



Oregon

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Public Utility Commission

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November 21, 2012

Via Electronic Filing

OREGON PUBLIC UTILITY COMMISSION
ATTENTION: FILING CENTER
PO BOX 2148
SALEM, OR 97308-2148

RE: *In the Matter of Public Utility Commission of Oregon Solar Photovoltaic Program Draft
Report Comments and Recommendations;
Docket No. UM 1505*

Dear Filing Center:

This investigation into the Oregon Solar Photovoltaic Incentive Program was opened in connection with House Bill 3039. Under this legislation, the Commission must provide a report to the legislature by January 1, 2013.

Pursuant to ALJ Grant's November 14, 2012 memorandum, party comments on the enclosed Draft Report are due on December 5, 2012.

Thank you for your attention.

John Crider
Senior Utility Analyst
Electric Resources and Planning

Enc.

c. UM 1505 Service List



Solar Photovoltaic Volumetric Incentive Rate Pilot Program

Report to the Legislative Assembly

Prepared by:

Public Utility Commission of Oregon

January 1, 2013

I. Background

Legislation and Rulemaking

Since the late 1970's Oregon has offered tax credits as an incentive for residents and businesses to implement renewable energy systems that utilize solar, wind, biomass, and combined heat and power.

Established in 2001, the Energy Trust of Oregon (ETO) – with funding from a charge on the bills of customers of Portland General Electric and PacifiCorp – has offered PGE and PacifiCorp customers additional incentives in the form of cash rebates to help defray the capital costs of qualified renewable energy projects.

HB 3039

The 2009 Legislature enacted House Bill 3039 to establish a pilot program to examine the effectiveness of a production-based incentive in the development of solar photovoltaic (PV) systems. The bill allows customers in the PGE, PacifiCorp and Idaho Power service territories to be paid directly for each kilowatt-hour of energy produced from their solar systems at a rate defined by the Commission.

House Bill 3039 mandated that a solar pilot program be established by the Commission to demonstrate the use and effectiveness of “volumetric incentive rates (VIR)” (i.e., a performance-based incentive based on kilowatt-hours produced), and to authorize direct payments to customers for electricity delivered from their PV systems. HB 3039 specified that the pilot program have the following key features:

- The cumulative nameplate capacity of all installed PV systems may not exceed 25 megawatts of alternating current, and eligible PV systems cannot exceed 500 kW;
- The systems must be “permanently installed” and become operational after the pilot program begins;
- Each electric company shall file for Commission approval schedules showing the rates offered for the output from eligible systems as well as any other relevant program implementation information;
- Participants will receive VIR payments for system output generated for 15 years after the PV system begins generating electricity, at rates established at the time of enrollment. After 15

years of operation, the participant will be paid at a rate equal to “resource value” for the output generated;

- The Commission shall design the pilot to achieve a goal that 75 percent of energy generated under the program comes from “smaller scale” systems;
- The Commission may set rates to encourage development of “most efficient systems” and it may set limits on total generator nameplate capacity so that the rate impact of the pilot program does not exceed .25 percent for any customer class; and
- In each odd numbered year beginning in 2011 the Commission must submit a report to the Legislature evaluating the effectiveness of the incentive rates for promoting the use of solar PV energy systems

House Bill 3690

House Bill 3690 (2010) amended the initial bill in several ways:

- “Residential” and “Small Commercial” qualifying systems were defined. Residential systems are those with a nameplate of 10 kilowatts or less, and small commercial systems are defined as those with a nameplate value between 10 and 100 kilowatts
- Clarification was added to define the volumetric incentive rate as payment for either the energy or the non-energy attributes of the electricity, or both
- The Commission was granted the authority to adjust the percentage goal for capacity deployed as residential or small commercial systems from the original 75%

Docket UM1452 was established in 2009 to develop the VIR program parameters and to allow input from parties interested in the program design. Several candidate designs were discussed before the Commission resolved to implement a net-metering based solution. Order 10-198 established the pilot program design.

Order 10-198 Solar Pilot Program Initial Design (5/28/2010)

The Commission allocated the total program capacity of 25 megawatts (MW) AC by size of system, by year, and by utility.

The Commission defined three sizes of PV systems for the pilot: small-scale systems with a nameplate capacity of less than 10 kilowatts (kW); medium-scale systems with a nameplate capacity of greater than 10 kW and less than or equal to 100 kW, and large-scale systems with a capacity of 100 kW up to 500 kW.

The Commission chose to allocate 80 percent of the program capacity to small-scale and medium-scale systems – 12 MW to small-scale and 8 MW to medium-scale. The Commission allocated the remaining amount of capacity - 5 MW - to large-scale projects. This allocation was adopted in order to generate greater levels of participation by all classes of customers and therefore provide the most information for evaluating the VIR approach.

The Commission allocated the 25 MW of total program capacity over a four-year period (6.25 MW per year) and adopted eight allocation windows over those four years for small- and medium-size systems. The capacity for large-scale systems is allocated once a year over the four-year period. This longer rationing period, with biannual allocations for small- and medium-sized systems, allows the Commission to adjust the pilot project as needed in order to minimize program costs and maximize useful information from the pilot.

The Commission allocated the 25 megawatt capacity cap among the three electric companies based on their share of 2008 retail sales revenues. The allocation is as follows:

PGE	14.9 MW AC = 17.5 MW DC
PacifiCorp	9.8 MW AC = 11.5 MW DC
Idaho Power	0.4 MW AC = 0.47 MW DC

Due to the small amount of capacity allocated to Idaho Power (400 kW), the Commission determined that Idaho Power's capacity should be filled only with residential qualifying systems. In addition, Idaho Power split its total capacity of 400 kW evenly between the first two years of the pilot program, with only two reservation periods, July 1, 2010 and April 1, 2011.

The choice of method by which the Commission can implement the pilot programs must be consistent with federal law giving the Federal Energy Regulatory Commission ("FERC") exclusive authority to determine rates for the wholesale sale of energy for retail in interstate commerce. The Commission considered several alternate methods and decided to implement two methods that would fulfill the Legislature's goals, not infringe on the federal government's authority over wholesale sales of energy for resale, and be consistent with the statutory duty to ratepayers. The Commission adopted a "Net Metering Plus VIR" approach for consumers with small-scale and medium-scale PV systems and a competitive bidding approach for all consumers with large-scale PV systems.

Under the "Net Metering Plus VIR" approach, the capacity of qualifying small-scale and medium-scale systems is limited to 90 percent of the retail electric customer's average annual use.

¹ See UM 1452, Order No. 10-198 at 9.

A critical element of the pilot program is the determination of rates offered for energy produced by the small-scale and medium-scale systems. In order to determine the initial volumetric incentive rate (VIR), the Commission relied on actual system cost data provided by the ETO for systems installed between the last quarter of 2009 through the first quarter of 2010. For each project, the Commission added loan financing costs, insurance costs, income taxes, and utility meter service charges to compute the total installed cost for each system. Rates were then structured to achieve an average 15-year payback among systems.

Based on the ETO's cost data, the Commission adopted different initial rates for small-scale and medium-scale systems. Given the correlation between solar radiation and energy output, the Commission also adopted different rates for four different geographic zones.

Table 1 shows the initial rates adopted by the Commission by geographic zone, by utility, and by size of systems.

Table 1

Rate Class	Counties	Electric Companies	Small-Scale Systems (≤10kW)	Medium-Scale Systems (>10kW and ≤100kW)
1	Benton, Clackamas, Clatsop, Columbia, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill	Pacific Power and PGE	.65/kWh	.55/kWh
2	Coos, Douglas, and Hood River	Pacific Power and PGE	.60/kWh	.55/kWh
3	Gilliam, Jackson, Josephine, Klamath, Morrow, Sherman, Umatilla, Wallowa, and Wasco	Pacific Power	.60/kWh	.55/kWh
4	Baker, Crook, Deschutes, Jefferson, Lake, Malheur, and Harney	Pacific Power and Idaho Power	.55/kWh	.55/kWh

It is important to note that the VIR rate is the rate applied to generation of energy, but is not the rate paid to the participant. Since each project is net-metered, this means the energy produced by the solar system is fed directly into the participant's service panel, and thus is not metered by the utility revenue meter. In order to properly account for this unmetered energy, the appropriate customer electric retail rate (tariff) is applied to the generated solar energy, and this amount is subtracted from the VIR payment. Otherwise, the participant would

not only get paid for energy produced at the VIR rate, but would receive free energy to use within their premises as well.

