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Attn: Filing Center

**Re: UM 1708; PGE Testimony in Support of the Application for Deferral of Expenses
Associated with Two Residential Demand Response Pilots**

Based on discussions at a UM 1708 workshop held on March 4, 2015, Portland General Electric Company (PGE) agreed to supplement its Application for Deferral of Expenses Associated with Two Residential Demand Response Pilots. Enclosed for filing is PGE's direct testimony in support of its UM 1708 application.

This filing contains non-confidential and confidential work papers. The non-confidential work papers will be posted to the OPUC mailbox for work papers, the confidential work papers are subject to Protective Order No. 14-402, and will be sent under separate cover.

If you have any questions or require further information, please call me at (503) 464-7623 or Patrick Hager at (503) 464-7580. Please direct all formal correspondence, questions, or requests to the following e-mail address pge.opuc.filings@pgn.com.

Sincerely,

A handwritten signature in blue ink that reads "Alex Tooman".

Alex Tooman
Project Manager, Regulatory Affairs

AT/kr

encls.

cc: Service Lists: UM 1708

UM 1708 / PGE / 100
Keller – Macfarlane

**BEFORE THE PUBLIC UTILITY COMMISSION
OF THE STATE OF OREGON**

UM 1708

**Two Demand Response
Pilots**

PORTLAND GENERAL ELECTRIC COMPANY

Direct Testimony and Exhibits of

*Joseph Keller
Robert Macfarlane*

May 5, 2015

Table of Contents

I. Introduction and Overview 1

II. Supporting Research 6

III. Pricing Pilot 13

IV. Direct Load Control Thermostat Pilot..... 23

V. Summary and Conclusions 28

VI. Qualifications..... 29

List of Exhibits 30

I. Introduction and Overview

1 **Q. Please state your names and positions with Portland General Electric (“PGE”).**

2 A. My name is Joseph Keller. I am a Program Manager in Product Development for PGE. I
3 am responsible for Demand Response and Pricing Programs.

4 My name is Robert Macfarlane. I am a senior analyst in Pricing and Tariffs for PGE. I
5 am responsible for pricing.

6 Our qualifications appear in Section VI of this testimony.

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

8 A. The purpose of our testimony is to describe in detail PGE’s two demand response (DR)
9 pilots for which PGE has requested deferred accounting treatment. Specifically, the two DR
10 pilots are: 1) a pricing pilot; and 2) a direct load control (DLC) thermostat pilot.

11 **Q. Please provide a brief summary of the pilots.**

12 A. PGE proposes that we develop two separate pilots by working with the distinct customer
13 segments driving the winter and summer peaks.

14 • Pricing Pilot: This pilot will test the system benefits of peak time rebates (PTR),
15 time-of-use (TOU) rates, and behavioral demand response (BDR) in reducing PGE’s
16 summer and winter peaks. Residential PTR involves paying customers for peak
17 reduction. TOU sends customers various pricing signals to change their peak load
18 and energy use. BDR enables PGE to test the value of information alone.

19 • Direct Load Control (DLC) Thermostat Pilot: This pilot will test the summer peak
20 reduction from directly controlled thermostats in customers’ homes. The pilot takes
21 advantage of connected thermostats already installed in customers’ homes through
22 an incentive to allow the thermostat to be automatically adjusted during peak times.

1 PGE estimates the incremental costs of these two residential pilots to be approximately
2 \$4.0 million. Because of PGE’s ability to leverage its smart meters, these pilots are
3 significantly less expensive than similar studies. For example, the Sacramento Municipal
4 Utility District’s (SMUD) similarly sized pricing study required an \$8.6 million budget.¹

5 **Q. How long will the pilots run?**

6 A. Due to the potential for mild winter or summer seasons, we believe it is necessary to
7 evaluate impacts over at least two successive peak periods for both summer and winter to
8 ensure that our results are valid² and can be reliably used for planning full-scale deployment.

9 **Q. What are the goals you plan to achieve with the DR pilots?**

10 A. The pilots’ goals consist of using the advanced metering infrastructure (AMI) system to test
11 customer response, and thus system benefit, to the pilots’ different approaches. The
12 proposed pilots will enable PGE to test sending PTR and TOU pricing signals, DLC
13 Thermostats, and providing additional education and alerts in order to assist targeted
14 customers in reducing their peak load. From The Brattle Group’s “An Assessment of PGE
15 DR Potential” study and the results of other utilities studies, there is likely an achievable
16 potential of up to 100 MW of residential peak shavings by 2020 in PGE’s service territory.
17 The pilots and their associated evaluations will serve to quantify these values in order to
18 develop full scale program designs. To achieve these goals, we plan to:

- 19 • Offer programs that match our customers’ lifestyles;
20 • Educate customers on peak demand; and
21 • Reward customers for their reduction of peak load.

¹ Potter, Jennifer, *et al.* (2013). SmartPricing Options Final Evaluation US DOE. Page 12. Total budget minus technology portion

² By evaluating two winter and two summer seasons, the study will be protected from idiosyncratic effects such as an especially extreme or mild season that might lead to results that are not representative of typical years.

1 Through the pilots, PGE will identify successful methods for achieving our shared
2 objectives before rolling out full-scale programs to capture the available demand side
3 system benefits.

4 **Q. Are these DR pilots and their timing new concepts?**

5 A. No. PGE’s 2013 integrated resource plan (IRP, Docket No. LC 56 – page 65) and the 2014
6 Smart Grid Report (Section 3.3) discuss the need for these pilots in order to: 1) quantify
7 demand side management capabilities for resource planning; and 2) plan full-scale programs
8 once PGE’s Customer Engagement Transformation (CET) initiative is complete.³ In
9 addition, Commission Order Nos. 13-311 (page 2) and 14-333 (Appendix A, page 3)
10 expressed an interest that PGE “Accelerate the pilot for smart HVAC and smart
11 thermostats.” Further, Commission Order No. 14-415 from the 2013 IRP acknowledgement
12 states that “PGE should pursue other [i.e., than EnerNOC, automated demand response] DR
13 options in light of looming energy and capacity needs.” (See page 9, item III. B. 2. b.)

14 **Q. What is the relationship between the pilots and completing PGE’s CET initiative?**

15 A. PGE has described the CET initiative in its last three general rate cases: UE 262 (PGE
16 Exhibit 900), UE 283 (PGE Exhibit 1000), and UE 294 (PGE Exhibit 900). In summary,
17 CET includes both large and small initiatives that focus on process improvements, business
18 strategies, operational efficiencies, employee development, and replacement of PGE’s
19 Customer Information System (CIS) and Meter Data Consolidator (MDC). After CET is
20 complete in 2018, PGE will be positioned to implement fully scaled DR programs that rely
21 heavily on CIS and MDC processing. These pilots will provide the necessary information
22 on the type of programs PGE should take to scale.

