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I. Introduction and Summary

1 **Q. Please state your name and position with Portland General Electric Company (PGE).**

2 A. My name is Ham T. Nguyen. I am employed by PGE as a Senior Economist. I am
3 responsible for developing PGE's end-use customer energy forecast. My qualifications
4 appear at the end of this testimony.

5 **Q. What is the purpose of your testimony?**

6 A. My testimony presents and explains the methodology and processes underlying PGE's 2011
7 test-year forecast of 19,243 million kilowatt-hours (kWh), on a cycle-month (billing) basis,
8 delivered to end-use customers, including deliveries to customers who opted out of PGE
9 cost of service rates for direct access under Schedules 483 and 489.

10 **Q. What is your forecast?**

11 A. I project that deliveries to all end-use customers will be 19,243 million kWh for test-year
12 2011, essentially flat from the 2009 weather-adjusted actual deliveries of 19,230 million
13 kWh. This 2011 total kWh delivery takes into account the effect on demand of anticipated
14 higher electricity prices in 2011 (compared to 2009 base period prices), savings from
15 "incremental" energy efficiency (EE) programs (funded through *Schedule 109 Incremental*
16 *Energy Efficiency Funding* per SB 838), and impacts of Advanced Meter Infrastructure
17 (AMI) programs.

18 There are four forecasts for the test year. They are B (base), P (price-effect), E (post
19 price effect and "incremental" EE programs) and M (post price effect, EE programs and
20 AMI programs) forecasts. The B forecast considers the effect of economic activities on
21 electricity delivery, all else equal. The P forecast incorporates the impact of higher
22 electricity prices on delivery. The E forecast specifically accounts for the savings from

1 incremental EE programs. The M forecast factors the benefits from full AMI
 2 implementation in 2011. PGE Exhibits 1401, 1402, 1403 and 1404 show four detailed kWh
 3 delivery forecasts.

4 Table 1 below summarizes the kWh delivery forecast in annual percentage changes by
 5 end-use sector from 2008 through 2011. The net saving of the AMI programs, due for
 6 completion by the end of 2010, however, is small, worth about 8.2 million kWh (roughly 1
 7 MWh) in 2011. Forecast M thus consists of mostly savings from SB 838 programs.

Table 1
Percent Change in kWh Delivery from Preceding Year: 2008-2011

<u>Sector</u>	<u>2008¹</u>	<u>2009¹</u>	<u>2010 (B)²</u>	<u>2010 (M)³</u>	<u>2011 (B)²</u>	<u>2011 (M)³</u>
Residential	1.0%	1.1%	(1.2%)	(1.4%)	0.9%	(0.6%)
Commercial	(0.1%)	(1.3%)	(0.3%)	(0.8%)	1.5%	0.4%
Industrial	2.1%	(10.2%)	3.4%	3.2%	1.7%	1.0%
Miscellaneous	<u>0.6%</u>	<u>(0.6%)</u>	<u>4.0%</u>	<u>4.0%</u>	<u>1.3%</u>	<u>1.3%</u>
Total Retail	0.8%	(2.4%)	0.2%	(0.1%)	1.3%	0.2%

¹ Weather-adjusted actual
² SDEC09B Base
³ SDEC09M, Post price, EE & AMI

8 **Q. Why do you adjust your base forecast for price elasticity effects?**

9 A. The *non-price* or *base* (B) delivery forecast does not take into explicit account the impact of
 10 electricity price changes on end-use consumption. The *price-effect* (P) forecast does. PGE
 11 expects customers to respond to price changes by making behavioral changes, implementing
 12 housekeeping measures and, over time, making changes to the capital stock such as
 13 appliances and equipment that would reduce energy consumption.

14 **Q. How do you specifically account for the impact of a price change in the test-year**
 15 **forecast?**

1 A. We calculate the implied demand elasticity of the price model by varying price levels, e.g.,
2 by 10%. Demand elasticity is the ratio of the percent change in demand, kWh delivery in
3 this case, to the percent change in “real” price. For the test-year forecast, we first calculated
4 the kWh demand change based on an assumed price change and the estimated price
5 elasticity, and then adjusted the base forecast by the demand change estimate. This is the
6 same procedure used in previous rate cases.