The Commission adopted a mechanism to adjust rates over time based on participation level and the speed of uptake of the eligible capacity in each of the eight enrollment periods. Under the original Commission mechanism:

- If less than 50 percent of the available capacity for the system size class is reserved after a five-month period, there is a rebuttable presumption that the VIR should be increased by 5 percent for the subsequent rate period.
- If more than 75 percent, but less than 100 percent, of available capacity is reserved after a five-month period, there is a rebuttable presumption that the VIR should not change for the subsequent rate period.
- If 100 percent of the available capacity is fully subscribed in less than three months, there is a rebuttable presumption that the VIR should be decreased by 10 percent for the subsequent rate period.
- If full subscription is obtained between three and five months, there is a rebuttable presumption the VIR should be decreased by 5 percent for the subsequent rate period.

Any party can challenge a rebuttable presumption prior to the next rate period. If no party overcomes the rebuttable presumption that the rate should be changed, or not changed, as set forth above, the presumptive rate will be effective for the subsequent rate period. This original automatic rate adjustment mechanism (ARAM) was subsequently updated in a later order (see Order 11-339 below).

For large-scale systems in PGE and PacifiCorp service areas, the Commission adopted a competitive bidding approach to set rates. The Commission chose this method in the belief that competition among bidders will drive down the rates offered for electricity from large-scale systems, achieve the legislative goals of HB 3039, and also protect the interests of ratepayers. In addition, under this approach, the VIRs are established by the market, thus removing any conflict with federal jurisdiction. .

Under the bidding system, the electric company first solicits bids annually through a request for proposal (RFP) process approved by the Commission. The bids consist of bid prices only; all other contract terms are uniform and identical among the sellers. Once bids are received in the RFP process winning bids are selected from the lowest VIR to the highest VIR until the capacity target is achieved.

Finally, the Commission requires program participants to fill out surveys in order to learn about the cost of the systems, individual perceptions of the program, ease of use, and many other factors that will be taken into consideration going forward. This is essential information the Commission will use to analyze the effectiveness of the VIR approach.

Commission Order 10-260 (June 2010)

The Commission clarified the establishing order for the VIR pilot program by adopting several Staff recommendations:

- Capacity to be defined by “DC Nameplate” values
- Deposits to be refunded on system acceptance
- PGE/PacifiCorp allocate one third of their 2010 total capacity in the spring enrollment, and two thirds in the fall
- Idaho Power to allocate half of its capacity in the first 2010 season, and the remainder in the April 2011 season
- No applications to be accepted after all capacity is reserved
- Standard monthly electric costs to participants to be based on gross monthly usage, not net
- Solar systems must be installed by trade allies in good standing with the Energy Trust of Oregon
- Participants must acquire \$1 million liability insurance
- Companies may deviate slightly from capacity limits to ensure first-come, first-served allocation
- Companies must assist net metered participants in correct sizing of their solar systems

Commission Order 11-089 (Mar 2011)

Docket UM1505 was established in October 2010 to further refine the pilot program. Several potential program improvements were identified in this proceeding. The following changes were adopted in Order 11-089:

- The previously-implemented “first come, first served” application approval process was replaced with a lottery system (beginning with the October 2011 enrollment period) to provide more equitable opportunity for potential residential and small commercial participants
- The Commission adopted a 20% VIR reduction (instead of the 10% indicated by the ARAM) for the April 2011 window
- The proposal for an Internet web-based participant survey was adopted
- The capacity allocation method for medium-sized systems was adjusted to include both VIR rates (identical to small system

allocation) and competitive bidding, alternating the two approaches from one enrollment period to the next

- All bid prices will be disclosed

Commission Order 11-280 (July 2011)

Once again capacity reservations were filled within minutes of the opening for the April 2011 enrollment window. The ARAM, if applied, would automatically reduce the VIR by 10%. However, the extraordinary demand indicated by the rate at which capacity was reserved (i.e., all capacity reserved in a matter of minutes) prompted the Commission to intervene and consider a more considerable reduction in the volumetric rate.

The Commission found the evidence compelling that the VIR was still set too high and issued an order to reduce the rate by 20% for the next enrollment window (October 2011)².

Commission Order 11-339 (Sept 2011)

This order dealt specifically with four issues regarding the pilot program.

Issue 1 – Medium system bidding window

A proposal was put forth to reschedule the medium-sized project bidding-based enrollment period from the fall (October) to the spring (April). The Commission declined to make this change.

Issue 2 – Fees and deposits

The Commission adopted a three-day deposit deadline for initial applicants, and a 5-day deadline for waiting list applicants who move forward due to project attrition. The Commission declined to implement an application fee.

Issue 3 – Notice of rates and ARAM adjustment

The Commission adopted a revised method to automatically adjust the VIR based on the number of viable capacity reservation requests received in the immediately preceding enrollment window. The final ARAM is as follows:

² see [VIR Rate History](#) in the following section for details

Ratio of Adjusted Capacity Reservation Requests (in kW) to Available Capacity <i>at the end of the 3-month enrollment window</i>	VIR Change
>150%	Decrease by 10%
Between 125% and 150%	Decrease by 5%
Between 75% and 125%	No Change
Between 50% and 75%	Increase by 5%
< 50%	Increase by 10%

Note: “Adjusted Capacity Reservation Requests” (ACRR) is calculated as follows:

$$ACRR = \frac{\text{applicants that pay deposit}}{\text{applicants offered capacity}} \times \text{capacity reservation requests}$$

Issue 4 – “Resource Value” calculation

There were concerns raised about the calculation of the “resource value” as mentioned in the original legislation. The resource value is the rate paid to participants for energy produced after expiration of the VIR contract (15 years after commencement of the contract). The Commission directed Staff to open an investigation into the appropriate method for computing this value. (This task resulted in the creation of Docket UM1559 which is currently ongoing).

Commission Order 12-041 (Feb 2012)

For the first time in the program, the available capacity was not fully allocated for the prior three-month enrollment period (October-December 2011). Pacific Power reserved 88.5% of their allocated capacity; PGE reserved only 43% of their capacity. Accordingly, the ARAM indicated a 10% increase in the VIR. The Commission concurred with Staff and Joint Utility recommendations to allow the ARAM to exercise and increase the VIR for Rate Class 1 systems for the April 2012 enrollment window. The VIR for Rate Classes 2, 3 and 4 remained unchanged.

The Commission also adopted the recommendation to set the medium-sized system VIR rates based on the bidding results of the prior enrollment window. The bid prices indicated a 10% reduction for Rate Class 1 and a 20% VIR reduction for Rate Classes 2, 3, and 4 for the April 2012 enrollment season.³

³ See the following section **VIR Rate History** for more details

Commission Order 12-325 (Aug 2012)

During the previous enrollment period (April 2012), the capacity of reservation requests was just over the allotted capacity for the enrollment window. According to the revised ARAM, no change in VIR rates was indicated. Despite some intervening petitions to the contrary, the Commission adopted the Staff recommendation that the ARAM be allowed to exercise without alteration.

As a result, the rates for the following enrollment period (October 2012) were kept unchanged from the April enrollment period.

