

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON**

**UM 1452**

In the Matter of	)	JOINT CLOSING COMMENTS OF
	)	OREGONIANS FOR RENEWABLE
PUBLIC UTILITY COMMISSION	)	ENERGY POLICY, ALBINA
OF OREGON	)	COMMUNITY BANK, ENVIRONMENT
	)	OREGON, SOLAR ENERGY SOLUTIONS,
Investigation into Pilot Programs to	)	INC., NATIONAL SOLAR, INC.,
Demonstrate the Use and	)	SUSTAINABLE SOLUTIONS UNLIMITED,
Effectiveness of Volumetric	)	LLC, MOVEON PORTLAND COUNCIL,
Incentive Rates for Solar	)	ENVIRONMENTAL LAW ALLIANCE
Photovoltaic Energy Systems	)	WORLDWIDE, ECUMENICAL
	)	MINISTRIES OF OREGON, OREGON
	)	INTERFAITH POWER AND LIGHT,
	)	DOUGLAS RICH FINANCIAL
	)	CONSULTING AND CAPITAL
	)	SOURCING, COLUMBIA RIVERKEEPER
	)	AND RAY NEFF

**Introduction**

Oregonians for Renewable Energy Policy, Albina Community Bank, Environment Oregon, Solar Energy Solutions, Inc., National Solar, Inc., Sustainable Solutions Unlimited, LLC, MoveOn Portland Council, Environmental Law Alliance Worldwide, Ecumenical Ministries of Oregon, Oregon Interfaith Power and Light, Douglas Rich Financial Consulting and Capital Sourcing, Columbia Riverkeeper and Ray Neff appreciate the opportunity to contribute comments in UM 1452 and to provide responses to the Commissioners' Questions adopted 1/22/10.

Our comments will begin by following the format of the Staff Opening Comments and proceed to our responses to the specific questions posed by the Commissioners, beginning at page 13. Additional comments follow the responses to the Commissioners' questions.

**Solar Capacity Standard**

We simply note that HB 3039, Section 3(3) provides for recovery in rates of all costs prudently incurred by an electric company to comply with the solar capacity standard. These solar PV systems will produce energy at a cost higher than avoided cost, yet it is assumed the electric companies will earn a profit on the systems installed. In addition, Solar PV systems installed pursuant to Section 3 are presumably eligible to claim tax credits under ORS 469.160 to 469.180 or 469.185 to 469.225. To be sustainable and successful, solar PV systems installed pursuant to Section 2 of HB 3039 should also receive compensation in incentive rates adequate to cover the cost of generation and a reasonable profit.

**Distribution of pilot program capacity annually**

Staff has proposed the distribution of pilot program annually across three sizes of systems. We are generally supportive of the size categories, but support a carve-out for public and nonprofit entities in the medium/small commercial category. While the systems in this carve-out would be in the same size category, this would allow for more community scale and public systems.

<b>Capacity Distribution and Number of Projects</b>				
<b>Pilot Program Year</b>	<b>Smaller Systems</b> (Less Than or Equal to 10 kW)	<b>Medium Systems</b> (Greater Than 10 kW and Less Than or Equal to 100 kW)		<b>Large Systems</b> (Greater Than 100 kW and Less Than or Equal to 500 kW)
		<b>Public and Nonprofit</b>	<b>General</b>	
<b>4/2010 thru 3/2011</b>	<b>5%</b> = 1.25 MW 180 - 625 systems (7kW - 2 kW)*	<b>3%</b> = 0.75 MW 11 - 38 systems (70 kW - 20 kW)	<b>5%</b> = 1.25 MW 18 - 63 systems (70 kW - 20 kW)	<b>5%</b> = 1.25 MW 3 - 10 systems (420 kW - 125 kW)
<b>3/2011 thru 3/2012</b>	<b>10%</b> = 2.5 MW 360 - 1250 systems (7kW - 2 kW)	<b>4%</b> = 1.0 MW 14 - 50 systems (70 kW - 20 kW)	<b>5%</b> = 1.25 MW 18 - 63 systems (70 kW - 20 kW)	<b>5%</b> = 1.25 MW 3 - 10 systems (420 kW - 125 kW)
<b>3/2012 thru 3/2013</b>	<b>15%</b> = 3.75 MW 536 - 1875 systems (7kW - 2 kW)	<b>4%</b> = 1.0 MW 14 - 50 systems (70 kW - 20 kW)	<b>2.5%</b> = 0.63 MW 9 - 31 systems (70 kW - 20 kW)	<b>5%</b> = 1.25 MW 3 - 10 systems (420 kW - 125 kW)
<b>3/2013 thru 3/2014</b>	<b>20%</b> = 5.0 MW 714 - 2500 systems (7kW - 2 kW)	<b>4%</b> = 1.0 MW 14 - 50 systems (70 kW - 20 kW)	<b>2.5%</b> = 0.63 MW 9 - 31 systems (70 kW - 20 kW)	<b>5%</b> = 1.25 MW 3 - 10 systems (420 kW - 125 kW)
<b>Total Capacity by Category</b>	<b>50%</b>	<b>15%</b>	<b>15%</b>	<b>20%</b>
	<b>65%</b> <b>Community Scale</b>		<b>35%</b> <b>Commercial and Industrial Scale</b>	

### **Section A. Pilot Program Requirements**

We believe that the net metered and VIR bid options will be confusing to potential customer generators, burdensome to administer and that the remove many of the advantages inherent in the Feed-In Tariff envisioned by the Legislature.

We agree with and join the comments of ELAW concerning alternative approaches to the potential of Federal law preemption of the Commission's authority to set wholesale electricity rates.

Several proposals have been suggested to avoid a possible preemption by federal law to the PUC's authority to set wholesale electricity rates above avoided cost. After reviewing the various proposals and legal memoranda, we believe that the method most likely to avoid FERC preemption is the "Pricing Avoided Energy Cost Plus Other Attributes" approach set forth in the Joint Opening Comments of Pacific Power and Idaho Power Company at pages 7-9.

It seems clear that FERC allows states to supplement a QF's avoided cost compensation (including production-based incentives) as long as the supplement does not take the form of mandatory utility payments for power to the QF. It is the avoidance of the mandatory element that makes competitive bidding attractive to its proponents.)

This mandatory element is also avoided with the approach suggested by Pacific Power and Idaho Power at page 9 of their Opening Comments, lines 7-9: "For that reason, the utilities and participants may need to agree to the arrangement and memorialize the arrangement under contract." The PUC could set an advisory rate, sufficient to achieve the pilot program goals and compensate small power producers for the solar PV energy produced. The investor-owned utilities could enter into contracts with the PUC and/or power producers to pay that incentive rate. To the extent that they participated in the pilot programs and made incentive payments, the utilities could recover their costs through rates.

