BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UE 319

In the Matter of	)
	)
PORTLAND GENERAL ELECTRIC COMPANY,	)
	)
Request for a General Rate Revision.	)
	)

REBUTTAL TESTIMONY

OF THE

OREGON CITIZENS' UTILITY BOARD

August 17, 2017

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

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I. INTRODUCTION

CUB anticipates a settlement agreement addressing all issues in this case, except for the large customer energy efficiency (EE) adjustment that CUB proposed. In this Rebuttal Testimony, CUB clarifies and elaborates on its two proposed large customer EE adjustments and responds to PGE's Response Testimony and concerns raised by other parties on this issue.

A. *CUB'S Large Customer EE Adjustment*

In our Reply Testimony, CUB argued that since small customers purchase a resource mix with a greater share of low cost EE, those customers should receive a credit for the value of the EE resource that is added to the system. Here, CUB clarifies how the cost of the credit should be allocated to customers. First, CUB discusses how its proposed credit does not take into account the full resource value of EE, because it is focused just on the energy value. Second, CUB modifies its original calculated energy value of EE. Third, CUB proposes a bill credit methodology, by which small customers

are compensated for the disproportionate EE funding they contribute to the benefit of the entire system. Fourth, CUB discusses removal of the SB 1149 programmatic cap to better ensure PGE is obtaining all cost-effective EE.

B. *CUB's Mechanisms Undervalue EE*

CUB's proposed mechanisms began by determining the value to the utility system of the SB 838 EE, purchased only by small customers. CUB offered two proposals. The first was a marginal cost approach, which included both energy and capacity. The second was a simplified approach, looking at the energy benefit of embedded EE. However, it should be noted that CUB's approach undervalues EE. EE is a distributed energy resource, and therefore it has additional benefits, just as distributed solar does.

In Order No 17-085, the PUC established a Straw Proposal for determining the Resource Value of Solar (RVOS). Below is a list of the 11 proposed elements in calculating the RVOS and a discussion of why 10 of these elements apply to EE[1]:

1. *Energy*. The marginal avoided cost of procuring or producing energy, including fuel, O&M, pipeline costs and all other variable costs.

CUB's Reply Testimony in this docket focused on this element – the marginal cost of energy. When EE is deployed as a resource it removes load and the utility avoids having to procure energy to serve the load that is removed.

2. *Generation Capacity.* The marginal avoided cost of building and maintaining the lowest net cost generation capacity resource.

EE is cumulative. Each year's EE is added on to the previous year's EE. As the size of the avoided load grows, it allows the utility to avoid building and maintaining generation capacity.

[1] OPUC Order NO 17-085, p 3-8.

3. *Transmission and Distribution Capacity*. Avoided or deferred costs of expanding, replacing, or upgrading transmission and distribution (T&D) infrastructure.

As EE is deployed, it reduces demand on the transmission and distribution system. This frees up capacity that can then accommodate growing numbers of customers being added to the system and additional load. Therefore EE also avoids the need to expand transmission and distribution capacity.

4. *Line Losses*. Avoided marginal electricity losses from the point of generation to the point of delivery.

As a distributed energy resource, EE clearly avoids line losses.

5. *Administration*. Increased utility costs of administering solar PV programs.

Both the utility and the ETO have costs associated with administering EE programs. CUB believes that the ETO administrative costs are taken into account by the ETO when determining the cost of EE programs.

6. *Market Price Response*. The change in utility costs due to lower wholesale energy market prices caused by increased solar PV production.

EE procurement reduces demand which should lower wholesale energy prices.

7. *RPS Compliance*. Avoided net incremental cost of purchasing renewable energy credits (RECs) to satisfy the Renewable Portfolio Standard (RPS).

EE reduces load, which then reduces the utilities need to procure RECs to satisfy the RPS.

8. *Integration and Ancillary Services*. Change in a utility's need for ancillary services due to changes in metered load and net load variability. Includes contingency reserves (spin and non-spin) needed for sudden outages; load" following reserves for fluctuations over the 5 to 60 minute time scale; and regulation reserves to accommodate sub-5 minute fluctuations.

By reducing a utility’s metered load, EE reduces the need for contingency reserves, load following reserves, and regulation reserves.

9. *Hedge Value*. Avoided cost of utility hedging activities, i.e., transactions intended solely to provide a more stable retail rate over time.