³ Thus allowing time for testing, evaluation, and learning while CET is in development.

1 Realistically, there is a narrow window for implementing the pricing pilot in relation to
2 CET implementation because it will take approximately six months to program the current
3 CIS system, engage a support vendor, plus plan and execute customer recruitment.
4 Furthermore at the end of 2015, CET implementation will result in strict system change
5 controls to PGE's existing CIS. After that time, PGE will not be able to execute the pilot
6 until after CET is operational. To address this, PGE's proposed timing for the pricing pilot
7 will enable us to complete it and its evaluation to provide valuable information on which
8 program should be taken to scale, and how to accomplish that, in advance of CET
9 completion.

10 **Q. Will the pilots' results affect IRP assumptions or planning?**

11 A. PGE is undertaking these pilots to help tangibly quantify the system benefits
12 of dynamic pricing and smart thermostats in our service territory. Ultimately, PGE cannot
13 state definitively how the pilots' results will affect IRP assumptions or planning practices
14 until: 1) the pilots are complete; 2) their final evaluations/reports are available; and 3) other
15 parties evaluate the final reports and determine which fully scalable program(s) will be
16 implemented subsequent to the completion of CET. PGE does not anticipate these
17 conditions will be satisfied in time to be incorporated in the 2016 IRP. Instead, PGE
18 anticipates including achievable demand response potential forecasts in its IRP assumptions
19 and planning process⁴ and that the results of these pilots will be used to inform a future IRP.

20 **Q. Will the pilots provide any other benefits for PGE's system?**

⁴ As part of the 2013 IRP, PGE commissioned the Brattle Group to review the demand response potential in the PGE service area. This study identified a 1-3% peak reduction opportunity from time of use pricing, peak time rebates, and direct load control programmable controllable thermostat programs that could potentially create significant system benefit compared to supply-side capacity resources.

1 A. Yes. The pilots will help create a more diverse demand side management portfolio, which
2 is currently dependent on the commercial and industrial (C&I) sector (i.e., Schedule 77 and
3 the Energy PartnerSM Automated Demand Response pilot). These programs currently have
4 25.3 MW enrolled as of April 2015. By pursuing residential programs, PGE will be able to
5 capture peak reductions during the time periods when the C&I market has issues
6 participating (i.e. events after 5:00 PM and before 7:00 AM). PGE's peaks are often outside
7 these hours.

8 **Q. Does PGE currently have any residential DR programs?**

9 A. Yes. PGE's voluntary TOU program is a basic form of BDR. Customer surveys, however,
10 suggest this program is viewed as difficult and complicated by customers. Consequently,
11 the only customers that remain on the current TOU program are those who significantly
12 lower their bill. Ultimately, it is an industry best practice to have a diversified DR portfolio.
13 The proposed pilots represent PGE's effort to diversify the current portfolio and improve
14 this program by identifying the optimal TOU structure.

15 **Q. How is the rest of your testimony organized?**

16 A. After this introductory section, we explain our choice of the proposed pilots by summarizing
17 the results of other utilities' and our own experiences with DR pilots or programs. In the
18 next section, we provide specific details regarding the pricing pilot. We then provide
19 specific details regarding the DLC thermostat pilot. We follow this by summarizing PGE's
20 proposals in this proceeding. The final section provides our qualifications.

II. Supporting Research

A. Findings from Other Utilities' Experience

1 **Q. Please summarize your findings from other utilities' experience.**

2 A. Based on other utilities' pilots and programs, peak time rebates (PTR) provide the best
3 pricing option for PGE to evaluate in our service territory and with conditions prevalent in
4 the Pacific Northwest. Several studies particularly influenced the development of PGE's
5 pilots and guided our program design, such as the US Department of Energy (USDOE)
6 Smart Grid Investment Grant Consumer Behavior Studies (CBS)⁵. The CBS evaluations
7 provided critical information on load impacts, cost effectiveness, customer adoptions, and
8 the use of enabling technology. Some of these studies also identified aspects regarding
9 enabling technology that informed the design of our proposed DLC thermostat pilot.

10 **Q. What specific studies have you evaluated as part of your research for the two DR**
11 **pilots?**

12 A. The following is a list of the primary programs we evaluated plus a brief summary of the
13 findings:

14 *Baltimore Gas and Electric (BGE)*

15 BGE launched one of the largest PTR programs in the US in the summer of 2013 after a
16 series of dynamic pricing pilots and they expect to reach 900,000 customers in 2015.⁶ BGE
17 found that CPP customers and PTR participants had similar demand impacts, both around
18 20% of usage during critical peak periods. As quoted in the report: "...customers show the

⁵ All available cited studies (excluding those with copyright restrictions) are provided in work papers to this testimony.

⁶ Based on conversations with BGE staff.

1 same responsiveness to dynamic pricing whether it is expressed as a price increase during
2 critical hours or as a peak time rebate.”⁷

3 Similar to PGE’s observations, BGE experienced a high call volume resulting from peak
4 events during their CPP program, whereas BGE’s PTR program led to fewer callbacks and
5 higher customer satisfaction (i.e., BGE’s PTR call back rate was less than 1%⁸). In short,
6 after spending four years studying CPP, PTR, TOU, and enabling technologies, customer
7 satisfaction and adoption rates lead BGE to select PTR as the primary offering they wanted
8 to continue at the program level.⁹

9 *Connecticut Light and Power (CLP)*

10 CLP undertook a study to review Dynamic Pricing (CPP) and PTR with and without
11 enabling technology. Their study demonstrated that while CPP provided greater peak
12 reductions than PTR or regular TOU prices, the CPP program participants increased their
13 overall energy usage unlike the PTR or TOU. The CLP program is also relevant because
14 Connecticut has year round mild climate conditions similar to Oregon.

15 *Austin Energy*

16 The studies from Austin Energy¹⁰ reveal the benefit of residential demand response
17 programs when kept simple. Instead of complicating their DLC thermostat program by
18 incorporating comparisons to baselines and per-kW payments, Austin Energy opted for a
19 single season payment of \$85 for the first season. Based on this, they experienced a 1.2 kW
20 per customer peak reduction and almost 100% participation. The single payment option
21 appears to achieve better results than other pay-for-performance DLC programs.

⁷ Faruqui, A. & Sergici, S. (2011). *BGE - Dynamic pricing of electricity in the mid-Atlantic region: econometric results from the Baltimore gas and electric company experiment*. Journal of Regulatory Economics. 40:82.

⁸ OPower presentations, Ruth Kiselewich *BGE DSM Manager slide 13*

⁹ Based on conversations with BGE staff.

¹⁰ Nest (2014). *Rush Hour Rewards Results from Summer 2013*. Nest Labs White Paper.

1 *Opt-In versus Opt-Out*

2 A cross-study comparison by the USDOE¹¹ found opt-in programs typically have enrollment
3 rates between 5% – 20%, while opt-out programs typically were around 80%. Dropout rates
4 were approximately the same for opt-out and opt-in programs.