VIR Rate History

VIR Rate for Small systems (<10kW)

Enrollment Period	Rate Class 1	Rate Class 2	Rate Class 3	Rate Class 4	Change Mechanism
Jul 2010	\$0.65	\$0.60	\$0.60	\$0.55	
Oct 2010	\$0.585	\$0.54	\$0.54	\$0.495	ARAM
Apr 2011	\$0.468	\$0.432	\$0.432	\$0.396	ORDER
Oct 2011	\$0.374	\$0.346	\$0.346	\$0.317	ORDER
Apr 2012	\$0.411	\$0.346	\$0.346	\$0.317	ARAM
Oct 2012	\$0.411	\$0.346	\$0.346	\$0.317	ARAM

VIR Rate for Medium systems (>10kw and <100kW)

Enrollment Period	Rate Class 1	Rate Class 2	Rate Class 3	Rate Class 4	Change Mechanism
Jul 2010	\$0.55	\$0.55	\$0.55	\$0.55	
Oct 2010	\$0.495	\$0.495	\$0.495	\$0.495	ARAM
Apr 2011	\$0.396	\$0.396	\$0.396	\$0.396	ORDER
Oct 2011	\$0.317	\$0.317	\$0.317	\$0.317	ORDER

Apr 2012	\$0.285	\$0.25	\$0.25	\$0.25	ARAM
Oct 2012	\$0.285	\$0.25	\$0.25	\$0.25	ARAM

July 2010 - Large		April 2011 - Large		October 2011- Medium		April 2012 - Large		October 2012 - Medium	
Nameplate Capacity kW	Bid Price	Nameplate Capacity kW	Bid Price	Nameplate Capacity kW	Bid Price	Nameplate Capacity kW	Bid Price	Nameplate Capacity kW	Bid Price
500.00	\$0.2397	300.00	\$0.2000	41.60	\$0.2000	500.00	\$0.1575	75.00	\$0.1650
500.00	\$0.2690	495.88	\$0.2340	93.12	\$0.2049	500.00	\$0.1695	100.00	\$0.1650
495.00	\$0.2830	488.40	\$0.2349	100.00	\$0.2167	500.00	\$0.1748	100.00	\$0.1666
105.00	\$0.2970	500.00	\$0.2387	100.00	\$0.2168	366.00	\$0.1748	100.00	\$0.1669
140.00	\$0.2989	122.00	\$0.2496	100.00	\$0.2169	500.00	\$0.1889	100.00	\$0.1676
116.00	\$0.2998	105.00	\$0.2496	100.00	\$0.2248	400.00	\$0.1889	100.00	\$0.1677
500.00	\$0.3188	153.00	\$0.2540	40.00	\$0.2249	500.00	\$0.1900	100.00	\$0.1678
102.00	\$0.3295	152.00	\$0.2789	99.875	\$0.2389	200.00	\$0.1969	70.00	\$0.1689
175.00	\$0.3495	105.54	\$0.2800	100.00	\$0.2400	500.00	\$0.2070	99.00	\$0.1690
500.00	\$0.3500	258.03	\$0.2800	33.70	\$0.2450	260.00	\$0.3950	99.00	\$0.1690
101.00	\$0.3500	286.33	\$0.2800	99.00	\$0.2480			99.00	\$0.1690
125.00	\$0.3500	498.96	\$0.2888	99.00	\$0.2489			99.00	\$0.1690
150.00	\$0.3995	500.00	\$0.2899	100.00	\$0.2600			99.00	\$0.1690
500.00	\$0.4223	115.00	\$0.2949	100.00	\$0.2800			100.00	\$0.1699
500.00	\$0.4969	493.50	\$0.2970	100.00	\$0.2900			100.00	\$0.1700
		500.00	\$0.2974	70.00	\$0.2900			100.00	\$0.1728
		152.00	\$0.2975	90.00	\$0.2990			100.00	\$0.1729
		350.00	\$0.2995	30.00	\$0.3000			100.00	\$0.1776
		302.00	\$0.2995	100.00	\$0.3200			100.00	\$0.1800
		449.00	\$0.3150	86.40	\$0.3378			100.00	\$0.1849
		500.00	\$0.3151					98.00	\$0.1895
		150.00	\$0.3900					98.00	\$0.1895
								98.00	\$0.1895
								100.00	\$0.1900
								100.00	\$0.1975
								74.88	\$0.2000
								100.00	\$0.2049
								99.96	\$0.2190
								100.00	\$0.2600

Bid History for PacifiCorp

July 2010 - Large		April 2011 - Large		October 2011- Medium		April 2012 - Large		October 2012- Medium	
Nameplate Capacity kW	Bid Price	Nameplate Capacity kW	Bid Price	Nameplate Capacity kW	Bid Price	Nameplate Capacity kW	Bid Price	Nameplate Capacity kW	Bid Price
325.00	\$0.3973	495.88	\$0.2250	98.70	\$0.3200	89.00	\$0.2900	98.00	\$0.2285
500.00	\$0.3988	200.00	\$0.3100	98.70	\$0.3200	80.00	\$0.2800	54.00	\$0.1899
N/A	\$0.3800	250.00	\$0.3100	100.00	\$0.2700	99.00	\$0.2890	100.00	\$0.2386
		N/A	\$0.3800	100.00	\$0.2700	99.00	\$0.3080	100.00	\$0.2386
			\$0.3850	100.00	\$0.2600	99.00	\$0.3100	100.00	\$0.2386
			\$0.3330	100.00	\$0.2800	99.88	\$0.3188	100.00	\$0.2386
			\$0.3490	99.00	\$0.2790	98.70	\$0.3200	100.00	\$0.2183
			\$0.3688			98.70	\$0.3200	100.000	\$0.2183
			\$0.3100			99.00	\$0.3070	100.00	\$0.2183
						499.88	\$0.2098		
						387.00	\$0.2099		
						387.00	\$0.2100		
						500.00	\$0.2100		

Bid History for PGE

II. Program Results to Date

Project Highlights

There have been six enrollment seasons for the program to date, beginning with July of 2010, and then continuing each April and October since then.

As of the last enrollment season where complete data has been collected (Spring 2011), the three utilities have completed 806 systems under 10kW and 49 systems >10kW. The total installed capacity is 5334 kW for small systems, and 5719 for medium and large scale systems, for a total of over 11MW installed capacity (DC).

The number of project applicants and capacity trends have followed the VIR rate as one would expect; as the rate decreased, less applications for less capacity was received and as the VIR increased again, the number of applications increased as well.

The data for all three utility programs shows a linear decrease in the price of PV panels. Interestingly, the cost for the balance of system (including labor, mounting hardware, inverters and other incidental equipment) has remained relatively stable throughout the program period. The overall cost of installation has dropped slightly over the 5 enrollment seasons for which complete data exists. In Spring of 2010 the average installed cost was about \$6.65/Watt for small systems, and by Spring 2012 that cost had dropped to \$6.50/Watt. Systems over 10kW have been about \$1/W less expensive than the smaller systems, and have trended lower faster. For example, in PGE's program medium sized systems started the program at an average of \$5.70/Watt and have fallen to an average of \$4.88/Watt at the time of this report. The drop in price for PacifiCorp's program was not as dramatic, beginning at \$6.39/W and falling to an average of \$5.98/Watt.

The average years-to-payback is calculated by dividing the net cost to the participant after incentives by the anticipated annual VIR payments. In all cases the average years-to-payback hovers close to 10 years, but with a large variance between the minimum and the maximum. This is due to the particular costs incurred by individual projects and the varying returns based on different VIRs. The projects with high VIR payments and low installation costs are able to recover the costs of the project within as little as 3 years, with the higher cost projects taking as long as 21 years to recoup their costs. There is not nearly as much variability in the years-to-payback for medium and large systems. The assumption is that larger systems are considered commercial ventures, and costs are more closely scrutinized by participants since the larger systems are considered business investments by the participants. Projects with high costs and poor payback periods would probably not be pursued.

The average return on investment (defined for this analysis as the internal rate of return) is 5-6% for all projects except the largest few, which are able to return a rate closer to 10% due to lower costs. The assumption is that larger systems are able to negotiate better costs due to economies of scale.

For complete statistical tables, see the end of this report. The tables provide summary results for each enrollment period except for October 2012, for which complete data is not yet available. ("S" refers to the spring/summer enrollment window; "F" refers to the fall enrollment window).

