Solar Photovoltaic Volumetric Incentive Rate Pilot Program

Report to the Legislative Assembly

Prepared by:

Public Utility Commission of Oregon

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Executive Summary

The 2009 Legislature enacted House Bill 3039 (HB 3039) to direct the Public Utility Commission of Oregon (Commission) to establish a pilot program to demonstrate the use and effectiveness of "volumetric incentive rates" and payments for electricity delivered from solar photovoltaic (PV) energy systems within Portland General Electric (PGE), PacifiCorp, and Idaho Power service territories.[1]

Volumetric incentive rates (VIR) are production-based incentives in which participants receive payments based on the actual output generated from the solar PV systems. HB 3039 capped the total nameplate capacity of all systems installed under the pilot at 25 megawatts (MW) and limited eligibility to systems under 500 kilowatts. Pilot program participants cannot take advantage of any state tax credit or Energy Trust of Oregon incentives.

HB 3039 directed the Commission to submit a report to the Legislature every two years starting January 1, 2011. In the report, the Commission shall:

- Evaluate the relative effectiveness of volumetric incentive rates versus the existing regime of state tax credits and Energy Trust incentives in promoting the development of solar PV systems and in reducing system costs.
- Estimate the cost of the pilot program on utility customers
- Offer legislative recommendations and pilot program adjustments to improve implementation of the pilot.
- Discuss other regulatory policies to increase the use of solar PV systems, make solar PV systems more affordable, reduce the cost of incentive programs to utility customers, and promote development of incentive

<u>Pilot Program Design and Results to Date</u>

After an extensive six month process, the Commission adopted rules to implement a pilot program starting July 1, 2010.

- The Commission allocated the 25 MW total program capacity by time period, by utility, and by size of eligible Solar PV systems.
- The Commission set the rates for systems under 100 kilowatts and is relying on competitive bidding to set the rates for systems between 100 kilowatts and 500 kilowatts.

[1] HB 3039 is codified in ORS 757.365 (2009), as amended by House Bill 3690 (2010).

- The Commission adopted a mechanism to automatically adjust rates for systems smaller than 100 kilowatts based on participation and the speed of uptake of the eligible capacity.

On July 1, 2010 and October 1, 2010, the electric companies opened enrollment windows for participants with proposed projects with output capacity less than 100 kilowatts. Eligible capacity was allocated within 15 minutes for both enrollment periods, and more than 500 projects will be receiving VIR payments for the output generated from their winning projects.

PGE and PacifiCorp also conducted a competitive bidding solicitation for eligible participants with proposed systems exceeding 100 kW in capacity. 19 participants bid into both solicitations and three projects were chosen. The price of bids submitted average 35 cents per kWh in Pacific's service territory and 39 cents per kWh in PGE's service territory.

Estimated Rate Impacts

The estimated peak yearly rate impacts from the pilot program range from .45 percent of revenue requirement for PacifiCorp customers in 2013, .48 percent of revenue requirement for PGE customers in 2013, to 1.33 percent of revenue requirement for Idaho Power customers in 2011. The estimated rate impact drops over time for all electric companies.

Comparative Effectiveness of Alternative Incentive Options

It is too early in the pilot for the Commission to draw conclusions about the relative effectiveness of the VIR versus the combination of tax credits and Energy Trust incentives in the promoting the development of Solar PV systems and in reducing the cost of systems.

The Commission does conclude that different individuals will find one or the other set of incentives more advantageous to their decision to install a solar PV system; neither incentive regime will prove superior in all situations. The body of this report sets forth some of the considerations in those individual decisions.

Program Design Recommendations and Legislative Recommendations

The Commission does not recommend changes to the legislation at this time.

Regulatory Policy Considerations and Recommendations

The information gained during the relatively short-duration of the pilot to date has not yet offered the Commission insight on regulatory policies that may be adopted to further facilitate solar photovoltaic energy generation. The Commission will continue to consider the issue, as instructed by the legislature, as additional information is obtained from the pilot programs.

Legislative Directive

Oregon has a long history of encouraging the development of renewable energy through its Business Energy Tax Credit (BETC) and Residential Energy Tax Credit (RETC) programs. In place for thirty years, these tax credits have gone to many Oregon homes and businesses to help pay for projects that use solar, wind, biomass, and combined heat and power.

Since 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 upfront incentives to install projects that use solar, wind, biomass, and other renewable resources to generate electricity. The ETO incentives buy down the "above-market" costs of systems. Customers taking advantage of ETO incentives for renewable resource projects are usually also eligible for either the BETC or RETC.

The 2009 Legislature enacted House Bill 3039 to establish a pilot program in the service areas of PGE, PacifiCorp, and Idaho Power to examine the effects of a production-based incentive to encourage the development of solar photovoltaic (PV) systems. In other words, a pilot program in which eligible participants are compensated for the output generated from PV systems.

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) and payments for electricity delivered from PV systems. The Legislature 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; and,

- 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.