5 *Use of Enabling Technology*

6 Most studies show increased load reduction when enabling technologies are included,
7 particularly programmable controllable thermostats (PCTs). The incremental savings for
8 DLC is approximately 10% – 15% above pricing programs alone.^{12, 13, 14} USDOE results
9 indicate that the use of enabling technologies led to a 5% – 10% increase in DR impacts,
10 which is similar to the results found by the Brattle Group.¹⁵ With an installed cost of
11 between \$300 and \$600,¹⁶ however, the incremental savings do not justify the expense. A
12 Navigant Research¹⁷ study predicted that approximately 23% of US households will have
13 PCTs by 2023. PGE assumes that Portland will be similar to the rest of the US.
14 Consequently, PGE has decided to structure our DLC thermostat pilot as a bring-your-own-
15 thermostat design. This allows us to enlist customers who already have or are interested in
16 installing these devices.

¹¹ USDOE. *Analysis of Customer Enrollment Patterns in Time-Based Rate Programs – Initial Results from the SGIG Consumer Behavior Studies*.

¹² *Dynamic pricing of electricity in the mid-Atlantic region: econometric results from the Baltimore gas and electric company experiment*, Ahmad Faruqui · Sanem Sergici, page 8

¹³ *Dynamic Pricing Page 21*

¹⁴ *The Impact of Dynamic Pricing on Residential and Small Commercial and Industrial Usage*, Ahmad Faruqui*, Sanem Sergici**, and Lamine Akaba***

¹⁵ Faruqui, A. & Sergici, S. *Household response to dynamic pricing of electricity—a survey of 15 experiments*. *Journal of Regulatory Economics* (2010), 38:193–225

¹⁶ The majority of the expense is the installation cost of the PCT.

¹⁷ Strother, Neil & Callaway, Lauren, *Smart Thermostats* Navigant Research

1 *Education and Awareness*

2 Research in the CBS evaluations and elsewhere have found that simply notifying customers
3 of critical peak periods, giving tips on how they can save, and providing performance
4 feedback can lead to peak savings of around 3%.¹⁸ PGE will explore this option in our
5 pricing pilot.

6 *Low Income Customers*

7 A key aspect of PTR programs is their success among low-income customers. A simple
8 TOU structure showed mixed results with some low-income segments having higher bills
9 and others having lower bills. PTR, however, entails no risk for the customer and could
10 lead to greater participation rates.¹⁹ Entergy New Orleans found higher rates of satisfaction
11 and engagement from their low-income customers after deploying a PTR program.²⁰

B. PGE's Research

12 **Q. What research has PGE conducted regarding DR alternatives?**

13 A. PGE has conducted significant research on potential options for meeting our IRP's dynamic
14 pricing and DLC program goals for customer-enabled capacity. Below we discuss our
15 recent research efforts which include the Flex PriceSM CPP pilot, the Salem Smart Power
16 Water Heater pilot, customer surveys, load segmentation, and focus groups. Future research
17 will include a discrete choice study on program features and criteria to ensure good designs.

18 *Flex PriceSM CPP pilot*

19 PGE launched this 2-year pilot in November 2011 as a condition of PGE's AMI system.
20 Initial enrollment was 1,043 residential customers but this dropped to 544 by the end of the
21 program due to: 1) customer disqualification (i.e., participation automatically terminated

¹⁸ OPower White Paper. *Transform Every Customer into a Demand Response Resource*.

¹⁹ Faruqui, A. et al (2010). *The Impact of Dynamic Pricing on Low Income Customers* IEE Whitepaper.

²⁰ Entergy New Orleans, Inc. (2014). *Advanced Metering Infrastructure Pilot Final Project Description*. US DOE.

1 when the customers moved); or 2) customer dissatisfaction with the program (i.e., customers
2 joined the pilot to save money but dropped out when they perceived that their savings were
3 not enough to compensate them for the changes made).

4 The pilot demonstrated that CPP has meaningful potential for peak curtailment in PGE's
5 service territory but that significant customer education would be required before
6 substantial, on-going participation could be expected from PGE's customers in such a
7 program. In addition, PGE's cost/benefit analysis demonstrated that it is not cost-effective
8 to implement a fully-scalable CPP program with PGE's existing CIS and MDC. PGE filed
9 the results of the CPP pilot in accordance with Commission order No. 14-152 in May 2014.

10 *Salem Smart Power Water Heater Pilot*

11 PGE tested relays on 20 conventional water heaters, which could be controlled with a direct
12 DR signal for grid balancing. PGE terminated the pilot in 2013 due to issues with the relays
13 and did not expand the pilot due to the high cost of installing new controls.²¹

14 *Customer Surveys Regarding Demand Response*

15 Third-party studies found that 58% of PGE customers are interested in DR opportunities and
16 60% were interested in TOU rates. These customers also identified the desire to have
17 choice in their pricing programs. Although it is normal for customer surveys to reflect
18 interest higher than actual program participation, these numbers correspond to the
19 experience of other utilities for which an opt-in program yielded up to 20% participation.

20 *Load segmentation*

21 Segmentation enables PGE to create targeted program designs and marketing in order to
22 maximize system benefits while minimizing costs. With a goal of addressing peak demand,

²¹ The \$1000+ control installation costs stemmed from variability in water heater installation resulting from the need to meet local codes.

1 PGE worked with a third-party consultant in 2014 to segment residential load using AMI
2 data. This research used interval data from our load research sample to conduct cluster
3 analysis, grouping customers based on their summer and winter peak period load shapes.
4 The result was the identification of five distinct load segments. Two segments drove the
5 winter peak while two other segments (one in particular) drove summer peak usage.

6 **Q. What specifically does the load segment detail indicate?**

7 A. PGE Exhibits 101 and 102 provide graphical representations of the impacts on winter and
8 summer loads by each of five customer segments. The winter peaking segments (Segments
9 1 and 2 in Exhibit 101) are mostly mid- to low-income customers and are either rural, fixed
10 income, manufactured homes, or young to middle aged. These customers represent 48% of
11 PGE's winter peak. They likely have electric heat and water heaters, they tend to live in
12 smaller home or multifamily homes, and most are renters.

13 These customers are critical to achieving winter peak time reductions. To reach these
14 customers and achieve the best results, incentives will need to be used to entice them into a
15 DR program. Based on PGE's research of other utility programs, we believe that a PTR will
16 be most effective in attracting, retaining, and achieving DR performance from these
17 segments.

18 **Q. What have you concluded regarding summer peaking segments?**

19 A. The summer peak is attributable to urban and suburban affluent customers in large, newer-
20 construction homes (Segments 4 and 5 in PGE Exhibit 102). They also tend to be single-
21 family homeowners with gas heat and air conditioning. These segments are also the
22 customers most likely to have a smart DLC thermostat that could be used for a bring-your-

1 own-thermostat DLC program. Because they typically utilize gas heat, these segments
2 contribute little to winter peak.