Both utilities have expressed a willingness to enter into a voluntary contractual arrangement with the Commission and other parties to buy at avoided cost the solar electricity produced by their retail customers. They appear willing to pay those producers an additional incentive for the environmental attributes of the solar energy and to accept an advisory recommendation from the Commission as to the amount of the incentive to be paid.

As the arrangement would be entered into voluntarily, we believe it would fall outside FERC jurisdiction and, by providing a fixed incentive rate by project size, would create a pilot program design that preserves the essential beneficial elements of a feed-in tariff.

We urge the Commission and stakeholders to consider such a voluntary approach for the duration of the pilot or until the FERC or Congress acts on the issue of whether a state can set the price for wholesale renewable energy under a feed-in tariff program. The Commission has the authority to issue an advisory recommendation for an incentive payment that is sufficient to cover a producer's cost of generation, including a reasonable rate of return.

This proposal offers simplicity, avoids federal preemption by not being a mandate and straightforwardly prices both the electricity produced and the non-energy attributes. It is also

faithful to the intent of the statute and is the suggestion closest to the feed-in tariff, which the statute proposed to test in the pilot programs. Sixteen states are now in the process of designing and implementing feed-in tariffs.<sup>1</sup> There is sufficient momentum in the states for feed-in tariff implementation that it is likely that FERC will address and resolve the question of preemption soon. To our knowledge, none of the other fifteen states have detoured from a feed-in tariff paradigm into net-metering or competitive bidding as an alternative. In our view, it would be prudent of Oregon to align its VIR pilot program so that it could take advantage of, and be in step with, the anticipated development in federal energy law that other states will join in promoting.

### **Preferred options for FERC work-arounds**

In its January 2010 Technical Report “Renewable Energy Prices in State-Level Feed-In Tariffs: Federal Law Constraints and Possible Solutions”, NREL recommends several paths to compliance open to states that wish to implement a state-level feed-in tariff program (Conclusions, page 46).

Applied to HB3039, these options could include:

- 1) The Commission setting the price an investor owned utility in Oregon would pay for solar energy at avoided cost and having a non-utility entity (such as Energy Trust of Oregon) provide an additional production-based incentive in order to yield a total payment high enough cover the cost of generation;
- 2) The Commission setting the price an investor owned utility in Oregon would pay for solar energy at avoided cost and assigning a price the utility will pay producers for each Renewable Energy Certificate created at a level high enough to yield a total payment that will cover the cost of generation.
- 3) A third option is a “voluntary” arrangement that could be memorialized in a contract signed by all parties, under which Oregon’s investor-owned utilities would buy the solar electricity generated by a producer at avoided cost and pay an additional production-based incentive at a level recommended by the Commission. Such an option is described by PacifiCorp and Idaho Power in their Opening Comments dated January 14, 2010 (Section B-3 page 7).
- 4) Another option is the “Net-metering + VIR and Competitive Bidding” solution described in Staff’s Opening Comments. We do not feel either of these approaches is the best way to respond to the potential FERC preemption.

In the event that the Commission does not adopt Options 1, 2 or 3 and chooses to implement Option 4, we request that the Commission make provision in the Rule and Order to cover the eventuality that prior to the end of the pilot (March 31, 2015) either FERC or Congress may clarify that states are permitted to set rates for wholesale energy under a feed-in tariff

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<sup>1</sup> See, “Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions”; Technical Report, NREL/TP-6A2-47408, January 2010. A map showing states with existing or pending Feed-In Tariff legislation is attached to these comments.

program. At a minimum, we would suggest addition of language to the definition of "Eligible Energy" in 860-084-0010(6). Currently the definition reads:

“(6) “Eligible energy” means the kilowatt hours that may be paid at the volumetric incentive rate under the net metering option of the volumetric incentive rate pilot program. Eligible energy is equal to the actual annual usage of the retail electricity consumer in the year that the energy is generated by the eligible system.”

The following language would be added:

***(6) “(a) In the event that prior to March 31, 2015, either FERC or Congress clarify that a state may set rates for wholesale energy or non-energy attributes under a feed-in tariff program, “eligible energy” shall mean the kilowatt hours that may be paid at the volumetric incentive rate. Eligible energy is equal to 100% of the actual energy generated by the retail electricity consumer.”***

To revert to a VIR net-metering model would be to retreat from the goals of HB 3039. As described by the PUC staff, this proposal would pay consumers to consume, rather than incentivize them to generate surplus energy. Britain’s recently enacted feed-in tariff pays small producers 8 cents/kWh for energy produced over and above consumption, which correctly incentivizes small producers to conserve and produce energy. Seen in that light, the incentive to consume which is inherent in the net-metering VIR proposal is backwards.

It is both noteworthy and a cause for caution that the detailed, nationwide NREL study does not suggest either net-metering or a competitive bidding option as a workable alternative to the FERC preemption problem. Oregon is alone suggesting this detour around FERC and away from a Feed-In Tariff.

### **Table 1. Pilot Program Options and Mechanism for Capacity Distribution**

For the above reasons, we suggest that the Commission amend UM1452, Addendum A (page 2), Table 1, to create a third Pilot Program Option called "Standard Offer Contract VIR Option".

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are needed to see this picture.

Standard Offer  
Contract VIR  
Option

Column 2, (Capacity Distribution Mechanism) would change as follows: Smaller systems would have capacity distributed throughout the year. Medium and Larger systems would have capacity distributed one month/year. Column 2, sub-column 3 “Distributed by bid” would disappear.

### **Section B. quality and Reliability**

OREP support Staff’s proposal. We applaud Staff’s addition of language establishing Commission guidelines for system quality and reliability based on existing ETO and ODOE standards in order to prevent installations of systems that fail before the system is paid off. We agree that systems must be made of new components.

### **Section C. Standard Contract**

We support a standard offer contract for all pilot program participants. A simple standard offer contract provides transparency and certainty for potential investors. VIR bidding proposals are not standard offer contracts. As noted above, the net-metering VIR proposal contains the potential for unintended consequences of under utilization of the solar resource and encouraging consumption. For these reasons, and others stated below, we do not support the added language that would enable net-metering VIR. We do support the added language in subparagraphs a, d, e, f, g, h, i, j, k, and l, on page 11-13 of Staff Opening Comments dated January 14, 2010.