7 **Q. What price change assumptions did you make to calculate the price effect on demand?**

8 A. We assumed no price change in 2010. In 2011, we assumed prices for residential customers
9 and non-residential customers to be 12% above October 2009 levels in “nominal” terms and
10 10.6% in “real” terms. October 2009 is the last historical data point.

11 **Q. What price elasticity does PGE estimate and use in the forecast?**

12 A. We used elasticity estimates of -0.08 for residential demand and -0.03 for nonresidential
13 demand. They were derived from the “price” model that was re-estimated in September
14 2009 and remain essentially unchanged from previous estimates. A price elasticity of -0.08
15 means that if electricity prices rose an average of 10%, kWh demand would decline by
16 0.8%, all else equal. As we pointed out in UE 180 and UE 197, these elasticity estimates
17 have remained stable since 2002. Using these estimates of elasticity and the assumed price
18 increases, the price-effect (P) forecast is about 98.5 million kWh or 0.5% lower than the
19 base (B) forecast for 2011.

20 **Q. Did you make any adjustments beyond the impact of electricity price changes to the
21 delivery forecast?**

22 A. Yes. We adjusted the forecast to account for the impact of PGE’s incremental EE programs
23 funded through *Schedule 109 Incremental Energy Efficiency Funding* enabled by SB 838.

1 The assumed EE program levels incorporate new funding for EE programs beyond prior
2 levels, starting in November 2009. The Energy Trust of Oregon (ETO) developed the
3 estimates of these “incremental savings” for PGE based on measures achievable at a
4 levelized cost of up to 6.5 cents per kWh. We assumed these EE savings to have an effect
5 beginning in November 2009 and ramping up gradually through 2011.

6 **Q. How significant is the impact of these incremental energy efficiency programs savings**
7 **on PGE’s delivery forecast?**

8 A. We estimate a total of 174.1 million kWh or 0.9% savings from these programs in the 2011
9 test year. PGE Exhibit 1405 shows the savings from the incremental energy efficiency
10 programs that are included in PGE’s delivery forecast. The savings were estimated by the
11 Energy Trust of Oregon (ETO).

12 **Q. Did you include any benefits associated with the Advanced Metering Infrastructure**
13 **(AMI) program in the forecast?**

14 A. Yes. We included estimates of two AMI-related benefits: “Remote Disconnect” (RD) and
15 “Lost Revenue Protection” (LRP) in the delivery forecast. RD speeds up the disconnect
16 process in the residential sector, thus reducing power deliveries that are likely to be written
17 off by PGE. AMI enhances the identification of unaccounted-for energy occurring primarily
18 as energy theft, raising the kWh billed to both residential and commercial customers. We
19 estimate RD to decrease energy delivery by 20.4 million kWh to residential customers and
20 LRP to increase energy delivery by 12.3 million kWh to both residential and commercial
21 customers.

22 **Q. How does the 2011 delivery forecast compare to recent history?**

1 A. The delivery forecast of 19,243 million kWh to end-use customers for test-year 2011 is
2 0.2% higher than the 2010 average-weather delivery forecast of 19,212 million kWh. The
3 end-use customer forecast for 2011 is 0.1% above the 2009 weather-adjusted delivery of
4 19,230 million kWh and 4.8% below the average-weather delivery of 20,214 million kWh
5 we settled in UE 197 for test-year 2009. The delivery forecast for 2011 is also 2.4% below
6 the 2008 weather-adjusted delivery of 19,709 million kWh that occurred as the “Great
7 Recession” of 2008/2009 unfolded. The recession, one of the worst since the Great
8 Depression, has had a great impact on the economy and, in the case of Oregon, an outsized
9 impact on resource-based industries, such as metals and paper products, which are large
10 energy users. PGE delivery of energy to end-use customers on a weather-adjusted basis fell
11 2.4% in 2009, a sharp decline, only exceeded by the 3.4% drop in 1982 and the 3.6% drop in
12 2001. The drop in 2009 energy delivery resulted from double-digit declines in deliveries to
13 the lumber, metals, and paper industries. The drop was most severe for the paper industries,
14 which took 30% less energy in 2009 than in 2008. Higher delivery of energy to residential
15 customers essentially offset lower delivery to commercial customers in 2009.