3 **Q. Does Segment 3 contribute significantly to load?**

4 A. No. Load Segment 3 represents 19% of the PGE residential load and has mixed fuels in
5 smaller homes. Hence, they are not a significant contributor to PGE's peaks.

III. Pricing Pilot

1 **Q. Please summarize PGE’s objectives for the pricing pilot.**

2 A. Our primary objective is to test and compare the results from a series of potential pricing
3 programs in order to recommend a cost-effective pricing program once CET is complete.
4 To do so, the pricing pilot will target the four customer segments (see Section II. b., above)
5 that drive summer and winter peak load by using a combination of education about peak
6 energy usage, alerts, peak time rebates, and/or a variety of TOU pricing.²² PGE will apply
7 industry standard experimental design to the pricing pilot and employ a recruit-and-deny
8 method to provide reliable estimates for designing full scale programs.

9 **Q. How will you identify eligible participants for the pilot?**

10 A. PGE will use the following criteria to identify the pool of eligible customers:

- 11 • Residential customer not currently enrolled in TOU pricing;
- 12 • Greater than 100 kWh consumption per month;
- 13 • 12 months of previous available billing data;
- 14 • Not currently on a time-payment agreement; and
- 15 • Member of a target segment (i.e., Segments 1, 2, 4, or 5).

16 All customers meeting the above criteria will be considered eligible to participate. In
17 addition, all customers are capable of participating, as there are no technology requirements
18 in the pricing pilot. PGE will perform targeted marketing to customers with higher potential
19 for peak load reductions, based on their load segment. These customers will then receive an
20 invitation to join the pilot with information showing their bill impacts. The invitation will
21 be via e-mail and US mail.

²² PGE is not proposing CPP as part of this pilot because the CPP-only pilot and its evaluations are already complete.

1 **Q. How do you plan to recruit customers for the pilot?**

2 A. PGE will recruit customers based on our knowledge of what motivates them to enroll into a
3 program. This may be done with sustainability messages, neighborhood competitive
4 messages, or savings messages. In all cases, customers will be shown their current bill and
5 will receive a complete set of customized solutions (based on their segment) that would
6 affect their bill while on the new rates. For example, they could consider moving laundry to
7 a different time or turning the heat down during peak periods. The targeted program would
8 provide them with savings opportunities for changes in behavior as well as provide system
9 benefits.

10 **Q. How will you select from eligible customers?**

11 A. PGE will perform the following steps:

- 12 • We will assign eligible customers to one of the pilot tracks (described below).
- 13 • A minimum number of customers will be recruited into each pilot track. The exact
14 distribution across tracks will be completed upon review with the vendors associated
15 with the pilot's implementation and evaluation.
- 16 • PGE will take a random sample of customers who accept the opportunity to
17 participate. Customers who are not accepted into the pilot will receive a nominal
18 reward and will be assigned to the "Schedule 7 Informed" track.

19 **Q. Please describe the customer tracks in more detail.**

20 A. Table 1, below, lists the tracks that we propose for the pricing pilot. Based on this structure,
21 PGE will be able to measure the incremental impact of TOU or PTR versus
22 education/information alone. The control group will then serve as the comparison for any
23 intervention. Although the structure looks complicated, each track is simple and distinct.

Table 1, Pricing Pilot Tracks

| | Schedule 7 Control Group | Schedule 7 Informed | Day and Night TOU | Peak only TOU | Revised TOU |
|-------------|--------------------------|---------------------|-------------------|---------------|-------------|
| Without PTR | 35,000 | 1,000 -35,000 | 250 – 1,000 | 250 – 1,000 | 250 – 1,000 |
| With PTR | | 250 – 1,000 | 250 – 1,000 | 250 – 1,000 | 250 – 1,000 |

- 1 • Track 1; Schedule 7 Control Group – a like group of customers on the current price
 2 structure and with no additional information.
- 3 • Track 2; Schedule 7 Informed – includes customers on the current price structure who
 4 will receive peak event information to test how someone responds to a notice that there
 5 will be a peak event when there is no pricing incentive for complying.
- 6 • Track 3; Schedule 7 Informed plus PTR – same as Track 2, but will offer a PTR incentive
 7 to see how much more that affects their response.
- 8 • Track 4; Day & Night TOU – tests customer response to a price differential between
 9 using their power in the evening as opposed to during the day.
- 10 • Track 5; Day and Night TOU plus PTR – same as Track 4, but will offer a PTR incentive
 11 to see how much more that affects their response.
- 12 • Track 6; Peak Only TOU – tests TOU pricing but the customer pays one rate for any
 13 time that is not considered the peak time of day. For example, in the summer customers
 14 pay a different rate on usage from 3-8 p.m. Monday through Friday versus what they pay
 15 during any other hour of any other day.
- 16 • Track 7; Peak Only TOU plus PTR – same as Track 6, but will offer a PTR incentive to
 17 see how much more that affects their response.

- 1 • Track 8; Revised TOU – uses the structure of our current TOU program but with on-peak
2 hours constant across the seasons.²³
- 3 • Track 9; Revised TOU plus PTR – same as Track 8, but will offer a PTR incentive to see
4 how much more that affects their response.

5 **Q. Will PGE be performing all of the pilots' operations?**

6 A. No. PGE does not currently have the systems or expertise in-house to perform all the
7 operations necessary to run the pricing pilot. Consequently, we will contract with a third-
8 party vendor to: 1) determine the individual customer performance; 2) provide customer
9 notifications; and 3) calculate the PTR rewards for customers that curtail during an event.
10 The vendor will also provide customers with energy information and tips on how they can
11 save during peak times. These results will be provided via a number of channels (e.g.,
12 email, text, and web) to keep the customers as engaged as possible.

13 **Q. Will any enabling technology be evaluated as part of the pricing pilot?**

14 A. No. As discussed in Section II, above, while available technologies can increase the impact
15 of DR programs, we have not included them in our pricing pilot because we do not believe
16 they would be cost-effective. We will not exclude customers with these technologies from
17 participating in the pilot, but they will not be an explicit part of the program design. Finally,
18 as discussed in Section IV, below, PGE is proposing the DLC thermostat pilot to directly
19 evaluate enabling technology.

20 **Q. How will you develop the customers' performance metrics?**

21 A. The third-party evaluator will estimate PTR demand impacts econometrically using
22 historical data from both the treatment and control groups. Using PGE's AMI system to

²³ Addresses a current customer concern with the program.

1 calculate the load profile for each participating customer, this analysis will estimate both
2 event period impacts as well as impacts during hours just before and after events to
3 determine any possible pre- or rebound-effects. Opt-out rates will also be tracked for each
4 PTR event.