We are pleased to see that 860-084-0240 (2)(b), the option that retail electricity consumers may uninstall their system upon contract termination, has been deleted.

860-084-0240(3)(c) “Excess Energy Option” provides for donation or sale of excess generation to the electric company at a market-based rate. Enterprising system owners might prefer to run an extension cord out the front door to charge the battery on a neighbor’s electric vehicle for profit. Would such a private retail sale be prohibited or allowed? How would a prohibition be enforced?

### **Section D. Capacity Reservation**

We oppose the proposed changes to 860-084-0230 which add language for net-metering and VIR bid option, for reasons stated above. Our suggested annual distribution or annual pilot program capacity under 860-084-1095 is set out in the table on page 2, above. Under our recommended carve-out for nonprofits and public entities, we feel a “reservation all year” capacity reservation mechanism should be used, as their will be more in-house process before these entities can submit applications.

We support Staff proposals on Random Drawings and Limitations on Capacity Reservation.

### **Section E. Interconnection and Interconnection Applications**

We have been generally supportive of Staff proposal on interconnection and 860-084-0280 specifically. It is our understanding that Staff closing comments will propose that the costs of interconnection be borne by the retail electricity customer, rather than by the electric company. Without an estimate of interconnection costs, it is not possible to gauge the economic impact of this change. In general, upfront costs are an obstacle to the installation of

smaller systems and drive up the costs of smaller systems disproportionately. We feel this potential change should not be implemented until data on the range of interconnection costs is received.

### **Section E. Interconnection and Interconnection Applications**

1) Payment for interconnection costs:

We agree with PGE's position that in order to enable a cleaner comparison between the two incentive systems, pilot program interconnection costs should be borne by the system owner just as they are in the existing net-metering program, provided that interconnection costs are not significantly different under the pilot program.

It is our understanding that these interconnection costs are already embedded in the dollar per watt figures provided by ETO, which we have used in the SolarFITRate spreadsheet. Therefore the VIR will not be affected by this change.

### **Section F. Measuring Capacity**

We support staff's proposal to change 860-084-0160.

### **Section G. Establishing and Terminating Contracts**

See section C. Standard Contract.

### **Section H. Volumetric Incentive Rates**

We believe the desired outcomes of Oregon's pilot can best be achieved with a rate setting process that is transparent to investors and ratepayers and that calculates a VIR that covers the actual costs of generation, including a return on investment, because it is based on real world costs as inputs. The proposed rules do not yet set out these costs in a transparent fashion.

The rates proposed in Staff Opening Comments, Table 2. Volumetric Incentive Rates by IOU, County and Project Size, are wholly inadequate to cover the cost of generation. We believe this was due primarily to the omission of a Total Solar Resource Factor in the calculation of system output, to the 6% loan interest rate assumption and to the omission of several cost factors other than installation costs. We have detailed these differences in our response to Commissioners' Question #7, below.

We support the Energy Trust's groupings of counties into four zones by solar production capacity. Our recommended incentive rates by system size category and geographic zone and the input assumptions used to calculate these rates follow. The recommended rates are for total VIR, not net VIR.

These rates were computed using the SolarFITRate-tk-v23.xls spreadsheet. Due to its printed length, it is not a part of physical copies of these comments, but is attached to electronic versions.

## Volumetric Incentive Rate (\$ per kWh)

System Category		Smaller	Medium	Large	Public and Nonprofit
Size Used for Calculation of Tax Status		3.3 kW Personal	40 kW Commercial	200 kW Commercial	40 kW Non-taxable
Zone	LPC*				
<b>1</b>	<b>1.1</b>	<b>\$0.85</b>	<b>\$0.68</b>	<b>\$0.52</b>	<b>\$0.90</b>
<b>2</b>	<b>1.2</b>	<b>\$0.78</b>	<b>\$0.62</b>	<b>\$0.48</b>	<b>\$0.82</b>
<b>3</b>	<b>1.3</b>	<b>\$0.72</b>	<b>\$0.57</b>	<b>\$0.44</b>	<b>\$0.76</b>
<b>4</b>	<b>1.4</b>	<b>\$0.67</b>	<b>\$0.53</b>	<b>\$0.41</b>	<b>\$0.70</b>

### Assumptions

Installed Cost per Watt	\$8.30	\$7.70	\$6.20	\$7.70
Interconnection Cost	\$0.00	\$0.00	\$0.00	\$0.00
Monthly Service Charge for Meter	\$10.00	\$10.00	\$10.00	\$10.00
Annual Insurance Rate	0.22%	0.22%	0.22%	0.22%
Operation & Maintenance	\$0.00	\$0.00	\$0.00	\$0.00
Replacement Inverter Cost	\$0.00	\$0.00	\$0.00	\$0.00
Tax Preparation	\$100.00	\$100.00	\$100.00	na
Contract Term (in years)	15	15	15	15
Loan Interest Rate	7.50%	6.50%	6.00%	6.00%
Loan Fee Rate & Appraisal Fee	1.00%	0.75%	0.50%	0.50%
Risk Premium	1.00%	1.00%	1.00%	0.50%
Annual Panel Degradation Rate	0.70%	0.70%	0.70%	0.70%
Solar Resource Fraction**	89%	89%	89%	89%
Depreciation Rate	6.7%	6.7%	6.7%	na
Allowable Depreciation with Federal	85%	85%	85%	na
Marginal State Income Tax Rate	9.00%	6.60%	6.60%	na
Marginal Federal Income Tax Rate	25.00%	35.00%	35.00%	na
Social Security and Medicare Rate	15.30%	na	na	na
Local Income Tax Rate	0.00%	0.00%	0.00%	na
Property Tax Rate***	0.00%	0.00%	0.00%	na
Business License and Fees	\$0.00	\$0.00	\$0.00	na

\* Local Production Capacity includes the solar resource minus the electrical loss due to wiring, inverter, and conversion from DC to AC

\*\* Solar Resource Fraction includes tilt & orientation, shading

\*\*\* The property tax exemption will expire in 2012

### Section I. Payments and Assignments of Payments

We support Staff's language in 860-084-0010, 860-084-0140 and 860-840-0250. We do not support the proposed language in 860-084-0360 as it related to net metering and excess generation or the language in 860-084-0365 as relate to the VIR bidding option. We think



these options go in the wrong direction, as stated above and below, and as stated by Environmental Law Alliance Worldwide.