HB 3039 tasked the Commission to prepare a report to the Legislative Assembly by January 1, 2011. This report must evaluate the effectiveness of paying output-based incentives as compared to the incentives offered under the BETC, RETC, and ETO programs in promoting the use of photovoltaic energy systems and in reducing system costs. The report must also estimate the cost of the pilot program to retail electricity consumers.

In addition, the report must include any Commission-recommended legislative changes to improve implementation of the pilot programs.

Solar Pilot Program Design

The Commission designed a pilot program over a six month period. Stakeholders from the solar industry, customer groups, electric companies, state agency representatives, and other interested parties were provided ample opportunity to provide input on pilot program design through workshops, public meetings and hearings, and public comment periods. The Commission adopted final rules for the pilot program on May 28, 2010 for an implementation start date of July 1, 2010.

The Commission allocated the total program capacity of 25 megawatts (MW) 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
PacifiCorp	9.8 MW
Idaho Power	0.4 MW

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 we believe would best fulfill the Legislature's goals, not infringe on the federal government's authority over wholesale sales of energy for resale, and be consistent with our 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. [2]

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.

A critical element of the pilot program is the rates offered for energy produced by the small-scale and medium-scale systems. 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 achieve a 15-year payback.

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.

[2] *See* UM 1452, Order No. 10-198 at 9.

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

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 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.

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 because it believes that competition among bidders will drive down the rates offered for electricity from large-scale systems, achieving the legislative goals of HB 3039, as well as protecting the interests of ratepayers. Also, under this approach, the VIRs are established by the market and are subject to regulation by the FERC, so there is no conflict with federal jurisdiction. .

Under this approach, the electric company solicits bids annually through a request for proposal (RFP) process approved by the Commission. These 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.

The Commission is requiring program participants to fill out surveys 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.

Pilot Program Results

On July 1, 2010 PGE, PacifiCorp and Idaho Power opened the first enrollment window for participants with proposed small-scale and medium-scale PV projects. The eligible output capacity was allocated on a first-come/first-served basis within fifteen minutes.

Table 2 shows the capacity allotted by electric company in the first enrollment period, the number of small-scale and medium-scale projects, the projected output from the winning systems, the average payment levels, and the estimated annual payment to all winning systems.

Table 2

Small and Medium Sized Systems						
Electric Company	Capacity Enrollment Window	Capacity Allotment in kW DC	Number of Projects	Estimated Annual kWh	Levelized VIR $/kWh	Estimated Annual Payments
PacifiCorp	July 1, 2010	768	80	1,006,848	0.586	$590,013
PGE	July 1, 2010	1,168	103	1,227,802	0.610	$748,980
Idaho Power	July 1, 2010	238	24	458,674	0.550	$252,270

After the first enrollment period for the small and medium-scale systems, the Commission adjusted all rates downward by 10 percent in accord with its automatic rate adjustment mechanism.

On October 1, 2010, PGE and PacifiCorp opened a second enrollment window for small and medium-scale systems. The available capacity was allocated within 10 minutes.

Table 3 shows the capacity allotted by electric company in the second enrollment period, number of projects, the projected output from the winning systems, average payment and the estimated annual payment to participants.

Table 3

Small and Medium Sized Systems						
Electric Company	Capacity Enrollment Window	Capacity Allotment in kW DC	Number of Projects	Estimated Annual kWh	Levelized VIR $/kWh	Estimated Annual Payments
PacifiCorp	October 1, 2010	1,537	128	2,015,007	0.527	$1,062,715
PGE	October 1, 2010	2,337	232	2,456,654	0.549	$1,348,684

Additional information, such as the installed cost of the system for all three electric companies, is included in Appendix A.

PacifiCorp and PGE solicited bids in the large-sized competitive bidding RFP on July 1, 1010. Bidders were required to respond to the RFP by August 19, 2010.

PacifiCorp and PGE awarded the large-sized capacity to the winning bids on August 20, 2010 and September 9, 2010, respectively.

In the competitive bidding RFP for the large-capacity sized systems PacifiCorp received a total of 15 bids with an average bid price of $0.35/kWh. PGE received 4 bids with an average bid price of $0.39/kWh in its RFP. The Commission has not yet determined whether it will make public individual bid information or winning bid prices from RFP process. This policy decision must take into consideration any potential harm to the integrity of our bidding process, and preserving the ability of the electric company to receive bids that are unbiased by previous results.

Table 4 shows the capacity allotted by utility in the first competitive bidding RFP, winning number of projects, the projected output from the winning systems, average bid price and the estimated annual payment based on the average bid price.

Table 4

Large Capacity Sized Systems						
Electric Company	Capacity Enrollment Window	Capacity Allotment in kW DC	Number of Projects	Estimated Annual kWh	Average Bid $/kWh	Estimated Annual Payments
PacifiCorp	July 1, 2010	576	1	755,136	0.350	$264,298
PGE	July 1, 2010	877	2	921,902	0.390	$359,542

Table 5 shows the number of winning projects by residential versus non-residential customer class by electric company for both enrollment periods and all capacity sizes. For additional winning project information, including winning system information by tariff schedule, and county, please see Appendix B.