5 **Q. How will you calculate the individual rebates?**

6 A. Individual rebates will be measured as the difference in energy consumed over the peak
7 period and the customer's personalized baseline. Each customer participating will have
8 their baseline calculated using similar methodology applied in PGE's Schedule 77 and
9 Energy PartnerSM pilot. This methodology averages the five highest days out of the last ten
10 weekdays excluding holidays and event days. The customer's peak event performance will
11 then be compared against their baseline to determine whether a reduction occurred and what
12 rebate the customer may have earned.

13 **Q. Do you also plan to evaluate customer satisfaction with the pilot?**

14 A. Yes. PGE will contract with a third-party evaluator to measure customer satisfaction
15 through surveys at the end of each season to determine if customers are satisfied with their
16 experience. Where problems are identified, we will address them on an on-going basis.

17 **Q. What will be your criteria for calling PTR events?**

18 A. PGE expects to call events at least once a season, with additional events called as indicated
19 by the following criteria²⁴ (these are also used in the Schedule 77 program and Energy
20 PartnerSM pilot):

- 21 • PGE load is forecasted to be in the top 1% of hourly load. In most cases, this is the
22 top 0.4% of forecasted load.

²⁴ If PGE load is not expected to peak, economics will not be a basis for calling an event.

- 1 • PGE load peaks are generally on hot days in the summer (>90 degrees) or cold days
- 2 in the winter (<32 degrees).
- 3 • Generation heat rates and Mid-Columbia prices are both high.
- 4 • Wind generation is expected to be low or transitioning.

5 **Q. Please describe your methodology for calling an event.**

6 A. First, PGE will determine the need for an event, one day in advance, by collecting the data
7 described above and evaluating other general criteria such as grid needs, current conditions,
8 plus load and pricing trends as discussed with key PGE personnel. If the criteria justify an
9 event, the pilot manager will call one by logging onto a secure web site (FERC Level
10 Security) and input the timing and duration of the event. The third-party vendor will then
11 send day-ahead notices to customers via their preferred communication channel(s) (e.g.,
12 phone, email, text message) informing them of the time and duration of the event plus a
13 reminder of the rebate level. Customers will also receive reminders and alerts closer to the
14 event by means of their selected format.

15 **Q. What do you propose for event duration and frequency?**

16 A. PGE proposes that pilot events be up to five hours in duration. A PGE analytical review of
17 our peak load and all of the USDOE studies indicate that there is no optimal duration for
18 events; however, two- to four-hour events are believed to meet PGE's peak requirements.
19 In fact, one research finding from this pilot would be to verify optimal event duration and
20 effects under different weather conditions for different customer profiles. For event
21 frequency, PGE proposes to call a maximum number of ten events per season and limit
22 calling them to no more two days in a row.

23 **Q. Can customers choose to opt-out of a PTR event?**

1 A. Yes, although there is no need for customers to notify PGE if they intend to opt-out of an
2 event. They will simply not receive a rebate if no demand reduction is observed from their
3 load data.

4 **Q. How quickly will customers be informed of their performance after an event and**
5 **when/how will the calculated rebates be processed?**

6 A. The day after an event, the third-party vendor will send customers a notice via their selected
7 communication channel(s), informing them of their curtailment amount and the rebate that
8 they will receive. Although the customer's monthly billing will remain part of PGE's
9 current system, the third-party provider will pay PTR benefits by individual checks at the
10 end of each season. In addition, customers can track their rebates for each event by means
11 of a web portal.

12 **Q. What amount do you propose to offer for the actual rebate and on what is it based?**

13 A. We currently plan to offer a rebate of \$0.83/kWh. While we may experiment with higher
14 and lower rates, pending discussions with our implementation vendor, \$0.83/kWh will be
15 the initial rate for all participants. This value is based on the cost of an F-Frame, single
16 cycle combustion turbine (SCCT) peaking plant, de-rated by 50% to account for reliability
17 and availability differences between the resources, as summarized in Table 2, below.

Table 2, PTR Calculation

| Variable | Value | Units |
|---------------------------|--------------|--------------|
| Frame F SCCT | \$124.46 | \$/kW-Year |
| Transmission Losses | 1.90% | |
| Secondary Internal Losses | 4.74% | |
| Total Losses | 6.64% | |
| Program Hours per Year | 80 | hrs |
| Gross Price | 1.67 | \$/kWh |
| De-Rate | 50% | |
| Price After De-Rate | 0.83 | \$/kWh |

1 **Q. The pilot also intends to evaluate TOU pricing. Please describe this in more detail.**

2 A. One of the pilot's aims is to help us understand the value of residential TOU programs for
3 peak reduction and energy saving in PGE's service area. To that end, we have evaluated
4 information from our own DR pilots and other utilities' programs, plus PGE's peak and
5 non-peak periods from the four contributing load segments described above. The factors
6 PGE specifically reviewed were the peak load duration, customer effects, retention, and
7 program persistence. PGE Exhibit 103 provides an outline of the proposed TOU periods to
8 be tested in the pricing pilot. These are designed to capture weekday peak hours during
9 each season, while maintaining consistency between seasons.

10 **Q. What rates do you propose for the different TOU periods?**

11 A. The proposed TOU pricing is designed to be rate neutral on an annual basis, assuming no
12 change in energy usage behavior by participants. Differentials in peak periods are based on
13 the final 2015 forward market energy prices used in PGE's power cost forecasting model,
14 MONET. To derive the rates, PGE identified the day with the highest projected summer
15 peak. For that day, we then averaged the hourly prices for each peak period to establish
16 differentials between the peak periods. The differential was then applied to the annual
17 average kWhs in a month for each peak period so that it yielded the same bill as on PGE's
18 standard residential rate schedule. Ultimately, the goal is for the rates to reflect PGE's
19 variable power cost in the different periods and reward customer for lowering costs.

20 **Q. What rates do you propose for the different TOU periods?**

21 A. We have currently identified ranges of prices (listed in Table 3, below) and plan to finalize
22 them as we complete the pilot's details as part of this proceeding.

Table 3, TOU Price Ranges

| Track | Peak (cents) | Mid Peak (cents) | Off Peak (cents) |
|---------------|----------------|------------------|------------------|
| Day and Night | 8.171 – 10.235 | | 3.438 – 5.972 |
| Peak Only | 8.511 – 13.947 | | 4.250 – 6.668 |
| Revised TOU | 8.546– 13.932 | 7.465 – 8.321 | 2.465 – 6.054 |

1 **Q. When do you plan to decide on the TOU prices?**

2 A. PGE is completing a discrete choice survey of customers and will have the results at the end
3 of May. Final pricing will be informed by those results and we expect to file a tariff with
4 prices and conditions in June.