### **Section J. Deployment of Pilot Program Capacity**

In OREP's Opening Comments, we addressed the issue of Staff's December 4<sup>th</sup> proposed reduction of program capacity deployment for small systems as follows:

"We believe that the allocation of the 25 MW capacity of the solar PV pilot programs should reflect the experience profile of the Energy Trust's solar PV project installations and should also reflect the composition of the customer classes of Oregon's investor-owned utilities.

HB 3039, section 2 (13), requires the PUC to compare the effectiveness of paying volumetric incentive rates under the pilot programs to the effectiveness of the Energy Trust of Oregon (ETO) and state tax credit incentive program. For this comparison to be effective and accurate, there needs to be a close approximation of the samples in both programs. Fully 88% of the ETO's installed solar capacity has been for projects  $\leq 10$  kW in size (figures taken from Maury Galbraith's Preliminary Analysis Solar PV Data). Table 2 of the Straw Proposal proposes an allocation of only 60% of capacity to systems  $\leq 10$  kW; this allocation should not be reduced further, as to do so would make the project size profiles of the two incentive programs less congruent. This would make the comparison less valid and would thus fail to fulfill the mandate of HB 3039.

HB 3039 establishes a goal that 75% of the energy generated in the pilot programs be generated by smaller-scale qualifying systems. While the capacity deployment proposed in Table 2 of the December 4<sup>th</sup> Straw Proposal does not achieve the 75% smaller-scale goal of HB 3039, we understand it to be an effort on the part of staff to accommodate the desire of larger-system solar developers for more capacity under the 25 MW pilot program cap. We consider this a reasonable compromise, but the capacity allocation should not deviate further from the 75% statutory goal of the pilot programs.

A further reason for allocating pilot program capacity predominately to projects less than 10 kW in size is that 86% of the customers (and potential solar PV producers) of Oregon's IOU's are residential customers. These small customers contribute 51% of the revenue to Oregon's IOUs. This customer class, which uses an average of 11,660 kWh per year, should receive its proportionate share of pilot program capacity; not more than 86%, not less than 51%.

Perhaps equally important is the visibility of neighborhood rooftop solar. Large PV arrays in remote areas, or flat roof arrays on warehouses, are not visible to the public. Each visible solar array is an advertisement for the potential of renewable energy. If we are to increase our awareness of conservation and take more responsibility for generating energy from renewable sources, we need to see projects where we live. This, too, is part of the reason for the success of distributed generation and the Feed-In Tariff model."

While we understand the need for the pilot to test projects of all sizes, we are concerned that the result of this continuing shrinkage in program capacity for small systems will be to limit the potential beneficial impacts of the program on small solar developers, small businesses,

homeowners and their local neighborhoods and will cause us to learn less about how a VIR works for this sector of the market.

We are also mindful that the ratepayers themselves will pay for the cost of the program. Eighty-six percent of retail customers of the electric companies are residential customers. We prefer to see 75% of the program set aside for residential and small-scale commercial projects under 10kW, or at least ensure that a significant portion of the program is set aside for these small-scale systems.

When raising electricity rates, it is essential that those affected by the increase see as much visible positive benefit as possible. With fewer projects deployed at the local level, that impact would be less noticeable.

**Annual Capacity Distribution:**

While we would like to deploy solar PV rapidly, we believe two years is too short a time span to ramp up small-scale installations and observe trends in response to incentives. The pilot is intended to compare data from two models over time. To allocate the total pilot capacity in two years would give the 2011 Legislature only a half-year's data; a snapshot rather than a test of the two incentive programs.

It is desirable to avoid creating a boom and bust - a hiatus between the time the pilot capacity is exhausted and the effective date of new legislation creating additional capacity.

We support deploying capacity over four years, from April 2010 until April 2014. This will allow the 2013 Legislature to consider two and a half years of experience with the pilot (April 2010 – October 2012) and pass new legislation that would come online in 2014. Installations could continue, utilizing the original pilot's remaining capacity, until the new legislation takes effect. We describe how this deployment would work in our accompanying Capacity Distribution Table on page 2.

**Section K. Rate Impact and Cost Recovery**

1) Rate Impact Limit:

We support the proposed rule -OAR 860-083-0380(2) -that requires periodic forecasts by utilities of the rate impacts of the solar PV pilot program, as we believe it is essential to continually monitor and assess the impact on ratepayers of acquiring solar energy under the pilot.

However, we also request the Commission to take note of the permissive language associated with the 0.25% rate impact limit. Having followed the legislation from its inception through both chambers, we are mindful that early versions of HB3039 contained a provision that permitted the utilities to collect the BETC incentive of 0.50%. When this provision was removed on the Senate side, there was no subsequent change to the .25% rate impact limit, as one might have expected since this change shifted the entire cost of the pilot to ratepayers. However, since the language is permissive, we request that the Commission take this history

into account when assessing how far above the suggested 0.25% limit to allow the costs of the pilot to rise.

## 2) Resource Value

We think that when resource value is calculated, an estimation of the avoided cost of building new transmission be considered and calculated as an avoided cost. This value is intended to be a calculation separate and distinct from the avoided cost of transmitting energy over existing transmission lines and is meant to determine and measure the value to ratepayers of producing distributed solar energy close to the point of consumption, i.e., on the build infrastructure closest to population centers.

The resource value of solar PV should also include its value at the summer peak load, on hot afternoons when solar PV is at peak production.

## **Section L. Learning and Recommendations**

1) One of the lessons we hope we can learn from the pilot is how much of a barrier the lack of a state tax liability is to potential producers. Included below is a letter from a Hood River resident who recently installed solar panels, in which he relates his difficulties recovering the state tax credits. As the testimonial shows, it is a problem for many who would like to install solar on their homes.

### **Solar Energy and Difficulties with Oregon's Tax Credits**

We installed a solar energy system on our Hood River home December 2009. When we decided to install the system, we knew getting the Oregon tax credits would difficult because we do not have an Oregon tax liability.

Oregon does not tax our primary source of income—Jurgen's U.S. government annuity as a retired federal employee. Oregon Department of Energy provides a method to pass-through or transfer our Oregon energy tax credits to an Oregon resident or business. We had to choose one or the other. We chose the business pass-through as we felt a business was more likely to have the capability to purchase the credits.

I put together a paper explaining the business pass-through for potential purchasers (see *attachment*). As explained in the paper, there are potential financial benefits for an Oregon business that purchases our credits—they could earn 36% interest. However, we have not found a business wanting to purchase our credits. Reasons include: the recession, tax credits may be taxed as income, the upfront lump sum payment to us of \$4,800, and the fact that the \$6,000 of tax credits are used over four years at \$1,500 per year. And to add pressure, per Department of Energy regulations, we have only 60 days to find a purchaser.