Program Costs and Estimated Rate Impacts

The electric companies, with Commission review, estimated the yearly rate impacts of the pilot program. Pilot program costs include both the cost of the incentive payments and the utility cost to administer the program.

To estimate the rate impacts of the pilot, the electric companies and Commission assumed the following:

- Full capacity reservation in each allocation window;
- Immediate installation of all winning solar systems after the enrollment window;
- Immediate incorporation of all costs into electricity rates. The estimates do not consider regulatory lag or deferred accounting treatment;
- The utility benefit of not having to purchase power on the open market in an amount equivalent to the output from participating solar systems;
- For the small and medium-sized projects the VIR is reduced by the retail rate, or bill savings the customer receives, due to the net-metering structure of the program. Without this reduction in the VIR the electric companies, and its customers, would be effectively paying the retail rate plus the VIR per kWh.

Below are the overall rate impact estimated by each utility. See Attachment A for the full associated compliance reports submitted by the utilities.

UTILITY	PGE	PAC	IPCO
% of Revenue Requirement	0.26%	0.24%	1.37% ⁴

⁴ Idaho's rate impact based on a 1.5% revenue rider and not on actual costs

III. Data Analysis

VIR Trends & Comparison to Energy Trust of Oregon Incentives

One goal of the VIR pilot is to help reduce costs for installed solar PV systems. The overall installed cost for PV systems has fallen somewhat over the course of the program so far. PV panel costs have fallen dramatically, from \$3 per watt in 2010 to under \$1 per watt at the time of this report. This trend holds true for systems of all sizes. However, the balance-of-system costs have remained steady and even increased over time, with an average cost of about \$3-4 per watt. This cost represents installation hardware, labor and inverter costs, among others. Although the overall cost per watt has declined, due to the drop in PV panel costs, it is difficult to attribute this specifically to the pilot program since it has followed a worldwide trend of dropping PV prices.

This is borne out by a similar trend in PV costs of ETO projects. As can be seen in Figures 4 and 5 at the end of this report, ETO projects reflect a similar drop in the overall installed cost per watt of solar projects. The ETO data does not split out the costs between panel cost and balance-of-system cost; however, there is no reason not to conclude that the downward trend in overall cost is primarily driven by falling PV prices, which are independent of which incentive program is utilized.

The number of applications and the amount of installed capacity has, as expected, tracked closely to the VIR rate. Initial interest in the program was extremely high at the original VIR rates. As a result of the falling VIR, the number of applications fell to a low in October of 2011 – the only enrollment season with unallocated capacity. When the VIR was subsequently raised, enrollment again reached 100% of allotted capacity in the April 2012 season. Further, it appeared that the VIR had reached a level that balanced demand and capacity allotment, resulting in no change in the VIR for the October 2012 enrollment window.

Some interesting trends can be observed from the data thus far collected. Overall, it can be noted that the existence of the VIR program has apparently not diminished the popularity of the legacy ETO program. On the residential side, about 3 times as many projects have been completed under the ETO program than under the VIR since July 2010, amounting to about 3 times as much capacity. A similar 3:1 ratio in capacity exists on the commercial side. Of course, it must be recognized that both programs impose limits on the number and capacity of projects so it cannot be said that the ETO program reflects greater interest than the VIR program. However, it is fair to conclude that the existence of the VIR has not noticeably diminished the demand for ETO programs.

Perhaps the most striking comparison is between the average times for payback. The payback period for the VIR-based programs is determined by the number of years of VIR payments it takes to equal the net cost of installation for the system. The net cost of the system is the total installed cost minus a 30% federal tax incentive (i.e., the Investment Tax Credit for solar). This tax incentive is available for both commercial and residential participants. Under the assumption that this incentive can be fully utilized, the time to recover costs is about 10 years, on average, for the VIR-incentive systems.

Under the legacy ETO incentive system, not only can the participant recover 30% of installed cost from the federal incentive, but they are also eligible for a direct rebate from the ETO and state tax credits under the RETC or BETC. Until the recent revision of the BETC rules, the state of Oregon offered an extremely generous tax credit worth 50% of the total installed cost of a commercial project (through the BETC). A solar project owner utilizing the BETC, ETO rebates and the federal tax credit can recover the vast majority of the installed cost of the system within 5 years, making it a better financial vehicle than the VIR. It will be interesting to observe whether the restructuring of the BETC in 2012 will result in greater interest in the VIR program during the final enrollment season.

Finally, it should be noted that the statistic “Percentage of Successful Installations” in Figure 3 may be misleading on face value. The statistic represents the ratio of completed projects to the total number of applications. However, the caps imposed on the VIR program forces a sizable number of potentially viable projects to be turned away. Before October 2011, this fact is not reflected since applications were simply not accepted after the capacity was fully reserved. However, after this date the “first come, first served” paradigm was changed to a lottery system. Those potentially viable projects that were not chosen in the lottery were still included in the count of “unsuccessful” installations, limiting the usefulness of the statistic in drawing conclusions.

IV. Survey Results

Both PacifiCorp and PGE have collected survey results from participants in the Solar Pilot program. Below some of the highlights of the surveys are presented. The complete survey results can be found in the Appendix.

PacifiCorp Survey Highlights

Participants

(The complete survey results can be found in Attachment B)

There were 101 respondents active in the VIR program and having received at least 2 payments. Below is a summary of the survey answers from the respondents:

- Overall, 73% responded they were very satisfied and only 1 reported “dissatisfied”
- When asked their primary reasons (multiple answers okay) for choosing the VIR program, 78 responded with a financial-based reason (incentives, income or ROI), and 53 for environmental or social reasons.
- When asked about their initial reasons for investigating the program, 58 indicated a financial related reason while 37 stated environmental or social reasons
- 71 respondents had made energy efficiency improvements before installing their solar system
- Indicating as to how they first became aware of the VIR program, 58 attributed this to a solar contractor and 18 to the newspaper – the top two answers
- The top three solar contractors mentioned in raising awareness – Sunlight Solar (17) SolarCity (8) Eco Solar (6)
- Respondents indicated their sources of information about the program as solar contractor (88), ETO website (46), utility website (41), other online resources (38); phoned ETO (28), talked to friends (27), phoned the utility (26), and from the newspaper (17).
- 76 respondents knew of the ETO/net metering program before investigating the VIR

In questions regarding the participants’ knowledge and understanding of Oregon’s solar incentives, there were some interesting results:

- Only 60% understood that ETO incentives were not included in the VIR program
- Only 60% understood the same about state tax credits
- Most (86%) knew federal tax credits were possible with the VIR;
- Nearly all (90%) understood they would receive monthly payments
- 74% claimed that they chose the VIR over ETO based on better financials
- All but 18% compared the two incentive programs before deciding
- Only 27 % were aware of insurance requirements before hand, and 32% still did not know after installation
- Only 26% knew of the metering fee beforehand; 19% still did not know after the install
- 57% knew about the need for “right sizing” before signing on; 29% learned of this during the process; and still 13% are unaware afterwards
- 75% knew of the income stream before joining the program; 22% learned of this during the application

In questions related to their perception of the program:

- When asked about perceived barriers to participating, 18 indicated insurance requirements, 17 indicated the additional meter fee and 45 the initial cash outlay required.
- When asked if they would still participate if the VIR was less, the results were:

New VIR

ANSWER	\$0.10	\$0.20	\$0.30	\$0.40
Def YES	5	7	8	13
Maybe YES	8	15	28	54
Neutral	12	14	11	12
Probably not	21	16	29	11
Def NOT	55	49	25	11

- Responding to questions about filling out the forms, the majority (78) had the contractor fill out the form, Of 23 who filled it out themselves 10 found it somewhat to unreasonably difficult

Responding to questions regarding the solar installation itself:

- As far as the physical installation of the solar system was concerned, 50% installed the size system they wanted; 36% installed a smaller size than they had wanted due to program restrictions.
- 49 respondents were involved in choosing components. The most important factors in their choice of hardware were: efficiency (47), quality (48), price (43), delivery (38), and “Made in Oregon” (30)
- Generally, participants are very happy with the knowledge and performance of the contractors
- In reference to interconnection, the majority of participants were somewhat to very satisfied with the time and cost to complete the interconnection. For those that knew (86), 72 took 10 days or less to have the meter installed.
- Respondents were generally pleased with the payment amounts they were receiving so far. However, of those dissatisfied, 3 indicated this was because the payment is redirected to Solar City; 3 have problems with generation and 8 receive an amount less than expected.