5 **Q. Do you plan to have the pilot fully evaluated?**

6 A. Yes. PGE is currently developing a request for proposals (RFP) to solicit a third-party
7 evaluator to provide ongoing evaluation, measurement, and verification throughout the pilot.
8 Our plan is to have the evaluator in place prior to the start of customer recruitment to allow
9 them an opportunity to: 1) consult on the implementation of the experimental design; 2)
10 conduct all necessary randomization; and 3) ensure that the necessary data are being
11 collected. The evaluator will also provide full process and impact evaluation reports at the
12 end of the pilot’s first year and after the pilot’s completion.

13 **Q. How much do you believe that the pricing pilot will cost?**

14 A. PGE estimates the incremental costs of the pricing pilot to be approximately \$2.5 million as
15 listed in Table 4, below. The cost for the customers’ rebates is included in the pilot’s cost
16 estimate, which assumes an early 2016 start date.

Table 4, Estimated Pricing Pilot Cost by Year (\$000)

| Pilot | 2015 | 2016 | 2017 | Total |
|-------------|----------|--------|--------|----------|
| Annual cost | \$ 1,595 | \$ 735 | \$ 240 | \$ 2,570 |

17 **Q. What is PGE’s proposed timeline for the pricing pilot by activity?**

1 A. PGE is targeting the pilot launch to be in early spring 2016 – see PGE Exhibit 104 for the
2 full timeline.

3 **Q. What do you ultimately plan to achieve by completing the pricing pilot?**

4 A. PGE believes that successful completion of the pricing pilot will lead to a cost effective opt-
5 in PTR and TOU program at scale with participation levels between 10-20%. Program costs
6 and benefits will be evaluated using a total resource cost test. Similar to how we evaluated
7 PGE’s CPP pilot, we will assume a range of possible participation levels and apply benefits
8 based on the derated avoided cost of a least-cost, supply-side resource. We will then
9 compare the benefits to the program’s costs over time and discount the amounts back to a
10 net present value. All calculations will be consistent with industry best practices as outlined
11 in FERC’s National Action Plan on Demand Response.²⁵

²⁵ Woolf, et al. (2013). *A Framework for Evaluating the Cost-Effectiveness of Demand Response*. FERC.

IV. Direct Load Control Thermostat Pilot

1 **Q. What are PGE’s objectives for the DLC thermostat pilot?**

2 A. The DLC thermostat pilot will target customer segments 4 and 5 who drive peak load in the
3 summer season. This pilot will test the value of DR using PCTs that are already installed in
4 customer homes, which means it will be a bring-your-own-thermostat program.
5 Consequently, we expect to achieve significant cost-effective DR benefits because the pilot
6 will not include the cost of installing and maintaining the customer’s enabling technology.

7 Other objectives include:

- 8 • Implementing a two-year pilot that will target up to 5,000 customers;
- 9 • Focusing on the summer season due to a stronger likelihood of having controllable
10 systems;
- 11 • Having participants receive a signup payment as well as seasonal incentive payment;
- 12 • Demonstrating measurable savings of between 0.8 kW and 1.2 kW per customer; and
- 13 • Enabling a program that can be taken to scale.

14 **Q. How will you select customers for this pilot?**

15 A. As noted in Section II, above, PGE will target customers that already have or are interested
16 in installing a PCT and are in segment 4 or 5. More specifically, PGE will send invitations
17 to all customers that have PCTs produced by the vendor with whom we are contracting to
18 run the DLC thermostat pilot. In addition, they must be PGE customers with air
19 conditioning or heat pump cooling.

20 **Q. How exactly will you enroll the participating customers?**

21 A. PGE and the vendor will solicit enrollment with e-mails, texts, and direct mail. If interested,
22 a customer will sign up for the pilot on the vendor’s website; part of which will include the

1 customer's PGE account information. PGE will then verify the account and enroll the
2 customer on PGE's system. Customers will receive a \$25 incentive for enrolling.

3 **Q. What is the purpose of contracting with a particular PCT vendor?**

4 A. The reason is that the vendor's system manages the PCTs on a daily basis per agreement
5 with their customers. By modifying settings and timing, the system actually learns the
6 customer's preferences and tolerances. The system will then use accumulated knowledge
7 about the customer to execute a PGE-called DR event in the customer's home. This may
8 occur by changing set points, pre-cooling, or cycling customer air-conditioning settings.
9 The customer, in turn, accepts the opportunity to participate in DR events through the
10 vendor's system, ostensibly without effort or inconvenience.

11 **Q. How will you select the vendor?**

12 A. PGE is currently negotiating with vendors that meet the following criteria:

- 13 • Installed base of at least 5,000 PCTs in PGE's service territory;
- 14 • Mobile app, website, and text capability;
- 15 • Developed and tested procedures for calling DR events;
- 16 • Learning and communicating thermostats enabled with Wi-Fi;
- 17 • Proven track record for DR events at other utilities; and
- 18 • Has worked with the Energy Trust of Oregon

19 **Q. How will PGE call DR events and how will they implemented?**

20 A. PGE will call events and notify customers 24 hours in advance. Customers will be notified
21 by mobile application, e-mail, and on the thermostat itself. During events, the vendor's
22 system will implement the curtailment measure(s) learned to work best per individual

1 household. No other effort is required by customers, who can see their thermostat in an
2 event and know they have agreed to participate.

3 **Q. Can customers choose to opt-out of an event?**

4 A. Yes. Customers can elect to opt-out at any time on their mobile device or on the thermostat.

5 **Q. What is the duration and frequency of events in the DLC thermostat pilot?**

6 A. We currently plan for program events to be three hours in duration and propose to call a
7 maximum number of ten events per season, limiting them to no more two days in a row.

8 **Q. Will the criteria for calling events be any different from those in the pricing pilot?**

9 A. No. The methodology used to call events will be the same as that described in Section III,
10 for the pricing pilot.

11 **Q. What incentive will you offer the selected customers for their participation?**

12 A. PGE will provide enrolling customers a \$25 sign-up incentive plus \$25 per season for
13 participating in events. PGE will monitor customer participation so that customers who fail
14 to participate in at least 50% of the events will not receive their season payment.

15 **Q. What is the basis of the \$25 amount?**

16 A. The amount is comparable to the cost of PGE's other commercial DR programs, Schedule
17 77 and Energy PartnerSM.

18 **Q. How will you measure the effectiveness of this pilot?**

19 A. Similar to the pricing pilot, we plan to evaluate the DLC thermostat pilot after each
20 operating year of the pilot. This will involve estimating demand impacts econometrically
21 using historical data from the treatment group and a control group. This analysis will
22 evaluate both event period impacts as well as impacts in hours just before and after events to
23 determine pre-event or rebound effects. Opt-out rates will also be tracked for each event.

1 Customer satisfaction will be measured through surveys at the end of each season to
2 determine if customers are satisfied with their experience. Where problems are identified,
3 we will address them on an on-going basis.

4 **Q. Will you measure cost-effectiveness in a manner similar to that described above for the**
5 **pricing pilot?**

6 A. Yes. The methodology described in Section III applies equally to the DLC thermostat pilot
7 as it does for the pricing pilot and the CPP pilot.