We had resigned ourselves to the fact we wouldn't get \$6,000 worth of tax credits. But we were hopeful that by transferring the credits we would at least get \$4,800. But that now appears unlikely. This will make our solar system much more expensive.

If we had known the financial difficulties we now face, it is doubtful we would have decided to install the solar system. Oregon tax credit incentives just haven't worked out. The many other federal government retirees living in Oregon face the same situation we do.

We believe in solar energy and wanted to do the right thing. But the Oregon tax credit system hasn't worked for us.

Jurgen and Susan Hess  
412 24<sup>th</sup> Street  
Hood River, OR 97031  
541.386.2668 [hess@gorge.net](mailto:hess@gorge.net)

February 6, 2010

2) The pilot can be used to educate Oregonians and increase public awareness of where our energy comes from, how much we consume and how we can begin to reduce the latter and create more renewable sources for the former. For these educational purposes we request the Commission make it easy for system owners to install meters in easily accessible and visible locations, e.g., the lobby of a church or public building or an inside location in the home. Meters that are primarily in basements, garages or on outside back walls will not serve these purposes as well. We also urge Staff to consider any adjustments to the provisions on interconnection requirements that may be needed to accomplish these purposes.

3) The program needs to be well advertised to potential participants, especially to residential and small system markets in the early years of the pilot, as we believe special targeted marketing of the opportunity to these market segments will probably be needed to reach capacity targets.

### **Section M. Pilot Year and Program Termination**

We agree with Staff's three proposed methods for plans for reallocating capacity during the course of the pilot, *provided that*, before deciding to reallocate unused capacity from one size category to another the Commission first carefully examines the factors that might be contributing to unused capacity and attempts to address them.

These factors should include, but are not be limited to: the role played by VIR payments that are too low, the level of advertising to that market sector, and the availability of financing. If any of these factors have indeed contributed to unused capacity, Commission should first help correct these situations and remove any such barriers, prior to deciding to re-allocate unused capacity from one size category to another.

We believe the pilot should be a time during which we discover those program elements that produce the best results for all market segments, so that at its end we will have developed a program design that will enable the future development of a solar industry that is stable, diversified and which flourishes in all market sectors.

## ANSWERS TO COMMISSIONERS' QUESTIONS

We answer the Commissioner's questions as follows:

1. *Bidding*: If the Commission requires competitive bidding, how should it structure the bidding process for efficiency and effectiveness? What, if anything, should it include in the rules (docket AR 538) or in the UM1452 order on the bidding process?

We urge the Commission not to adopt a bidding process as part of a work-around for the problem of FERC pre-emption.

The success of the Feed-In Tariff policy model is now well established. FITs increase the rate at which new renewable energy is produced, creating accelerated mass deployment at the lowest cost. We believe it was the intent of the legislature to test the FIT model and compare it to our current incentives.

One of the key characteristics of the FIT model that is responsible for these results is the standard offer contract. A FIT replaces the customary single Power Purchase Agreement (PPA), which negotiates prices one project at a time, with the "standard offer" PPA (a fixed price set for a fixed period of time). Different incentive rates are set by project categories (size, solar radiation level) rather than by single projects. This feature speeds deployment because it eliminates the lengthy price negotiation associated with the traditional PPA and expands development opportunities beyond those who can manage these individual negotiations, allowing more producers to enter the market ("Paying for Renewable Energy: TLC at the Right Price", a Deutsche Bank Green Paper on FIT Policy design, December 2009, page 50 Chapter V, 2.0 Pricing Electricity: The role of PPAs - online at <http://www.dbcca.com/research>)

Unless competitive bidding is used a method for discovering a price that will then become the standard offer price, the competitive bidding process has no place in the Feed-In Tariff model. If Oregon's pilot program includes such a feature we will be failing to test one of the key elements of the FIT model that contributes to accelerated deployment, i.e., the standard offer contract.

2. *Utility and Affiliate Ownership*: Should the Commission allow utilities or their affiliates to own and operate eligible projects as qualifying third parties? If so, how would it work? How would the Commission address issues of payment, ratemaking treatment, etc?

We strongly urge the Commission not to permit utilities or their affiliates to own and operate solar projects under the pilot.

Utilities are regulated monopolies. This status grants them exclusive access to their customers via monthly bill inserts and other contact methods. Permitting utilities to act as solar developers for retail electricity customers would give them an unfair competitive advantage compared to private solar developers and installers and would constitute an unfair use of their monopoly status.

The intention of the Feed-In Tariff and of HB3039 is to open the renewable energy marketplace to many new developers and thereby expand and diversify the solar industry and make it more competitive. Permitting utilities the use of their privileged access to retail customers could lead to less competition, market domination and would especially adversely affect existing small solar developers, prevent new solar entrepreneurs from entering the market and lead to less choice for customer-producers who want to install solar.

3. *Net-Metering Incentives*: Some parties are concerned about the perverse incentive for owners to waste energy under the net metering approach. Is this a problem? If so, how should the Commission address it (if the net metering approach is adopted)? Can (and should) the Commission limit the size of system installed relative to the consumer's usage?

We believe the “Net-metering VIR” FERC work-around proposed by Staff will be overly complex and confusing for consumers, will deter many from making the decision to invest in solar PV and will be complex and burdensome for the utilities to administer.

The “Net metering plus VIR” solution creates a perverse incentive for customers to consume as much energy as they produce in order to ensure they receive sufficient compensation over the 15-year contract term to repay their capital investment.

Such an approach would put the pilot program to produce solar on a collision course with efforts to reduce energy consumption. The UK’s new feed-in tariff program contains an innovative feature designed to encourage surplus energy production and reduce energy consumption. It offers customers a cash incentive in addition to the standard incentive for each kWh hour they produce in excess of their consumption. (See table of UK tariff rates at <http://www.wind-works.org/FeedLaws/Great%20Britain/BritaintoLaunchModestFeed-inTariffProgramin2010.html>.) This is the logical way to design a program where energy production and conservation compliment one another.

There are many scenarios under which a householder’s consumption level might drop significantly, especially over the long term. For example, a residential producer who chose to retire during the 15 years and spend several months elsewhere (the “snow bird”), a homeowner whose household unexpectedly shrinks to a single person (through death, divorce or children leaving home) and one who implements conservation measures that substantially reduce usage during the contract term would all be dealt a decline in revenue due to a decrease in energy consumption, yet still have to make loan payments on their solar PV system. All would benefit financially from leaving the lights on. The perverse incentive is real and is an undesirable element to build into the pilot design.