II. Model Mechanics

1 **Q. Please summarize the process you use to develop the retail energy delivery forecast.**

2 A. The core retail energy delivery (load) model and the forecast process are the same as those
3 we have used in previous rate cases and regulatory filings. However, we re-estimated the
4 model using the most current data, an extended historical period through October 2009.
5 Re-estimation is the process of applying regression techniques to obtain, from the updated or
6 extended historical data, the estimates of the coefficients of the equations that constitute the
7 forecasting model. We retained the structure (specification) but re-estimated the base model
8 to include new information, examining the results for any changes in the coefficients and, if
9 necessary, re-specifying the relevant equations. Finally, we used the most recently available
10 forecasts of the drivers or independent variables to develop our load forecast.

11 **Q. Are these models new or different from previous PGE load models?**

12 A. Except for the re-estimation of the coefficients, performed to capture any behavioral or
13 structural changes over time, the forecast model specification remains the same as that used
14 in previous filings with the Commission. I described in detail the theory and specification of
15 our model, as well as our forecast processes, in my previous testimonies on PGE's load
16 forecast. These were submitted in various regulatory proceedings, most recently in UE 197
17 (PGE Exhibit 1100) and in UE 180 (PGE Exhibit 1200).

18 **Q. Why do you need to re-estimate the model?**

19 A. To capture evolving changes in customer behavior or mode of operation as early as possible,
20 PGE re-estimates the load model to reflect the most current customer-to-energy
21 relationships. These relationships could change significantly in the events of a war, natural
22 disaster, severe economic downturn or sharp price hikes. If we do not re-estimate our

1 models to reflect such changes, the models, in all likelihood, would produce inaccurate
2 forecasts. Timely re-estimation is crucial as we pass through one of the most severe
3 economic downturns since the Great Depression.

4 **Q. What sources of information do you use to forecast electricity delivery?**

5 A. PGE relies primarily on three sources of economic information to drive our forecast: 1) a
6 national economic forecast, 2) state economic and unemployment forecasts, and 3) a
7 forecast of the California economy. IHS Global Insight provides the US economic forecast.
8 The Department of Administrative Services, Office of Economic Analysis (OEA) provides
9 the Oregon economic forecast (Oregon Economic and Revenue Forecast) and the Oregon
10 Employment Department provides the state unemployment forecast. The California
11 Employment Development Department (EDD) provides the forecast of the California
12 economy. The Global Insight forecast and the California EDD forecast were obtained in
13 November 2009 and the OEA forecast in December 2009. In addition, customers who are
14 large energy users provide us with specific operation information, direct inputs and, if
15 available, forecast of energy use. We used these same sources of information to develop our
16 forecasts of kWh delivery in our previous filings with the Commission.

17 **Q. Did you make any changes to the model?**

18 A. No. Except for the re-estimation, we made no changes to the structure of the model.

19 **Q. What assumption did you make regarding weather variables in the forecast?**

20 A. The accuracy of a forecast depends not only on the performance of the model specification
21 but also on the performance of the independent variables driving the forecast. In our model,
22 the independent variables include temperature and other weather variables that affect energy

1 use. Since UE 180, we have been using 15-year moving averages to represent
2 forward-looking weather conditions.

3 **Q. How current are the data you use to estimate the model?**

4 A. We use the most recent historical kWh deliveries and economic data to estimate the model
5 and develop the forecast. For the development of the model in this proceeding, we used data
6 from 1985 through October 2009 for the residential equations and data from 1990 through
7 October 2009 for the nonresidential equations. A limitation of the NAICS- (North America
8 Industry Classification System) based Oregon employment data dictated the latter choice;
9 this data was not available prior to 1990.

10 **Q. What end-use sectors do you forecast in the model?**

11 A. We forecast demand (kWh delivery) by residential, commercial, manufacturing (industrial)
12 customers and energy served under miscellaneous rate schedules. Residential customers are
13 mostly households, but also include dwellings that PGE has connected for electrical service
14 that are not yet occupied. Commercial customers typically are businesses providing
15 services, such as retail and wholesale establishments, schools, hospitals, government and
16 financial institutions. Manufacturing customers include producers of paper, lumber, steel,
17 machinery, micro-processors, computers, truck and aircraft parts, and shipyards, among
18 others, that serve national and global markets.