Utilities generally hedge to protect customers from price increases related to natural gas and purchased power. By reducing loads, utilities need less fuel and purchased power so have a reduced need to hedge.

10. *Environmental Compliance*. Avoided cost of complying with existing and anticipated environmental standards.

EE is an environmentally friendly resource. It produces no carbon, methane, NO_x, or SO_2. It clearly results in lower environmental compliance costs.

11. *Security, reliability, and reserves*. The potential capability of solar, when deployed in combination with other technologies such as energy storage and control systems, to provide backup energy or microgrid islanding capabilities during a loss of service from the utility.

This element may not apply to EE. While EE might make it easier to form a microgrid, EE does not provide energy to a microgrid, it reduces the need for energy within the grid.

To identify the Resource Value of EE with the same rigor the PUC is conducting with rooftop solar would require the utility to determine values for several elements CUB did not include in its calculation. This suggests that CUB's methodology underestimates the value of EE. Once the resource value of solar is determined, it would be appropriate to revisit the resource value of EE. In the meantime, focusing on the energy benefits of EE is a reasonable start towards estimating this value. Estimating the energy value alone will underestimate the actual resource value, but it is more accurate than our current methodology which, by failing to recognize any value, places that value at zero.

C. *CUB's Modified Calculation of the Energy Value of EE*

CUB proposed two methodologies to value EE. The first was the marginal cost methodology CUB introduced in UE 283. This valued EE based on forward looking marginal costs, including capacity resources. The second was a more simplified approach that valued the EE currently embedded in the system, using the current short-term marginal cost of energy for 2018. (CUB notes that we incorrectly labeled the marginal cost of energy as the marginal cost of energy and capacity. CUB only included energy costs.) PGE identified the short term marginal cost of energy for 2018 as $32.33/MWh.[2]

CUB then compared this marginal cost of energy to the cost of acquiring EE through the ETO. CUB used ETO annual reports to identify the levelized cost of EE for the last 10 years. In doing so, CUB used the annual levelized cost of all ETO electric EE programs. This meant that it was the levelized cost of both PGE and PacifiCorp programs and included EE funded by SB 1149 and SB 838. This was a data set that was available for all 10 years, and CUB was assuming a 10 year life for EE measures.

Ideally, CUB would have used the levelized cost of PGE's 838 programs alone, but this was not available for all years. CUB could have used the ETO's levelized cost of PGE programs, but this was only available for 6 years. Below is the set of data that CUB extracted from ETO annual reports on levelized cost[3]:

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[2] UE 319/PGE /1301 Cody – Macfarlane /2.
[3] CUB Exhibit 203.

	ETO Levelized Cost (cents/kwh)	PGE Levelized Cost	PGE levelized cost 838 only
2016	2.6	2.63	
2015	2.6	2.7	
2014	2.6	2.5	
2013	2.4	2.4	
2012	2.7	2.8	
2011	2.9	3	
2010	2.5		2.0
2009	2.8		3.0
2008	2.1		2.0

In this testimony, CUB modifies its approach using data that reflects PGE programs alone. The average cost of the first column, which includes PGE and PacifiCorp programs under both SB 838 and SB 1149, is 2.58 cents/kwh. If we combine the second and third column, which is PGE specific data including both SB 1149 and SB 838 data for 6 years and SB 838 data for three years, we get a levelized cost of 2.56 cents/kwh. Substituting these levelized costs for the ones CUB used in its Reply Testimony produces an SB 838 2018 benefit of $7,272,020 instead of 7,336,566[4].

D. *Customers Whose Load Exceeds 1 aMW Should Credit Small Customers for the Benefit They Provide to the System*

In our Reply testimony, CUB proposed establishing a bill credit for small customers. Customers would receive credit for the value of the EE they have purchased for the system, and customers would be identified by rate class. CUB did not discuss

[4] CUB Exhibit 204.

how the cost of this credit should be allocated. This implied that large customers would pay more than $7 million in bill credit to small customers.

CUB is ***not*** proposing that large customers pay $7 million to small customers. The $7 million is the system value of EE. Small customers are part of the system, and some of this benefit would flow through to small customers.