8 **Q. How much do you estimate that the DLC thermostat pilot will cost?**

9 A. Table 5 summarizes the costs for setting up and running the pilot as well as the customer
10 payments for sign-up and participation. The total amount, however, will vary with
11 participation.

Table 5, Estimated DLC Thermostat Pilot Cost by Year (\$000)

| Pilot | 2015 | 2016 | 2017 | Total |
|-------------|--------|--------|-------|----------|
| Annual cost | \$ 955 | \$ 412 | \$ 75 | \$ 1,442 |

12 **Q. What is your proposed timeline for the DLC thermostat pilot by activity?**

13 A. PGE has issued an RFP for the PCT vendor and our goal is to have a one selected by the end
14 of this month (April 2015). Once the vendor is selected and Commission approval to
15 proceed is given, PGE has a team identified to integrate PGE's and the vendor's systems.
16 We hope to complete these activities in time for a summer 2015 start, which corresponds
17 with Table 5, above. If this timing proves to be impracticable, PGE is also working with the
18 vendor on how to enable a potential winter program. Otherwise, PGE will have the program
19 in place for a summer 2016 launch.

20 **Q. What do you plan to achieve by completing the DLC thermostat pilot?**

1 A. The design of this pilot will allow PGE to evaluate the potential of a full-scale DLC
2 thermostat program. In addition, a fully scaled program would be independent of PGE's
3 CET project, because the PCT vendor's system would continue to perform the program's
4 primary activities (i.e., there is no impact on PGE's metering or billing systems). Assuming
5 the program is cost effective, PGE would propose to implement the program at scale.

V. Summary and Conclusions

- 1 **Q. Please summarize your proposals for the two pilots.**
- 2 A. The DLC thermostat and pricing pilots represent major steps to develop programs at scale
3 that will capture significant residential demand side value in PGE’s service area. The
4 pricing pilot will enable PGE to test eight different program designs simultaneously. The
5 DLC thermostat pilot represents the best opportunity for cost effective direct load control.
6 Additionally, the DLC thermostat pilot builds on investments made by Energy Trust of
7 Oregon to fund significant PCT deployment. Further, PGE proposes that both pilots have
8 detailed evaluations performed after each operating year, as has occurred in the Flex PriceSM
9 (CPP) and Energy PartnerSM (ADR) pilots.
- 10 **Q. What do you recommend regarding the two DR pilots?**
- 11 A. PGE recommends that the Commission: 1) approve PGE’s request for deferred accounting
12 treatment for the two DR pilots; and 2) authorize PGE to implement the pilots according to
13 the proposals set forth.

VI. Qualifications

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

2 A. I received both my Bachelor of Science in Industrial and Systems Engineering emphasizing
3 Operations Research and information system design as well as my Master of Business
4 Administration focused on High Technology and New Market Development from the
5 University of Southern California. Since joining PGE in 2013, my work has been directed
6 at new program development for pricing, DR, and Energy Information Systems. Prior to
7 PGE, I have held Group Product Manager and Product Development positions at Epson,
8 Hewlett-Packard, Sharp Laboratories, and Xerox. I have 25 years experience in market
9 research, product test marketing, market development, and digital experience management.

10 **Q. Mr. Macfarlane, please state your educational background and experience.**

11 A. I received a Bachelor of Arts business degree from Portland State University with a focus in
12 finance. Since joining PGE in 2008, I have worked as an analyst in the Rates and
13 Regulatory Affairs Department. My duties at PGE have focused on pricing and regulatory
14 issues. From 2004 to 2008, I was a consultant with Bates Private Capital in Lake Oswego,
15 OR, where I developed, prepared, and reviewed financial analyses used in securities
16 litigation.

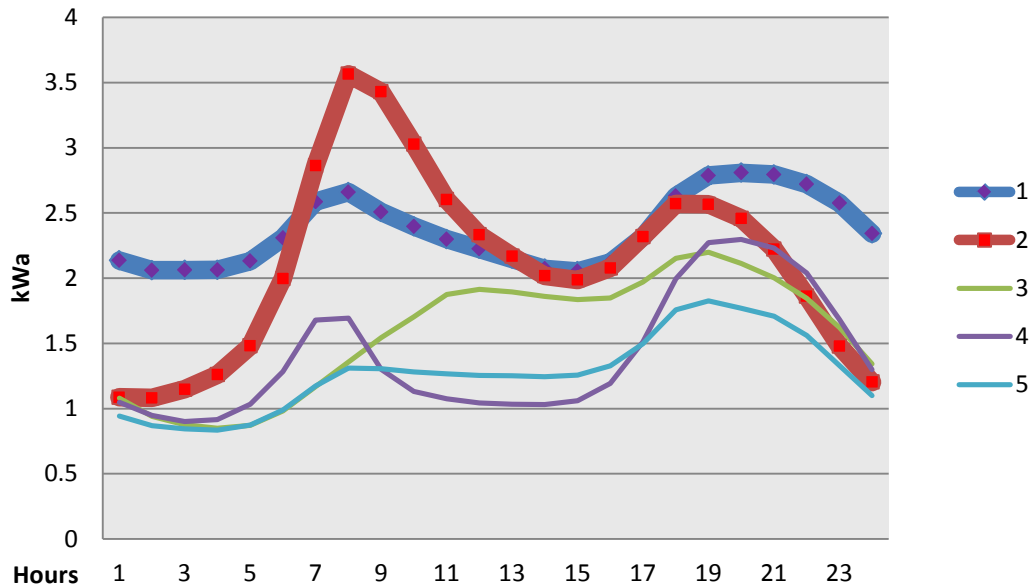
17 **Q. Does this conclude your testimony?**

18 A. Yes

List of Exhibits

| <u>PGE Exhibit</u> | <u>Description</u> |
|--------------------|----------------------------------|
| 101 | Residential Winter Load Segments |
| 102 | Residential Summer Load Segments |
| 103 | Proposed Time of Use Periods |
| 104 | Pricing Pilot Timeline |

Residential Load Segments (Winter Weekdays)



Load Segment descriptions:

Segment 1 – Winter Peak – Represents 30% of PGE winter residential load and 29% of winter morning peak. The group primarily consists of renters in smaller, single-family homes and multi-family buildings. They tend to be lower income, younger, and smaller households. They mostly have electric space and water heating systems. They represent 21% of PGE residential customers.

