals of residential rate design?

A. No. The current structure emphasizes how much electricity customers use. This price structure falls into the "basic" tier and does a poor job reflecting the actual costs of using electricity at peak times, a principle of residential rate design. Further, the lack of time-based variation does not reflect long-term portfolio supply costs, another principle, because PSE bases its resource planning on expected *peak* usage.

[26] 2017 PSE GRC Order at 117, ¶ 347.
[27] *Id.* at 120, ¶ 357.

Consequently, the incentive to reduce electricity consumption is non-existent during the peak periods; unfortunately this is when it is most needed.

2. Concerning the Incentive to Conserve Electricity

Q. Does the Company's proposal to increase the tail block address these problems by encouraging customers to conserve electricity?

A. No. The Company's proposal fails to encourage conservation during the peak periods because it relies on limited and generic price signals. Even though the Company's proposal increases the direct incentive in the tail block, this is a very limited method of encouraging energy conservation.

The point in time when customers decide to consume electricity and the point in time in which they are billed for that decision are too disparate for a "tail-block" price to convey an adequate price signal. Rather, all that PSE's customers see are higher overall bills, with no direct information on what caused the increase: did they use the clothes dryer too much? Was the heat set too high? These questions cannot be readily answered by a price signal that simply talks about energy usage that is above or below a certain kWh range. To address these issues, as discussed in Section IX, I recommend the Company develop pricing pilots for residential customers.

Q. Is it clear that the Company's proposal incents conservation and energy efficiency?

A. No. When queried for the amount of energy savings expected from this proposal, the Company responded:

> Puget Sound Energy ("PSE") has not specifically quantified the amount of energy efficiency it expects to receive by assigning the entire residential class increase to the second block of Schedule 7's rate structure. However, it is very much in line with the basic economic principle of price elasticity that increasing the price in the tail energy block rate of Schedule 7 will reduce electricity usage by the effected customers, all other things being equal.[28]

The lack of data presents a problem that pricing pilots are uniquely positioned to address. Measuring the actual effect on energy efficiency and conservation potential should be a key design element of a pricing pilots. The data gathered from pricing pilots would thus allow the Commission to make a clear decision based on quantified costs and benefits.

3. Concerning "Vulnerable Customers"

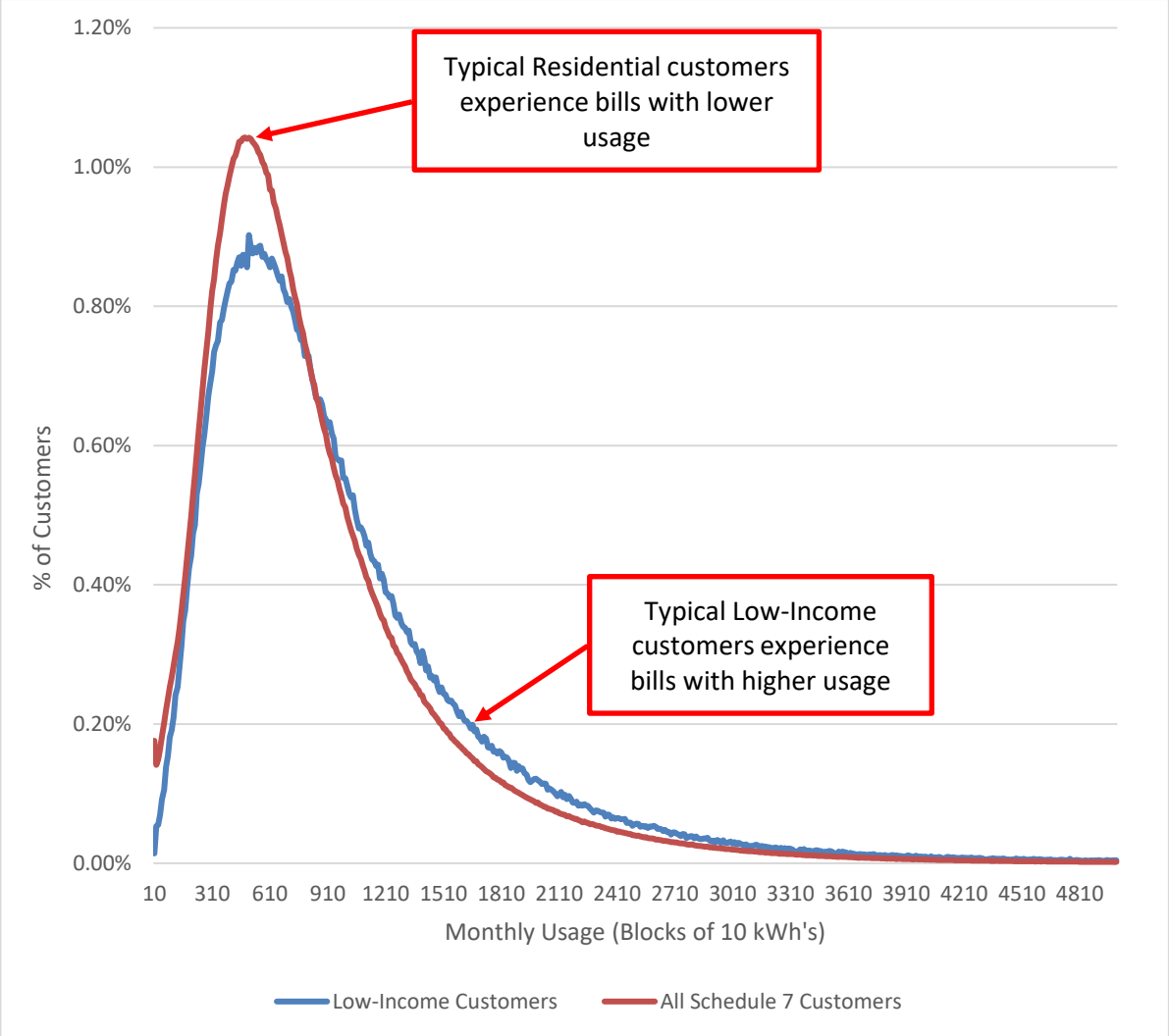
Q. Does the Company's proposal help the most "vulnerable customers"?

A. No. The Company asserts that "lower income customers are thought to use less energy than those with higher incomes."[29] The application of this by PSE is that it treats the first energy block as essential usage and the second block as voluntary usage. However, the first energy block has little to do with end-usage, since it was set to equitably share the benefits of low-cost power on PSE's system.[30]

[28] Ball, Exh. JLB-4 at 1.
[29] Piliaris, Exh. JAP-1T at 18:7-9.
[30] Ball, Exh. JLB-5, Excerpt from 11th Supplemental Order in PSE 1992 GRC, at 1.

PSE's assertion is also misleading. While it is true that lower income customers use less overall energy because of decreased disposable incomes, the *average* low income customer uses *more energy* than a typical residential customer.[31] This is evident in the chart below which compares PSE's residential population to low income customers.

Figure 4 - Comparison of All Residential Bills to Low-Income Bills



[31] Ball, Exh. JLB-6, PSE 2017 Decoupling Evaluation, at 62-63.

Q. Has the Company quantified the effects of its proposal on "vulnerable" customers?

A. No. In response to an Energy Project Data Request the Company stated:

> The reference to "vulnerable customers" is meant to be broadly construed as those using less energy. Please see the monthly bill comparison for Schedule 7 (Residential Service) in the Thirteenth Exhibit to the Prefiled Direct Testimony of Jon A. Piliaris, Exh. JAP-14, for an illustration of the varying bill impacts relative to usage. Note that customers using 600 kWh and below see no bill increase, and in fact, may see a slight reduction to their monthly bill, based on Puget Sound Energy's proposal in this case.[32]

This means the Company has failed to provide a modicum of evidence explaining why its proposal is in the best interest of "vulnerable" customers.

C. Non-Residential Rate Design

Q. Do you agree with PSE's proposed changes to non-residential electric rate design?

A. For the purposes of this case, yes. PSE has generally proposed rational and reasonable non-residential rate design changes based on the current structures in place for these customers. However, these structures overemphasize usage based on non-coincident peak loads, the "basic" tier of energy consumption, and underemphasize the value of power at a given point in time, the "intermediate" tier. PSE's proposed Demand Aggregation Pilot Program starts to address this issue, but I believe it does not go far enough. As I discuss in Section IX, I recommend several pricing pilots that may begin to address this issue.

[32] Ball, Exh. JLB-4, Company's responses to various data requests, at 2.

Q. Does Staff support PSE's proposal for updating lighting rates based on a special cost study?

A. Yes. As it did in its previous GRC, UE-170033, the Company presented a principled cost study that fairly allocates costs across the various lighting schedules. In the present case, the Company updates this methodology and removes a weighting factor for schedule 51. This change is a more accurate application of the cost causation principle in the special cost study. The Commission should approve the Company's proposed revisions to the existing electric lighting schedules.