Since our Reply Testimony, CUB has received a data response from the Company which provides the loads of customers over 1aMW and the loads of customers under 1aMW.[5] Based on this data response, and using our updated $7.27 million benefit (rather than our earlier $7.34 million benefit), customers with loads above 1aMW receive $1.5 million in benefits associated with SB 838 efficiency purchased by small customers. Therefore, CUB's updated proposal is to have customers with loads above 1aMW pay a bill credit of $1,458,484 to customers with loads below 1aMW. This will ensure the energy value of the EE purchased by small customers is retained by those small customers.

E. *If CUB's Bill Credit Mechanism is Adopted to Address the Fairness Issue, Then Eliminating the SB 1149 Program Cap May Also be Appropriate*

CUB believes it is important to treat small customers fairly, by recognizing that they purchase a different resource mix than large customers. As a separate issue, CUB recognizes the current SB 1149 program cap may be preventing the acquisition of all cost-effective EE. If the Commission were to adopt CUB's bill credit mechanism to remedy the fairness issue, CUB believes it would then be appropriate to modify SB 1149's program cap.

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[5] CUB Exhibit 205.

F. *Historical Development of the SB 1149 Program Cap*

In Reply testimony CUB stated that the current interpretation of direct benefits[6]:

> …has been interpreted as ensuring that there are no additional energy efficiency programs aimed at large customers funded out of SB 838, and that residential and small commercial programs not be shifted to SB 838 as a way to allow more funding of industrial programs through SB 1149's public purpose charge.

There are two parts to this interpretation. The first is SB 838 dollars cannot be used to fund programs aimed at large customers. The second is SB 1149 program allocation cannot increase for large customers. This second limitation of direct benefits grew out of a commitment PGE made during the 2007 legislative session:[7]

> The intent here is 'no pay, no play.' In asking the OPUC to exempt these customers, we would also ask that they work with the ETO to cap public purpose charge expenditures on behalf of this group at current levels. If later it appeared that more cost effective EE was available through these customers, and they were willing to pay for it, adjustments could be made.

After the 2007 session, this limitation on increasing the large customer share of SB 1149 funds was agreed to by ETO, OPUC, PGE, PacifiCorp, CUB and ICNU.[8]

G. *CUB is Willing to Reconsider the SB 1149 Agreement if the Fairness Issue is Solved*

From a policy perspective, the cap on large customers' use of SB 1149 was important. Without it, small customer programs could be shifted from SB 1149 to SB 838, and large customers could receive more SB 1149 dollars. In its most extreme, all of SB 1149 programs could be dedicated to large customers, and all small customer EE

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[6] UE 319/CUB/100/Jenks/11.
[7] UE 283 – PGE/2201/Tinker/1.
[8] Energy Trust of Oregon, *Briefing Paper: Energy Efficiency Programs*, Energy Trust Board of Directors Strategic Planning Workshop at 27 (June 7, 2013), https://www.energytrust.org/wpcontent/uploads/2017/03/120607_Board_strategic_Planning_Workshop.pdf.

could have been funded through SB 838, resulting in all customers paying for large customer EE, but only small customers paying for small customer EE.

If the Commission were to adopt the bill credit mechanism to remedy the fairness issue, the concerns that led to the SB 1149 program cap would be resolved. EE is a cost effective system resource. It should not make a difference to customers where their resources are being purchased, as long as they are cost effective, and the customers purchasing the resource receive the benefit.

CUB is in favor of developing a mechanism ensuring when small customers pay for a different resource mix than large customers, they receive the benefit of that resource mix. This eliminates the policy justification for the cap on large customer programs funded by SB 1149.

II. RESPONSE TO PGE

In its Reply Testimony, PGE states it is "sympathetic to the fairness issues being raised by CUB."[9] While CUB appreciates PGE's sympathy, PGE offers no adjustments to address the fairness issue, and the Company cannot even admit to the basic fact underlying the unfairness – small customers are buying more EE than large customers. Instead, PGE states:

> CUB, again, alleges that residential and small commercial customers who pay Senate Bill (SB) 838 funds are buying more EE than large industrial customers who only contribute to SB 1149 funds[10].

CUB's fairness concern is not based on an allegation, but rather it is based on a factual issue. In 2015, for example, SB 1149 EE programs delivered 13.67 aMW of energy to the system, while SB 838 programs delivered 17.56 aMW of energy to the

[9] UE 319/PGE/ 1600/Piro -Lobdell/7.
[10] UE 319/PGE/ 1600/Piro –Lobdell/6.

system[11]. Since the programs funded only by small customers are larger than the program funded by all customers, small customers have to be purchasing more EE than large customers.