19 In our model, we group commercial and manufacturing customers according to the
20 NAICS definition of business segments. We develop the kWh projections for the three end-
21 use sectors separately and then sum them together with the forecast of existing
22 miscellaneous schedules (streetlight, irrigation, etc.) to obtain total end-use energy.

1 Finally, we allocate these NAICS-segment delivery forecasts into voltage-level (rate
2 schedule) kWh deliveries using their respective preceding-year ratios. We described in
3 detail these sectors' model specifications and forecast processes in UE 197 and UE 180
4 testimonies.

5 **Q. Do you make any changes or adjustments to the forecast?**

6 A. We adjust the base (B) delivery forecast results to account for impacts on delivery from any
7 electricity price changes, incremental EE programs and AMI projects.

8 **Q. How do you forecast the ultimate loads delivered to the PGE distribution system?**

9 A. This process involves three steps: 1) aggregate cycle-based sector kWh deliveries into
10 various voltage service levels, 2) convert cycle-based deliveries to calendar-based deliveries
11 and 3) add transmission and distribution losses to voltage-service level kWh deliveries to
12 calculate system load in average MW and in MW demand (peak) at the bus bar.

13 **Q. What is the voltage aggregation process?**

14 A. Different customers require different voltage levels to run their appliances or equipment.
15 Residential, most commercial, and some manufacturing customers require *secondary*
16 voltage services (less than 11,000 volts). Most manufacturing and some commercial
17 customers require *primary* voltage services (between 11,000 volts and 57,000 volts). Large
18 manufacturing customers require services at "transmission" voltage (equal to or greater than
19 57,000 volts). We prorate projected kWh deliveries to commercial and manufacturing
20 customers by the most recent service-level allocation factors at the NAICS level to obtain
21 the forecast of kWh deliveries by voltage service levels.

22 **Q. How do you calculate the ultimate load?**

1 A. First we convert cycle-based energy deliveries to calendar-based deliveries using cycle-to-
2 calendar ratios. We then add transmission and distribution (line) losses to the kWh
3 deliveries at the meter to obtain the gross (or bus bar) average MW required to meet the end
4 users' demand. For test year 2011, we apply line loss factors based on those used in UE 197
5 and adjusted for the AMI effect. We use monthly and annual voltage-level load factors to
6 calculate the monthly MW and annual peak MW based on the projected average MW. PGE
7 Exhibit 1411 displays the forecast of total distribution loads in annual average MW and MW
8 peak demand.

III. Forecast Results

1 **Q. What are the key results of your residential sector forecast?**

2 A. We project 2010 deliveries of 7,683 million kWh using the base model (B) and a lower
3 forecast of 7,667 million kWh to 718,072 residential customers after accounting for the
4 effects of incremental energy efficiency programs (E). We assumed no price change in 2010
5 and no savings from AMI in 2010. For the test-year 2011, we forecast deliveries of 7,755
6 million kWh (B) and 7,624 million kWh (M), respectively, to 723,630 residential customers.
7 The assumed price increase, the incremental energy efficiency programs and the AMI
8 programs each and all combine to reduce deliveries in 2011. These delivery levels reflect a
9 +0.9% (B) and -0.6% (M) change from 2010 to 2011, compared to an actual 1.1% growth in
10 kWh delivery, adjusted for weather, in 2009. Both forecasts include outdoor area lighting
11 energy.

12 The forecasts include projections of 6,252 new residential connects in 2010 and 7,478
13 in 2011. The 2011 levels are above the total new residential connects of 6,822 in 2008 and
14 3,813 in 2009, likely the trough of the current housing market cycle. We forecast 0.5%
15 growth in the number of residential customers in 2010 and 0.8% in 2011, compared to a
16 0.5% increase in 2009. PGE Exhibit 1406 shows the forecast of building permits, new
17 connects, and occupied accounts. PGE Exhibit 1407 displays the forecast of kWh use per
18 occupied account and deliveries to residential customers in detail.