Demographics:

- Residential demographics tend to be older with 56 of 74 respondents aged 41-70 yrs.
- Income level tends to be medium with 44 respondents in the \$40,000-120,000 income range

- Commercial installations are small with 17 of 27 businesses having less than 20 employees from and a wide range of annual revenue (<250K to \$50million) with fairly even distribution.

Drop -Outs

There were 16 respondents who were surveyed after leaving the PacifiCorp VIR program.

Of these 16:

- 15 did NOT complete a solar installation
- 11 have decided against putting on solar, 2 are still considering, 2 unsure
- 12 opted out after acceptance, 4 were rejected by PacifiCorp

There is no one unifying reason for choosing to opt out. Of the 12 opt-outs, when asked to state the overriding reason for leaving the program:

- Half claimed that the high upfront cost was important
- 25% claimed the upfront incentives of net metering were important
- Contractor interactions, difficulty of application process, insurance requirements, and availability of financing were generally of little or no importance in the decision

Three out of four of those who were cancelled by the utility felt that the process was fair.

Other factors and attributes of those who did not participate include the following:

Out of 16 respondents -

- 11 made no energy efficiency improvements before looking at solar
- 8 heard about the program through contractor; 7 from PAC phone or website (multiple choices allowed)
- As to their decision to enroll –10 claimed financial/income factor; 7 based it on contractor recommendation
- Financing availability was important to 8
- The insurance requirement was almost a deal breaker for 6 and initial cash outlay nearly a deal breaker for 5
- 9 did *not* know about the ETO/RETC option; of the 7 that did 5 chose the VIR based on financial reasons
- Only 1 of 7 that were aware of ETO decided to net meter.
- Generally, those that opted out and worked with a contractor had a positive experience

- 11 had the contractor fill out the online form. None of the remaining 5 had major issues with the process.
- 14 were disappointed about not being in the program, 10 are likely to enroll in the future, and 12 would recommend to others

PGE Survey Highlights

(The complete survey results can be found in Attachment C)

PGE offered online surveys to solar program participants and prepared a comprehensive report on the findings⁵. Below are some of the highlights from PGE's data analysis, quoted from the report:

Participants

Residential

- Most respondents report hearing about the SPO program through contractors (31%), the media (27%) and lenders (described in the open-ended responses).
- Respondents show a moderate level of previous ownership of solar systems.
- Respondents are making the decision to invest in a solar system relatively rapidly; 24% considered the decision for less than three months and nearly half considered for less than one year.
- Overall, respondents are satisfied with program processes and communications. Satisfaction is mixed regarding time it took to get the system installed and connected.
- Installation contractors play an important role in the respondents' experiences; they are an influential source of information on the program, are submitting the majority of applications and assist participants to complete forms. In addition, most respondents (80%) are satisfied with the service they received from their contractor.
- About 80% of participants estimated the system payback period, with estimates ranging from one to 16 years, with most payback estimates between seven and 10 years. Respondents had a low tolerance for additional extension to their payback period.

⁵ Consultant memorandum from Marti Frank and Jane S. Peters, *Research Into Action, Inc* to Linda Evens, PGE Senior Research Analyst & Project Manager, dated Sept. 8, 2011.

- Just over half of respondents (56%) considered net metering for this project, typically for a system the same size or smaller than the one they installed in the SPO program. Most chose the program because they found the incentives more attractive.
- Nearly half of respondents (44%) had unresolved issues when they decided to participate.

Commercial

- Nearly half of respondents (47%) report hearing about the SPO program through contractors and word-of-mouth (32%).
- Only one respondent reported previous ownership of solar systems.
- Respondents are making the decision to invest in a solar system relatively rapidly; 32% considered the decision for less than three months and 64% considered for less than one year.
- Overall, respondents are satisfied with program processes and communications. Satisfaction is mixed regarding time it took to get the system installed and connected.
- Installation contractors play an important role in the respondents' experiences; they are an influential source of information on the program, are submitting the majority of applications and assist participants to complete forms. In addition, nine-out-of-ten respondents (89%) are satisfied with the service they received from their contractor.
- All respondents estimated the system payback period, with estimates ranging from one to 15 years. Respondents had a low tolerance for additional extension to their payback period.
- Just under half of respondents (47%) considered net metering for this project, typically for a system the same size or larger than the one they installed in the SPO program. Most (70%) chose the program because they found the incentives more attractive.

Drop-Outs

Residential

- Five of six drop-outs chose to terminate their participation in the program (as opposed to having their participation terminated by PGE).
- One of six drop-outs installed a solar PV system, and did so in the net metering program.
- Total system cost and availability of upfront capital were important barriers to participation.

Commercial

- There was only one completed commercial drop-out survey.
- The respondent withdrew because he/she did not receive as large an allocation as was desired.

V. Comparative Effectiveness of Alternative PV Incentive Options

The 2009 Legislature directed the Commission to compare the effectiveness of paying a volumetric-based (i.e., kilowatt hours produced) incentive to that of one based on capacity (kilowatts installed) -- as currently offered through the Energy Trust of Oregon-- in terms of reducing the cost of installing solar generation.

Comparison of ETO and VIR incentives

Solar generation participants currently have two incentive programs to choose between – those offered through the Energy Trust of Oregon, and those offered through the utility by way of the VIR. Both programs offer cash incentives to the program participant, but the two programs vary greatly in the way these incentives are determined and paid out.

In conceptual terms, a performance incentive such as the VIR is usually determined by assuming a required return-on-investment (ROI) to a “typical” project. The candidate “typical” project comprises average costs for hardware and installation, assumes an average geographical-based solar insolation, and an estimate of the project’s efficiencies. Financial considerations regarding a “typical” project must also be assumed – whether the project is debt or equity financed and by what percentage, the carrying-cost of capital, and the ability of the participant to take advantage of additional tax incentives. The VIR rate is then determined as that rate which will produce the target ROI for the candidate project. The VIR is then applied to the energy generated and paid to the participant in regular installments over the course of the long-term contract.

The capacity approach, such as that currently offered by ETO, provides a cash rebate upon successful installation of the project. The amount of the cash incentive is based on the size (kilowatt capacity) of the system. The ETO incentives have varied over time, ranging from \$2.00/watt to \$0.75/watt as solar costs have moved downward. In addition to the direct cash rebate, the State of Oregon offers tax credits to solar program participants. However, the participant must incur a high enough tax liability in order to fully utilize the benefits of the tax credits.

The administrative challenge in the VIR case is in creating an accurate description of a “typical” solar project, from both a physical and financial point of view. In truth, it is impossible that a single “typical” project description will accurately reflect all the possible project variables, so it is to be expected that there will be a range of ROI outcomes for any given VIR rate. However, if an adjusting mechanism (such as the ARAM or periodic manual rate review) is incorporated, over time the rate will tend towards a stable midpoint where supply and demand are approximately equal. It can reasonably be assumed that this midpoint represents a rate that produces an acceptable ROI for most participants, neither too high nor too low. Once the rate is determined and an adjusting process is in place, ongoing program implementation is simple and straightforward, requiring only that the rate be applied to the metered system output and a payment generated. From this point on, for the duration of the contract, the onus for proper ongoing performance of the system is on the participant, since payment of the incentive is based solely on the energy produced by the system.