Table 5

Electric Company	Residential	Non-Residential
PacifiCorp	117	92
PGE	277	58
Idaho Power	10	14

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;
- The VIR rate will be reduced by 10 percent for the April 1, 2011 enrollment period and then held constant thereafter; and,
- 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.[3]

All three electric companies are forecasting to exceed the .25 percent rate impact early in the pilot program. The rate impacts decline over time. The following tables show the estimated rate impacts by year by electric company through 2027.

[3] As is true in any conservation program, when a customer realizes a reduced bill, in this instance due to the production of the solar facility, the electric company receives less revenue on behalf of that customer. This decrease in revenue must be accounted for going forward from all retail electric customers in order to compensate the electric company for its fixed costs and allowed rate of return. Therefore, even though the electric company issues a payment that nets out the bill savings, it is effectively realizing the full cost of the VIR rate.

Solar Photovoltaic Pilot Programs - PGE
Estimated Costs of Photovoltaic Pilot Programs

Year	Implementation Costs	VIR Payments	Offsets to Costs	Total Program Costs	Revenue Requirement	% Rate Impact
2010	$463,365	$2,457,206	-$196,840	$2,723,731	$1,734,017,686	0.16%
2011	$455,563	$4,804,175	-$400,567	$4,859,171	$1,786,038,217	0.27%
2012	$622,083	$7,150,775	-$632,410	$7,140,448	$1,839,619,363	0.39%
2013	$544,380	$9,497,281	-$864,241	$9,177,419	$1,894,807,944	0.48%
2014	$622,092	$9,497,281	-$911,860	$9,207,513	$1,951,652,182	0.47%
2015	$398,475	$9,497,281	-$959,497	$8,936,259	$2,010,201,748	0.44%
2016	$398,475	$9,497,281	-$1,007,192	$8,888,564	$2,070,507,800	0.43%
2017	$398,475	$9,497,281	-$1,035,794	$8,859,962	$2,132,623,034	0.42%
2018	$398,475	$9,497,281	-$1,065,253	$8,830,503	$2,196,601,725	0.40%
2019	$398,475	$9,497,281	-$1,095,597	$8,800,159	$2,262,499,777	0.39%
2020	$398,475	$9,497,281	-$1,126,850	$8,768,905	$2,330,374,770	0.38%
2021	$398,475	$9,497,281	-$1,159,042	$8,736,714	$2,400,286,013	0.36%
2022	$398,475	$9,497,281	-$1,192,199	$8,703,557	$2,472,294,594	0.35%
2023	$398,475	$9,497,281	-$1,226,351	$8,669,405	$2,546,463,432	0.34%
2024	$398,475	$9,497,281	-$1,258,079	$8,637,677	$2,622,857,335	0.33%
2025	$398,475	$7,040,075	-$1,243,953	$6,194,597	$2,701,543,055	0.23%
2026	$318,780	$4,693,106	-$1,281,272	$3,730,614	$2,782,589,346	0.13%
2027	$239,085	$2,346,505	-$1,319,710	$1,265,881	$2,866,067,027	0.04%

Pilot Program costs are for all system sizes – small, medium and large sized-systems. Pilot Program implementation costs include estimated incremental labor, vendor and Paypal fees. Offsets to costs include an estimate of the customer monthly charge, interconnection application fee, forfeited deposits, and the avoided energy value.

Solar Photovoltaic Pilot Programs - PacifiCorp
Estimated cost of Small, Medium and large Size System size only

Year	Implementation Costs	VIR Payments	Offsets to Costs	Total Program Costs	Revenue Requirement	% Rate Impact
2010	$525,000	$1,841,513	-$197,840	$2,168,673	$1,076,153,000	0.20%
2011	$500,000	$3,393,548	-$428,321	$3,465,228	$1,137,476,000	0.30%
2012	$500,000	$4,686,566	-$670,847	$4,515,719	$1,171,600,280	0.39%
2013	$500,000	$5,769,779	-$939,820	$5,329,959	$1,206,748,288	0.44%
2014	$260,000	$5,769,779	-$985,156	$5,044,623	$1,242,950,737	0.41%
2015	$260,000	$5,769,779	-$1,074,127	$4,955,652	$1,280,239,259	0.39%
2016	$260,000	$5,769,779	-$1,166,266	$4,863,514	$1,318,646,437	0.37%
2017	$260,000	$5,769,779	-$1,208,724	$4,821,055	$1,358,205,830	0.35%
2018	$260,000	$5,769,779	-$1,208,711	$4,821,068	$1,398,952,005	0.34%
2019	$260,000	$5,769,779	-$1,228,029	$4,801,750	$1,440,920,565	0.33%
2020	$260,000	$5,769,779	-$1,308,072	$4,721,707	$1,484,148,182	0.32%
2021	$260,000	$5,769,779	-$1,411,022	$4,618,757	$1,528,672,628	0.30%
2022	$260,000	$5,769,779	-$1,333,687	$4,696,093	$1,574,532,806	0.30%
2023	$260,000	$5,769,779	-$1,314,041	$4,715,738	$1,621,768,791	0.29%
2024	$260,000	$5,769,779	-$1,396,703	$4,633,076	$1,670,421,854	0.28%
2025	$260,000	$3,928,266	-$1,079,073	$3,109,193	$1,720,534,510	0.18%
2026	$130,000	$2,376,231	-$719,306	$1,786,925	$1,772,150,545	0.10%
2027	$130,000	$1,083,213	-$359,596	$853,617	$1,825,315,062	0.05%