19 **Q. What are the key results of your commercial sector forecast?**

20 A. We project deliveries to NAICS-based commercial customers of 7,075 million kWh using
21 the base (B) model and 7,041 million kWh after accounting for the effect of incremental
22 energy efficiency programs for 2010 (E). We assumed no price change in 2010 and no

1 savings from AMI in 2010. For test-year 2011, we forecast deliveries of 7,181 million kWh
2 in the base (B) forecast and 7,069 million kWh in the adjusted (M) forecast. As with
3 residential customers, we expect rising electricity prices to have an impact on kWh delivery
4 to commercial customers, albeit to a lesser degree due to this sector's *inelastic* demand
5 response (i.e., relatively small nonresidential price elasticity). On the other hand, the
6 savings from incremental energy efficiency programs in the commercial sector are larger
7 than those in the residential sector. The AMI programs are expected to raise, not to reduce,
8 kWh delivery in the commercial sector due to the LRP benefit. We forecast energy delivery
9 to this market segment - after accounting for price impacts, EE program savings and AMI
10 benefits - to decrease 0.8% in 2010 as economic weakness persists while EE programs ramp
11 up, but to increase 0.4% in 2011 as the economy strengthens sufficiently to offset the
12 savings generated from incremental EE programs. Delivery to this market segment,
13 adjusted for weather, declined 1.3% in 2009. PGE Exhibit 1408 contains the detailed
14 forecast of deliveries to commercial consumers.

15 **Q. What are the key results of your manufacturing sector forecast?**

16 A. We project total deliveries to NAICS-based manufacturing (industrial) customers of 4,285
17 million kWh using the base model (B) and 4,278 million kWh accounting for price and
18 energy efficiency savings (E) for 2010. For the test-year 2011, we forecast deliveries of
19 4,357 million kWh (B) and 4,320 million kWh accounting for price, energy efficiency and
20 AMI savings (M). We expect only minimal response to electricity price changes due to the
21 industrial sector's *inelastic* response and a slightly larger impact from incremental energy
22 efficiency programs. We forecast delivery (M) to industrial customers to increase 3.2% in
23 2010 and 1.0% in 2011. We have included in the delivery forecast the expected completion

1 and gradually increasing operation of two solar cell and panel manufacturers and expansion
2 of one non-solar company that have constructed plants in the Portland metro area. Delivery
3 to this market segment declined 10.2% in 2009. PGE Exhibit 1409 contains the detailed
4 delivery forecast of the manufacturing sector.

5 PGE's manufacturing sector is concentrated in a few energy-intensive industries and
6 large customers. In 2009, high tech industry accounted for over 42% of all industrial energy
7 delivery, the paper industry at roughly 21% and metals at 11%. Among these, the top dozen
8 customers alone accounted for almost 60% of delivery. As a result, when one or several of
9 these large manufacturing customers decide to add capacity or to shut down operations in
10 response to economic conditions, they have a significant impact on our energy delivery
11 forecast.

IV. Direct Access Forecasts

1 **Q. Did you make a separate forecast of delivery to Schedule 483/489 customers?**

2 A. Yes. PGE separates the delivery of energy to customers served under PGE cost-of-service
3 (COS) rates, including variable-price (market power) purchases for customers who choose
4 this option, and delivery of energy to those few customers who chose service under
5 Schedule 483/489 (non-COS) by 2009 year-end. Schedule 483/489 is the only service under
6 which customers may not receive COS pricing. We pro-rated COS and non-COS deliveries
7 by applying the forecasted kWh shares of these customers to their respective service level or
8 revenue class. PGE Exhibit 1412 shows a forecast of COS and NCOS (Schedule 483/489)
9 deliveries for test-year 2011.

10 **Q. Do you recommend a specific forecast or forecasts of test-year 2011 kWh delivery to**
11 **end-use customers for ratemaking purposes?**

12 A. Yes. I recommend the adoption of the M (post price, energy efficiency and AMI) forecast
13 of 19,243 million kWh delivery to all customers and the forecast of 18,529 million kWh
14 delivery to COS customers for test-year 2011.

V. Forecast Uncertainty

1 **Q. How do you propose to address kWh delivery forecast uncertainty?**

2 A. We can reduce uncertainty by using more current information, data and forecast drivers
3 because conditions could and will likely change between the time PGE develops this
4 forecast and the start of the test year.