PGE states that it opposes CUB's large customer EE adjustment proposal because: (1) it may cause a legal challenge; (2) it would allow SB 838 funds to benefit large customers; (3) EE is not a marginal resource; and (4) legislation is the only available solution.[12]

PGE's first objection is unpersuasive. The parties will brief the legal issues later in this proceeding. But, it is worth highlighting that PGE should be asking whether CUB's adjustment is necessary to uphold the law, not whether CUB's adjustment may increase the likelihood of litigation.

A. *CUB's Approach Does Not Alter How SB 838 Funds are Spent*

Contrary to PGE's assertion, neither of CUB's two proposed EE adjustments would affect how SB 838 funds are spent. Both of CUB's adjustment proposals are designed to recognize that small customers are purchasing more EE resources than large customers, and small customers should be credited with the economic benefits of the EE they purchased.

PGE is conflating this fairness issue with the SB 838 public purpose cap on large customers and/or the SB 1149 program cap. These are distinct issues. As stated above, CUB believes that solving the fairness issue would set the stage for solving the SB 1149 program cap problem. However, doing so does not require using SB 838 funds to benefit large customers.

[11] 2015 ETO Annual Report, Appendix 10, http://assets.energytrust.org/api/assets/reports/2015.Annual.Report.OPUC.with.NEEA.pdf
[12] UE 319/PGE/1600/Piro-Lodbell/7-9.

B. *EE is a Marginal Resource*

PGE argues that EE should not be included in a marginal cost of service study:

> Marginal cost analysis is aimed at determining the cost of generating an additional increment of output (marginal generation capacity and marginal energy costs) to meet an increment of load, so that prices can lead to efficient consumption decisions by consumers. Energy efficiency is not a traditional capacity or energy resource.[13]

The Pacific Northwest has been investing money in energy efficiency since the late 1970's and has seen loads drop significantly. Integrated Resource Planning (IRP) has been used since the 1980s to ensure that supply-side and demand-side (EE) resources are compared on equal terms as part of a resource plan. If we have been including EE as an energy resource in IRPs for 30 years, it makes little sense to argue it is not a traditional energy resource.

The purpose of a marginal cost of service study is to help send accurate price signals. A marginal cost of service study looks at how we serve the next increment of energy, or capacity, or how we serve the next new customer. When a single new customer is added to the system, there is a cost to serve that customer. That cost includes various elements: a meter to read the customer demand, a bill (mail or electronic to bill), a line drop, a shared line transformer, and energy to serve the customer's load. The energy has several components. Fifteen percent (15%) of PGE's energy needs must be met with qualifying renewables under the RPS (with that amount growing to 50%). But SB 1547 requires the resources to meet the load include all cost effective energy efficiency. From a long-run marginal cost perspective, energy resources include renewables, energy efficiency, and non-renewables.

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[13] UE 319/PGE/1600/Piro-Lodbell/9.

Beyond this issue, however, CUB has proposed two alternatives, and only one alternative involves identifying EE as a resource in the marginal cost study. As was proposed above, the other method simply offers a credit for the current value of EE purchased for the system.

C. *The Problem Can Be Solved Through Ratemaking and Does Not Require Legislation*

PGE argues that this problem cannot be solved through ratemaking, and the only solution is legislative. Yet, while claiming to support a legislative solution[14], the Company is not planning to pursue a legislative solution and has not even discussed the issue with legislators. CUB strongly disagrees with PGE's position. While legislation is needed to address the issue of how the costs of EE are allocated, there is no barrier to a ratemaking solution to address the issue of how the benefits are allocated. Moreover, while the Company may claim to support a legislative solution, PGE admits it has no plans to pursue legislation to solve this problem in the 2018 legislature. [15] CUB asked if the Company had even discussed this issue with legislators, to which PGE responded:

> In a broad sense, yes. During discussions regarding the transportation package adopted in the 2017 legislative session, PGE opposed redirecting EE funds contributed through the SB 1149 public purpose charge towards incentives for electric vehicles.[16]

Even in the broadest sense possible, CUB does not believe opposing diverting SB 1149 funds to EV's counts as discussing a legislative solution to the EE problem CUB is raising in this docket.

