Exh. DJR-5
Dockets UE-220066 and UG-220067, UG-210918
Witness: Deborah J. Reynolds

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**DOCKETS UE-220066, UG-220067, UG-210918 (consolidated)**
In the Matter of the Petition of **PUGET SOUND ENERGY** **For an Order Authorizing Deferred Accounting Treatment for Puget Sound Energy's Share of Costs Associated with the Tacoma LNG Facility**	

EXHIBIT TO TESTIMONY OF

DEBORAH J. REYNOLDS

STAFF OF WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

PSE Response to UTC Staff Data Request No. 295

July 28, 2022

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

Dockets UE-220066 & UG-220067
Puget Sound Energy
2022 General Rate Case

UTC STAFF DATA REQUEST NO. 295:
Re: CEIP (Clean Energy Implementation Plan)
REQUESTED BY: Kathi Scanlan

Please reference Exh. JJJ-1T, traditional optimization practices, at page 19 of 58, and (i) list all software models and/or vendor(s) relied on to determine lowest reasonable cost portfolio(s), considering risk, and resources specified in the IRP, and (ii) explain how each model is used by PSE decision-makers to determine the preferred portfolio, required by WAC 480-100-620(11), and clean energy action plan, required by WAC 480-100-620(12).

Response:

i) Puget Sound Energy ("PSE") uses three models for electric integrated resource planning: AURORA, PLEXOS and the Resource Adequacy Model ("RAM"). AURORA is used in several ways:

1. to analyze the Western power market to produce hourly electricity price forecasts of potential future market conditions and resource dispatch;

2. to create optimal portfolios and test these portfolios to evaluate PSE's long-term revenue requirements for the incremental portfolio and the risk of each portfolio; and

3. in the stochastic analysis, the model is used to create simulations and distributions for different variables.

PLEXOS estimates the cost savings due to sub-hour operation for new generic resources. PSE's probabilistic RAM enables PSE to assess the following:

1. to quantify physical supply risks as PSE's portfolio of loads and resources evolves over time;

2. to establish peak load planning standards, which in turn leads to the determination of PSE's capacity planning margin; and

3. to quantify the peak capacity contribution of a renewable and energy-limited resource (its effective load carrying capacity, or "ELCC").

The peak planning margin and ELCCs are inputs into PSE's portfolio expansion model. A full description of RAM is in Chapter 7 of the 2021 Integrated Resource Plan (IRP).

Figure 1 below demonstrates how the models are connected. The following steps are used to get to the least-cost portfolio for each of the scenarios and sensitivities.

1. Create Mid-C power prices in AURORA for each of the five electric price scenarios.

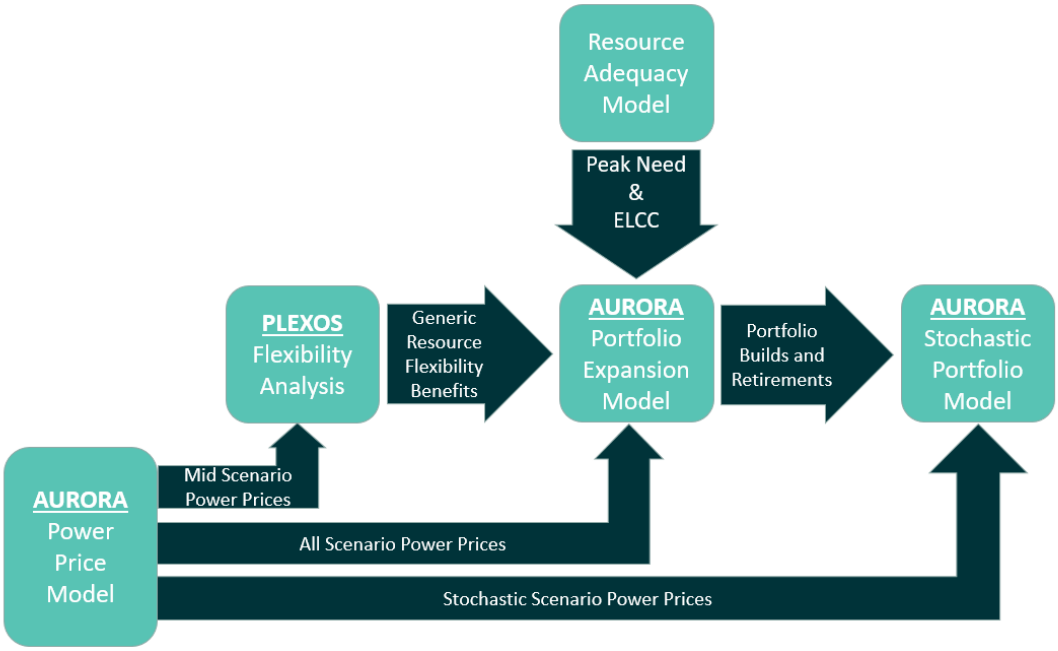
2. Using the Mid Scenario Mid-C prices from AURORA, run the flexibility analysis in PLEXOS to find the flexibility benefit for each of the generic supply-side resources.

3. Run RAM to find the peak capacity need and ELCCs.

4. Using the electric price forecast, peak capacity need, ELCC and flexibility benefit, run the portfolio optimization model for new portfolio builds and retirements for each of the 37 different scenario and sensitivity portfolios.

5. Develop stochastic variables around power prices, gas prices, hydro generation, wind generation, PSE loads and thermal plant forced outages.

Figure 1: Electric Analysis Methodology



A full description of the Aurora Plexos model are located in the 2021 IRP, Appendix G.

A full description of the Resource Adequacy model is located in the 2021 IRP, Chapter 7, and the Resource Adequacy primer submitted under Docket UE-210220.

ii) The preferred portfolio and the clean energy action plan is the outcome of robust IRP analyses developed with stakeholder input. To support the portfolio analysis to arrive at the preferred portfolio, three distinct types of analysis are used. Deterministic portfolio analysis solves for the least cost solution and assumes perfect foresight about the future. The stochastic analysis assesses the risk of potential future changes in hydro or wind conditions, electric and natural gas prices, load forecasts and plant forced outages. The Customer Benefit Analysis incorporates the equitable distribution of burdens and benefits into the resource planning process. All three of these analytical methods are used to identify and evaluate the preferred portfolio and the clean energy action plan.

A full discussion of the resource plan decisions is located in the 2021 IRP, Chapter 3.