Docket No. UE 263
Exhibit PAC/700
Witness: Kelcey A. Brown

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

PACIFICORP

Direct Testimony of Kelcey A. Brown

March 2013

DIRECT TESTIMONY OF KELCEY A. BROWN

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Q. Please state your name, business address, and present position with PacifiCorp d/b/a Pacific Power (PacifiCorp or Company).

A. My name is Kelcey A. Brown. My business address is 825 NE Multnomah Street, Suite 600, Portland, Oregon 97232. My present title is Manager, Load Forecasting.

QUALIFICATIONS

Q. Briefly describe your education and professional experience.

A. I have been employed by PacifiCorp since May 2011. I have been the Manager of Load Forecasting since June 2012. Before that time, I worked as a Senior Consultant in the Regulatory Net Power Costs Department. Before joining PacifiCorp, I worked at the Public Utility Commission of Oregon (Commission) from 2007 through May 2011. During my time at the Commission, I sponsored testimony in several dockets involving net power costs, integrated resource planning, and various revenue and policy issues. From 2003 through 2007, I was the Economic Analyst with Blackfoot Telecommunications Group, where I was responsible for revenue forecasts, resource acquisition analysis, pricing, and regulatory support. I have a Bachelor of Science degree in Business Economics from the University of Wyoming, and I have completed all course work towards a Master's degree in Economics from the University of Wyoming.

PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to explain how the Company developed the forecasts of the number of customers, kilowatt-hour (kWh) sales at the meter

(sales), system loads and system peak loads at the system input level (loads), and number of bills by rate schedule for the 12-month period ending December 31, 2014.

OVERVIEW

Q. When did the Company prepare the sales and load forecast used in this filing?

A. The sales and load forecast used in this filing was completed in July 2012 and is the same forecast that is being used in the Company's 2013 Integrated Resource Plan (IRP). The July 2012 sales and load forecast is the most recent forecast of sales and loads prepared by the Company.

Q. How did the Company use the July 2012 sales and load forecast in this filing and in the Company's concurrent 2014 Transition Adjustment Mechanism (2014 TAM) filing?

A. The July 2012 load forecast was used to calculate net power costs in the 2014 TAM filing. The load forecast was also used by Mr. Gary W. Tawwater to calculate the inter-jurisdictional allocation factors. The sales forecast by rate schedule was used by Mr. C. Craig Paice and Ms. Joelle R. Steward to allocate costs between customer classes and to design rates that correctly reflect the cost of service, respectively.

Q. Is the forecast methodology used in this case the same as presented in the Company's 2012 general rate case, docket UE 246 (2012 Rate Case), and 2013 TAM, docket UE 245?

A. Yes. The updates to data and assumptions are discussed below.

Q. Please provide a general overview of the Company's sales and load forecast methodology.

A. The Company's methodology consists of first developing a forecast of monthly sales by customer class and monthly peak load by state. This sales forecast becomes the basis of the load forecast by adding line losses, meaning kWh sales levels are grossed-up to a generation or "input" level. The monthly loads are then spread to each hour based on the peak load forecast and typical hourly load patterns to produce the hourly load forecast.

Q. Please provide a summary of the forecasted energy sales for 2014.

A. Table 1 provides the forecasted energy sales for the 12-month period ending December 31, 2014.

Table 1 - Test Period Sales Forecast (MWh)

	2013 GRC (CY 2014)	
	Total Company	**Oregon**
Residential	**15,912,619**	**5,381,873**
Commercial	**17,321,091**	**5,378,807**
Industrial	**19,825,363**	**2,133,140**
Irrigation	**1,245,400**	**238,210**
Public Authority	**276,500**	**-**
Lighting	**141,650**	**36,940**
Total	**54,722,623**	**13,168,971**

COMPARISONS TO PRIOR SALES FORECASTS

Q. How does the total-company sales forecast for 2014 compare to the sales forecast used in the 2012 Rate Case?

A. As shown in Table 2, total-company 2014 forecast sales are 0.8 percent lower than 2013 forecast sales used in the 2012 Rate Case. The difference in the forecasts is attributable to a decline in industrial load and a small level of growth in the commercial and residential load. The growth in the commercial class is

related to data centers. The industrial class decrease in the forecast is attributable to prolonged recessionary impacts and additional self-generation elections by some of the Company's large industrial customers in Utah, Wyoming, and Oregon.

Table 2 - Total Company Sales Comparison (MWh)

	2012 GRC (CY 2013)	2013 GRC (CY 2014)	Change	Percentage Change
Residential	**15,866,151**	**15,912,619**	**46,468**	**0.3%**
Commercial	**17,166,799**	**17,321,091**	**154,292**	**0.9%**
Industrial	**20,363,476**	**19,825,363**	**(538,113)**	**-2.6%**
Irrigation	**1,214,725**	**1,245,400**	**30,676**	**2.5%**
Public Authority	**406,610**	**276,500**	**(130,110)**	**-32.0%**
Lighting	**141,670**	**141,650**	**(20)**	**0.0%**
Total	**55,159,430**	**54,722,623**	**(436,807)**	**-0.8%**

Q. How does the Oregon sales forecast for 2014 compare to the sales forecast for the 2012 GRC?

A. As shown in Table 3, the 2014 Oregon sales forecast has increased by approximately 0.5 percent from the 2013 sales forecast used in the 2012 Rate Case. On an Oregon basis, the commercial class increase reflects the planned expansion of data centers in Oregon. The declines in residential and industrial load reflect prolonged recessionary impacts, growth in energy efficiency and conservation programs, and self-generation elections by some of the Company's large industrial Oregon customers.