VII. NATURAL GAS RATE DESIGN

Q. Please provide an overview of the Company's proposed natural gas rate design.

A. *Residential Schedules 16/23/53*

- No Changes

Commercial and Industrial Schedules 31/31T

- No Changes

Large Volume Schedules 41/41T

- Demand Charge – Increase by $.08 to $1.25 per Therm
- Increase Transportation Charge by $.0003

Interruptible Schedules 85/85T

- Demand Charge – Increase by $.09 to $1.30 per Therm
- Increase Transportation Charge by $.0003

Limited Interruptible Schedules 86/86T

- Demand Charge – Increase by $.13 to $1.35 per Therm
- Increase Transportation Charge by $.0003

Non-Exclusive Interruptible Schedules 87/87T

- Demand Charge – Increase by $.07 to $1.45 per Therm
- Increase Transportation Charge by $.0003

Q. Overall, do you agree with PSE's proposed changes to natural gas rate design?

A. Yes. PSE has generally proposed rational and reasonable natural gas rate design changes based on the current estimates of costs to serve customers. Therefore, Staff supports the Company's proposed rate design provided they update the economic bypass study for their special contract.

Q. Why do you recommend updating the economic bypass study?

A. The economic bypass study that PSE's only natural gas contract relies upon has not been updated since 1995.[33] It is important to keep these economic bypass alternatives updated on a reasonable basis so that these customer rates remain in compliance with RCW 80.28.090 and RCW 80.28.100.

VIII. BILL IMPACTS

Q. Can you please quantify the bill impacts of Staff's proposed revenue requirement, rate spread, and rate design?

A. Yes. Exh. JLB-7 presents the bill impacts for electric customers and Exh. JLB-8 presents the bill impacts for natural gas customers. Figures 5 and 6 provide visual comparisons between Staff's and PSE's cases regarding the overall bill impact for average residential customers.

[33] Ball, Exh. JLB-4, Company's responses to various data requests, at 9.

Figure 5 - Comparison of Staff and PSE Residential Electric Bill Impacts

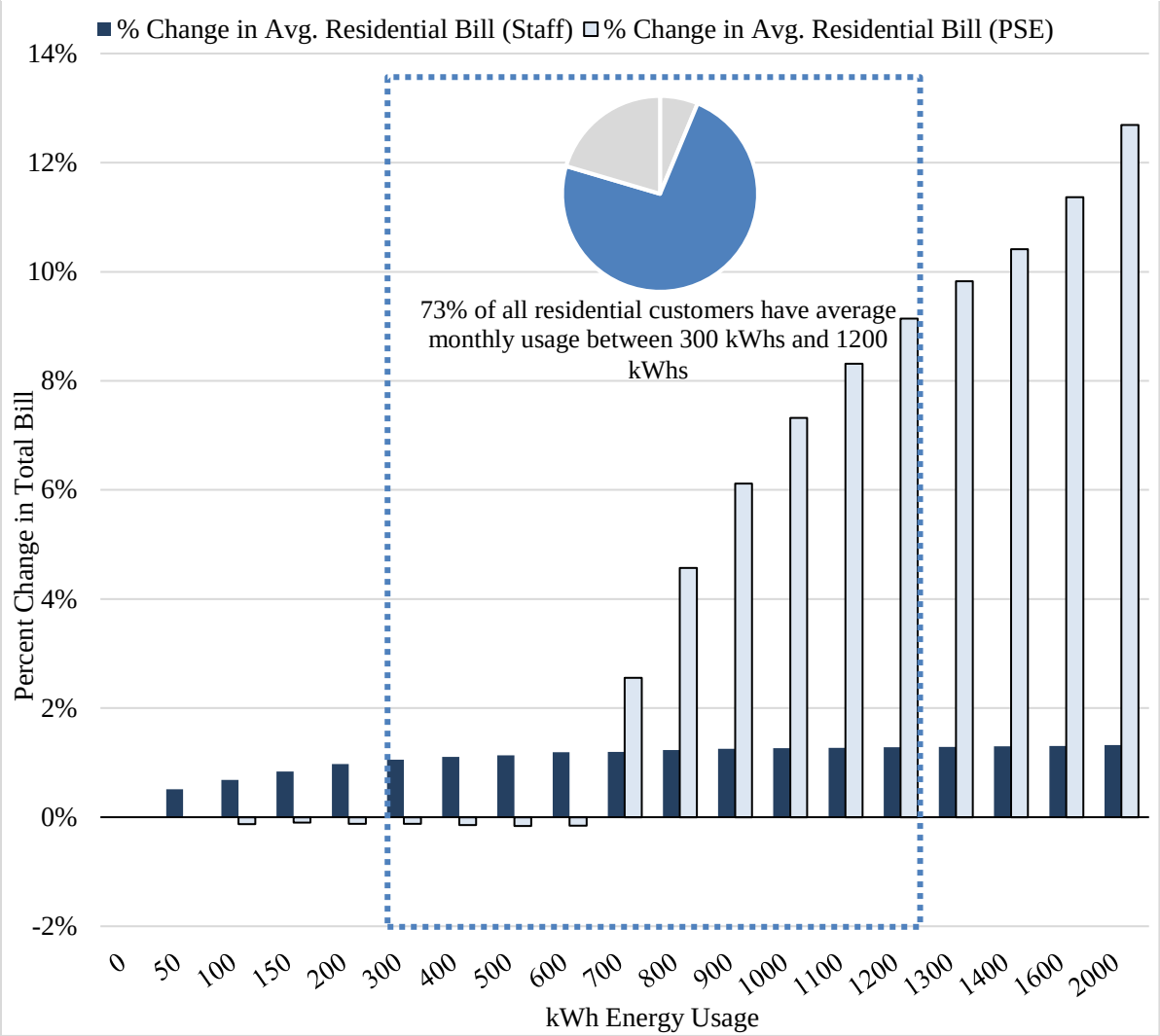
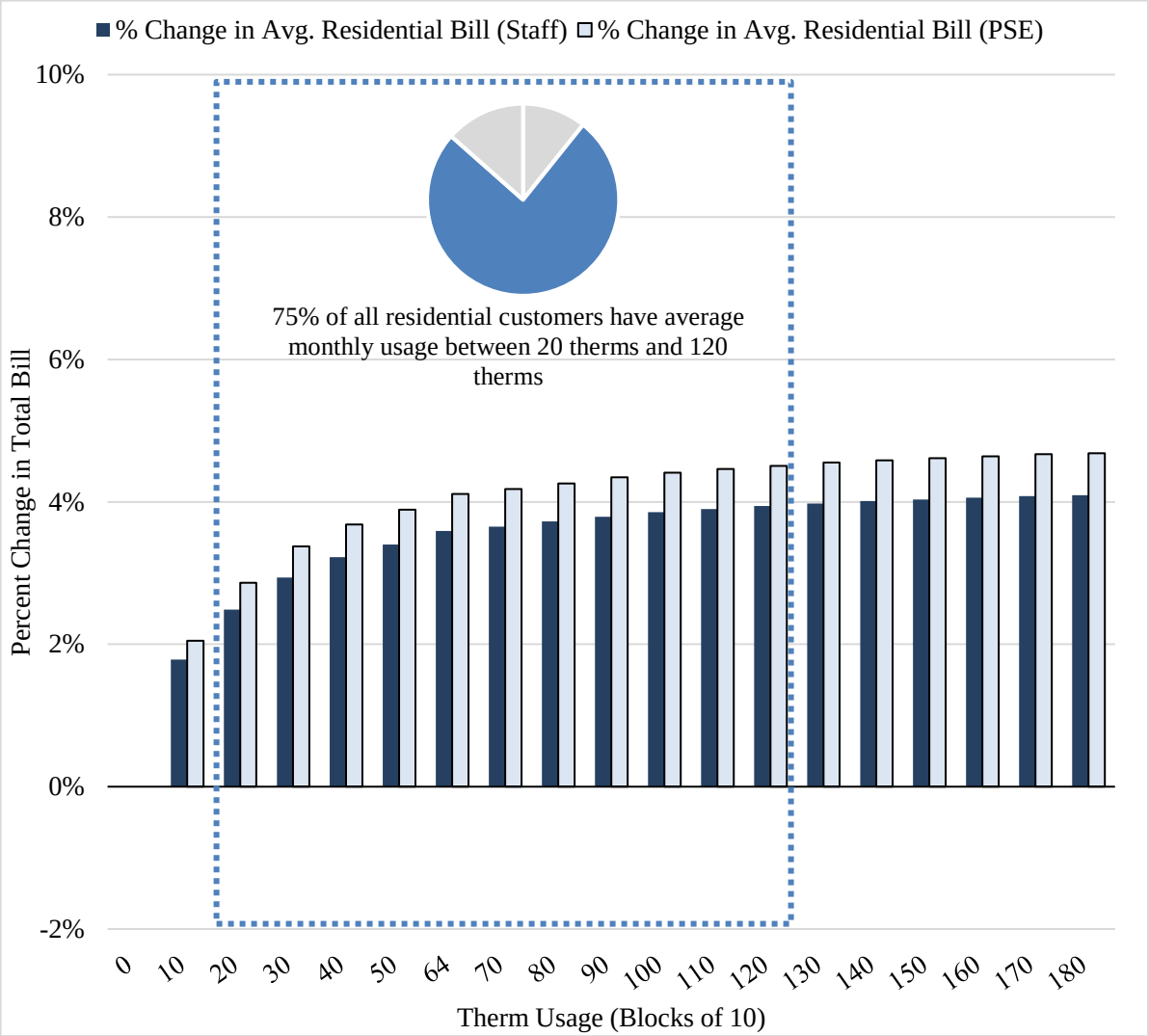


Figure 6 - Comparison of Staff and PSE Natural Gas Bill Impacts



IX. PRICING PILOTS

Q. Please summarize your recommendations regarding pricing pilots for the Commission.

A. In the present dockets, I recommend the Commission direct PSE to file a revised proposal for an electric Demand Aggregation Pilot Program based on Staff's

proposed design and evaluation elements.[34] Further, I recommend that the Commission require PSE to prepare pilot programs for both electric time-of-use rates and electric critical-peak-pricing rates. I also recommend that the Commission direct PSE to engage with local resources, such as Pacific Northwest National Laboratory (PNNL), to evaluate the potential for a real-time pricing pilot program. Finally, I recommend that the Commission entertain deferred accounting treatment for expenses associated with developing and administering these programs.