PacifiCorp's calculations are based on its compliance filing for OAR 860-084-0370 and 0380 Filed on November 1, 2010. The offsets to costs include meter revenue and the avoided energy costs. Revenue requirement assumes an annual growth rate of 3 percent.

Solar Photovoltaic Pilot Programs - Idaho Power
Estimated Cost of Pilot Program Small system size only

Year	Implementation Costs	VIR Payments	Offsets to Costs	Total Program Costs	Revenue Requirement	% Rate Impact
2010	$388,660	$252,270	-$23,033	$617,898	$46,488,824	1.33%
2011	$60,600	$406,813	-$41,995	$425,418	$47,883,489	0.89%
2012	$60,600	$406,813	-$43,729	$423,684	$49,319,994	0.86%
2013	$60,600	$406,813	-$44,896	$422,516	$50,799,594	0.83%
2014	$60,600	$406,813	-$46,099	$421,313	$52,323,581	0.81%
2015	$60,600	$406,813	-$47,338	$420,074	$53,893,289	0.78%
2016	$60,600	$406,813	-$48,614	$418,798	$55,510,088	0.75%
2017	$60,600	$406,813	-$49,929	$417,484	$57,175,390	0.73%
2018	$60,600	$406,813	-$51,283	$416,130	$58,890,652	0.71%
2019	$60,600	$406,813	-$52,677	$414,735	$60,657,372	0.68%
2020	$60,600	$406,813	-$54,114	$413,299	$62,477,093	0.66%
2021	$60,600	$406,813	-$55,593	$411,820	$64,351,405	0.64%
2022	$60,600	$406,813	-$57,117	$410,296	$66,281,948	0.62%
2023	$60,600	$406,813	-$58,686	$408,726	$68,270,406	0.60%
2024	$60,600	$406,813	-$60,303	$407,110	$70,318,518	0.58%
2025	$60,600	$154,542	-$27,953	$187,189	$72,428,074	0.26%

Offsets to costs include monthly meter charge revenues and the avoided energy value offset. Revenue requirement assumes an annual growth rate of 3 percent.

Comparative Effectiveness of Alternative PV Incentive Options

The 2009 Legislature directed the Commission to compare the effectiveness of paying VIR versus Energy Trust incentives and state tax credits in encouraging the installation of PV systems and in reducing system costs. The primary difference between these programs is that the solar pilot program is based on the production of the facility and is a fixed rate per kWh for a fifteen year period. In comparison, the existing incentive programs under ETO and state tax credits provide an upfront payment and 3-5 years of tax credits to the residential or business customer that help write down the capital costs of the system.

The relative risks of the two different types of incentives vary. Because recipients of volumetric incentive rates only get paid when their systems operate, they bear the risks associated with reduced generation due to system damage and degradation in the panel efficiency, among other factors. In addition, owners may not be able to take advantage of the payments for a sufficiently long period to justify the investment. Further, the solar pilot program participant must bear the full upfront cost of the system (minus the federal tax credit), and incur greater

carrying costs or realize greater opportunity costs, depending on the individual's financing arrangements, as compared to a lump sum upfront payment.

Some customers will prefer the up-front payments of the Energy Trust incentive coupled with the BETC or RETC. Others will prefer the volumetric incentive rates and payments offered in the pilot program. Obviously, the higher the VIR rates, the more customers that will favor the VIR approach. Still, even at high VIR rate levels, some individuals would still prefer incentives to reduce the upfront cost of a system.

A fundamental element in the determination of which incentive regime is preferred is an individual's "discount rate" A personal discount rate reflects the value of a dollar today versus a dollar tomorrow. The greater the value placed on having a dollar today, the higher the discount rate. The discount rate also reflects the risk appetite an individual may have towards a specific investment. For example, if individuals believe an investment is inherently risky, they will require a higher rate of return to compensate them for that risk.[4]

From 2005 through the third quarter 2009, the Energy Trust provided incentives for 986 solar systems. The number of systems installed through the Trust programs has increased each year. The Solar pilot has signed up 568 participants in its first two open enrollment periods.

