CONFIDENTIAL PER WAC 480-07-160

Exh. RJM-5C
Docket UE-25____
Witness: Ramon J. Mitchell

BEFORE THE WASHINGTON

UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PACIFICORP dba PACIFIC POWER & LIGHT COMPANY Respondent.	Docket UE-25_____

PACIFICORP

REDACTED EXHIBIT OF RAMON J. MITCHELL

2020 Benchmark Report

April 2025

PACIFIC POWER
A DIVISION OF PACIFICORP

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Results of the 2020 Aurora Benchmarking Study

The results of the benchmarking study show that Aurora simulated 2020 historical net power costs (NPC) at $58.7 million less than actual NPC. Aurora estimated total company 2020 NPC to be $1,453 million compared to actual 2020 costs of $1,511 million, an under-forecast of 3.9 percent.

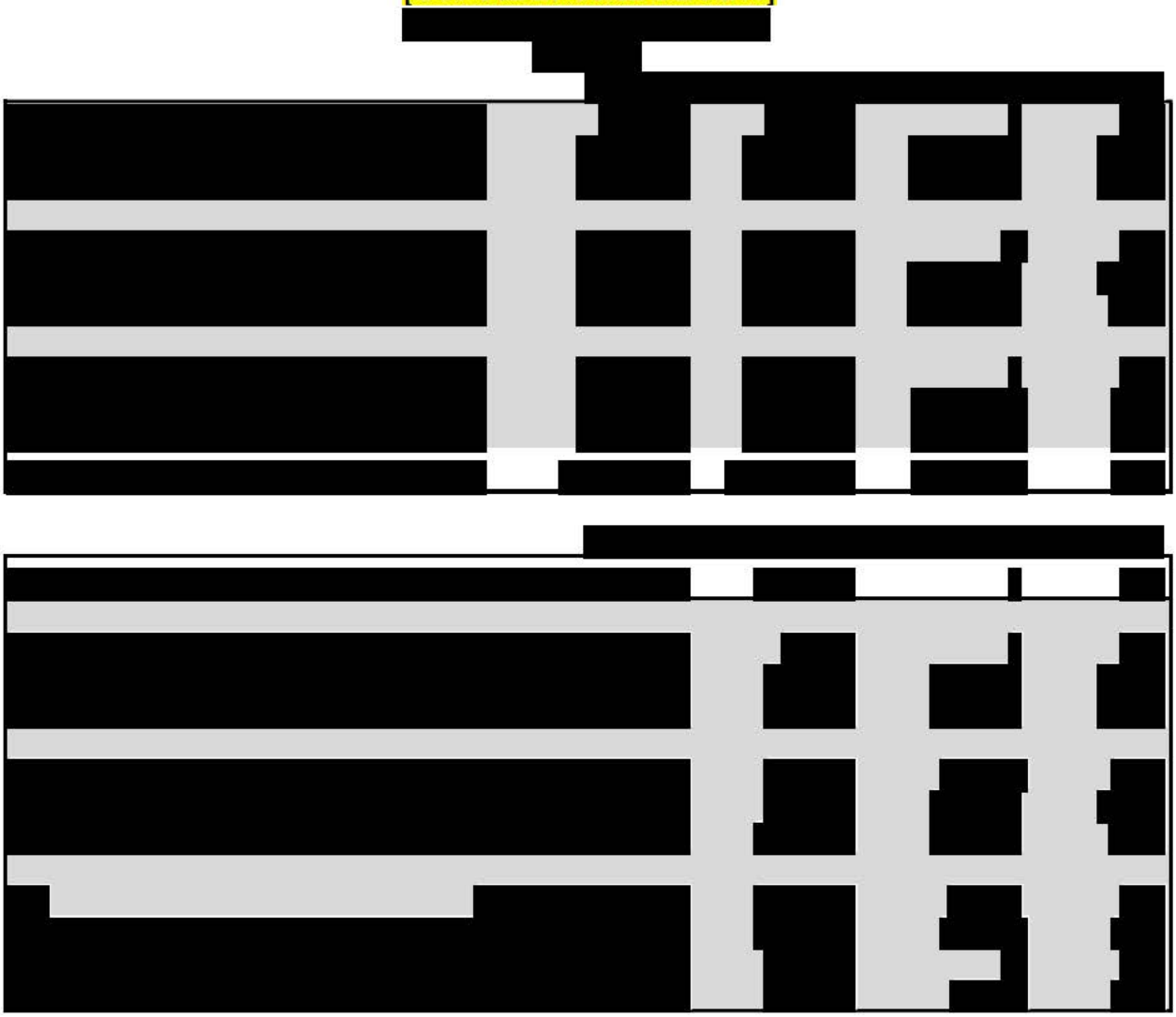
Confidential Table 1 illustrates a detailed comparison between the benchmarking study and 2020 Actual NPC. Long-term firm sales and long-term firm purchase dollars and megawatt-hours (MWh) are based on actual transactions. Hydroelectric generation and solar generation are based on actual generation. The variance between short-term firm and system balancing sales and purchases is driven by the fact that Aurora balances the system differently than the Company does in actual operations. More specifically, Aurora faces a different set of operational constraints compared to what the Company faces in real time. For example, market liquidity in the benchmarking study is predetermined based on market capacity limits that allow more sales transactions than the Company's historical experience.

It is important to note that the NPC forecast is designed with hourly average inputs. Given a certain set of hourly average input variables, Aurora applies its system balancing logic to meet load and wholesale obligations under the operational constraints assumed in the model. In actual operations, the Company faces a different set of real (moment-to-moment) system constraints, many of which are not able to be fully reflected in Aurora's modeling assumptions. Furthermore, Aurora is not able to forecast thermal dispatch in the same way that PacifiCorp dispatches its thermal plants in real time and Aurora's optimization of the system is perfect which means that after the optimization is complete no net savings can be further achieved by backing down one unit and ramping up another unit.