Q. What is a pricing pilot?

A. A pricing pilot offers a unique price of electricity to a limited number of customers as an experiment with a rate structure. A common example is time-of-use rates. Pricing pilots allow a utility to gather data on things such as program costs and benefits, price responsiveness, and administrative complexity. Since pricing pilots typically rely on volunteers they offer a distinct advantage: the utility engages with the customers most willing to provide feedback and to tolerate fluctuations in program design. This allows the utility to evaluate potential benefits and to work out potential problems before making a decision on whether or not offer the price to the entire ratepayer population.

[34] I also recommend that the Commission set out the appropriate design and evaluation elements for evaluating pricing pilots.

Q. How are you applying this definition to the present case?

A. For the purposes of this case, I believe sufficient research exists on the potential benefits of several types of pricing.[35] Therefore, I limit my recommendations to those dynamic pricing structures which have already been reviewed or tested in other jurisdictions. This does not necessarily preclude, but does not directly include, the possibility of evaluating pricing structures that are in the early proof-of-concept stage. Rather, my recommendation recognizes the organizational and managerial burden that a pricing pilot can present.[36] As a whole, Staff's proposals are designed to reduce barriers to pricing reform, rather than exacerbate them.

Q. How is the remainder of your testimony organized?

A. My testimony related to pricing pilots has five sections.

1. The Need and Value of Pricing Pilots highlights industry changes and Washington state policies that require new and innovative rate designs.
2. The Design of Pilots summarizes the principles and development of pricing pilots.
3. The Evaluation of Pilots discusses the elements that should be included in the evaluation of pricing pilots.
4. PSE's Proposed Demand Aggregation Pilot discusses the Company's proposed pilot based on the previous three sections.

[35] Ball, Exh. JLB-9, Time-Varying and Dynamic Rate Design, RAP, at 29-39.
[36] Ball, Exh. JLB-10, Experiences from Consumer Behavior Studies on Engaging Customers, DOE, at 34-35.

5. Staff's Proposal to Develop Additional Pricing Pilots underscores the need for PSE to develop additional pricing pilots for both residential and commercial & industrial customers.

Q. Overall, what principles should be used in the consideration, design, and evaluation of pricing pilots?

A. Since pricing pilots are essentially about the *rates* that are offered to customers, it is useful to rely on principles that are fundamental to rate regulation. In 1961, James Bonbright offered a series of principles to consider when building rates. Indeed, both Piliaris and Taylor cite to these principles in their testimony for PSE.[37]

While these principles provide a useful guidepost for developing utility rates, they require updating for 21st century technology, customer expectations, and utility systems. The Rocky Mountain Institute (RMI) provides an excellent summary, detailed in the table below:[38]

Table 6 - A 21st Century Interpretation of the Bonbright Principles of Public Utility Ratemaking

BONBRIGHT PRINCIPLES	21ST CENTURY INTERPRETATION
***Rates* should be practical, simple, understandable, acceptable to the public, feasible to apply – and free from controversy in their interpretation.**	*The customer experience* should be practical, simple, and understandable. New technologies and service offerings that were not available previously can enable a simple customer experience even if underlying rate structures become significantly more sophisticated.

[37] Piliaris, Exh. JAP-1T at 16:3-10; Taylor, Exh. JDT-1T at 21:3-15.
[38] Ball, Exh. JLB-11, Rate Design for the Distribution Edge, RMI, at 38.

***Rates* should keep the utility viable, effectively yielding the total revenue requirement and resulting in relatively stable ash flow and revenues from year to year.**	*Rates* should keep the utility viable by encouraging economically efficient investment in both centralized and distributed energy resources.
***Rates* should be relatively stable such that customers experience only minimal unexpected changes that are seriously adverse.**	*Customer bills* should be relatively stable even if the underlying rates include dynamic and sophisticated prices signals. New technologies and service offerings can manage the risk of high customer bills by enabling loads to respond dynamically to price signals.
***Rates* should fairly apportion the utility's cost of service among consumers and should not unduly discriminate against any customer or group of customers.**	*Rate design* should be informed by a more complete understanding of the impacts (both positive and negative) of DERs on the cost of service. This will allow rates to become more sophisticated while avoiding undue discrimination.
***Rates* should promote economic efficiency in the use of energy as well as competing products and services while ensuring the level of reliability desired by customers.**	*Price signals* should be differentiated enough to encourage investment in assets that optimize economic efficiency, improve grid resilience and flexibility and reduce environmental impacts in a technology neutral manner.

I rely on these principles as I develop a framework for designing and evaluating pricing pilots.

A. The Need and Value of Pricing Pilots

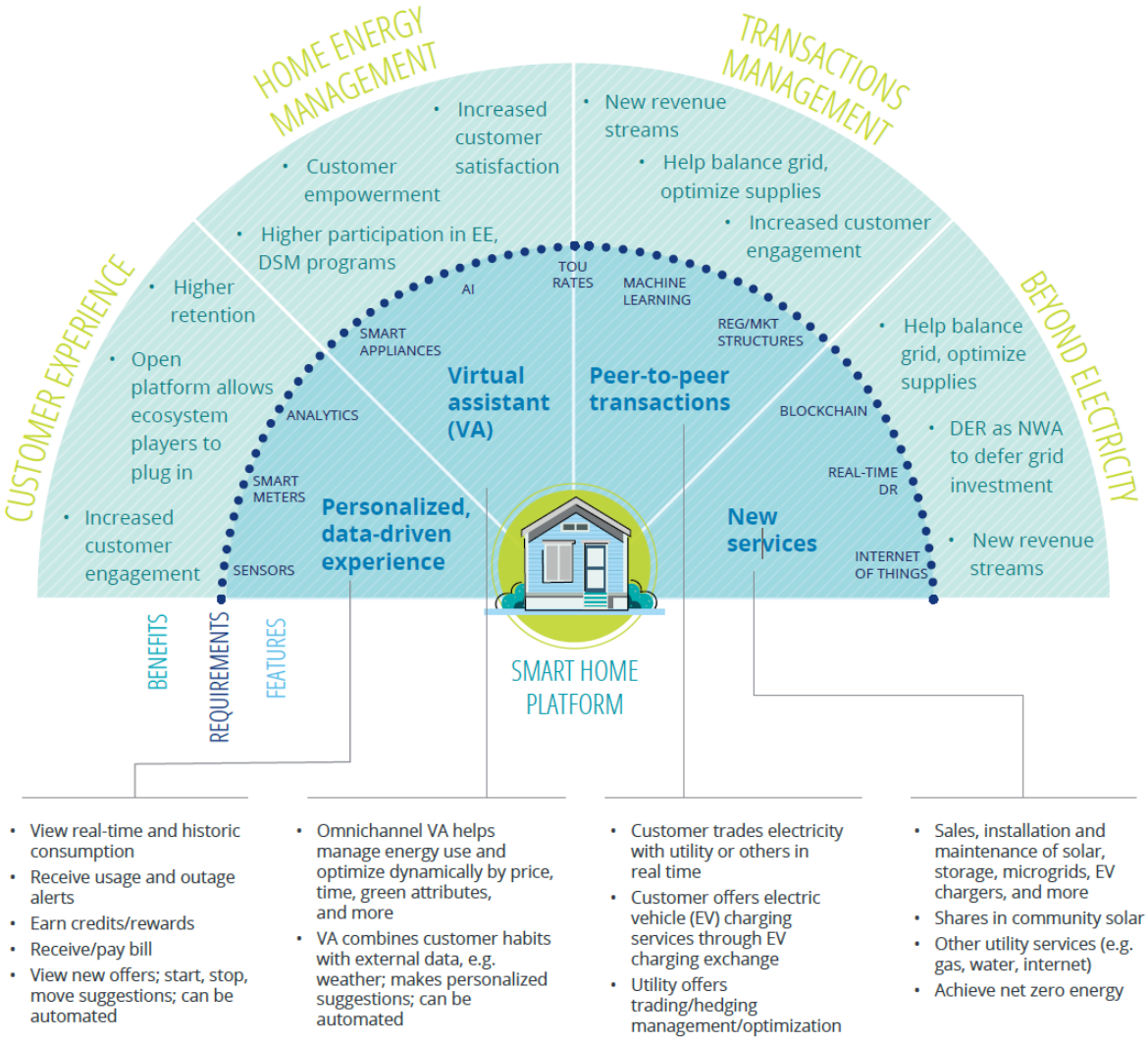
Q. Why are pricing pilots needed?