At this time, it is difficult to understand the individual motivation that a participant may have in choosing the upfront payment options associated with ETO/BETC/RETC incentives versus a VIR rate with 15 year pay-back period. On a net present value basis, assuming like-sized systems and costs, a loan rate of 5 percent, a discount rate of 5 percent, and a VIR rate of $.65/kWh, it is in the best interest of customers to choose the pilot program. However, if the personal discount rate were at 8 percent, it is in the best interest of the customer to choose the ETO/tax credit option.

The Commission cannot speculate on the relative effectiveness of the pilot program in reducing the cost of solar systems. Due to the fact that it is so early in the pilot, few or no systems have been installed and we have no estimates of the installed costs to compare with the costs of systems receiving Trust and tax credit incentives.

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[4] Each individual's perception of risk may vary, especially with regard to receiving payments for the output of a solar facility over a fifteen-year period. If the participant knew how to maintain the solar facility, had previously owned a facility, or had a personal acquaintance that was a licensed PV installer, this person may perceive their risk to be minimal and the discount rate would be reflective of that and therefore lower. It is this type of individual decision making that the Commission cannot possibly speculate on.

PGE and PacifiCorp will be surveying winning participants to gather information on installation costs, on participants' decision-making processes, and on ways to improve the pilot. These surveys were issued early November 2010, and the results have not yet become available to the Commission. Once we begin getting results from the survey, the Commission will begin evaluating the pilot in terms of its comparative effectiveness in promoting the use of Solar PV systems and in reducing system costs. The survey instrument will be made publicly available on the Commission website as soon as possible.

Program Design Adjustments and Legislative Recommendations to Improve Implementation of the Program

On November 23, 2010 interested parties filed comments offering a number of recommendations for changes to the solar pilot program. These recommendations include the following:

- Reduce the incentive rate more than 10 percent before the next enrollment period
- Conduct research on non-winning applicants
- Change the application process and current online system.
- Require regular reports on capacity installed
- Report annually rather than every two years
- Deploy the entire capacity over a 2 year period rather than 4 year period.
- Eliminate the bidding approach for large-scale systems
- Change the insurance requirement
- Broaden the goals of the pilot program to include job creation, local economic impact, and environmental impact
- Adopt an "avoided cost" based approach to set rates consistent with the recent Federal Energy Regulatory Commission order

The Commission will address these issues in a future proceeding to determine whether to adopt them or not. The Commission will report on the final bulleted asked-for modification because implementing it would require an amendment to the legislation.

Use an "avoided cost" based approach to set rates: On October 21, 2010, the Federal Energy Regulatory Commission (FERC) issued an order attempting to clarify the extent of states' flexibility to tailor avoided cost rates for purchases of certain types of energy under the Public Utility Regulatory Policy Act (PURPA). Under PURPA, energy utilities must purchase energy and capacity from small generators and co-generators that are "qualifying facilities" (QFs) at rates not in excess of the "incremental cost to the electric utility of alternative electric energy" (aka "avoided cost rates"). PURPA defines the incremental cost of alternative energy as "the cost to the electric utility of the electric energy which, but for the purchase from [the QF], such utility would generate or purchase from another source."

States determine the avoided cost rates for electric utility purchases from QFs in accordance with rules adopted by FERC. FERC has previously stated that when setting avoided cost rates, states must take into account all costs from all sources of energy from which a utility can acquire energy.

In its October 21, 2010 order, FERC clarified that states need not consider costs from all sources when determining QF rates when the circumstances are such that only certain sources of energy are "available" to the utility:

> [A previous FERC opinion] supports the proposition that, where a state requires a utility to procure a certain percentage of energy from generators with certain characteristics, generators with those characteristics constitute the sources that are relevant to the determination of the utility's avoided cost for that procurement requirement.

In other words, the October 21, 2010 FERC Order clarified that if the state were to require electric utilities to acquire a certain amount of energy generated by Solar PV generators (such as under a Renewable Portfolio Standard), the state regulatory commission would be authorized to set rates for Solar PV QFs that are based only on the costs a utility would incur to purchase or generate energy from a Solar PV facility.

With this clarification coming from FERC, some parties have argued that the Commission should replace its "Net Metering Plus VIR" approach with one based on avoided costs. This change would have no effect on the rates offered to customers but would allow owners to install systems that generate more electricity than they use in their home or small business.

Oregon law would need to be changed to allow use of the "avoided cost" approach to setting rates. The Legislature would have to create a carve-out for solar systems under 500 kilowatts in the state's Renewable Portfolio Standards law.

The Commission does not support such a law change at this time. As a matter of policy, the Commission does not support carve outs for any renewable resource in the RPS. A carve-out would create winners and losers in the development of renewable generation. It would also dilute the RPS and create disincentives for innovation in the solar industry to compete against more economic renewable resources.