5 **Q. Does PGE intend to update its 2011 forecast during this case?**

6 A. Yes, we intend to update the test-year delivery forecast as we have in prior cases with the
7 most current input assumptions and, if necessary, the model. This would include additional
8 actual load data, more current economic data and forecasts for the US and Oregon and large
9 customers' usage forecasts and other components such as demand elasticity and price
10 changes.

11 **Q. Is there risk associated with this forecast?**

12 A. Yes, somewhat. The kWh delivery forecast we submit in this filing is our "expected" or
13 mid-point estimate. As such, it is a 50/50 "point" forecast, 50 percent chance that the actual
14 outcome falls short or exceeds the forecast, typical for "baseline" projections. As with any
15 estimate, actual conditions may differ from what we assumed or anticipated in the forecast,
16 rendering a different outcome.

17 **Q. What are the drivers of uncertainty in your forecast?**

18 A. Our forecast depends on the stability of our model and the accuracy of input assumptions.
19 Our model typically performs well over the *sample* period, the span over which we estimate
20 the model, as it captures most, if not all, behaviors and relationships such as economic
21 activities or customer response to price changes on energy use. We expect our model to
22 perform equally well over the forecast period if these relationships remain unchanged or

1 *stable*. If such relationships change in the test year period in response to significant events
2 that were not anticipated or have never occurred over the historical period, our model will
3 become outdated, or in statistical language *mis-specified*, leading to inaccurate forecasts.

4 The other areas of uncertainty, outside of weather variances, involve input assumptions
5 such as the economy, electricity prices, key customers' operation decisions, new customers'
6 entry or existing customers' exit and the absence of unforeseen natural disasters, wars or
7 geopolitical turmoil. These variables' future outcomes could turn out differently than
8 anticipated, resulting in a significant variance from the forecast.

9 **Q. Are the input assumptions PGE uses to drive its forecast deterministic or subject to**
10 **uncertainty?**

11 A. All input assumptions are subject to uncertainty. PGE used as key drivers the November
12 2009 Global Insight and December 2009 Oregon OEA *baseline* economic forecasts that
13 could change going forward as these organizations develop newer forecasts. These
14 economic forecasts have their own issues of uncertainty. Global Insight at this point
15 maintains a fairly symmetrical risk distribution, assigning 60% probability of occurrence to
16 its November 2009 *baseline* U.S. economic forecast, 20% probability to its *Low Scenario*
17 (False Dawn) and 20% probability to its *High Scenario* (V-Shaped Recovery). As economic
18 realities unfold, Global Insight will likely adjust their baseline forecast as well as their
19 uncertainty distribution as they have in the past. The Oregon OEA uses *stochastic*
20 techniques to develop its uncertainty band. For 2011, OEA (December 2009) forecasts total
21 Oregon employment to grow 2.2% from 2010 (1.3% from 2009) in its *baseline* case,
22 bounded by 1.7% growth (0.2% decline from 2009) in the low case and 2.7% growth (2.9%
23 from 2009) in the high case. Finally, PGE's key customers could operate differently than

1 planned. They could shut down plants, curtail operations, or add new capacity that we did
2 not anticipate or include in the forecast because of their own economic or unique
3 circumstances. One of our large paper customers recently filed for bankruptcy protection,
4 rendering its future operation uncertain at best. We specifically included in this forecast
5 completion and operation of two large solar-panel manufacturers that located to Oregon in
6 2009 and other high-tech customers' expansions. If any of these assumptions fails to
7 materialize, significant deviations from the test-year forecast would result. The risk here is
8 skewed to the downside as we included known upside potential (expansion) in the forecast.