A. Customer expectations regarding how they receive and pay for electricity are evolving. While this is a well-documented phenomenon, it is difficult to gauge what customers actually want when discussing the prices of electricity. This is because, in

the aggregate, a customer's expectations simultaneously lag and drive customer demand. A clear example is the telecommunications industry following the invention of the smartphone. Customer expectations and their demand for smartphones shifted *after* the product first became available – the demand for smartphones was almost nonexistent before the apple iPhone.[39] However, once the iPhone appeared on the market, the customer demand for more variation lead to the most prolific marketplace for apps being owned a different company – Google.[40] As illustrated in the Figure 7 below, customer demand now shifts the product, but only after it has been digitized. Electricity, and its pricing, is going through the same phenomenon by virtue of customers demanding an improved customer experience.[41]

[39] Ball, Exh. JLB-12, Innovation in the Mobile Industry, at 12.
[40] *See generally* Wikipedia, Google Play Store (last visited Nov. 19, 2019), *available at* https://en.wikipedia.org/wiki/Google_Play
[41] Ball, Exh. JLB-13, Digital Innovation: Creating Utility of the Future, at 9.

Figure 7 - Illustration of Grid Digitization Affecting Electric Customers



Q. What is the impact of changing customer expectations on electricity and its price?

A. Again, it is useful to look at the telecom industry. The shift in customer demand following the invention of the smartphone charted a new course for software: in essence, customers increasingly expect to merge their virtual systems with their

physical environment.[42] What started in the software sphere has migrated to the physical one, creating what is often called the internet of things (IoT). The IoT can be best be described as the physical manifestation of virtual products and services; for example "smart" speakers now can order products, switch on lighting, or place to-go orders all through voice or automated control.[43]

In the electricity industry, IoT has a different name: grid digitization. Just like the IoT, grid digitization is the physical manifestations of virtual products: things such as automated thermostat control based on GPS location, customer self-generation, or electric vehicles with batteries that can be used as demand response. Whether customer expectations have reached the point of driving these changes versus lagging them is difficult to say. However, if the customer expects the ability to control their bill, another principle of rate design, they will find the means to do so. In order to give the customer the options to control their bill, PSE needs to understand how and to what degree customers value different price signals.

Q. What other changes in the utility industry create a need for pricing pilots?

A. The utility operating environment is evolving as rapidly as customer expectations. Just like customers who want options, utilities want to maximize the value of their systems. A key, and relatively unexploited, element of this value is the exchange of information between the customer and the utility:

> IoT technology offers the possibility to transform agriculture, industry, and energy production and distribution by increasing *the availability of*

[42] Ball, Exh. JLB-14, The Internet of Things: Mapping the Value Beyond the Hype at 9.
[43] *Id.*

> *information along the value chain of production* using networked sensors.[44]

The value chain for a utility extends from the facility that generates electricity to the meter at which it is consumed. In the 20th century, miles separated these transactions and weeks separated the date of consumption and the bill that had a price signal. In the 21st century, energy can be generated mere feet away and prices can change in real-time. As a recent paper by RAP discussed:

> Pricing can be designed to reflect grid management needs at regional, utility, zonal, nodal and even circuit levels…What market designers and stakeholders need to do is develop markets on each scale that reward innovative solutions to provide energy and use transmission and distribution lines efficiently. Providing capacity alone is almost meaningless, because that only establishes a promise to be available, while energy and reserves are what are necessary to run the grid.[45]

Unfortunately, these possibilities have been limited primarily to avoid revisiting the principles of cost of service and rate design. This was seen when the Commission approved Avista's proposed electric vehicle charging pilot where the Commission refrained from determining if the proposed EV charging rates adhered fair, just, reasonable and sufficient standard.[46] Instead the Commission approved a pilot to gather more information on the pricing structure, in order to judge what level of rates would be appropriate. The implicit acknowledgement of this order is that pricing should not act as a barrier to grid evolution. Instead, the price of electricity should

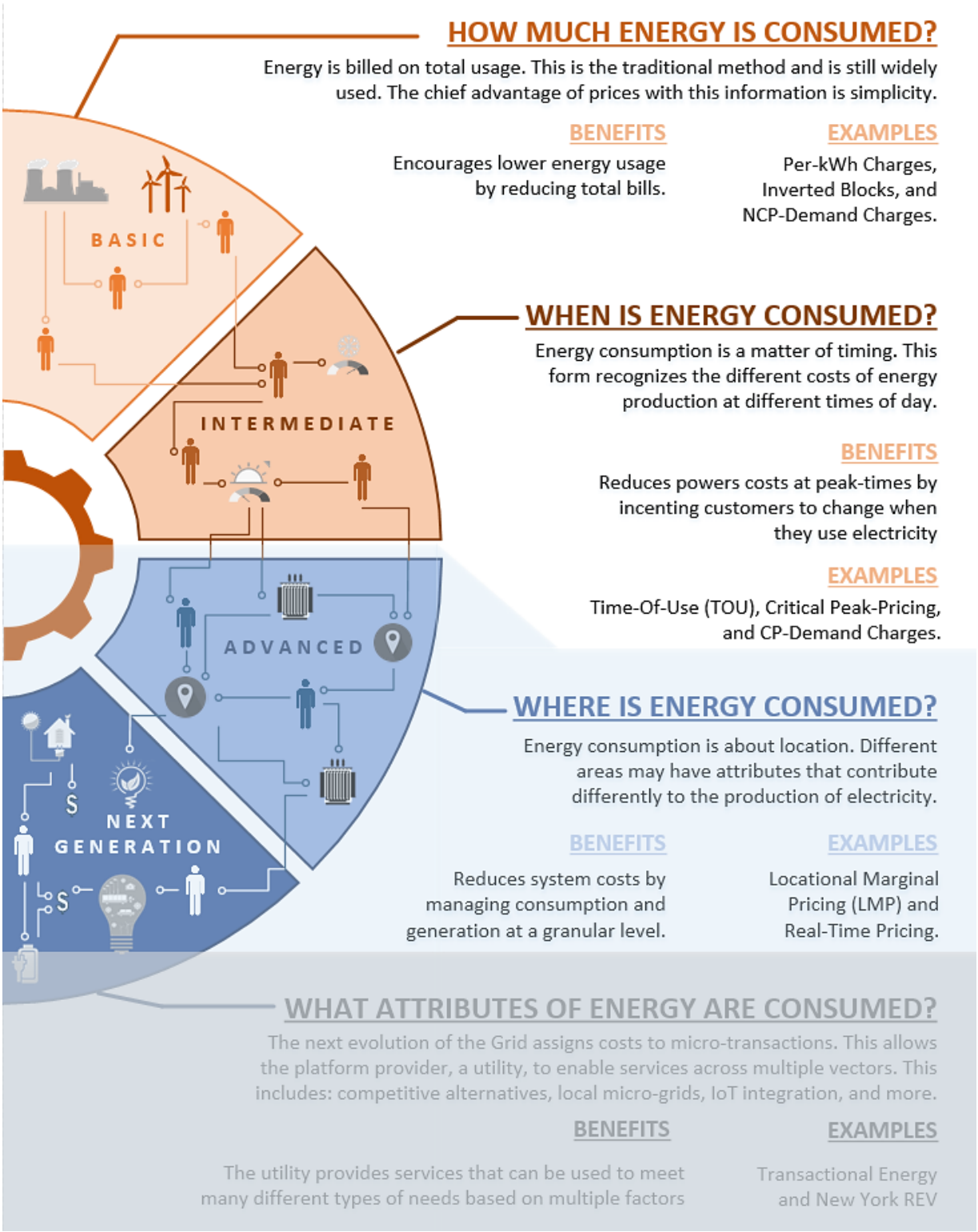
[44] Ball, Exh. JLB-15, The Internet of Things: An Overview, at 10 (emphasis added).
[45] Ball, Exh. JLB-16, Flexibility for the 21st Century Power System, at 18.
[46] As the Commission noted, "Staff and stakeholders agree with Avista that the unknown utilization of the planned charging stations is a barrier to designing cost-based rates. Avista further contends that a cost-based rate may not be competitive with the market, and could inhibit use of DC fast chargers and EV adoption in Avista's service territory. Until more information becomes available, we find it reasonable to adopt a market-based rate for DC fast chargers in the Pilot Program*."* - *Wash. Utils. & Transp. Comm'n v. Avista Corp.*, Docket UE-160082, Order 01, at 6 ¶ 20 (Apr. 28, 2016).

meet the expectations for a positive customer experience and economically efficient rates.

Q. Do the objectives of rate design you discussed previously support the need for pilot programs?

A. Yes. As I discussed above, electricity pricing exists across four tiers: how much is consumed, when it is consumed, where it is consumed, and what is consumed. I have updated the graphic I used above to identify what is possible with the pricing pilots PSE and Staff are proposing:

Figure 8 - Updated Tiers of Energy Consumption



As this figure shows, Staff's and PSE's proposed pilot programs fall in the second "intermediate" category. Further, Staff is recommending the Company engage with PNNL to evaluate the value of real-time pricing. Depending on how such a pricing pilot is implemented, this may be in the "intermediate" or "advanced" tier.