Further, one of the benefits of the Commission's net metering approach is that it allows for more participation in the pilot due to the fact that it constrains system size to the projected usage of the home. More participants in the program provides the Commission an opportunity to better learn the appropriate cost

structure and potential bidding strategies to encourage the most cost-effective manner of implementing a solar feed-in tariff program.

Regulatory Policy Considerations and Recommendations

Section 7 of ORS 757.365, provides that in compiling this report, the commission shall also consider regulatory policies designed to increase the use of solar photovoltaic energy systems, make them more affordable, reduce the cost of incentive programs to utility customers and promote the development of the solar industry in Oregon. The Commission interprets this directive more broadly than a directive to consider how and whether it should modify the pilot programs. The Commission interprets this as a directive to consider what measures the legislature, the Commission, or other agencies could implement to attain the listed goals. The information gained during the relatively short duration of the pilot to date has not yet offered the Commission insight on regulatory policies that may be adopted to further facilitate solar photovoltaic energy generation. The Commission will continue to consider the issue, as instructed by the legislature, as additional information is obtained from the pilot programs.

Solar Photovoltaic Volumetric Incentive Rate Pilot Program

Report to the Legislative Assembly

Appendix A
Installed System Cost

Pacific Power Oregon Solar Incentive Program
2010 Installed Cost by kW Size

Installed kW	Total Installed Cost	$/kW
4.93	$38,496	$7,812
9.90	$62,500	$6,313
3.24	$21,060	$6,500
6.11	$36,672	$6,002
5.00	$29,970	$6,000
3.60	$23,040	$6,400
2.99	$18,055	$6,038
2.88	$18,302	$6,355
5.76	$34,560	$6,000
3.78	$26,400	$6,984
9.18	$53,244	$5,800
9.00	$52,000	$5,778
5.04	$29,600	$5,873
2.64	$17,028	$6,450
4.34	$23,603	$5,441

* Pacific Power has 15 customers that completed the data collection survey that includes the installed kw and cost of their PV system.

PGE Oregon Solar Incentive Program
2010 Installed Cost by kW Size

Nameplate Capacity kW	Total Installation Cost	$/kW
3.36	$19,107	$5,686.61
7.74	$20,813	$2,688.95
6.30	$22,712	$3,605.00
4.92	$24,000	$4,878.05
9.00	$25,500	$2,833.33
3.30	$27,685	$8,389.39
3.23	$27,864	$8,626.63
4.32	$31,108	$7,200.83
5.04	$33,556	$6,657.94
9.24	$36,777	$3,980.19
5.59	$43,740	$7,824.69
2.60	$47,653	$18,328.22
9.60	$54,050	$5,630.21
3.84	$54,896	$14,295.83
3.14	$56,592	$18,022.97
9.60	$60,000	$6,250.00
5.98	$72,640	$12,147.16
9.60	$73,850	$7,692.71

Oregon Solar Photovoltaic (PV) Pilot Program
Idaho Power

PV Systems Under Contract

Capacity Reservation - July 1, 2010	Signed Contract	PV System On-line	Size of PV System, Nameplate Capacity	Cost of PV System	Estimated Annual Generation	Zip Code	Installation
(Number)	(Date)	(Date)	(kW)	($)	(kWh)		(Rate Class)
90000001	December 10, 2010		9.89	$54,000	22,800	97914	Residential
90000002	December 10, 2010	December 17, 2010	9.80	$40,000	22,050	97914	Residential
90000003	December 10, 2010		9.60	$80,250	18,000	97914	Residential
90000006	November 10, 2010	December 3, 2010	9.84	$47,700	15,000	97914	Residential
90000007	December 10, 2010		9.60	$84,667	18,000	97914	Large General Service (9S)

Oregon Solar Photovoltaic (PV) Pilot Program
Idaho Power

PV Systems Not Under Contract

Capacity Reservation - July 1, 2010	Estimated Size of PV System, Nameplate Capacity	Estimated Cost of PV System*	Estimated Annual Generation	Zip Code	Installation
(Number)	(kW)	($)	(kWh)		(Rate Class)
90000004	10.00		18,000	97914	Large General Service (9P)
90000005	9.60	$69,600	18,000	97914	Residential
90000008	10.00		15,000	97914	Large General Service (9S)
90000012	10.00		18,250	97914	Residential
90000013	9.60	$69,600	18,615	97913	Residential
90000018	10.00		18,250	97914	Irrigation
90000020	9.60	$69,600	18,615	97913	Residential
90000025	10.00	$48,500	18,000	97914	Irrigation
90000028	9.60	$69,600	18,000	97914	Residential
90000029	10.00		18,250	97914	Residential
90000030	10.00		18,250	97914	Irrigation
90000031	10.00		18,250	97914	Irrigation
90000032	10.00		18,250	97914	Irrigation
90000033	10.00		18,250	97914	Irrigation
90000034	10.00		18,250	97914	Irrigation
90000035	10.00		18,250	97914	Irrigation
90000036	10.00		18,250	97914	Irrigation
90000037	10.00		18,250	97914	Irrigation
90000038	10.00		18,250	97914	Large Power Service (19P)

Notes: *Estimated Cost of PV System if provided by the participant. This information is provided in the signed Energy Sales Agreement.