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[14] UE 319 / PGE / 1600/Piro-Lobdell/9.
[15] CUB Exhibit 201.
[16] CUB Exhibit 201.

Based on Data Responses CUB received in this docket, as well as CUB's conversations with other parties, CUB concludes there are a number of misconceptions as to EE and CUB's position. CUB addresses a few misconceptions below.

D. EE Is a System Resource, Not a Class Resource

Oregon looks at EE as a resource. All customers pay into EE programs, and there are programs that seek EE out of nearly all customer classes. However, this does not mean customers are supporting their respective classes' EE programs. The dollars raised by the surcharges on residential bills are not designed to fund residential programs, and the dollars raised by the large customer surcharge is not designed to support large customer programs.

When an Oregon utility (through the ETO) offers an incentive to a customer to pursue EE, that utility is buying an energy resource for the system, not for the individual customer, nor for the customer class. This concept will become even more important as Distributed Energy Resources play an important role in maintaining supply/load balance. Demand response programs, for example, compensate customers for reducing demand as a way to balance supply and load. But the system benefits of demand response programs do not flow to individual customers or classes, but to the system.

From a resource standpoint, the utility is purchasing an energy resource from an energy supplier, in a similar manner in which supply side resources are purchased. The fact that this energy supplier is a customer does not change the transaction: the customer is simply purchasing a resource for the system.

Because customers are purchasing system resources, rather than purchasing a resource for their class of customers, program spending and program funding are

allocated much differently. Customers are not funding the programs targeted at their customer class. This can be seen by the fact that residential customers pay a greater share of the costs of EE funding, while receiving a smaller share of the program dollars:[17]

PGE Residential Customers	
Share of SB 1149 Programs	28.52%
Share of SB 838 Programs	35.82%
Share of Revenue Requirement	48.73%
Share of System Load	41.39%

If EE program funding was assigned to the class receiving the program spending, then residential customers would pay significantly less for EE programs, particularly SB 1149 programs, and industrial customers would pay more.

E. *Because EE is a System Wide Resource, Customer Classes Do Not Get Credit When Their EE is More Cost Effective*

The confusion over system versus class assignment of EE also relates to program costs. Not all EE programs cost the same. While all programs are considered cost effective, some are more cost effective than others. Does it matter if one class of customers has a better EE resource within its class?

It matters to the extent to which costs matter, and we want our utilities to acquire EE at the *least cost*. But it does not matter for purpose of cost assignment, because these are system resources, not class programs. If these programs were funded by the customer class receiving the programs, then it would make sense to recognize some customer classes were buying a cheaper resource. But as demonstrated above, that is not how we fund these programs.

It should also be noted that residential programs currently are the most cost effective EE resource:[18]

[17] CUB Exhibit 202.

2016 Cost of EE by Class	cents/kwh
Residential	2.13
Commercial	2.90
Industrial	2.99

Although these program costs can vary from year to year, residential programs were also the most cost effective EE resource in 2015 as well.[19]

2015 Cost of EE by Class	cents/kwh
Residential	2.30
Commercial	3.00
Industrial	2.60

F. *Reduction of Load Is Not an Adequate Compensation to Customer Classes for their Investment in EE Programs*

When EE is added to the system, there are several things that happen:

- The utility needs less energy to serve load and has its energy costs reduced.
- All customers will see a reduction in energy charges, as the cost of the cost-effective EE resource is less than the alternative energy generation.
- The customers who installed EE measures see all volumetric charges on their bills decline.
- Customers who are in the same class as the customer who installed the EE measure will see their bills increase.

Cost effective EE reduces the utility's energy costs, because it is purchasing an energy resource at a lower cost than alternative sources of energy. *This in turn reduces all customers' bills.*

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[18] ETO Annual Report to the PUC, page 35: https://www.energytrust.org/wp-content/uploads/2017/04/Energy.Trust_.2016.Annual.Report.OPUC_.pdf

[19] 2015 ETO Annual Report to the PUC, page 28; http://assets.energytrust.org/api/assets/reports/2015.Annual.Report.OPUC.with.NEEA.pdf

However, customers who participate in installing the EE measure see their bill go down for all volumetric charges, including transmission and distribution, and the capital portion of energy generation. Most of these costs are assigned through the marginal cost of service study to the participating customers' service class.