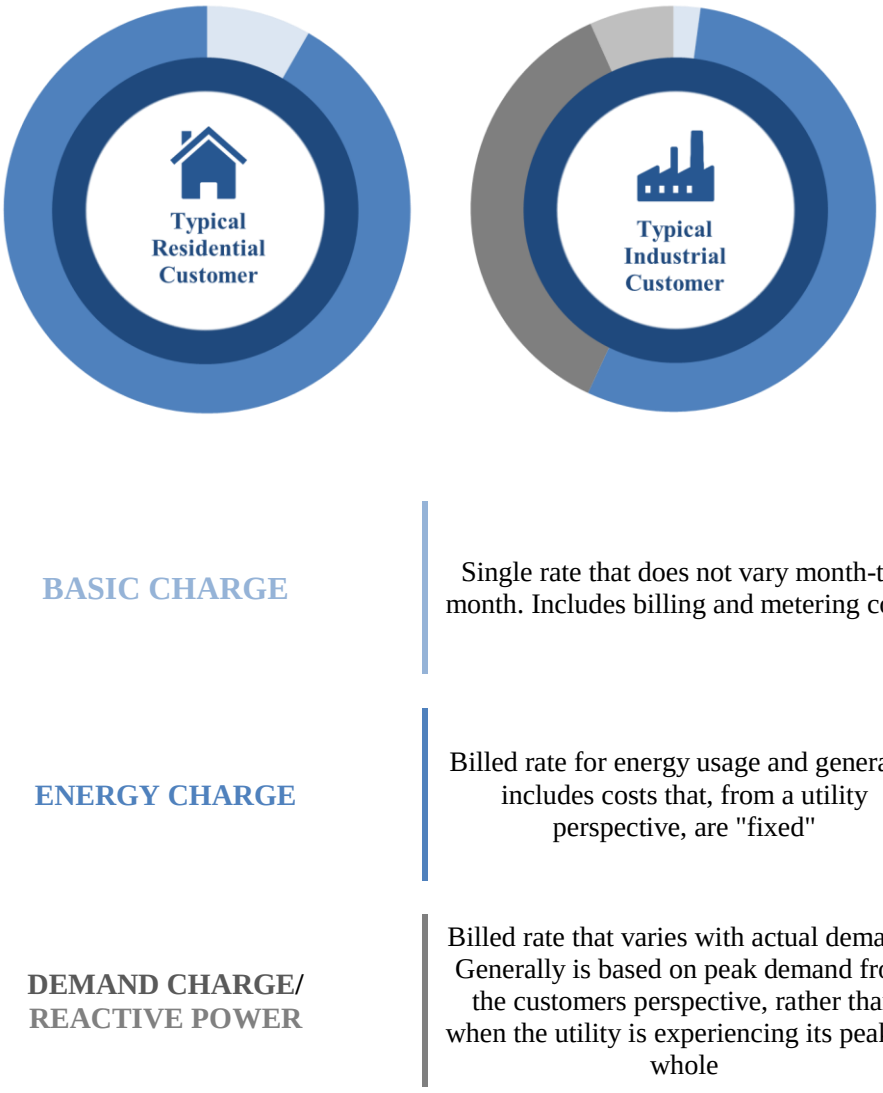
The final tier, "next generation," which answers the question what attributes of energy are consumed, is not relevant in the near term. In essence, this question looks at utilities as a pipeline through which price signals travel up and down the supply chain of electricity. Different prices for the individual attributes of electricity supply allow more efficient optimization of each individual element. An example of this is the potential savings from Volt-VAr optimization, which is a disaggregation of pricing information for the utility.[47] However, this kind of optimization requires a more mature form of grid digitization before it can be implemented. In the near-term, pricing pilots can improve the current rate structures, which are in the "basic" tier and those perform poorly at providing accurate price signals.

Q. Why do the current rate structures perform poorly at providing accurate price information?

A. Traditional rate design relies on average cost pricing, with little to no variation based on the time of use or location of consumption. The graphic below shows the few elements in a bill for a PSE customer.[48]

[47] Ball, Exh. JLB-17, Volt-VAr Optimization Benefits, at 1.
[48] Based on graphic in Ball, Exh, JLB-11, Rate Design for the Distribution Edge, RMI, at 12.

Figure 9 - Graphical Depiction of PSE Bill Elements



Each element of these bills closely relate to the level of consumption, the "how much is used" tier, rather than the advanced "when" or "where" tiers. However, even the level of consumption is poorly communicated. For example, PSE's current residential tariff charges for electricity on a per-kWh basis across two blocks of usage. All 1.01 million residential PSE customers on the same tariff pay the same price for the 601st kWh that they pay for the 10,001st kWh.

Q. Does the lack of accurate pricing information in the current rate structures also affect Commercial & Industrial (C&I) customers?

A. Yes, but it is more a question of willingness to participate. As discussed by the Rocky Mountain Institute, large customers have historically had more sophisticated billing structures.[49] When queried about requests for new pricing pilots, PSE responded:

> Puget Sound Energy ("PSE") has ongoing dialogue with its largest customers, many of whom have multiple locations throughout the utility service area and who, through those discussions, complain, comment and/or generally request pricing structures that are more reflective of the nature of the service provided to them by PSE. The concept underlying the proposed pilot in this case has been discussed with one PSE customer, in particular, for several years and would be responsive to many of the general types of comments heard from similarly situated customers served by PSE.[50]

Q. If C&I customers already have more sophisticated pricing, how can they benefit from new pricing pilots?

A. As was done in the 20th century, 21st century prices for C&I customers should align with the incentives of the utility.

> Consider that under most market structures firms are rewarded for increasing the utilization of their existing capacity. In the power sector, this means that profitability will increase as system load factors (the ratio of total consumption to maximum potential consumption, given actual peak demand) increase. As a practical matter, this is achieved through the shifting of on-peak demand to off-peak hours, when marginal costs are lower. Total system costs will be lower as well; everyone is better off. But what if on-peak demand is served by low- or non-emitting resources and off-peak demand is served by highly polluting ones? This is precisely the conundrum faced at times in places where on-peak usage may be met at the margin by natural gas and hydro-electric production, while off-peak

[49] Ball, Exh. JLB-11, Rate Design for the Distribution Edge, RMI, at 12.
[50] Ball, Exh. JLB-4, Company's responses to various data requests, at 3.

> usage variations are often served by ramping the output of coal-burning plants up and down.[51]

The pricing structures for most C&I customers have traditionally aligned with the incentive structure the utility faces. This is seen in the relevant demand charges, whereas residential customers typically only have energy based rates. Since higher load factors could drive down utility *average* costs, utilities build the demand rate to incentivize flatter load curves. This works well when utilities rely on large, baseload generating resources located miles away from the actual point of sale.[52] However grid digitization, and especially distributed energy resources, disrupt this model since they are physically closer to the actual consumption of electricity.

Q. What benefit does the combination of pricing pilots and distributed energy resources provide?

A. Recent legislation requires utilities to obtain clean energy and references DER in multiple places.[53] Pricing pilots are a hidden complement to DER, with value streams that support, rather than inhibit, each other. The table below, provided by RMI, illustrates this point. [54]

[51] Ball, Exh. JLB-9, Time-varying and Dynamic Rate Design, RAP, at 7 n. 4.
[52] *Id.*
[53] *See e.g.*, RCW 19.405.020; RCW 19.280.030(1)(h); RCW 19.280.100.
[54] Ball, Exh. JLB-11, Rate Design for the Distribution Edge, RMI, at 11.

Table 7 - Distributed Energy Resources (DERs)

Definition		Examples	Variable Output	Controllable
Efficiency	Technologies and behavioral changes that reduce the quantity of energy that a customer needs to meet all of their energy-related demands.	LED light bulbs High-efficiency appliances Building shell improvements		
Distributed generation	Small, self-contained energy sources located near the final point of energy consumption.	Solar PV Combined heat & power Small-scale wind	✓ ✓	
Distributed flexibility & storage	Technologies that allow the overall system to use energy smarter and more efficiently by storing it when supply exceed demand, and prioritizing need when demand exceeds supply.	Demand response Eclectic vehicles Thermal storage Battery storage		✓ ✓ ✓ ✓
Distributed intelligence	Technologies that combine sensory, communication, and control functions to support the electricity system and magnify the value of DER system integrations (e.g. islandable microgrids, connected thermostats, EV chargers, and water heaters).	Microgrids Home-area network & smart devices Smart inverter		✓ ✓ ✓

In short, the 20th century grid paired *controllable* generation with *variable* load. The 21sth century grid flips this paradigm and pairs *variable* generation with *controllable*

load. Pricing pilots can evaluate this paradigm for potential savings that reduce overall system costs.

Q. How can pricing pilots reduce overall system costs?

A. Pricing pilots, and by extension their application to the general ratepayer population, have the potential to significantly reduce energy consumption. For example, an international study on dynamic pricing, conducted across 163 pricing treatments in seven countries found:

> The amount of demand response increases as the peak to off-peak price ratio increases but at a diminishing rate. When coupled with enabling technologies, price responsiveness increases even more. Of course, there are many drivers of demand response besides the price ratio. The length of the peak period, number of pricing periods, climate, and appliance ownership can all affect the average customer response during the peak period. Additionally, the marketing of dynamic pricing rates has a tremendous impact on customer response, for customer awareness and education is critical to the success of time varying pricing. Finally, the section of customers into time-varying rate experiments can affect the results of these studies. Because we were unable to control for these factors in this initial analysis, there are some outliers in our dataset which require further inspection. **Even then, the surprising amount of consistency in the results shows that utilities and policymakers can be confident that dynamic pricing and time-of-use pricing will yield significant load reductions.**[55]

The authors found that "[o]ur analysis supports the case for the rollout of dynamic pricing wherever advanced metering infrastructure is in place."[56]

[55] Ball, Exh. JLB-18, International Evidence on Dynamic Pricing, at 16. (emphasis added)
[56] *Id.* at 1.