At first glance, the capacity payment approach may appear to be much simpler to administer of the two programs. Once a system is installed, the incentive amount is determined by the nameplate capacity, and a one-time payment is made to the participant. However, under this type of program the risk and onus for performance is on the incentive provider – in this case, the State of Oregon. Installed solar capacity has little intrinsic value – its true value comes from the renewable energy produced over time. However, with all of the cash incentive coming in the first year, there is less financial motivation for the project participant to ensure proper operation of the system over time. Further, there is no guarantee that the State will see the full benefit of the potential energy production during the course of the program. In other words, there is a risk that the State will not realize a good return on its investment in the solar capacity.

In practice, the amount of incentive available through the legacy ETO/RETC/BETC regime is not always clear and easily calculable for potential participants. Over the course of the last 3 years, both the amount of “per-watt” rebate available and the tax credit rate have been moving targets, affected by state budget constraints and dependent on the level of previous incentive payouts. For a potential participant the amount of incentive available at a given time is not always clear and transparent, and the rules for determining the incentive amount and the process for receiving it can be burdensome. In addition, to fully utilize all of the available incentives a participant must have enough tax liability to make use of the credits. This may introduce another element of uncertainty when attempting to calculate the net cost of the project.

By comparison, the VIR incentive is simple, transparent and easy for anyone to understand – the utility will pay the participant at a set “per kwh” rate on a monthly basis for the length of the contract (15 years). The VIR rate is determined months in advance of the enrollment window, and often the contractor is able to do perform all the necessary paperwork on behalf of the

participant. On its own, the relative ease of participating may make the VIR program more attractive than the rebate program to some participants.

From the participants view, the capacity-rebate incentive has the benefit of reducing the upfront capital cost of the project, which is considered a sizable amount for many participants. The ability to limit immediate out-of-pocket costs is often cited as a primary consideration in a participant choosing the rebate option over the VIR⁶. On the other hand, if initial installation costs do not pose an obstacle to the participant, residential participants are likely to find that the VIR program offers a better return on their investment than the legacy rebate scheme, resulting in a greater amount of revenue over the course of the contract, and over the lifetime of the solar installation. However, at least in the past several years of generous BETC incentives, commercial system owners could realize a 5 year payback on their investment (compared to 10 years for the VIR). The choice of incentive program in any particular case is highly dependent on the financial characteristics of that project and participant. The actual rate of return is not likely to be identical for any two projects, but instead will vary project by project. This fact is borne out by the data collected to date.

When examining the effectiveness of the incentive programs on installation costs, it is difficult to ascertain the direct effect of either program on cost reduction. Obviously, under both systems the installed cost per watt has fallen dramatically. However, as shown previously, this cost reduction is primarily due to the fall in PV panel prices from \$3/watt in mid 2010 to under \$1/watt at the time of this report. This price drop is one seen worldwide and cannot be attributed to localized effects of Oregon's incentive programs. At the same time, the balance-of-system (BOS) costs have remained consistent between the programs, and over the time period covered in this report. The availability of incentive programs has not reflected a drop in BOS costs under either program, based on the data collected.

Determining the relative attractiveness of the two incentive approaches in absolute terms is very difficult, if not impossible. Each participant and each solar installation is unique, and the difference in the value of the two incentive approaches will similarly be different. Further, it should be noted that not all participants base their decisions on purely financial reasoning. A participant may choose one or the other programs based on recommendations from friends and contractors, a desire to choose the "easiest" program to enroll in, or some other measure of merit that remains unique and personal to them.

For these reasons, the Commission cannot speculate on the relative superiority of one incentive approach over the other. Instead, it can be stated that both incentive programs have proven successful in their ability to promote the

⁶ See [Survey Results](#) section IV of this report

installation and use of solar distributed generation, and that both programs exhibit a high level of support and acceptance in the community.

Tables and Figures

Cost per Watt - Systems < 10kW

Enrollment Season	Total Cost of Installation	PV Cost	Balance of System Cost
S2010	\$6.54	\$2.99	\$3.55
F2010	\$6.74	\$2.69	\$4.04
S2011	\$6.21	\$1.92	\$4.29
F2011	\$6.38	\$0.87	\$5.51
S2012	\$6.41	\$0.82	\$5.59
Total	\$6.46	\$2.04	\$4.42

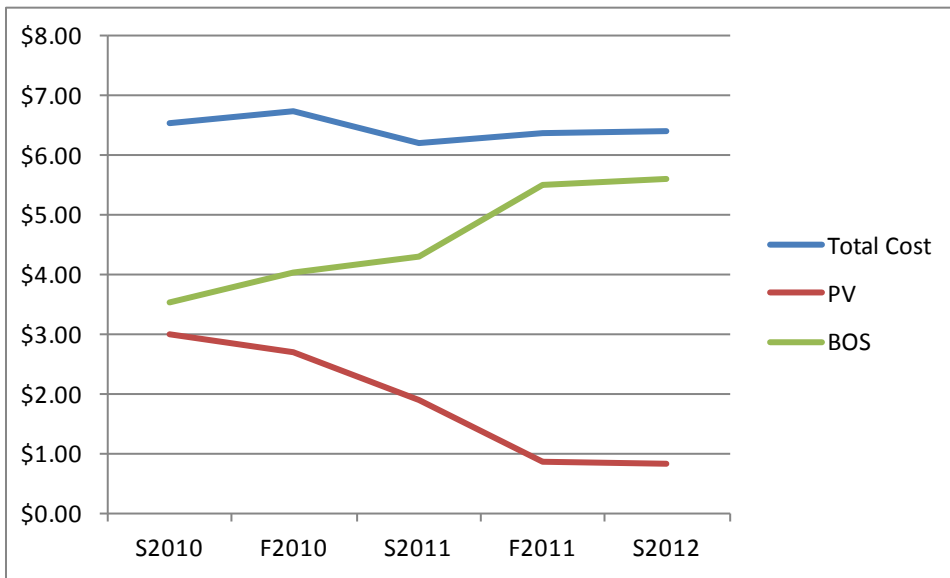


Figure 1 – Small System Cost Breakdown

Cost per Watt - Systems >10kW

Enrollment Season	Total Cost of Installation	PV Cost	Balance of System Cost
S2010	\$4.96	\$2.00	\$2.96
F2010	\$4.86	\$2.11	\$2.75
S2011	\$4.81	\$1.22	\$3.59
F2011	\$5.01	\$0.76	\$4.26
S2012	NA	NA	NA
Total	\$4.79	\$1.61	\$3.18

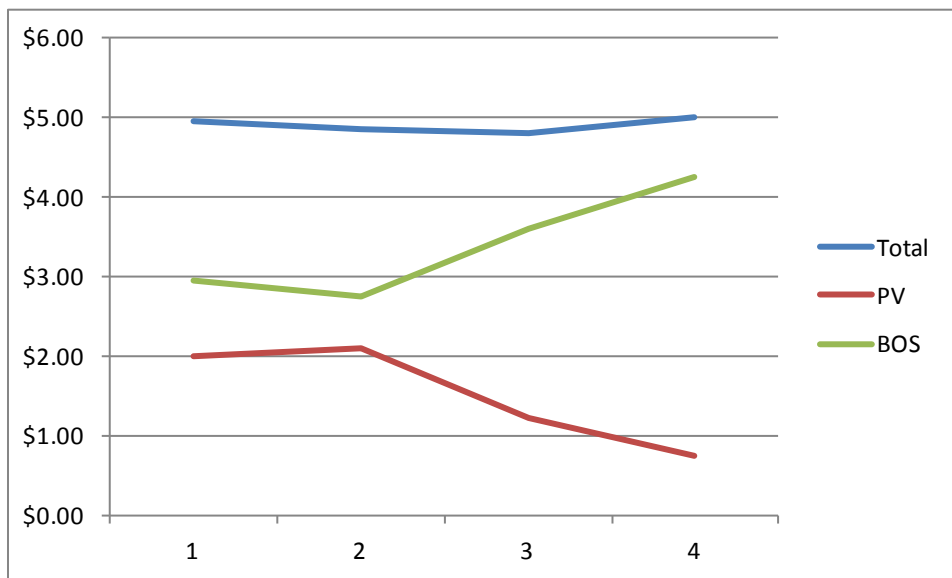


Figure 2 – Medium and Large System Cost Breakdown

PacifiCorp

SMALL SYSTEMS (Residential and Non-residential, < 10kW DC Capacity)