Total Installation

Installation	Estimated Total Nameplate Capacity	% Nameplate Capacity
(Rate Class)	(kW)	(%)
Residential	97.53	41%
Large General Service	39.60	17%
Irrigation	100.00	42%
Total	237.13	100%

Solar Photovoltaic Volumetric Incentive Rate Pilot Program

Report to the Legislative Assembly

Appendix B
Competitive Bidding Projects

Pacific Power Oregon Solar Incentive Program
2010 Capacity Reservations
Number of Participants by System Size and by Customer Class

July 1, 2010 Enrollment Period

Small-Sized Systems - July 1, 2010 Enrollment

Pacific Power Schedule Description	Rate Schedule	Number of Participants	Nameplate Capacity	% NP Cap
Residential Service	4	43	219.07	52%
General Service Small Nonresidential	23	10	77.42	18%
General Service Large Nonresidential	28	9	88.8	21%
General Service Large Nonresidential 201 kw to 999 kW Delivery Service	30	0	0	0%
Klamath Basin Irrigation and Drainage Pumping	33	3	29.4	7%
Agricultural Pumping Service Delivery Service	41	1	9	2%
		66	423.69	100%

Medium-Sized Systems - July 1, 2010 Enrollment

Pacific Power Schedule Description	Rate Schedule	Number of Participants	Nameplate Capacity	% NP Cap
Residential Service	4	-	-	-
General Service Small Nonresidential	23	1	99.45	30%
General Service Large Nonresidential	28	2	130.01	39%
General Service Large Nonresidential 201 kw to 999 kW Delivery Service	30	1	100	30%
Klamath Basin Irrigation and Drainage Pumping	33	-	-	-
Agricultural Pumping Service Delivery Service	41	-	-	-
		4	329.46	100%

Total Number of Participants - July 1, 2010 Enrollment	70	753.15

*The total number of participants at the initial enrollment was 80.
There are participant dropouts which are not included the above totals.

**Nameplate Capacity is based on reserved capacity

October 1, 2010 Enrollment Period

Small-Sized Systems - October 1, 2010 Enrollment

Pacific Power Schedule Description	Rate Schedule	Number of Participants	Nameplate Capacity	% NP Cap
Residential Service	4	58	381.42	51%
General Service Small Nonresidential	23	9	78.00	10%
General Service Large Nonresidential	28	15	149.10	20%
General Service Large Nonresidential 201 kw to 999 kW Delivery Service	30	2	19.90	3%
Klamath Basin Irrigation and Drainage Pumping	33	6	59.40	8%
Agricultural Pumping Service Delivery Service	41	6	59.90	8%
		96	747.72	100%

Medium-Sized Systems - October 1, 2010 Enrollment

Pacific Power Schedule Description	Rate Schedule	Number of Participants	Nameplate Capacity	% NP Cap
Residential Service	4	-	-	-
General Service Small Nonresidential	23	2	99.00	17%
General Service Large Nonresidential	28	3	299.98	50%
General Service Large Nonresidential 201 kw to 999 kW Delivery Service	30	1	99.00	17%
Klamath Basin Irrigation and Drainage Pumping	33	1	99.98	17%
Agricultural Pumping Service Delivery Service	41	-	-	-
		7	597.96	100%

Total Number of Participants - October 1, 2010 Enrollment	103	1345.68

*The total number of participants at the initial enrollment was 128.
There are participant dropouts which are not included the above totals.

**Nameplate Capacity is based on reserved capacity

Pacific Power Oregon Solar Incentive Program
2010 Capacity Reservations
Number of Participant by Zip Code

Zip Code	Number of Customers	County
97031	2	Hood River
97039	2	Sherman
97040	1	Wasco
97210	4	Multnomah
97211	3	Multnomah
97212	8	Multnomah
97213	4	Multnomah
97218	2	Multnomah
97220	3	Multnomah
97227	1	Multnomah
97266	1	Clackamas
97304	1	Polk
97306	1	Marion
97321	3	Linn
97322	3	Linn
97325	3	Marion
97330	8	Lane
97333	3	Benton
97351	2	Polk
97355	2	Linn
97358	1	Linn
97385	1	Marion
97420	2	Coos
97424	1	Lane
97446	1	Linn
97448	4	Lane
97456	1	Benton
97470	2	Douglas
97501	1	Jackson
97502	1	Jackson
97520	1	Jackson
97523	1	Josephine
97524	1	Jackson
97525	1	Jackson
97526	15	Josephine
97527	2	Jackson
97530	1	Jackson
97539	1	Jackson
97601	4	Klamath
97603	14	Klamath
97630	5	Lake
97632	6	Klamath
97701	13	Deschutes
97702	2	Deschutes
97734	1	Jefferson
97754	2	Crook
97756	3	Deschutes
97760	3	Deschutes
97801	5	Umatilla
97826	1	Umatilla
97828	13	Wallowa
97838	3	Umatilla
97846	1	Wallowa
97862	2	Umatilla

