

**REDACTED**  
Exh. DRS-1CT  
Docket UE-21\_\_\_\_  
Witness: Douglas R. Staples

**BEFORE THE WASHINGTON  
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP dba  
PACIFIC POWER & LIGHT COMPANY

Respondent.

Docket UE-21\_\_\_\_

**PACIFICORP**

**REDACTED DIRECT TESTIMONY OF DOUGLAS R. STAPLES**

**June 2021**

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Exhibit No. DRS-2C—Washington-Allocated Net Power Costs

1 additional MWh at a given resource. The Company's production costs used to  
2 calculate EIM benefits are equal to the resource bids submitted to the EIM. The  
3 benefit of EIM imports is equal to the import expense less the avoided expense of the  
4 generation that would have otherwise been dispatched.

5 **Q. How did the Company forecast the inter-regional EIM benefits in the test**  
6 **period?**

7 A. Using EIM benefits by month, a linear regression model was developed using the  
8 following four independent variables: electric market prices, natural gas market  
9 prices, EIM transfer capability, and spring oversupply conditions. The linear  
10 regression model with multiple independent variables will reflect market conditions  
11 which drive EIM benefits, resulting in a reasonable forecast.

12 **Q. What are GHG benefits, and how much are included in this case?**

13 A. GHG benefits are realized when the GHG revenue is higher than the Company's  
14 resulting compliance obligation. The total-Company GHG benefits for the forecast  
15 year 2022 is about [REDACTED]

## 16 **Day-Ahead and Real-Time System Balancing Transactions**

17 **Q. Please describe the DA/RT adjustment.**

18 A. PacifiCorp incurs system balancing costs that are not reflected in the Company's  
19 forward price curve or modeled in AURORA, because, much like GRID, AURORA is  
20 a deterministic production cost model that optimizes the system perfectly in a single  
21 step. To address this the Company proposes the DA/RT adjustment to more  
22 accurately model system balancing transaction prices and volumes.

1 **Q. Please explain how the AURORA model currently balances load and resources**  
2 **on an hourly basis.**

3 A. The AURORA model calculates the least-cost solution to balance the Company's load  
4 and resources to fractions of a MW for each hour. The model makes purchases in the  
5 wholesale market (labeled as "system balancing purchases" in the NPC report) in the  
6 hours for which the Company does not have enough owned- or contracted-resources  
7 to meet its load. The model also makes wholesale market sales (labeled as "system  
8 balancing sales" in the NPC report) when it has excess resources for a given hour.  
9 These system balancing transactions are calculated for each hour independently and  
10 are for the precise volume required by the model. Wholesale market prices for the  
11 system balancing sales are based on an hourly forward price curve that is developed  
12 from monthly heavy load hours (HLH) and light load hours (LLH) prices with hourly  
13 scalars applied to transform the monthly prices into a series of hourly prices that, on  
14 average, remain equal to the monthly prices. These scalars are identical within a  
15 given month for each weekday of that month. The prices are input into the model and  
16 do not change based on the volume of the system balancing transactions.

17 **Q. How do actual operations differ from the model logic?**

18 A. In actual operations, the Company continually balances its market position—first  
19 with monthly products, then with daily products, and finally with hourly products.  
20 The monthly and daily position is calculated as the average for the respective time  
21 horizon during HLH and LLH periods; for example, the average HLH position during  
22 the month of January or the average LLH position on a given day in February. The  
23 monthly and daily products used to balance the Company's position in the wholesale

1 market are available in flat 25 MW blocks. The Company's load and resource  
2 balance, however, varies continuously each hour in quantities that may vary widely  
3 from a flat 25 MW block. In real-time operations, the Company balances its hourly  
4 position in the hourly real-time market. At that point, the Company must transact to  
5 maintain a balanced system and, as a result, becomes a price-taker subject to  
6 whatever price is available at the time.

7 **Q. How do the system balancing volumes in AURORA compare to the Company's**  
8 **actual volumes?**

9 A. The volume of system balancing transactions generated by AURORA is smaller than  
10 the volume of similar transactions in actual results. Because AURORA balances the  
11 Company's load and resources to fractions of a MW for each hour in a single step, it  
12 avoids the additional purchase and sale transactions that occur in actual operations as  
13 the Company progresses through balancing its system on a monthly, daily, and real-  
14 time system basis.

15 For instance, when the Company buys a monthly product that aligns with the  
16 Company's average open position for the month, one can expect that roughly half of  
17 the days will still have a remaining position to be covered by additional daily  
18 purchases. On the other days, the Company will have to make daily sales to unwind  
19 the excess volume. The same is true for daily transactions—in some hours the  
20 volume acquired will be too low, while in others it will be too high, and additional  
21 purchases and sales will be required to cover the Company's actual position.

22 In addition, buying or selling standard block products for monthly and daily  
23 average requirements will not result in a perfect balance of load and resources. This

1 difference then must be closed out in the real-time market where the Company is a  
2 price-taker.

3 **Q. Please describe the price component of the DA/RT adjustment.**

4 A. To better reflect the market prices available to the Company when it transacts in the  
5 real-time market, PacifiCorp includes separate prices for forecast system balancing  
6 sales and purchases in AURORA. These prices account for the historical price  
7 differences between the Company's purchases and sales compared to the monthly  
8 average market prices.

9 **Q. Why is the DA/RT adjustment needed to differentiate the market prices for  
10 purchases and sales?**

11 A. The AURORA model used an hourly price curve developed from monthly HLH and  
12 LLH forward market prices. Hourly prices were simply the product of applying a  
13 scalar, or shape, to the monthly average prices. These scalars were identical within a  
14 given month for each weekday of that month. In addition, the prices were input into  
15 the model and did not change regardless of the volume of the system balancing  
16 transactions or other system conditions in the model. In reality, however, prices vary  
17 within each month and the Company has historically bought more during higher-than-  
18 average price periods and sold more during lower-than-average price periods. As a  
19 result, the average cost of the Company's daily and hourly short-term firm purchases  
20 has been consistently higher than the average actual monthly market price, while the  
21 average revenues from its daily and hourly short-term firm sales has been consistently  
22 lower than the average actual monthly market price.

1 **Q. Please describe the volume component of the DA/RT adjustment.**

2 A. The Company reflects additional volumes to account for the use of monthly, daily,  
3 and hourly products. In actual operations, the Company continually balances its  
4 market position—first with monthly products, then with daily products, and finally  
5 with hourly products. The products used to balance the Company’s forward position  
6 in the wholesale market are available in flat 25 MW blocks. The Company’s load and  
7 resource balance, however, varies continuously each hour in quantities that may vary  
8 widely from a flat 25 MW block. Thus, in real world operations, the Company must  
9 continuously purchase or sell additional volumes to keep the system in balance.

10 In contrast, AURORA has perfect foresight and can model wholesale market  
11 transactions at whatever volume is necessary to balance the system. Because of  
12 AURORA’s perfect foresight, it can balance the system with far fewer transactions.  
13 The DA/RT adjustment adds additional volumes to NPC to more accurately model the  
14 transactions necessary to balance the Company’s system.

15 **Q. Has PacifiCorp previously used the DA/RT adjustment in forecast NPC?**

16 A. PacifiCorp has used the DA/RT adjustment in all filings for all jurisdictions that have  
17 included forecast NPC since 2015, including the 2021 GRC.

18 **Q. Has this adjustment changed since the 2021 GRC with the switch from GRID to**  
19 **AURORA?**

20 A. No, this adjustment was also used in the NPC baseline for the 2021 GRC.