Q. How does the deployment of AMI support the need for pricing pilots?

A. The granular data about electrical consumption gathered by AMI infrastructure allows utilities to improve price signals and by extension the customer experience. At the same time, the offering of advanced pricing options is a critical component of realizing the full benefits of AMI infrastructure. For example:

> With the use of new technologies, savings can be determined in near-real time to benefit a range of stakeholders and provide a baseline consistency across applications… These efforts hold great promise for facilitating deeper energy efficiency savings through better customer engagement, program optimization, and potentially increased accuracy and certainty in savings determination.[57]

Q. Does the Commission have existing guidance on pricing pilots?

A. No. However, the Commission does have a policy statement on pricing in general:

> The Commission expects that time-of-use metering and rate designs will be examined on a case-by-case basis in rate investigations or other proceedings considering the varying circumstances of each utility and each utility's customer classes.
>
> The Commission will consider a broad range of factors when examining advanced metering and rate design proposals. The factors most pertinent to any case, and the manner in which such factors are appropriately evaluated, will depend on the specific details of proposals and may change over time with changing circumstances, loads, and technologies.[58]

In essence, the Commission has stated a preference for flexibility over hard-and-fast rules. Pricing pilots align with this preference by examining the specific characteristics of improve rate design to meet the needs of the utility's customers.

[57] Ball, Exh. JLB-19, The Status and Promise of Advanced M&V, at 27.

[58] *In re the Comm'n's Investigation of Pub. Util. Regulatory Policies Act Standards Pertaining to Smart Metering and Time of Use Rates*, Docket UE-060649, Interpretative and Policy Statement, 10, ¶¶ 32-33 (Aug. 23, 2007).

Q. Should the Commission update this guidance?

A. Yes. As I discuss in the next two sections, I recommend the Commission provide direct guidance to PSE on what needs to be included in a pricing pilot. This allows the utilities to know what the Commission expects to see in the design and evaluation of pricing pilots.

Q. Please summarize the need for pricing pilots as well as updated Commission guidance.

A. As utilities consider how they will comply with new energy laws and state policy, they will need to gain experience with the options provided by new technology. In particular, Grid Digitization will disrupt older rate structures that are out of step with 21st century principles. Without guidance, utilities will face uncertainty for future pricing proposals. This uncertainty creates regulatory risk that may have a chilling effect on examining rate design options for complying with new laws and policies. Most importantly, this guidance is needed immediately so that utilities can begin collecting information. Since pricing pilots generally need a few years to complete, it is better that PSE begin them now rather than wait until it is too late to reap the benefits.

B. The Design of Pricing Pilots

Q. What elements of design should be included in a proposal for a pricing pilot?

A. I reviewed several sources and relied on the updated principles of Bonbright to determine common design components for pricing pilots. I have summarized eight elements across three categories that I believe are critical to the design of a pricing pilot.

1. <u>GOALS:</u> What is the purpose of the pricing pilot?

a) <u>Pricing pilots should utilize Specific, Measurable, Achievable, Relevant, and Time-Bound (S.M.A.R.T.) goals.</u> This ensures that a program is clear, defined, and has identifiable results.[59]

b) <u>Pricing pilots should be both practical and understandable</u>. Developing complex pricing structures cannot be done in a vacuum; customer expectations and engagement need to be taken into account. The pricing pilot should be accessible to customers and not, by virtue of its design, present a barrier to participation in dynamic pricing.

2. <u>STRUCTURE</u>: What are the components of the pricing pilot?

a) <u>Pricing Pilots should be designed to provide a meaningful signal.</u> Ideally, all of the tiers of electricity consumption should be reflected in the pricing pilot (How much energy is used, when energy is used, where energy is used, and what is used). The pilot should clearly articulate how and why it is addressing some or all of these tiers.

b) <u>Pricing pilots should be based in cost causation.</u> Rates cannot be divorced from their legal and regulatory underpinnings. Therefore, the *starting place* for any rate should be the underlying cost drivers.

c) <u>Pricing pilots should be feasible to implement</u>. The design of a pricing pilots should not itself be a barrier to success.[60]

3. <u>ADMINISTRATION</u>: How is the pricing pilot administered?

a) <u>Pricing Pilots need to have Internal Validity</u>. The pricing pilot, as a sample of the broader ratepayer population, must have statistically valid

[59] Ball, Exh. JLB-9, Time-varying and Dynamic Rate Design, RAP, at 40-41. Staff introduces S.M.A.R.T. goals here as an addition to RAP's recommendations to guide the creation of "ratemaking objectives."

[60] Ball, Exh. JLB-10, Experiences from Consumer Behavior Studies on Engaging Customers, DOE, at 35-36.

roots. Clear program design with transparency in assumptions will help the utility, regulator, and customer make better choices.[61]

b) The pricing pilot should have consistent and regular reporting. Communication between regulators, stakeholders, and the utility is critical to ensuring a successful pricing pilot.[62]

c) The pricing pilot should prioritize customer engagement and communication. A successful program will engage and communicate information to consumers in an effective manner so as to improve the overall experience.[63]

C. The Evaluation of Pricing Pilots

Q. How should a pricing pilot be evaluated?

A. I reviewed several sources to develop general evaluation protocols. This is not meant to be an exhaustive list but instead should serve as a minimum guide reviewing a pricing pilot. The Commission should review any pilot for:

1. STUDY FINDINGS

a) A clear summary of findings and recommendations going forward especially in relation to S.M.A.R.T. goals.
b) Communications with study participants and specific suggestions for improvement.
c) Generalization of findings and their applicability to broader ratepayer population, including the amount and degree of participation required for a cost-effective program.[64]

[61] *Wash. Utils. & Transp. Comm'n v. Puget Sound Energy*, Dockets UE-011570 & UG-011571, Twelfth Supplemental Order, 16, ¶¶ 33-34 (June 20, 2002) (2001 TOU Order). Ball, Exh. JLB-20, Experiences of Vulnerable Customers, Lawrence Berkeley National Laboratory, at 65.
[62] 2001 TOU Order at 16, ¶¶ 33-34.
[63] Ball, Exh. JLB-10, Experiences from Consumer Behavior Studies on Engaging Customers, DOE, at 35.
[64] 2001 TOU Order UE-011570 at 16, ¶ 34

d) Measurement of effect on vulnerable populations and recommended mitigation strategies.[65]

2. <u>DEVELOPMENT AND ADMINISTRATION OF STUDY</u>

a) Discussion of any type of assumptions made in the design, application, or analysis of pricing pilots.[66]
b) Overview of data collection needs and methods.[67]
c) Discussion of education and outreach efforts with customers including:[68]
    a. Education efforts, with particular focus on those designed to increase customer acceptance and retention, engagement, satisfaction, and knowledge of rates.[69]
    b. Delivery channels.
    c. Customer reception to information, their overall feedback, and their suggestions for improvements.[70]
    d. Engagement specific to vulnerable populations.
d) Refinements or other changes made to the study and program during its operation.

3. <u>PROGRAM COSTS AND BENEFITS</u>

a) Statistical review of costs and benefits to customers in comparison to a control group or other statistically valid sample of behavior from customers with default electricity rates. This should include: [71]
    a. Distribution of bill impacts associated with pilot rates for various customer segments.
    b. How load impacts vary by rate period and selected customer segments.
    c. How load impacts vary by different areas, such as climate or rural/non-rural boundaries.
    d. Review of vulnerable customers in relation to other customer groups and the distribution of bill impacts.[72]
b) Summary of costs and benefits to the utility in comparison to an appropriate baseline, such as the most recent Integrated Resource Plan, including:

[65] Ball, Exh. JLB-20, Experiences of Vulnerable Customers, Lawrence Berkeley National Laboratory, at 90.
[66] 2001 TOU Order at ¶ 34.
[67] *Id.*
[68] Ball, Exh. JLB-21, Nexant Report on TOU Pricing Opt-In Pilot Plan, at 11.
[69] *Id.* at 83.
[70] Ball, Exh. JLB-10, Experiences from Consumer Behavior Studies on Engaging Customers, DOE, at 34.
[71] Ball, Exh. JLB-21, Nexant Report on TOU Pricing Opt-In Pilot Plan, at 80-81.
[72] Ball, Exh. JLB-20, Experiences of Vulnerable Customers, Lawrence Berkeley National Laboratory, at 63.

a. The costs and benefits of the program to the utility.
b. Pricing pilot software and/or physical integration requirements and costs.[73]
c. Existing capabilities of required operating systems, limitations, and potential barriers to expansion.[74]
d. Effects, if any, on long-term planning requirements.

c) Overall effects on peak and energy consumption including:
   a. Methods for measurement and verification of energy savings and reduction in peak usage.[75]

d) Summary of Regional benefits of program, including quantifiable factors such as reductions to GHG's, air benefits, etc.[76]

e) Customer acceptance/complaints, and satisfaction with program participation.[77]

4. <u>PROGRAM RISKS</u>

a) Sensitivity of program outcomes to periods of wholesale price stability or instability.[78]

b) Summary of relationships with vendors directly or indirectly related to program and any risks from their software on the operations of the general program.[79]

c) Customer outreach and engagement associated with a broader default participation rate, such as availability of call centers.[80]

d) Privacy implications from customer participation and methods to ensure security of consumer information.