Other examples of the deterrent effect are purchasers of electric vehicles, landlords whose retail usage is low (furnace room; hallway lighting) compared to their rooftop production capacity and whose tenants have separate meters, and farmers whose available roof and ground space could produce more than they use. Such producers would be unlikely to engage in a complex competitive bidding process, despite having good potential production capacity. Thus the net metering plus VIR approach would lose the benefits traditionally afforded by the

feed-in tariff -- a predictable income stream sufficient to repay the upfront investment and the incentive to maximize production at a single location.

The net metering with VIR plan would create an artificial constraint on maximizing production on the consumer's available roof space, since investing money in any additional system capacity over projected future usage would result in an unrecovered cost. This would have a deterrent effect on the solar industry and reduce cost-effectiveness, as it would limit the number of kWh produced from any single location

We also opposes "Net Metering + VIR and Competitive Bidding" on the grounds that it treats small and large producers inequitably. Large producers who put forward competitive bids will not make an offer that does not cover their cost of generation plus a rate of return. However, small producers have no such option. If the VIR they are offered by the Commission does not cover their costs, they will be at a distinct investment disadvantage compared to larger producers.

Implementing the "Net-metering + VIR and Competitive Bidding" approach may create a short-term solution for the FERC pre-emption problem, but they fail to fulfill the legislative intent of HB3039 to test the feed-in tariff model for solar PV and treat large and small producers inequitably.

The Commission should not limit the size of the system installed relative to the consumer's usage. There are fixed costs for the installation of any system. Limiting the system size makes smaller systems inherently more expensive per watt and less economically efficient. The Commission cannot see fifteen years into the future and know changes in usage may occur at a location and cannot be confident that the FERC preemption will remain as it is today. A customer producer, or a successor to the resident at the time the system was installed, may wish to switch from fossil fuel to electric heat, dramatically increasing consumption. The customer may wish to install a greenhouse or do any number of things that will increase future usage. To limit system size would be short-sighted.

One of the advantages of the Feed-In Tariff is that it provides an incentive to maximize production of renewable energy, to utilize each rooftop resource to its full potential. To limit system sizes defeats a key element of the intent of HB 3039. We believe it is preferable to adopt a FERC work-around without the drawbacks inherent in net-metering VIR.

We request that the Commission amend the Rule to change the definition of "Eligible Energy" in 860-084-0010(6). Currently the definition reads:

"(6) "Eligible energy" means the kilowatt hours that may be paid at the volumetric incentive rate under the net metering option of the volumetric incentive rate pilot program. Eligible energy is equal to the actual annual usage of the retail electricity consumer in the year that the energy is generated by the eligible system." The following language would be added:

***(6) "(a) In the event that prior to March 31, 2015, either FERC or Congress clarify that a state may set rates for wholesale energy or non-energy attributes under a feed-in tariff program, "eligible energy" shall mean the kilowatt hours that may be paid at the***

***volumetric incentive rate. Eligible energy is equal to 100% of the actual energy generated by the retail electricity consumer.”***

For the same reason, we request that the Commission amend UM1452, Addendum A (page 2), Table 1, to create a third Pilot Program Option called "Standard Offer Contract VIR Option" as set out in Table 1 at page 2 above.

We request the Commission make the above amendments in order to clarify that, except for the constraints imposed on it by FERC statutes, its intention is to test a feed-in tariff model.

4. Market Rate Authority: We have no information to assist the Commissioners.

5. Pilot Testing: What does the Commission need to do for an effective comparative assessment of the feed-in tariff approach versus the current tax credit/subsidy approach? For example, how would one determine that high or low participation in the pilot program vis-à-vis the current approach isn't simply a response to high or low volumetric incentive rates? Do the rules specify the right information to be collected for this analysis?

Firstly, the rate of participation in the pilot programs *should be* a response to the level of incentive rates. However, the question seems to assume that the success of the pilot program versus the tax credit/subsidy approach should be measured solely by the level of incentive rates paid.

HB 3039, Section 2 requires the Commission “to 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's report must compare policy options with respect to their impact on utility customers and solar industry development in Oregon.”

A comparative analysis should produce a measurement of success in each of these areas for each approach during the pilot period.

- How much solar capacity is installed under each approach?
- How much energy is produced under approach?
- What are the installed project sizes under each approach?
- What are the trends in rates of enrollment under each approach?
- What is the installed cost per watt under each approach?
- What are the trends in installed cost per watt under each approach?
- What amounts of BETC and RETC claims are made during each year of the pilot for solar PV?
- What are the impacts on retail utility rates?
- What impacts does each approach have on the solar industry?

The two approaches differ in several ways:

- method of payback (tax credits vs. monthly production payments)



- amount of system costs recovered
- certainty (predictability) of cash repayment
- length of the payback period

Finally, incentives that cover the cost of generation are part and parcel of the FIT model and are in great part responsible for the faster deployment rate we see in places where FIT policies are in place. It is this ability of the FIT model to increase the rate of solar deployment that creates the conditions for downward pressure on costs, spurs technological innovation and expands the solar industry. This means offering incentives of a greater value than we currently offer. We should make sure to measure the rate of deployment under each approach.

The rules should make provisions for determining how many kWh of solar energy is produced annually per taxpayer dollar and per ratepayer dollar spent. In order to be able to link cost data to system generation data for a comparison of kWh produced per dollar spent under each approach, we request the following changes to AR538 (Addendum C):

860-084-0430 - Data Availability (*changes in bold italics*)

(1) Each electric company must verify that the data collected pursuant to OAR 860-084-0400 and OAR 860-084-0410 **and OAR 860-084-0270 (4) (b)-(g)** has been recorded in an appropriate electronic database prior to making volumetric incentive rate payments to participating retail electricity consumers. ***This electronic database must also contain the monthly generation (kWh) for each qualifying system.***

(2) Each electric company must provide the data collected pursuant to OAR 860-084-0400 and OAR 860-084-0410, in a format established by the Commission, upon request. Reports that include this raw data and a summary of this data for the pilot program to date, must be provided to the Oregon Department of Energy, the Energy Trust of Oregon, the Oregon Department of Revenue, and to the Commission, quarterly, on the 15th day of the first month of each calendar quarter.

***(3) Each electric company must provide the aggregated data collected pursuant to OAR 860-084-0430 (1), in a format established by the Commission, upon request.***

(4) Each electric company must make graphically visible, on a publicly accessible website, the general locations and sizes of reserved and contracted systems. This information must not include consumer names or installation addresses or total capacity deployed to date.