In actual operations, as a matter of prudence, PacifiCorp seeks to optimize the system. However, in reality, PacifiCorp faces a different set of constraints resulting from actual market conditions, and in real time, system dispatch will choose to balance the system using coal plants, gas plants and system balancing purchases and sales in an order that is feasible to current market conditions. The order of selection of coal plants, gas plants and system balancing purchase and sales results in differences in each resource category compared to the benchmarking study results. Consequently, and as shown in **Confidential Table 1** below, the coal and natural gas dispatch (on a MWh basis) in Aurora was approximately one percent more and two percent less than actuals, respectively.

Confidential Table 1 – Net Power Cost Differential Summary – Benchmark

[CONFIDENTIAL BEGINS]



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Conclusions

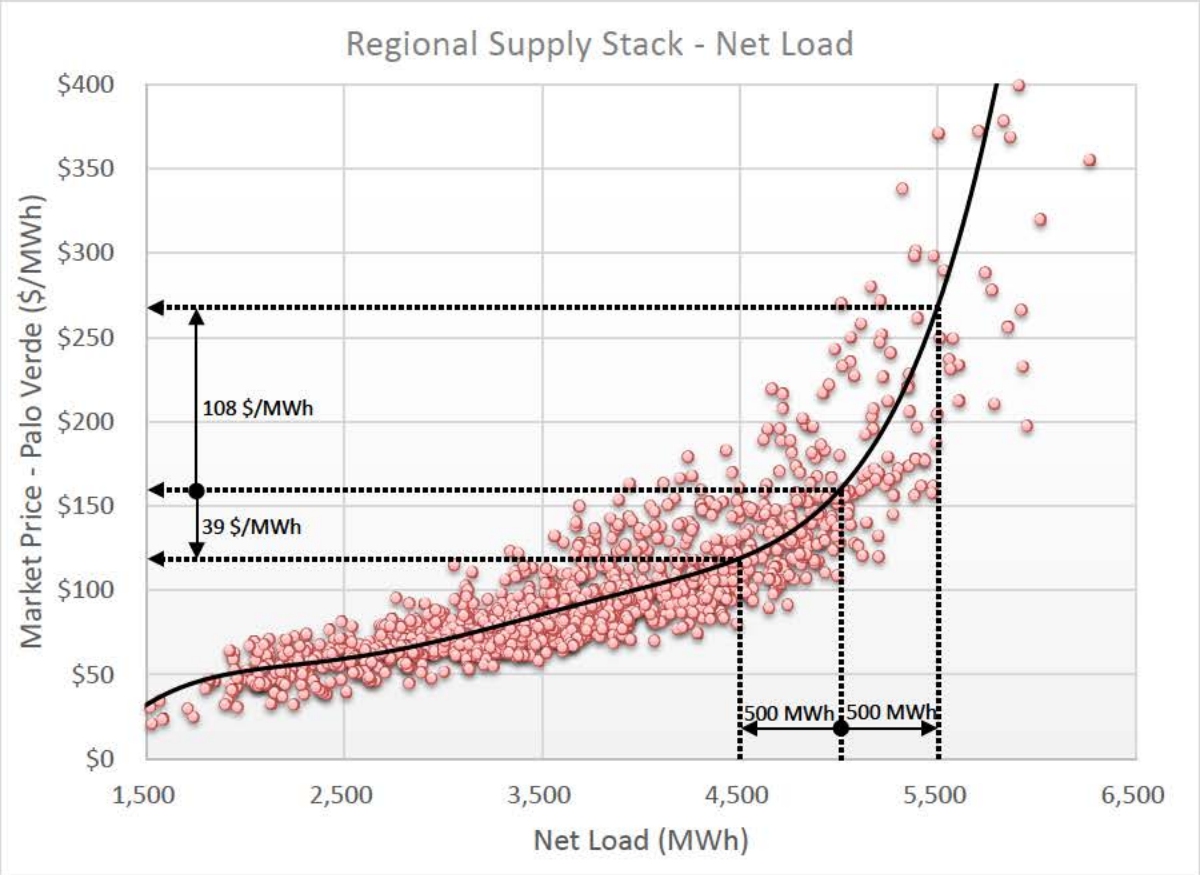
When actual data is used as inputs, Aurora produces 2020 NPC below the actual 2020 NPC and this is to be expected.

First, Aurora applies its system balancing logic with perfect foresight and perfect execution. That is to say, Aurora knows the future and operates the system with perfect efficiency in every hour. In reality, the future is uncertain, humans cannot know exactly at what level variable resources will be producing in a future hour and there will always be some inefficiency within a grouping

of individuals (people). In the context of NPC, this reality of the human experience deviates from the perfection inherent in Aurora and the associated perfectly-low Aurora NPC.

Second, there is an asymmetry in the response of market prices to changes in load and generation. As an illustrative example, **Figure 1** below shows a proxy supply/demand curve (with inelastic demand) based on actual load, wind, and solar data within the region. It is observed that because of the asymmetry of market price response, a 500 MWh increase in net load (load less wind less solar) results in a $108 dollar per MWh ($/MWh) increase in market price, whereas an identical 500 MWh decrease in net load results in only a $39/MWh decrease to market price.

Figure 1



This asymmetrical response impacts actual operations because the net load forecasts, in reality, are uncertain (i.e., there is no perfect foresight). This uncertainty results in an equal chance of net load being higher or lower than forecasted. However, the impact to NPC is an asymmetric response wherein the actual NPC has a greater chance of being higher than the forecast NPC and consequently the forecast NPC is biased downwards relative to the actual NPC. This result is observed in this benchmarking study.