Q. Over what timeline do you recommend evaluating a pricing pilot?

A. I recommend that utilities provide the Commission with annual updates on the pricing pilots. Utilities should also present the full evaluation, including all the

[73] Ball, Exh. JLB-10, Experiences from Consumer Behavior Studies on Engaging Customers, DOE, at 17-18.
[74] *Id.*
[75] *"For example, how does more-timely continuous savings feedback impact savings realization and customer experience? What types of facilities and measures do M&V 2.0 tools work well for, and where is additional human expertise required? What are the tradeoffs between time, cost, and accuracy?"* Ball, Exh. JLB-19, The Status and Promise of Advanced M&V, at 24.
[76] 2001 TOU Order UE-011570 at ¶ 34.
[77] Ball, Exh. JLB-10, Experiences from Consumer Behavior Studies on Engaging Customers, DOE, at 25-29.
[78] 2001 TOU Order UE-011570 at ¶ 34.
[79] Ball, Exh. JLB-10, Experiences from Consumer Behavior Studies on Engaging Customers, DOE, at 35.
[80] *Id.* at 28

criteria above, to the Commission upon completion of the pilots. I also believe the Commission should express a preference for pricing pilots that last no more than three years. This should provide an adequate amount of time to collect data on the effects of dynamic rate structures.

D. PSE's Proposed Demand Aggregation Pilot

Q. Please describe the Company's proposed Demand Aggregation Pilot Program.

A. The Company's proposal unbundles power cost in the demand rate for large customers served at multiple locations. This is accomplished through three steps:

1. Demand is determined across all locations where a particular customer receives service.
2. Demand at all locations measured at the time of the system peak, called Coincident Peak (CP) Demand, is billed at a rate that includes power generation and transmission costs only.
3. Demand for all locations measured individually at the time of maximum usage, called Non-Coincident Peak (NCP) Demand, is billed at a rate that includes all other costs, such as distribution facilities.

The Company proposes that the pricing pilot begin January 1, 2021.

Q. What is Staff's recommendation regarding the Company's proposed Demand Aggregation Pilot Program?

A. I recommend the Company file a revised proposal that incorporates Staff's proposed design and evaluation elements. Staff supports in concept the Company's proposal to unbundle demand for customers served at various locations. This type of demand charge is a clear application of cost causation and from within the "intermediate" tier of energy consumption. Further, this proposal fits well with the 21st century version of Bonbright's principles. For instance, the Company discussed that larger customers "consider themselves one customer of PSE, not many."[81] In essence, these customers want a cleaner *customer experience*.

Q. Does the design of the Company's proposed Demand Aggregation Pilot fit with the design requirements you proposed earlier?

A. It is difficult to say. While the Company certainly characterizes this as a pricing pilot, PSE's direct testimony and responses to data requests seem to indicate that the Demand Aggregation Pilot is simply an update to certain aspects of rate design. For instance, there is no limit on the participation of customers that are involved in the electrification of transportation.[82]

PSE's design seems to suffer from unclear goals: Who is the target audience? What is the pricing pilot trying to measure? What will benefits will be measured against? How will customer education and outreach be conducted? The answers to these question are all unclear. The Company cites several hypothetical reasons for

[81] Pilaris, Exh. JAP-1T at 31:13-14.
[82] There are, however, limits for other customers including a maximum participation rate. *See* Pilaris, Exh. JAP-1T at 33:11-35:6.

Demand Aggregation Pricing, such as removing demand barriers to electrification of vehicle. However, when queried for more information, the Company simply cited their testimony.[83]

Further, when queried about how many customers would participate, the Company responded that the answers to these questions are currently unclear.[84] This makes judging the pricing pilot, and measuring its practicality, relationship to cost-causation, or level of internal validity uncertain.

Q. Is the Company's proposed evaluation of the Demand Aggregation Pilot sufficient to meet the evaluation you proposed earlier?

A. No. The Company makes little to no mention of how it will evaluate the program, how the goals of the program will determine its success, or the proposed process for reviewing the pricing pilot. When queried, the Company responded that:

> PSE would further note that it is proposing this program as a pilot and, as such, this could potentially include a review of how this pricing structure helps increase electric vehicle adoption.[85]

This is another example of how the Company's proposal has failed to establish S.M.A.R.T. goals or how it will evaluate them. Without these goals, the company and the Commission will have difficulty judging the program objectively.

E. Staff's Proposal to Develop Additional Pricing Pilots

[83] Ball, Exh. JBL-4, Company's responses to various data requests at 4.
[84] *Id.* at 5.
[85] *Id.* at 6.

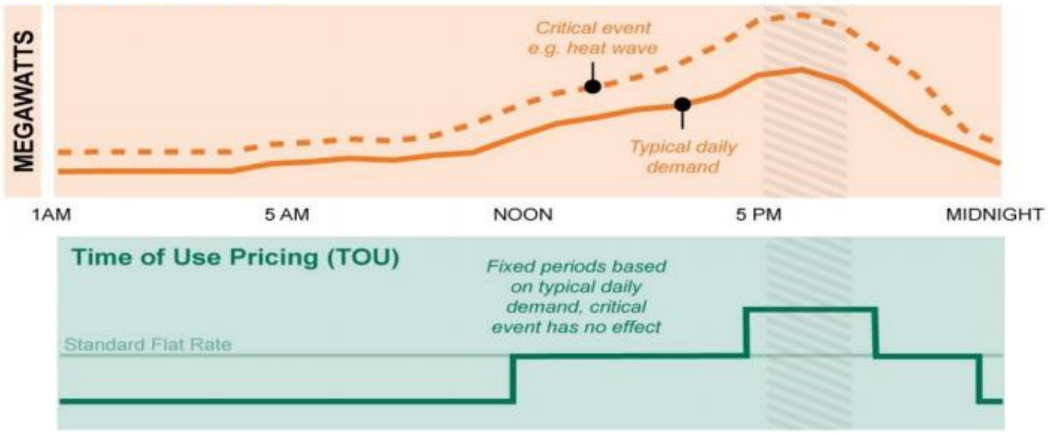
Q. Does you have any additional recommendations regarding pricing pilots for PSE?

A. Yes. I recommend that the Commission require PSE to prepare pricing pilots for both an electric time-of-use rate and an electric critical-peak-pricing rate. I also recommend that the Commission direct PSE to engage with local resources, such as PNNL, to evaluate the potential for a real-time pricing pilot.

Q. What is a time-of-use (TOU) rate?

A. A TOU rate is a structured price that is pre-determined but changes during set periods. These periods can include seasons, months, weeks, days, or hours. Generally, TOU rates are designed to encourage customers to shift electricity usage away from peak periods. Ideally, TOU rates have a ratio between peak and non-peak rates of at least 2:1.[86] The graphic below illustrates how TOU pricing works.[87]

Figure 10 - Graphical Depiction of Time-of-Use Rates



[86] Ball, Exh. JLB-18, International Evidence on Dynamic Pricing, at 7.
[87] Ball, Exh. JLB-22, A Primer on Time-Variant Electricity Pricing, EDF, at 10.

Q. What is a Critical-Peak Pricing (CPP) rate?

A. A CPP has a structured base rate as well as a large "surge" price during critical pricing events. Before such an event, usually somewhere between a day and an hour, the utility provides CPP participants a warning about the upcoming pricing period. During the event period, the "surge" price is added to energy usage. This is designed to significantly reduce usage during the peak period. Ratios between "surge" prices and base rates can be as large as 20:1.[88] The graphic below illustrates how CPP pricing works.[89]

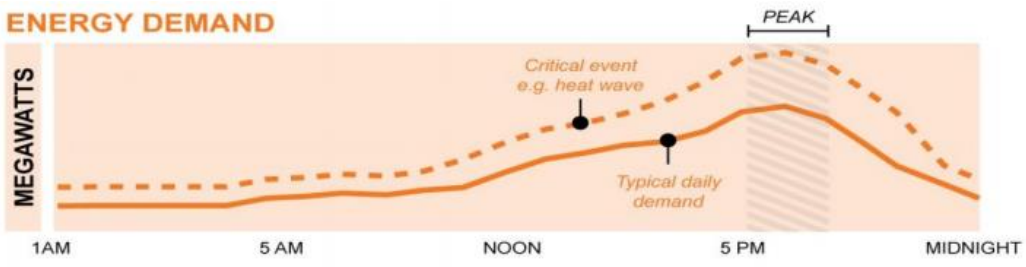
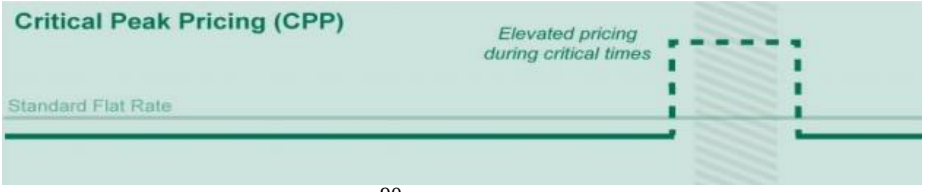


Figure 11 - Graphical Depiction of Critical Peak Pricing

Q. Why is Staff recommending that the Company begin <u>both</u> a TOU and CPP pricing pilot?

A. Rate structures should reflect the reality of customer behavior: customers value price signals when consuming electricity.[90] TOU and CPP pricing pilots can gauge the amount of responsiveness that actual customers in PSE's service territory will have



[88] Ball, Exh. JLB-18, International Evidence on Dynamic Pricing, at 7.
[89] Ball, Exh. JLB-22, A Primer on Time-Variant Electricity Pricing, EDF, at 10.
[90] *See generally* Ball, Exh. JLB-11, Rate Design for the Distribution Edge, RMI.

to various, time based, price signals. Unfortunately, the current rate design recognizes only the "basic" tier of energy consumption and largely ignores the "intermediate" and "advanced" tiers.

