

**EXH. LIM-3T  
DOCKETS UE-190529/UG-190530  
UE-190274/UG-190275  
2019 PSE GENERAL RATE CASE  
WITNESS: LORIN I. MOLANDER**

**BEFORE THE  
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

**WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,**

**Complainant,**

**v.**

**PUGET SOUND ENERGY,**

**Respondent.**

**Docket UE-190529  
Docket 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 IT/Technology Investment**

**Docket UE-190274  
Docket UG-190275 (*Consolidated*)**

**PREFILED REBUTTAL TESTIMONY (NONCONFIDENTIAL) OF**

**LORIN I. MOLANDER**

**ON BEHALF OF PUGET SOUND ENERGY**

**JANUARY 15, 2020**

**PUGET SOUND ENERGY**

**PREFILED REBUTTAL TESTIMONY (NONCONFIDENTIAL) OF  
LORIN I. MOLANDER**

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1 **PUGET SOUND ENERGY**

2 **PREFILED REBUTTAL TESTIMONY (NONCONFIDENTIAL) OF**  
3 **LORIN I. MOLANDER**  
4

5 **I. INTRODUCTION**

6 **Q. Are you the same Lorin I. Molander who submitted prefiled direct testimony**  
7 **on June 20, 2019, on behalf of Puget Sound Energy (“PSE” or “the**  
8 **Company”) in this proceeding?**

9 A. Yes. I submitted my prefiled direct testimony regarding electric and gas sales  
10 temperature normalization, Exh. LIM-1T, and an attachment for my professional  
11 qualifications, Exh. LIM-2.

12 **Q. What is the purpose of your rebuttal testimony?**

13 A. My rebuttal testimony serves to respond to the recommendations made by WUTC  
14 Staff witness, Jing Liu, in her prefiled response testimony regarding the  
15 temperature normalization of electric and gas sales and revenues.<sup>1</sup> I also respond  
16 to Ms. Liu’s concerns about the electric Schedule 29 model and the Company’s  
17 use of two separate gas sales reports.

18 **Q. Please summarize your testimony.**

19 A. My testimony concludes the following:

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<sup>1</sup>Liu, Exh. JL-1CT at 10-29.

- 1 • PSE accepts WUTC Staff’s recommendation regarding the approach to  
2 calculate the temperature adjustment for electric and gas using the results  
3 of the rate schedule-level models and not reconciling to the system-level  
4 model;
- 5 • PSE accepts WUTC Staff’s recommendation that electric rate Schedule 29  
6 not be included in the temperature adjustment, and
- 7 • WUTC Staff’s concern about the Company’s use of two separate gas  
8 reports does not affect the amount of temperature adjustment.

9 **II. TEMPERATURE ADJUSTMENT METHODOLOGY:**  
10 **TWO-MODEL VERSUS ONE-MODEL APPROACH**

11 **Q. What is the major difference between the electric and gas modeling and**  
12 **temperature adjustment process followed by you and the process proposed**  
13 **by Ms. Liu?**

14 A. To calculate the electric and gas temperature adjustments, the Company uses a  
15 two-model approach, meaning there is both a system-level model and a set of rate  
16 schedule-level models. The system-level model results determine the overall  
17 temperature adjustment, which is then allocated among the rate schedules in  
18 proportion to the temperature adjustment estimated for each rate schedule. The  
19 same general process is followed for both gas and electric, with a difference that  
20 electric rate schedule models use daily energy consumption data and the gas rate  
21 schedule models are based on monthly data.

22 In contrast to the Company’s approach, Ms. Liu prefers to omit the last step of  
23 reconciling the rate schedule model results to the system results, and she  
24 recommends using schedule-level modeling results alone to estimate the  
25 temperature adjustment by rate schedule.

1 **Q. What was the original purpose of the two-model approach?**

2 A. When the current two-step model approach that utilizes daily electric rate  
3 schedule data was developed (in the mid-2000s), daily energy usage data for  
4 electric rate schedule modeling had just become available with the completion of  
5 the installation of the Company's Automated Meter Reading (AMR) system.  
6 PSE did not have much, if any, experience using the daily rate schedule data for  
7 analytical purposes. The two-model approach allowed the Company to use the  
8 certainty of the system-level daily data while gaining experience with the daily  
9 rate schedule electric energy consumption data and modeling. For consistency, a  
10 similar methodology was used for gas, but the rate schedule-level gas data  
11 remained at a monthly level because there was no daily gas therm consumption  
12 data available at the rate schedule level.

13 **Q. What kind of experience has PSE gained over the years with the**  
14 **implementation of the daily rate schedule modeling?**

15 A. As the Company gained more experience working with the daily rate schedule  
16 data, techniques and tools have evolved. For example, the Company has  
17 implemented rigorous data verification processes to ensure data are properly  
18 prepared for analysis and erroneous data are excluded. Data processing tools  
19 have evolved to handle larger sample sizes. The models have been annually  
20 updated to re-estimate the relationship of energy consumption to temperature, and  
21 they remain robust year after year through various economic environments and  
22 variations of weather observed. In light of PSE's experience in working with the

1 data and these models, the timing is appropriate to re-evaluate the two-model  
2 approach.