Table 3 - Oregon Sales Comparison (MWh)

	2012 GRC (CY 2013)	2013 GRC (CY 2014)	Change	Percentage Change
Residential	**5,403,215**	**5,381,873**	**(21,341)**	**-0.4%**
Commercial	**5,165,190**	**5,378,807**	**213,617**	**4.1%**
Industrial	**2,274,055**	**2,133,140**	**(140,915)**	**-6.2%**
Irrigation	**217,560**	**238,210**	**20,650**	**9.5%**
Lighting	**37,720**	**36,940**	**(780)**	**-2.1%**
Total	**13,097,740**	**13,168,971**	**71,231**	**0.5%**

FORECAST METHODOLOGY

Q. What aspects of the sales and load forecast methodology do you address?

A. First, I describe the updates to the data and assumptions used to produce the sales and load forecasts. Second, I describe the forecasting approach used to develop monthly sales for the residential, commercial, irrigation, and lighting customer classes, followed by a description of the forecasting approach for the industrial customer class. Third, I describe how the hourly load forecast is developed. Fourth, I describe how the forecast by rate schedule for sales and number of bills are developed.

SUMMARY OF CHANGES IN FORECAST DATA AND ASSUMPTIONS

Q. Please summarize major updates used to produce the 2014 forecast as compared to the forecast used in the 2012 Rate Case.

A. The Company updated many of its data inputs and assumptions compared to the forecast prepared for the 2012 Rate Case. For each of these updates, the Company used the most recent information available.

1. The Company expanded the historical data period used to develop the monthly retail sales forecasts by adding eight months of retail sales data. All classes, except the industrial class, use an historical data period of January 1997 through March 2012. The historical data period used to develop the industrial monthly sales is from January 2002 through March 2012.

2. The Company expanded the historical data period used to develop the monthly peak forecasts to include January 1997 through December 2011.

3. The Company updated the economic drivers from IHS Global Insight using the most recent information available for each of the Company's jurisdictions.

4. The Company updated the forecast of individual industrial customer usage based on the best information available as of March 2012.

5. The time period used to define normal weather was rolled forward to the 20-year time period of 1992 through 2011.

6. The Company rolled forward the line loss calculation to the five-year period ended December 2011.

7. The data used to develop temperature splines was rolled forward based on available customer class hourly data (2007 through 2011).

8. The Company continued to use the residential use per customer per day model with appliance saturation and efficiency results released in June 2010.

FORECASTS FOR NON-INDUSTRIAL CUSTOMER CLASSES

Q. How are monthly sales forecasts developed by customer class?

A. The Company develops monthly sales forecasts as a product of two separate forecasts: (1) the number of customers; and (2) sales per customer. The Company uses this methodology for residential and commercial customer classes.

Q. How are the forecasts for number of customers developed?

A. For the residential class, the Company forecasts the number of customers using IHS Global Insight's forecast of number of households as the major driver. For the commercial class, the Company forecasts the number of customers using the

forecasted number of residential customers as the major economic driver. For the industrial, irrigation, and street lighting classes, the customer forecasts are fairly static and developed using time series or regression models without any economic drivers.

Q. How does the Company forecast sales per customer for each customer class?

A. The Company models sales per customer for the residential class through a Statistically Adjusted End-Use (SAE) model, which combines the end-use modeling concepts with traditional regression analysis techniques. Major drivers of the SAE-based residential model are heating and cooling-related variables, equipment shares, saturation levels and efficiency trends, and economic drivers such as household size, income, and energy price.

For the commercial class, the Company forecasts sales per customer using regression analysis techniques with non-manufacturing employment used as the major economic driver, in addition to weather-related variables.

As already described, the sales forecast for the residential and commercial classes is the product of the number of customer forecast and the use per customer forecast. The development of the forecast of monthly commercial sales involves an additional step. To reflect the addition of a large "lumpy" change in sales such as a new data center, monthly commercial sales are increased based on input from the Company's customer account managers (CAMs). Although the scale is much smaller, the treatment of large commercial additions is similar to the previous methodology for large industrial customer sales, which is discussed below.

Monthly sales for irrigation and lighting are forecasted directly from historical sales volumes, not as a product of the use per customer and number of customers.

INDUSTRIAL CLASS FORECASTS

Q. How does the Company forecast sales for the industrial customer class?

A. The majority of industrial customers are modeled using regression analysis with trend and economic variables. Manufacturing employment is used as the major economic driver. For a small number of industrial customers, the largest on the Company's system, the Company individually forecasts these customers based on input from the customer and information provided by the CAMs.