860-084-0440 – Pilot Program Overhead

(1) Electric companies must contribute to Commission led evaluations of solar photovoltaic pilot programs through efforts including, but not limited to:

- (a) Proposals for the design and execution of surveys to measure participant satisfaction with and recommendations for improving the pilot program processes,
- (b) Proposals for the design and execution of surveys to understand participant decision processes in choosing between the volumetric incentive rate program and the existing net metering program (with tax credits and Energy Trust incentives), and

***(c) Proposals for the evaluation of the aggregated data collected pursuant to OAR 860-084-0430 (1), in order to make a comparison between kWh produced per dollar spent under the volumetric incentive rate program and the existing net metering program (with tax credits and Energy Trust incentives),***

(d) Comment on Commission recommendations for regulatory policy changes that can may lead to the increased use of solar photovoltaic energy systems, making solar photovoltaic systems more affordable, reducing the cost of incentives to utility customers, and promoting the development of the solar industry Oregon.

(2) Each electric company may enter into a contract with the Energy Trust of Oregon to provide data collection and summary services required by OAR 860•084•0400 and OAR 860•084•0410. An electric company may also contract with the Energy Trust of Oregon to administer pilot programs, including capacity reservation services, survey execution or program evaluation. The Commission may direct the electric companies to contract with the Energy Trust of Oregon, if the Commission judges that the costs to administer individual pilot programs are unreasonable.

Additional information which would be useful for the comparison and which could be obtained in a follow-up survey to producers, would include:

- What factor(s) prompted you to opt for the FIT option instead of the ETO and state tax incentives option and vice versa?
- Did you use all the roof (or land) area that was well suited and available for your solar installation? If you did not, why not?
- Was your choice of panels influenced by their efficiency rating?
- Is your system generating as much power as you had anticipated it would, based on the manufacturer specifications and the system size?

6. Carve-outs and/or Rate Differentials: Should the Commission provide ‘carve-outs’ and/or higher rates for non-profit organizations? For other groups? Why or why not?

We agree with the comments of Ecumenical Ministries of Oregon and Oregon Interfaith Power and Light on their proposal for a carve-out and higher VIR for public and non-profits entities. Installation of solar projects on public and nonprofit facilities will enable an increased number of Oregonians to participate vicariously in producing renewable energy and will lead to increased public education and awareness of energy conservation and production.

We quote here the EMO-OIPL summary:

- Solar installations on public and nonprofit buildings have public educational and engagement value beyond the value of the electricity produced
- A carve-out for this sector provides for:
  1. Participation by a valuable sector that has been largely left out under the current system of incentives. (This will make an interesting area of comparison for the pilot.)
  2. A pool of capacity protected from the intense competition expected in the commercial sector for the general Medium (10kW to 100kW) capacity allocation.
  3. A year-long (first come first serve) application process suited to this sector without competition from commercial interests (although commercial interests will have access to any unused capacity the following year)

4. VIR set in keeping with the actual cost of the system
5. VIR rates independent from rates set for the taxable sector and therefore easily adjustable (to a lower rate) as federal policy adapts to the growing number of FITs around the country and develops a process for incentives for public and nonprofit entities
6. A demonstration of demand in this sector that will help drive reform at the federal level

Please see EMO-OIPL comments for a complete discussion.

7. Rate calculations -- methods and results: What explains the wide discrepancy in the Matching Incentive approach versus the Cost Model approach? What explains the wide discrepancy in results for different cost models? What is the basis for the input assumptions used to estimate breakeven costs/kWh for different project categories?

The Matching Incentive approach result comes from the Solar Advisor Model (SAM) spreadsheet. We have not been able to determine all of the bases for these results because the algorithms and calculations in the SAM are below the surface. It is in many ways a black box; some input assumptions are resident and hidden in the program; others may be entered and manipulated.

That said, the primary difference seems to be that the Matching Incentive approach is uneconomic; its payback period is uncertain, but using RETC, at least, it is much longer than 15 years, the “payback” being realized, to the extent it exists, through savings in monthly electrical bills. The ETO subsidy and tax credits are taken in the first four years, while the VIR payments are made over fifteen years. Thus, while more money is paid with the VIR approach over time, it is unclear whether the present value of the stream of VIR payments has been compared to the present value of the ETO/tax credit model. In addition, with the ETO/tax credit model, after the installation costs are paid, it is uncertain whether or to what extent energy will be produced. With the FIT, VIR payments are based on actual production of electricity.

The discrepancy in results is driven by the differences in input assumptions. To illustrate, the three models are compared below:

## Comparison of Inputs Used in VIR Calculations

	<u>OREP</u>	<u>PUC Staff</u>	<u>PGE</u>
Cost/watt	\$8.30	\$8.20	\$6.51-\$7.34
Meter charge	\$10	none	none
Insurance	0.22%	none	none
Tax Prep	\$100	none	none
Interest Rate	7.50%	6%	7%
Loan fee	1.00%	none	none
Risk Premium	1.00%	none	none
Local Capacity Factor	1.1	?	?
Panel Degradation Rate	0.70%	none	1.00%
Solar Resource Fraction	0.89	none	none
Depreciation Rate	6.70%	none	MACRS
State Income Tax	9%	none	6.6-9%
Federal Income Tax	25%	none	35%
Social Security & Medicare	15.30%	none	N/A
Federal Tax Credit	30%	30%	30%

These differences are set out more fully in the sensitivity analysis in the response to Commissioner Savage's additional questions at pages 25-31.

The basis for the installed cost figures is the Energy Trust's Solar PV Data 2008-2009. We have used the statewide 50<sup>th</sup> percentile figure as computed by PUC staff. The Energy Trust has lower installed cost figures for the month of January, 2010, but the installed cost is probably lower due to the effect of Solarize Portland systems installed during that month. Panels cost have dipped as a result of the recession, but many analysts believe they may rise as demand increases. We prefer the two-year historical data. Jonathan Cohen of Imaginenergy, which is doing the Solarize Portland project, provided an email stating that a typical 3kW ranges from \$7.50 - \$9/watt at this time. (See attached)

The basis for the \$10 per month meter charge is unofficial information from PGE. Agents from both Farmer's Insurance and Amica Insurance have supplied the .22% insurance figure by phone. The \$100 tax preparation was provided orally by a Portland C.P.A. Websites for webcpa.com and Hans Kaspar, MS-CPA, PS list charges of \$212 and \$155 for preparing a Schedule C.