Q. How can Customers be empowered to respond to price signals?

A. Customer education about the intersection between energy usage and price is a critical conversation. Unfortunately, because few customers would be able to say with any accuracy how much energy each electric device in their household consumes, they are unable to apply a optimize decisions to engage in the use of electricity (e.g. turning on a light, leaving on a computer, increasing the temperature of a water heater, etc.). Consequently, it isn't until after the billing period is over that a customer knows which level of pricing they were paying for the additional kilowatt-hours.

Q. How does providing TOU and CPP pricing pilots meet the needs of evolving customer expectations?

A. As virtual software and services become increasingly incorporated in the physical world, the options for customers to fine-tune and control electricity consumption will continue to expand. As RMI puts it:

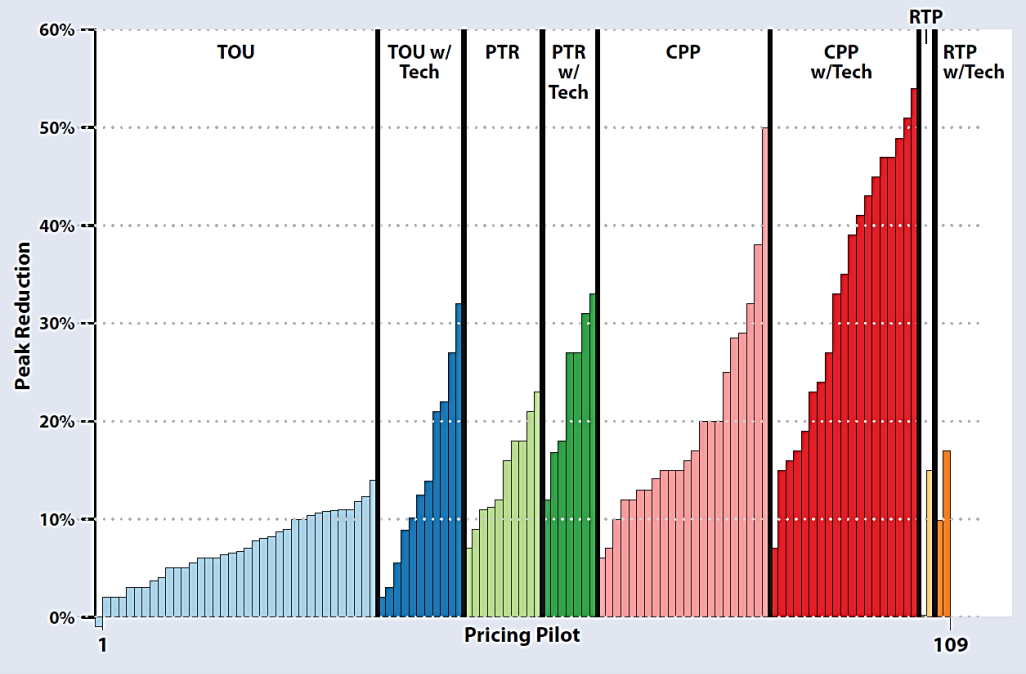
> Customers will respond to these new price signals by shifting their load profile to take advantage of periods of low-cost grid service while making more targeted investments in DERs that can provide greater value to the grid. This combination of price signals beneficially shifting load (such as through home pre-cooling, water heater cycling, and strategic electric vehicle charging) and more optimally directing DER investment can reduce the need for rarely

utilized peaking generation units, reduce system congestion, and defer distribution upgrades. To achieve this vision, regulators need to establish processes to lead stakeholders through the transition from today to tomorrow.[91]

Q. What are the expected benefits of a TOU and CPP pricing pilot?

A. The Regulatory Assistance Project did a review of Time-Varying and Dynamic Rate Design across 109 different pilots:[92]

Figure 12 - Average Peak Reduction from Time-Varying Rate Pilots



As this study illustrates, all but one of the pricing pilots resulted in peak reductions. CPP in particular resulted in significant peak reductions, with two reducing peak consumption by over 50 percent.

[91] Ball, Exh. JLB-11, Rate Design for the Distribution Edge, RMI, at 18.
[92] Ball, Exh. JLB-9, Time-varying and Dynamic Rate Design, RAP, at 30.

Further, both Washington State policy and industry literature points towards a distributed energy future. All utilities, including PSE, should be exploring multiple pathways to support the State's energy goals. This is especially true if that pricing can result in significant reductions in peak usage.

Finally, State policy also supports electric vehicle transportation. As the Company acknowledges there is a need for "an array of approaches" that "will ultimately be necessary to fully support the state's policy objectives for promoting transportation electrification."[93] TOU and CPP pricing pilots may help alleviate some of the demand charge problem that electric vehicle charging infrastructure is facing.[94]

Q. Are other utilities in the Northwest engaging in these types of Pilots?

A. Yes. Portland General Electric began offering Flex 1.0 in 2015, which included a variant on CPP called Peak Time Rebate. In early 2019, the Oregon Commission approved a permanent version of the program going forward.[95] Seattle City Light is also planning to offer several pricing pilots, including a residential time-of-use pilot and industrial demand response pilot.[96] Across the country, multiple utilities have engaged in pricing pilots to determine the impact and value of different price structures.[97]

[93] Ball, Exh. JLB-4, Company's responses to various data requests, at 7.
[94] Ball, Exh. JLB-23, EVGO Fleet and Tariff Analysis, RMI, at 5.
[95] Ball, Exh. JLB-24, Oregon Commission Acknowledgement of PGE Pilot, at 1.
[96] Ball, Exh. JLB-25, Memo to Mayor's Office from Seattle City Light, at 1-2.
[97] Ball, Exh. JLB-26, Advancing the Practice of Rate Design, at 7.

Q. Does PSE support a proposed CPP Pilot program?

A. PSE has stated that they are "open to exploring the possibility of a pilot program."[98]

Q. Do you have any other recommendations?

A. Yes. First, the Commission should require PSE to explore more advanced forms of pricing structures. In 2006 – 2007, the Pacific Northwest National Laboratory ran a very successful demonstration project to "create and observe a futuristic energy-pricing."[99] The project illustrated several benefits that real-time market based pricing can produce. Given that this project is now over 10-years old, I recommend PSE work with PNNL to evaluate whether an additional pilot is warranted and what it could accomplish.

Second, I recommend the Commission entertain future accounting petitions for costs associated with setting up and administering these programs. As discussed by Staff witness Aimee Higby, the Commission generally grants accounting petitions based on extraordinary circumstances.[100] As I discuss in Part A above, broad changes in the utility industry are driving the need for pricing pilots. These changes, I believe, constitute circumstances that may merit extraordinary rate treatment. Further, I believe it is necessary to remove any financial barrier a Company may have to engaging in pricing pilots.

[98] Ball, Exh. JLB-4, Company's responses to various data requests, at 8.
[99] Ball, Exh. JLB-27, PNNL Olympic Peninsula Project, at 7.
[100] Higby, Exh. ANH-1T at 28:15-18.

Q. Please summarize your recommendations regarding pricing pilots for PSE.

A. I recommend the Commission direct PSE to: 1) file a revised proposal for an electric Demand Aggregation Pilot Program, 2) prepare pricing pilots for both electric TOU and CPP rates, and 3) engage with local resources, such as PNNL, to evaluate the potential for a real-time pricing pilot. I also recommend the Commission entertain deferred accounting treatment for expenses associated with developing and administering these programs.

These recommendations in total address the current issue facing customers: they do not know what their usage or associated bill will be at the "point of sale"—i.e., when they make a decision to use electricity or not. Thus, the impact of any price signal will be muted since it is disconnected, in real time, between the decision to consume electricity and the actual consumption of electricity. In general, this leads to an oversimplified rate structure and, counterintuitively, a complicated customer experience. Staff's recommendation will allow PSE to address this issue, explore pathways to complying with new energy laws, and meet evolving customer expectations.

Without guidance from the Commission on the design and evaluation of pricing pilots, utilities will face uncertainty when proposing dynamic pricing structures. Such uncertainty creates regulatory risk that may prevent innovative rate designs from being offered to customers. Staff recommends the Commission give direct guidance to PSE so that they can immediately begin developing and offering pricing pilots.

Q. Does this conclude your testimony?

A. Yes.