PGE Solar Payment Option Pilot Program
2010 Enrollments
Number of Participants by System Size and by Customer Class

July 1, 2010 Enrollment Period

Small-Sized Systems - July 1, 2010 Enrollment

PGE Schedule Description	Rate Schedule	Number of Participants	Nameplate Capacity	% NP Cap
Residential Service	7	88	537.9	88%
Stable Rate Pilot	9	1	4.9	1%
Small Nonresidential Standard Service	32	4	37.44	6%
Large Nonresidential Opt Time-of-Day Standard Service	38	-	-	-
Small Nonresidential Irrigation and Drainage Pumping Standard Service	47	-	-	-
Large Nonresidential Standard Service	83	3	29.38	5%
		96	609.62	100%

Medium-Sized Systems - July 1, 2010 Enrollment

PGE Schedule Description	Rate Schedule	Number of Participants	Nameplate Capacity	% NP Cap
Residential Service	7	1	33.1	7%
Stable Rate Pilot	9	-	-	-
Small Nonresidential Standard Service	32	2	58.74	12%
Large Nonresidential Opt Time-of-Day Standard Service	38	-	-	-
Small Nonresidential Irrigation and Drainage Pumping Standard Service	47	-	-	-
Large Nonresidential Standard Service	83	4	387.37	81%
		7	479.21	100%

Total Number of Participants - July 1, 2010 Enrollment	103	1088.83

*The total number of participants at the initial enrollment was 119.
There are participant dropouts which are not included the above totals.

October 1, 2010 Enrollment Period

Small-Sized Systems - October 1, 2010 Enrollment

PGE Schedule Description	Rate Schedule	Number of Participants	Nameplate Capacity	% NP Cap
Residential Service	7	183	1018.33	76%
Stable Rate Pilot	9	1	6.11	0%
Small Nonresidential Standard Service	32	26	224.85	17%
Large Nonresidential Opt Time-of-Day Standard Service	38	-	-	-
Small Nonresidential Irrigation and Drainage Pumping Standard Service	47	1	9.9	1%
Large Nonresidential Standard Service	83	8	77.5	6%
		219	1336.69	100%

Medium-Sized Systems - October 1, 2010 Enrollment

PGE Schedule Description	Rate Schedule	Number of Participants	Nameplate Capacity	% NP Cap
Residential Service	7	1	26.95	3%
Stable Rate Pilot	9	-	-	-
Small Nonresidential Standard Service	32	-	-	-
Large Nonresidential Opt Time-of-Day Standard Service	38	1	25	3%
Small Nonresidential Irrigation and Drainage Pumping Standard Service	47	-	-	-
Large Nonresidential Standard Service	83	9	847.8	94%
		11	899.75	100%

Total Number of Participants - October 1, 2010 Enrollment	230	2236.44

*The total number of participants at the initial enrollment was 246.
There are participant dropouts which are not included the above totals.

PGE Solar Payment Option Pilot Program
2010 Enrollments
Number of Participants and Nameplate Capacity by Enrollment Period, System Size and County

July 1, 2010 Enrollment Period

Small-Sized Systems - July 1, 2010 Enrollment

County	Number of Participants	Nameplate Capacity	% NP Cap
Clackamas	22	167.88	28%
Marion	15	98.99	16%
Multnomah	25	120.94	20%
Polk	3	15.82	3%
Washington	21	125.1	21%
Yamhill	10	80.89	13%
	96	609.62	100%

Medium-Sized Systems - July 1, 2010 Enrollment

County	Number of Participants	Nameplate Capacity	% NP Cap
Clackamas	4	258.37	54%
Marion	3	220.84	46%
	7	479.21	100%

Total Number of Participants - July 1, 2010	103	1088.83

*The total number of participants at the initial enrollment was 118.
There are participant dropouts which are not included the above totals.

October 1, 2010 Enrollment Period

Small-Sized Systems - October 1, 2010 Enrollment

County	Number of Participants	Nameplate Capacity	% NP Cap
Clackamas	42	321.6	24%
Marion	38	264.68	20%
Multnomah	65	313.44	23%
Polk	1	8.28	1%
Washington	53	278.36	21%
Yamhill	20	150.33	11%
	219	1336.69	100%

Medium-Sized Systems - October 1, 2010 Enrollment

County	Number of Participants	Nameplate Capacity	% NP Cap
Clackamas	3	191.45	21%
Marion	5	411.3	46%
Washington	3	297	33%
	11	899.75	100%

Total Number of Participants -	230	2236.44

*The total number of participants at the initial enrollment was 246.
There are participant dropouts which are not included the above totals.