If a customer's variable charge is 10 cents/kwh, and the difference between the cost of EE and the cost of energy is 2 cents (EE costs 2 cents less than the alternative), then for every kilowatt hour a customer saves, the utility saves 2 cents, but the customer saves 10 cents. The difference is reallocated to other customers, mostly of the same customer class.

Residential customers are the largest source of funding for SB 838 programs, and a significant amount of the SB 838 programs are focused on residential EE (though residential customers contribute more funding to ETO than they receive programs). This means residential loads decrease, and there are less costs assigned to residential customers. Does this compensate residential customers?

Based on the discussion above, the answer is no. Individual customers who participate in the programs benefit. The non-participating residential customers see some energy benefits, but also see distribution costs that are assigned to the residential class reassigned to them from the participant. These reassigned joint-and-common distribution costs are not part of the cost of EE – they are not a new cost. However, the changes in customer loads due to EE deployment cause a reallocation within the customer class.

IV. CONCLUSION

CUB recommends the Commission adopt a mechanism to credit small customers with the value of the EE purchased through SB 838. In Reply Testimony, CUB identified

two approaches to this: a marginal cost approach and an embedded cost/rate credit approach. In this testimony, we further refined the rate credit approach, which would require large customers to pay a surcharge of $1,458,484, in order to fund a rate credit to small customers.

August 1, 2017

TO: Sarah Knox-Ryan
Citizens Utility Board of Oregon (CUB)

FROM: Patrick Hager
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 319
PGE Response to CUB Data Request No. 032
Dated July 25, 2017

Request:

PGE's Reply Testimony (UE 319/PGE/1600/Piro-Lobdell/9) states that PGE supports a legislative solution to CUB's EE issue.

a. Please provide any legislative language PGE has developed to resolve this issue.
b. Has PGE discussed this issue with legislators?
c. Has PGE supported legislation to solve this problem in 2015 or 2016?
d. Does PGE have any plans to pursue this in the 2018 legislative session?

Response:

a. PGE has not developed any legislative language regarding CUB's EE issue.

b. In a broad sense, yes. During discussions regarding the transportation package adopted in the 2017 legislative session, PGE opposed redirecting EE funds contributed through the SB 1149 public purpose charge towards incentives for electric vehicles.

c. In 2015, PGE and CUB discussed addressing the industrial EE issue in SB 1547, however, it was CUB's determination to instead work on placeholder legislation for 2016. PGE is aware that placeholder legislation in 2016 was left idle and PGE was not asked by CUB to support such legislation. PGE has supported CUB's effort to reach agreement on the issue with stakeholders and supported the inclusion of language in SB 1547 to acquire all cost-effective EE.

d. No.

EE By Customer Class

	A	B	C	D	E	F
1	**1149 PGE**	**Saving aMW**	**Cost**	**Percent of Total Cost**		
2	Residential	4.45	$8,277,000.00	28.52%		
3	Commercial	4.9	$12,495,000.00	43.05%		
4	Industrial	4.32	$8,251,200.00	28.43%		
5						
6	*Total*		*$29,023,200.00*			
7						
8	**1149 PAC**					
9	Residential	3.67	$6,826,200.00			
10	Commercial	4.75	$12,112,500.00			
11	Industrial	3.42	$6,532,200.00			
12						
13	*Total*		*$25,470,900.00*			
14						
15	**838 PGE**					
16	Residential	7.57	$16,199,800.00	35.82%		
17	Commercial	7.27	$20,646,800.00	45.65%		
18	Industrial	2.72	$8,377,600.00	18.52%		
19						
20	*Total*		*$45,224,200.00*			
21						
22	**838 PAC**					
23	Residential	4.53	$9,694,200.00			
24	Commercial	4.04	$11,473,600.00			
25	Industrial	1.43	$4,404,400.00			
26						
27	*Total*		*$25,572,200.00*			
28						
29						
30						
31	Residential customer % Rev	48.73%				
32	Res customer % load	41.39%				
33						
34	**PGE Residential Customers**					