9 **Q. Do changing economic conditions have an effect on your forecast?**

10 A. Yes. The November 2009 Global Insight US forecast, in its baseline case, envisions the
11 GDP to grow 2.2% in 2010 and 2.9% in 2011 and payroll employment to decline in 2010
12 before growing 1.7% in 2011. The OEA baseline forecast similarly anticipates Oregon
13 payroll employment to decline through 2010 before growing 2.2% in 2011. Both forecasts
14 were predicated on a number of assumptions including the effectiveness of on-going fiscal
15 and monetary stimuli. In fact, Global Insight warned in its more recent (December 2009)
16 US economic forecast that “the risk of a *Hard W*, i.e., a double-dip, recession is still
17 uncomfortably high, a one in five chance.” Such an outcome would clearly lead to a
18 significantly lower 2011 test-year delivery than we currently forecast. This indeed happened
19 in 2009 when the recession hit both the US and Oregon much harder than anticipated in late
20 2008 by Global Insight and the OEA. Global Insight then forecasted US GDP to grow 1%
21 in 2009 and OEA projected Oregon nonfarm payrolls to gain 0.3% in 2009. Oregon payrolls
22 dropped 5.1% in 2009 and US GDP declined 2.4% in 2009. Actual energy delivery by PGE,

1 adjusted for weather, was 4.8% below our test-year 2009 forecast that was based on the
2 August 2008 Global Insight and September 2008 OEA economic forecasts.

3 **Q. Is weather also an area of uncertainty?**

4 A. Yes. In UE 180, PGE discussed extensively the uncertainty of the delivery forecast with
5 regard to weather in terms of the *average* or the *mean* condition and the *variance* or
6 *departure from the average* condition in the forecast year. The impact of this uncertainty,
7 expressed as deviation from the mean, is significant because of the large impact of
8 temperature on kWh usage. PGE estimates that one degree variation in temperature could
9 affect (total retail) kWh usage by as much as 1.2% in peak months and as much as 0.7% on
10 an annual basis.

11 **Q. How much can the results vary for these areas of uncertainty?**

12 A. If history is a guide, the effect can be substantial. For example, actual kWh deliveries
13 deviated as much as 8.5% below the 2002 test-year forecast (UE 115) for a number of
14 reasons that included the economic downturn, the aftermath of the West Coast energy crisis
15 and the urgency it generated, the effect of the September 11 attack, and the weather.

16 **Q. How did PGE's forecast of loads for the 2009 test year in UE 197 compare to the 2009
17 weather-adjusted actuals in light of the impact of the 2008/2009 Great Recession?**

18 A. Actual deliveries fell as much as 4.8% below the 2009 test-year forecast (UE 197).

VI. Qualifications

1 **Q. Mr. Nguyen, please describe your qualifications.**

2 A. I received all my undergraduate and graduate education from the University of Oregon. I
3 received my Bachelor of Arts in 1967 and Master of Science in 1972, both in Economics. I
4 also completed all the course work and examinations for a doctoral degree in Economics,
5 except for the dissertation.

6 I joined Portland General Electric Company in 1979. Prior to joining PGE, I worked as
7 an independent consultant and later with Northwest Natural Gas Company as an economist.
8 I oversee the development of PGE's economic and energy forecasting models and have the
9 overall responsibility for the development of PGE's economic and energy forecasts. I am
10 currently a member of the Governor's Council of Economic Advisors, State of Oregon, and
11 a panelist of the Western Blue Chip Economic Forecast, Economic Outlook Center, Arizona
12 State University. On various occasions I have served as a member of the Regional Forecast
13 Panel, the Pacific Northwest Executive at the University of Washington; a member of the
14 Northwest Power Planning Council's Economic and Demand Forecasting Advisory
15 Committees.

16 **Q. Does this conclude your testimony?**

17 A. Yes.

List of Exhibits

<u>PGE Exhibit</u>	<u>Description</u>
1401	(Non-Price) Delivery Forecast by market Segment and Service Level
1402	(Price Effect) Delivery Forecast by market Segment and Service Level
1403	(Post Price & EE) Delivery Forecast by Market Segment and Service Level
1404	(Post Price, EE & M) Delivery Forecast by Market Segment and Service Level
1405	Forecast of Incremental Energy Efficiency Program Savings
1406	Residential Building Permits, New Connects, Vacancy Rates and Occupied Accounts
1407	Forecast of Residential Use per Occupied Account and Ultimate Deliveries
1408	Commercial Deliveries Forecast by NAICS Cluster
1409	Industrial Deliveries Forecast by NAICS Cluster
1410	Forecast of Deliveries under Miscellaneous Secondary Rate Schedules
1411	Total Deliveries and Demand Forecast
1412	Forecast of Deliveries to Cost-of Service and Non-Cost-of-Service Customers