Q. Has the Company changed how it models its industrial forecast?

A. Yes. Previously, the Company separated the industrial class into three categories: (1) existing customers tracked by CAMs; (2) new large customers or expansions by existing large customers; and (3) industrial customers that are not monitored by CAMs. The Company developed the forecast for the first two categories through the usage data gathered by the CAMs based on direct input from the customers, forecasted load factors, and the probability of the project occurrence. The third category was forecasted using regression analysis consistent with how the total industrial class is now forecast.

Q. What was the reason for the change in methodology of the industrial forecast?

A. For existing large industrial customers and for new large industrial customers, the Company found that the inputs provided by customers for their existing loads and

for new load tended to be overly optimistic and ultimately overstated. Therefore, the Company uses a regression analysis for the entire industrial class, excluding those largest industrial customers and taking into consideration historical patterns of industrial growth. The Company believes this is a reasonable means of forecasting existing customer load and future growth. The Company continues to monitor new load requests and planned expansions of existing customers for significant changes that would require an adjustment to the forecast.

Q. Why does the Company forecast industrial sales using total usage versus the use-per-customer methodology used for the other customer classes?

A. The Company forecasts the industrial class differently because of the diverse makeup of the customers within the class. In the industrial class, there are no "typical" customers. Large customers have very diverse usage patterns and power requirements. In contrast, customer classes that are made up of mostly smaller, homogeneous customers are best forecasted by multiplying use-per-customer by the number of customers. Those customer classes are generally composed of many smaller customers that have similar behaviors and usage patterns.

HOURLY LOAD FORECAST

Q. Please outline how the hourly load forecast is developed.

A. After the Company develops the forecasts of monthly energy sales by customer class, a forecast of hourly loads is developed in two steps.

First, monthly and seasonal peak forecasts are developed for each state. The monthly peak model uses historical peak-producing weather for each state, and incorporates the impact of weather on peak loads through several weather

variables that drive heating and cooling usage. These weather variables include the average temperature on the peak day and lagged average temperatures from up to two days before the day of the forecast. The peak forecast is based on average monthly historical peak-producing weather for the 20-year period 1992 through 2011.

Second, the Company develops hourly load forecasts for each state using hourly load models that include state-specific hourly load data, daily weather variables, the 20-year average temperatures identified above, a typical annual weather pattern, and day-type variables such as weekends and holidays as inputs to the model. The hourly loads are adjusted to match the monthly and seasonal peaks from the first step above. Also, the hourly loads are adjusted so the monthly sum of hourly loads equals monthly sales plus line losses.

Q. How are monthly system coincident peaks derived?

A. After the hourly load forecasts are developed for each state, hourly loads are aggregated to the total system level. The system coincident peaks can then be identified, as well as the contribution of each jurisdiction to those monthly peaks.

FORECASTS BY RATE SCHEDULE

Q. Were any additional forecasts created for these proceedings?

A. Yes. As mentioned earlier, Ms. Steward and Mr. Paice require two additional forecasts that are based on the kWh sales forecast and the number of customers forecast. Once the kWh sales forecast is complete, it must be applied to individual rate schedules to forecast kWh sales by rate schedule. In addition, the forecast of number of customers must be expressed in number of bills.

Q. How are rate schedule level forecasts produced?

A. The Company develops this forecast in two steps. First, the Company forecasts test year sales by rate schedule. Then the Company proportionally adjusts the rate schedule sales forecasts so that the total matches the customer class forecast.

Q. How does the Company forecast the number of bills for each rate schedule?

A. The forecast of the number of bills for each rate schedule follows the same process as the sales forecast for each rate schedule. First, the Company forecasts the number of bills by class and by rate schedule. Then, the Company proportionally adjusts the forecasted number of bills by rate schedule so that the total number of bills matches the customer class forecasted number of bills.

Q. Does the Company plan to update its load forecast during the course of this proceeding?

A. The Company may need to update the 2014 load forecast for changes associated with interruptible contract changes with industrial customers. Updating the load forecast would impact net system loads used in the development of the Company's net power costs in the 2014 TAM, and inter-jurisdictional allocation factors applied in this proceeding and in the 2014 TAM. Inter-jurisdictional allocation factors are addressed in the direct testimony of Mr. Tawwater. Mr. Gregory N. Duvall's direct testimony in the 2014 TAM proceeding discusses the potential impact of updating loads on total company net power costs.

Q. Does the Company intend to update the entire load forecast during this proceeding?

A. At this time, the Company does not intend to update all assumptions in the load

forecast, such as the most recent actual load data, economic data, forecasts for large industrial and commercial customers, and incorporation of the class 2 demand-side management from the 2013 IRP preferred portfolio. However, the Company will evaluate any changes that occur in the load forecast assumptions that may significantly impact the TAM or rate case proceedings.

Q. Does this conclude your direct testimony?

A. Yes.