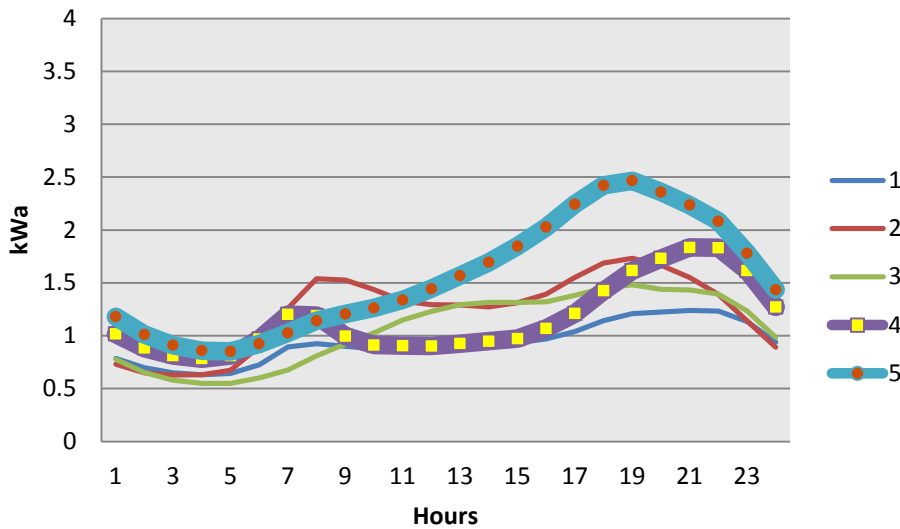
Segment 2 – Winter Peak – Represents 14% of PGE winter residential load and 20% of winter morning peak. The group primarily consists of owners of smaller single-family homes. They tend to be lower income, older, and more rural households that mostly have electric heating systems. They represent 11% of PGE residential customers.

Segment 3 – Represents 18% of PGE winter residential load and 16% of winter morning peak. The group primarily consists of dual-fuel households and are mostly renters. They represent 19% of PGE residential customers.

Segment 4 – Represents 20% of PGE winter residential load and 18% of winter morning peak. The group primarily consists of owners of newer single-family homes. They tend to be middle income and urban. They represent 24% of PGE residential customers.

Segment 5 – Represents 18% of PGE winter residential load and 17% of winter morning peak. The group primarily consists of owner’s larger single-family homes. They tend to be lower income, older, and more rural households. They mostly have electric heating systems. They represent 25% of PGE residential customers.

Residential Load Segments (Summer Weekdays)



Load Segment descriptions:

Segment 1 – Represents 17% of PGE summer residential load and 15% of summer peak. The group primarily consists of renters in smaller, single-family homes and multi-family buildings. They tend to be lower income, younger, and smaller households. They represent 21% of PGE residential customers.

Segment 2 – Represents 11% of PGE summer residential load and 11% of summer peak. The group primarily consists of owners of smaller single-family homes. They tend to be lower income, older, and more rural households. They represent 11% of PGE residential customers.

Segment 3 – Represents 17% of PGE summer residential load and 17% of summer peak. The group primarily consists of dual-fuel households. They are also mostly renters and represent 19% of PGE residential customers.

Segment 4 – Summer Peak – Represents 24% of PGE summer residential load and 23% of summer peak. The group primarily consists of owners of newer single-family homes. They tend to be middle income and urban. They represent 24% of PGE residential customers.

Segment 5 – Summer Peak – Represents 32% of PGE summer residential load and 35% of summer peak. The group primarily consists of owners of larger single-family homes. They tend to be affluent suburban households with air conditioning systems. They represent 25% of PGE residential customers.

Proposed Time of Use Periods for Pricing Pilot

Standard Schedule 7 rate

| | | | | | | | | | | | | | PM | | | | | | | | | | | |
|--|---------------|---|---|---|---|---|---|---|---|----|----|----|----|---|---|---|---|---|---|---|---|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Standard Rate | | | | | | | | | | | | | | | | | | | | | | | |

DAY / NIGHT TOU

| | | | | | | | | | | | | | PM | | | | | | | | | | | | | | | | | |
|--|------------|---|---|---|---|---|----------|---|---|----|----|----|----|---|---|---|---|---|---|---|---|----|----|----|------------|--|--|--|--|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | | | | |
| | Night Rate | | | | | | Day Rate | | | | | | | | | | | | | | | | | | Night Rate | | | | | |

Peak Only TOU

| | AM | | | | | | | | | | | | PM | | | | | | | | | | | | | | | | | |
|--------|----------|---|---|---|---|---|----------|---|---|----|----|----|----------|---|---|---|---|---|---------|---|---|----|----|----|-----|--|--|--|--|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | | | | |
| Summer | Off Peak | | | | | | Off Peak | | | | | | On Peak | | | | | | Off | | | | | | | | | | | |
| Winter | Off Peak | | | | | | On-Peak | | | | | | Off Peak | | | | | | On Peak | | | | | | Off | | | | | |

Revised TOU

| | AM | | | | | | | | | | | | PM | | | | | | | | | | | | | | | | | | | | | | | |
|--------|----------|---|---|---|---|---|----------|---|---|----|----|----|----------|---|---|---|---|---|---------|---|---|----|----|----|----------|--|--|--|--|--|-----|--|--|--|--|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | | | | | | | | | | |
| Summer | Off Peak | | | | | | Off Peak | | | | | | Mid Peak | | | | | | On Peak | | | | | | Mid Peak | | | | | | Off | | | | | |
| Winter | Off Peak | | | | | | On-Peak | | | | | | Mid Peak | | | | | | On Peak | | | | | | Mid Peak | | | | | | Off | | | | | |

Pricing Pilot Timeline

| ID | Task Name | Finish | 2015 | | | 2016 | | | | 2017 | | | | 2018 | | | |
|----|--------------------------------|-----------|--|----|----|------|----|----|----|------|----|----|----|------|----|----|--|
| | | | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | |
| 1 | RFP and Regulatory Approval | 6/1/2015 | ◆ | | | | | | | | | | | | | | |
| 2 | Develop PGE and Vendor Systems | 10/9/2015 | ■ | | | | | | | | | | | | | | |
| 3 | Market Education | 3/30/2016 | ■ Education will continue for Participants | | | | | | | | | | | | | | |
| 4 | Recruit Customers | 4/7/2016 | ■ | | | | | | | | | | | | | | |
| 5 | Program Launch | 4/4/2016 | ◆ Launch chosen to avoid high bill season | | | | | | | | | | | | | | |
| 6 | Summer Season 1 | 9/30/2016 | ■ | | | | | | | | | | | | | | |
| 7 | Winter Season 1 | 2/28/2017 | ■ | | | | | | | | | | | | | | |
| 8 | Summer Season 2 | 9/29/2017 | ■ | | | | | | | | | | | | | | |
| 9 | Winter Season 2 | 2/28/2018 | ■ | | | | | | | | | | | | | | |
| 10 | First Season Report | 4/3/2017 | ◆ | | | | | | | | | | | | | | |
| 11 | Interim Report | 4/3/2018 | ◆ | | | | | | | | | | | | | | |
| 12 | Final Report | 8/28/2018 | ◆ | | | | | | | | | | | | | | |