EE By Customer Class

	A	B	C	D	E	F
35	Share of SB 1149 Programs	28.52%				
36	Share of SB 838 Programs	35.82%				
37	Share of Revenue Requirement	48.73%				
38	Share of System Load	41.39%				
39						
40	**2016 Cost of EE by Class**	**cents/kwh**				
41	Residential	2.13				
42	Commercial	2.90				
43	Industrial	2.99				
44						
45	**2015 Cost of EE by Class**	**cents/kwh**				
46	Residential	2.30				
47	Commercial	3.00				
48	Industrial	2.60				
49						
50						
51						
52	the data for rows 1-27 comes from the 2015 ETO Annual Report to the PUC, Appendix 10					
53	the data for rows 31 and 32 comes from the 2015 Oregon Utility Statistics Book published by the OPUC					
54	the data for lines 34-38 comes from the 2015 ETO Annual Report to the PUC, Appendix 10					
55	the data for lines 40 to 43 comes from the 2016 ETO Annual Report to the PUC, p35					

	ETO Levelized Cost (cents/kwh)	PGE Levelized Cost	PGE levelized cost 838 only
2017			
2016	2.6	2.63	
2015	2.6	2.7	
2014	2.6	2.5	
2013	2.4	2.4	
2012	2.7	2.8	
2011	2.9	3	
2010	2.5		2.0
2009	2.8		3.0
2008	2.1		2.0
	2.58		2.56

Source: data is from ETO Annual Reports to the PUC, 2008--2016

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
SB 838 savings (aMW)	2.1	4.8	7.21	13.24	17.36	17.43	16.88	17.56	17.36	**20.6**	134.537
total savings from measures in MWh	18396	42048	63159.6	115982.4	152073.6	152686.8	147868.8	153825.6	152073.6	180427.5	
annualized savings (10 year life) in MWH	1839.6	4204.8	6315.96	11598.24	15207.36	15268.68	14786.88	15382.56	15207.36	18042.75	
levelized cost (cents/kwh)	2	3	2	3	2.8	2.4	2.5	2.7	2.63	2.6	2.563
annualized cost of power cents per kWh	3679200	12614400	12631920	34794720	42580608	36644832	36967200	41532912	39995357	46911151	
levelized cost (cents/kwh) for 2008-2017	2.616388088										

total SB 838 embedded in test year (10-year life)	134.5367472
total MWh	1178541.905
total amount of SB 838 EE embedded in 2018 rates	117854.1905

notes:
The source for the 2008 -- 2015 is ETO Annual Reports to OPUC
The source for the 2017 is CUB DR 03-A
There was not source for 2016, but because the SB 838 dollars were nearly identical to 2012, CUB assumed similar performance.
The soruce for levelized cost was ETO Annual Reporst to OPUC. Did not break out 838 versus 1149.

assumed 10 year measure life
10 year measure life is most common measure life: https://energytrust.org/wp-content/uploads/2016/12/021611_ResourceAssessment.pdf

PGE 2018 Marginal Energy and Capacity Cost (UE 319/PGE/1301)	32.33
value per MWh of EE in 2018 ($/MWh	6.166119124
credit of SB 838 paying customers	7,267,029.78

Loads Above and Below 1aMW

	Over 1aMW			Below 1aMW			
Year	Customer Accounts	Total MWh	Annual Revenue	Customer Accounts	Total MWh	Annual Revenue	SB 838 Funds
2008	83	3,910,350	$ 129,352,210	811,010	15,673,559	$ 1,346,600,830	$ 7,159,178
2009	78	3,502,928	$ 129,283,434	815,564	15,644,797	$ 1,430,241,060	$ 14,216,617
2010	77	3,444,270	$ 176,598,764	819,962	15,060,555	$ 1,380,333,827	$ 24,078,583
2011	73	3,751,231	$ 193,343,390	822,870	15,288,650	$ 1,479,107,601	$ 28,700,853
2012	74	3,816,466	$ 195,133,863	827,165	15,124,945	$ 1,446,340,118	$ 41,713,841
2013	75	3,831,187	$ 188,911,352	832,821	15,085,900	$ 1,407,463,421	$ 49,474,982
2014	73	3,613,483	$ 190,199,920	840,685	15,493,993	$ 1,521,401,674	$ 49,081,069
2015	77	4,138,400	$ 201,203,879	848,211	14,974,589	$ 1,515,494,248	$ 42,682,199
2016	79	3,603,957	$ 207,094,143	859,080	14,795,927	$ 1,449,933,887	$ 41,714,088

	Customers Over 1 aMW	**Customers Below 1aMW**
2014-16 Share of Load	20.06%	79.94%
Share of benefit	$ 1,458,484.44	$ 5,813,535.56