COMPLETED SYSTEMS												
Enrollment Season	No. Projects	DC (kw) Capacity	Installed Cost Total	PV Total	Average \$/Watt (dc)	Max \$/Watt (dc)	Min \$/Watt (dc)	Expected Actual kwh	Min Years to PB	Max Years to PB	Avg Years to PB	Avg IRR
S2010	59	376.5	\$2,495,785	\$1,171,558	\$6.57	\$10.06	\$3.35	468,214	4	18	8	9.1%
F2010	63	456.7	\$2,955,842	\$1,211,892	\$6.61	\$12.62	\$4.17	713,308	7	21	10	5.1%
S2011	89	715.6	\$4,540,190	\$1,484,396	\$6.37	\$8.12	\$1.75	953,408	3	15	11	3.9%
F2011	21	121.5	\$769,888	\$135,911	\$6.47	\$7.98	\$4.40	137,258	10	20	16	-0.1%
S2012	16	97.4	\$631,954	\$81,024	\$6.75	\$7.98	\$4.36	111,943	10	20	15	0.0%
Total	248	1,767.7	\$11,393,660	\$4,084,780	\$6.45	\$12.62	\$1.75	2,384,131	3	21	11	4.9%

APPROVED (RESERVED + PENDING)		
Enrollment Season	No. Projects	DC (kw) Capacity
S2012	52	422.2
F2012	102	855.8
Total	167	2,250.1

CANCELED + REJECTED		
Enrollment Season	No. Projects	DC (kw) Capacity
S2010	16	59.42
F2010	57	343.39
S2011	24	161.61
F2011	27	219.92
S2012	4	27.52
Total	128	811.85

MEDIUM SYSTEMS (Non-residential, 10 - 100 kW DC Capacity)

COMPLETED SYSTEMS												
Enrollment Season	No. Projects	DC (kw) Capacity	Installed Cost Total	PV Total	Average \$/Watt (dc)	Max \$/Watt (dc)	Min \$/Watt (dc)	Expected Actual kwh	Min Years to PB	Max Years to PB	Avg Years to PB	Avg IRR
S2010	2	124.58	\$799,739	\$104,720	\$6.39	\$6.45	\$6.33	150,411	8.91	9.25	9.08	6.6%
F2010	6	402.27	\$2,378,497	\$868,214	\$5.78	\$8.18	\$4.96	641,130	8.12	13.65	9.71	6.1%
S2011	4	253.57	\$1,486,538	\$571,714	\$5.62	\$7.68	\$4.47	430,500	8.78	14.38	10.42	5.1%
F2011	-	-	-	-	-	-	-	-	-	-	-	-
S2012	1	99.82	N/A	N/A	N/A	N/A	N/A	126,500	N/A	N/A	N/A	N/A
Total (10-11)	12	780.422	\$4,664,774	\$1,544,648	\$5.98	\$8.18	\$4.47	1,222,041	8.1	14.4	9.84	5.95%

APPROVED (RESERVED + PENDING)		
Enrollment Season	No. Projects	DC (kw) Capacity
F2011	4	388.799
S2012	9	583.29
Total	13	972.089

CANCELED + REJECTED		
Enrollment Season	No. Projects	DC (kw) Capacity
S2010	3	249.54
F2010	1	96.00
S2011	3	286.67
F2011	1	41.60
Total	8	673.81

LARGE SYSTEMS (Non-residential, > 100 kW DC Capacity)

COMPLETED SYSTEMS												
Enrollment Season	No. Projects	DC (kw) Capacity	Installed Cost Total	PV Total	Average \$/Watt (dc)	Max \$/Watt (dc)	Min \$/Watt (dc)	Expected Actual kwh	Min Years to PB	Max Years to PB	Avg Years to PB	Avg IRR
S2010	1	497.50	\$1,960,000	\$1,050,000	\$3.94	\$3.94	\$3.94	790,000	7.91	7.91	7.91	8.7%
S2011	1	360.64	\$1,338,877	\$494,077	\$3.71	\$3.71	\$3.71	456,850	7.22	7.22	7.22	10.2%
Total	2	858.14	\$3,298,877	\$1,544,077	\$3.84	\$3.94	\$3.71	1,246,850	7.22	7.91	7.56	9.5%

APPROVED (RESERVED + PENDING)		
Enrollment Season	No. Projects	DC (kw) Capacity
Total	0	0

CANCELED + REJECTED		
Enrollment Season	No. Projects	DC (kw) Capacity
S2011	1	300
Total	1	300

PORTLAND GENERAL ELECTRIC

SMALL SYSTEMS (Residential and Non-residential, < 10kW DC Capacity)

COMPLETED SYSTEMS

Enrollment Season	No. Projects	DC (kw) Capacity	Installed Cost Total	PV Total Cost	Avg \$/Watt (dc)	Max \$/Watt (dc)	Min \$/Watt (dc)	Expected Actual kwh	Min Years To PB	Max Years To PB	Avg Years To PB	Avg IRR
S2010	84	552.7	\$3,604,034	\$1,596,649	\$6.70	\$9.20	\$4.94	527,224.8	6	11	8	9.80%
F2010	159	915.3	\$6,286,865	\$2,481,790	\$7.08	\$13.69	\$3.00	867,649.4	4	18	9	7.22%
S2011	100	706.3	\$4,420,172	\$1,227,882	\$6.36	\$10.26	\$0.66	677,584.5	1	16	10	6.56%
F2011	52	330.9	\$2,116,890	\$257,726	\$6.53	\$7.98	\$3.00	314,540.5	6	16	13	2.06%
S2012	138	835.8	\$5,354,349	\$686,888	\$6.49	\$9.58	\$1.74	790,832.0	3	17	12	3.45%
Total	533	3,340.9	\$21,782,309	\$6,250,935	\$6.52	\$13.69	\$0.66	3,177,831	1	18	10	5.82%

APPROVED (RESERVED + PENDING)

Enrollment Season	No. Projects	DC (kw) Capacity
S2010	3	19.95
F2011	56	448.25
S2012	29	146.7
Total	88	614.9

CANCELED + REJECTED

Enrollment Season	No. Projects	DC (kw) Capacity
S2010	25	35.69
F2010	65	197.97
S2011	65	214.85
F2011	108	158.05
S2012	36	256.96
Total	299	863.52

MEDIUM and LARGE SYSTEMS (Non-residential, > 10 kW DC Capacity)

COMPLETED SYSTEMS

Enrollment Season	No. Projects	DC (kw) Capacity	Installed Cost Total	PV Total Cost	Avg \$/Watt (dc)	Max \$/Watt (dc)	Min \$/Watt (dc)	Expected Actual kwh	Min Years To PB	Max Years To PB	Avg Years To PB	Avg IRR
S2010	7	479.16	\$2,704,449	\$1,044,767	\$5.70	\$6.63	\$4.62	459,413	6.3	9.0	7.6	9.59%
F2010	12	1608.94	\$7,401,200	\$3,382,048	\$5.27	\$7.09	\$3.61	1,528,436	6.8	10.2	8.0	8.73%
S2011	12	1617.25	\$7,917,086	\$1,656,557	\$5.79	\$7.10	\$2.37	1,569,301	5.4	14.3	11.3	4.04%
F2011	2	198.56	\$995,000	\$150,000	\$5.00	\$6.45	\$3.55	195,504	9.4	16.4	12.9	2.59%
S2012	2	177.28	\$917,480	\$75,696	\$4.99	\$6.47	\$3.50	167,826	9.1	16.8	12.9	2.66%
Total	35	4081.19	\$19,935,215	\$6,309,068	\$4.88	\$7.10	\$2.37	3,920,480	5	16.8	10.5	5.52%