3 **Q. Are the rate schedule models as good as the system models, and do the**  
4 **models at the rate schedule level explain usage variation due to weather as**  
5 **well as the system-level models?**

6 A. Yes. Model fit statistics show that most rate schedule models explain variation in  
7 energy consumption due to weather almost as well as the system model, and in  
8 some cases as well or better than the system model. As Ms. Liu states in her  
9 testimony, “Adjusted R-squared is an accepted, common statistic that is used to  
10 evaluate how well a model fits its data. A high adjusted R-squared would indicate  
11 a strong correlation between usage and temperature.”<sup>2</sup> As shown in Table 1,  
12 below, the electric system model has an adjusted R-squared of 0.97, which  
13 indicates that temperature variation explains 97 percent of the usage variation.  
14 The electric rate schedule models have adjusted R-squared statistics ranging from  
15 0.83 to 0.98, except for Schedule 29 – Irrigation, which has a much lower  
16 adjusted R-squared of 0.45. I will address Schedule 29 later in my testimony.

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<sup>2</sup> Liu, Exh. JL-1CT at 22:11-13.

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**Table 1 - Electric Rate Schedule Model Fit**

<b>Model</b>	<b>Adjusted R-squared</b>
<b>System</b>	<b>0.97</b>
Schedule 5	0.98
Schedule 7	0.97
Schedule 8	0.83
Schedule 10	0.93
Schedule 11	0.96
Schedule 12	0.92
Schedule 24	0.89
Schedule 25	0.95
Schedule 26	0.93
Schedule 29	0.45
Schedule 31	0.93
Schedule 40	0.94
Schedule 43	0.91

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**Q. Do the gas rate schedule models explain variation in gas usage due to temperature as well as the electric rate schedule models?**

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A. Yes. Gas rate schedule models also have good adjusted R-squared statistics. For gas, the rate schedule model results are reconciled to their respective firm, interruptible, and transportation total model results. For the firm gas volumes, the adjusted R-squared for the total firm model is 0.99, and the rate schedule models also have very good adjusted R-squared statistics ranging from 0.93 to 0.99. The models for total interruptible and total transportation do not have as good of a fit as the individual rate schedule-level models within those service classes, although the adjusted R-squared statistics are still quite acceptable, at 0.92 and 0.88, respectively. Table 2, below, illustrates the adjusted R-squared statistics.

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**Table 2 - Gas Rate Schedule Model Fit**

<b>Model</b>	<b>Adjusted R-squared</b>
<b>Firm</b>	<b>0.99</b>
Schedule 23 Residential	0.99
Schedule 31 Commercial	0.99
Schedule 41 Commercial	0.97
Schedule 31 Industrial	0.99
Schedule 41 Industrial	0.93
<b>Interruptible</b>	<b>0.92</b>
Schedule 85 Commercial	0.97
Schedule 86 Commercial	0.99
Schedule 87 Commercial	0.97
<b>Transportation</b>	<b>0.88</b>
Schedule 41T Commercial	0.94
Schedule 85T Commercial	0.93
Schedule 87T Commercial	0.98
Schedule 99 Special Contracts	0.98

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**Q. Are there benefits to using a one-model approach?**

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A. Yes, there are some significant benefits to using the one-model approach that WUTC Staff proposes. A one-model approach is simpler to implement and to interpret. Omitting the step of reconciling the rate schedule results to the system model reduces the steps necessary to produce the temperature normalized load adjustment. Given its simplicity, the results are more straightforward to interpret.

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1 **Q. Does PSE accept WUTC Staff's approach to calculating the total electric**  
2 **weather adjustment using only the rate schedule models, without reconciling**  
3 **to the electric system adjustment?**

4 A. For the electric temperature adjustment, given the goodness-of-fit of the rate  
5 schedule-level models and the benefits of the one-model approach, PSE is willing  
6 to accept the one-model approach in this proceeding, using the rate schedule  
7 models only, as outlined by WUTC Staff.<sup>3</sup> PSE will continue to look for  
8 improvements to this calculation for future filings.

9 **Q. Does PSE also accept WUTC Staff's approach to calculating the total gas**  
10 **weather adjustment using only the rate schedule models, without reconciling**  
11 **to the gas system adjustment?**

12 A. Yes. As with electric, PSE is willing to accept the one-model approach outlined  
13 by WUTC Staff for the gas temperature adjustment for purposes of this  
14 proceeding.<sup>4</sup> PSE will continue to look for improvements to this calculation for  
15 future filings.

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<sup>3</sup> Liu, Exh. JL-1CT at 25:3-6.

<sup>4</sup> *Id.* at 29:5-8.



1 recommendation that electric rate Schedule 29 should not be included in the  
2 temperature adjustment.<sup>5</sup>

3 **IV. SOURCE OF GAS SALES VOLUME DATA**

4 **Q. Does Ms. Lui have other concerns regarding gas temperature normalization?**

5 A. Yes. Ms. Liu presented concerns regarding two different sources of gas sales  
6 datasets used by PSE for different purposes and argues only one source should be  
7 used for all purposes. PSE sales data (SAP unbilled sales report), is the  
8 accounting report that includes billed sales and an estimate of unbilled sales to  
9 derive the month's energy consumption. A separate report (SAP Business  
10 Warehouse report ("BW")), also based on SAP billing data, produces an estimate  
11 of calendar month gas usage, but by using a different approach. Rather than using  
12 an accounting estimate of unbilled sales to determine calendar month usage, the  
13 BW report estimates calendar month usage by prorating the billing cycle sales on  
14 the basis of how many days in each billing cycle fall under the current month and  
15 sums the prorated volumes for all of the billing cycles. The concern is that the  
16 two different reports have slightly different estimates of calendar month usage.  
17 The total sales from the BW report are 0.2 percent lower than the total sales  
18 reported by the SAP unbilled sales report.

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<sup>5</sup> Liu, Exh. JL-1CT at 25:3-6.