APPROVED (RESERVED + PENDING)

Enrollment Season	No. Projects	DC (kw) Capacity
S2012	5	300

CANCELED + REJECTED

Enrollment Season	No. Projects	DC (kw) Capacity
S2010	1	25.1
F2010	1	88.3
S2011	2	135.2
Total	4	248.6

Idaho Power

SMALL SYSTEMS (Residential and Non-residential, < 10kW DC Capacity)

COMPLETED SYSTEMS

Enrollmer Season	No. Projects	DC (kw) Capacity	Installed Cost Total	PV Total	Average \$/Watt (dc)	Max \$/Watt (dc)	Min \$/Watt (dc)	Expected Actual kwh	Min Years to PB	Max Years to PB	Avg Years to PB	Avg IRR
2010	9	87.73	\$551,450	\$275,465	\$6.30	\$8.82	\$4.08	128,963	3.5	7.6	5.5	16.3%
2011	16	137.7	\$723,002	\$275,221	\$5.15	\$5.56	\$4.00	202,419	6.0	8.3	7.7	9.3%
Total	25	225.43	\$1,274,452	\$550,686	\$5.65	\$8.82	\$4.00	331,382	3.5	8.3	6.9	11.8%

APPROVED (RESERVED + PENDIN)

Enrollmer Season	No. Projects	DC (kw) Capacity
2010	15	149.2
2011	25	239.47
Total	40	388.67*

Denied

Enrollment Season	No. Projects	DC (kw) Capacity
2010	0	NA
2011	7	NA
Total	7	NA

*Includes projects reserved but not completed

Data from PacifiCorp, PGE and Idaho bi-annual compliance filings raw data tables, required by Orders 860-084-0420 and 860-084-0430, and submitted to the OPUC August 2012. See docket-associated working papers for data files.

Cumulative Statistics from July 2010 - April 2012 VIR Season				
Residential & Small (<kW) Commercial				
	ETOPGE	ETOPAC	VIRPGE	VIRPAC
Number of Completed Projects	1971	1059	533	248
Percentage of Successful Installations*	96.5%	98.1%	67.5%	76.4%
Total Capacity Installed (kW)	7,282	3,569	3,341	1,768
Total ETO Incentive Spent	\$12,241,540	\$5,003,018	\$0	\$0
Total Spent - all parties	\$47,133,705	\$22,189,607	\$21,782,309	\$11,393,660
Estimated OR Tax Credits	\$11,062,908	\$5,823,333	\$0	\$0
Estimated Federal Tax Credits	\$14,140,111	\$6,656,882	\$6,534,693	\$3,418,098
Average Estimated Energy Output(kWh)	6,772,626	3,839,074	3,177,831	2,384,131
Average Years to Payback	14.3	12.3	10.0	11.0

(Assumption - @ 10 cents per kwh net metering value)

(Assumption of maximum tax credits, OR and FED)

*VIR numbers reflect a sum of oversubscription of feasible projects, rejected projects and drop-outs

Cumulative Statistics from July 2010 - April 2012 VIR Season <i>Commercial (>10kW)</i>				
	ETOPGE	ETOPAC	VIRPGE	VIRPAC
Number of Completed Projects	128	202	35	15
Percentage of Successful Installations*	88.3%	91.3%	84.7%	63.8%
Total Capacity Installed (kW)	13,649	3,826	4,081	1,751
Total ETO Incentive Spent	\$14,962,157	\$3,976,437	\$0	\$0
Total Spent - all parties	\$83,507,420	\$23,331,648	\$19,935,215	\$13,037,537
Estimated OR Tax Credits	\$41,753,710	\$11,665,824	\$0	0
Estimated Federal Tax Credits	\$25,052,226	\$6,999,494	\$5,980,565	\$3,911,261
Average Estimated Energy Output(kWh)	14,608,797	4,296,181	3,920,480	3,646,777
Estimated Annual VIR payout	n/a	n/a	\$1,542,011	\$993,207
Average Years to Payback	4.8	5.3	9.6	9.8

(Assumption - @ 8 cents per kwh net metering value)

(Assumption of maximum tax credits, OR and FED)

*VIR numbers reflect a sum of oversubscription of feasible projects, rejected projects and drop-outs

Figure 3 – Cumulative Statistics for ETO and VIR Projects

RESIDENTIAL TRENDS

ETO		VIR	
PGE	PAC	PGE	PAC

Number of Completed Projects

S2010	169	144	84	59
F2010	445	310	159	63
2010	614	454	243	122
S2011	206	103	100	89
F2011	617	275	52	21
2011	823	378	152	110
S2012	405	191	138	16

Installed Capacity (kW)

S2010	521.7	399.0	552.7	376.5
F2010	1,357.2	882.4	915.3	456.7
2010	1,878.8	1,281.4	1,468.0	833.2
S2011	699.9	406.9	706.3	715.6
F2011	2,386.7	1,060.9	330.9	121.5
2011	3,086.6	1,467.8	1,037.1	837.2
S2012	1,735.7	681.5	835.8	97.4

Installed Average Cost Over Time (\$/W)

S2010	\$7.38	\$6.87	\$6.70	\$6.57
F2010	\$6.27	\$6.32	\$7.08	\$6.61
S2011	\$6.36	\$6.52	\$6.36	\$6.37
F2011	\$6.89	\$6.22	\$6.53	\$6.47
S2012	\$6.29	\$5.98	\$6.49	\$6.75

Success Rate Over Time

S2010	95.5%	96.6%	77.7%	87.4%
F2010	94.9%	97.8%	76.8%	74.3%
S2011	97.2%	99.0%	66.5%	91.4%
F2011	98.1%	98.6%	32.5%	43.8%

NOTE
Reflects lottery

Figure 4 – Overall Statistics for Residential & Small Systems (<10kW)

COMMERCIAL TRENDS

	ETO		VIR	
	PGE	PAC	PGE	PAC
Number of Completed Projects				
S2010	29	35	7	3
F2010	29	37	12	6
2010	58	72	19	9
S2011	19	20	12	5
F2011	22	67	2	0
2011	41	87	14	5
S2012	29	43	2	1
Installed Capacity (kW)				
S2010	2,159.0	659.7	479.2	623.8
F2010	3,072.1	734.4	1,608.9	410.4
2010	5,231.2	1,394.1	2,088.1	1,034.2
S2011	1,387.4	477.6	1,617.3	617.3
F2011	3,767.3	927.4	198.6	0.0
2011	5,154.7	1,405.0	1,815.8	617.3
S2012	3,263.0	1,026.4	177.3	99.8
Installed Average Cost Over Time (\$/W)				
S2010	\$7.03	\$7.24	\$5.70	\$5.58
F2010	\$6.15	\$6.82	\$5.27	\$5.78
S2011	\$6.11	\$5.90	\$5.79	\$5.24
F2011	\$5.95	\$5.60	\$5.00	n/a
S2012	\$5.68	\$5.39	\$4.99	\$7.41
Success Rate over time				
S2010	80.6%	89.7%	87.5%	50.0%
F2010	90.6%	90.2%	92.3%	85.7%
S2011	86.4%	90.9%	92.3%	55.6%
F2011	95.7%	94.4%	66.7%	n/a

Figure 5 – Overall Statistics for Medium and Large Systems (>10kW)

Attachments

Attachment A – Rate Impact Reports from Utilities

Attachment B – PacifiCorp Survey Results (CD)

Attachment C – PGE Survey Results (CD)

CERTIFICATE OF SERVICE

UM 1505

I certify that I have, this day, served the foregoing document upon all parties of record in this proceeding by delivering a copy in person or by mailing a copy properly addressed with first class postage prepaid, or by electronic mail pursuant to OAR 860-001-0180, to the following parties or attorneys of parties.

Dated this 21st day of November, 2012 at Salem, Oregon

Kay Barnes

Kay Barnes

Public Utility Commission
550 Capitol St NE Ste 215
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UM 1505
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