Depreciation rates and tax rate may be verified with the Oregon Department of Revenue and the I.R.S. While we have use an input of zero for Operation and Maintenance we have attached a sample invoices for PV panel cleaning and inspection. Prices range from \$200-\$330 for a 3kW system.

Interest rate and loan fee information was obtained from Albina Bank and Douglas Rich Financial Consulting and Capital Sourcing (letter s attached) and from Umpqua Bank's Greenstreet Lending program (online at

<http://www.umpquabank.com/1.0/pages/ProductCompare.aspx?prodCAT=pGreenStreet>). Rates ranged from 6.5%-9%; fees ranged from zero to 2.5%. We chose figure in the middle.

Local Capacity Factor and Total Solar Resource Fraction figures were supplied by the Energy Trust. The basis for the .7% panel degradation figure is a SolarWorld limited warranty, paragraph B 2. (Attached)

Depreciation rates and tax rate may be verified with the Oregon Department of Revenue and the I.R.S. While we have use an input of zero for Operation and Maintenance we have attached two sample invoices for PV panel cleaning and inspection which range from \$200-\$325 for a 3kW system.

All of these inputs may be tested using the attached SolarFITRate spreadsheet.

8. System Quality: What system quality requirements should the Commission impose, if any?

Consumer protection is important for the integrity and reputation of the solar PV programs. The Commission should impose standards equivalent to those currently used by the Energy Trust.

9. Rate Adjustments: Should the Commission use a formulaic approach to adjusting rates (e.g., hardwired adjustment) or an approach that provides the Commission flexibility in how it adjusts rates?

In "Powering the Green Economy: A Feed-In Tariff Handbook" (by David Jacobs, Miguel Mendonca and Benjamin Sovacool, Earth Scan Publications, November 2009; Chapter 3.9 Tariff Degression, page 49), the authors explain "Tariff degression means that FITs are reduced automatically on an annual basis . . . Germany was the first country to implement this design option in order to both anticipate technological learning and provide an incentive for the industry to further improve renewable energy technologies. The cost reduction potential of renewable technologies is based on economies of scale and technological innovation." In this "hardwired" approach the tariff decrease is set at a predetermined percentage per year. In 2009 Germany set its solar PV degression rate at 8-10 percent per year (page 49).

It should be noted that Germany has no MW caps on its FIT program, so adoption rates are free to rise to levels that can actually create economies of scale. The proposed roll-out of Oregon's 25W pilot program over four years at a rate of 5MW, 6.25 MW, 6.25 MW and 7.5 MW in years 1-4 (see PUC Staff's January 14 straw proposal Table 3), is unlikely to be of a magnitude that will create economies of scale or spur technological innovation. Given the program's low cap of 25MW and the above annual capacity deployment limits, automatic tariff reductions designed to spur reductions in costs seem unwarranted.

However, that could change if the 25MW cap were to be increased substantially and/or market conditions were to change, such as adoption of FIT policies in other states that could spur production, resulting in a substantial decrease in panel costs.

The goal of degression is to move the cost of renewables toward grid parity. Degression promotes this by putting pressure on the industry to bring costs down. The difficulty is striking a balance between the need to provide producers the cost of generation in order to build capacity and the need to increase economic efficiency.

Another more flexible approach to tariff degression is described by the authors of “Powering the Green Economy” in Section 3.10 - Flexible Tariff Degression (page 50). This approach varies the degression rate (percentage) based on achieving capacity deployment targets. However, given that the January 14<sup>th</sup> straw proposal calls for deployment targets for small systems to be “ramped up” (Table 3 shows a 5% limit in year 1, 10% in year 2, 15% in year 3 and 20% in year 4) while capacity limits for medium and large systems remain stable at 10% and 5% respectively, we suggest that no tariff degression be instituted for small systems until data is in for the second year of the pilot.

A further point is that degression designs all assume that future tariff rates will be lower than (degress from) the initial rate. It is therefore critical that the initial rate be set high enough to attract producers by covering actual costs plus a reasonable return on investment.

We believe that a tariff rate that covers “the cost of generation plus a reasonable profit” will be required to attract renewable energy sellers into the market on a steady and predictable basis. In Chapter 2.3 Tariff Calculation Methodology, page 19 of "Powering the Green Economy: A Feed-In Tariff Handbook," the authors state, “. . . empirical evidence shows that those countries that have based their FITs on the real generation costs plus a small premium, and thus offered sufficient returns on investment, have been most successful . . . Only if the profitability of renewable energy generation is similar to or higher than that of nuclear or fossil plants will there be an economic incentive to invest in cleaner forms of energy.”

In "Paying for Renewable Energy: TLC at the Right Price", a Deutsche Bank Green Paper on FIT Policy design, December 2009 (online at <http://www.dbcca.com/research>) the authors state in Section IV 5.2.1 Degression (page 36-37) “The goal of a degression is to track changes in technology costs. Based on the criteria for identifying a least cost path to grid parity, we feel that the opportunities to encourage future producers to reach grid parity are best achieved through using a degression and/or a periodic review. . . . A degression and a set review utilize current market fundamentals to set and adjust the generation cost,”

“Ontario and Spain . . . choose to track objective changes in technology costs via biennial reviews . . . and annual revisions, removing the need for degression. Germany opts for revisions every 4 years instead with incremental degression in between, thereby increasing TLC (Transparency, Longevity and Certainty) and providing a longer horizon for investors (page 37).”

A degression helps speed up adoption and encourages cost efficiencies. The review helps ensure producers continue to receive tariffs that cover their cost of generation.

If a tariff rate is adjusted on a “hardwired basis”, i.e., decreased by a pre-determined percentage on a certain date, rather than based on actual changes in market costs, the resulting new tariff could fall below the seller’s cost of generation. This could easily result in a sharp

drop in applications and lead to “boom and bust” cycles in the solar industry rather than a steady stream of new projects.

We urge the Commission to establish an initial tariff rate that meets this criterion and strive to maintain a rate that does not fall below this level. We favor use of a market sector survey method for calculating the initial rates, in which the market price for inputs of a number of cost variables are taken into account, with generators and developers contributing cost information. A spreadsheet with accepted cost of generation factors should be adopted and input values for each cost factor should be determined. These cost input amounts should be reviewed periodically using the same market survey method. At each review, all cost input amounts should be entered into the spreadsheet and the tariff rate re-calculated. This will result in a new tariff rate that continues to closely match the real costs of generation.

Combining a degression with periodic reviews better ensures that tariff rates will not drop below generation costs and can take account of possible increases in costs (due to supply bottlenecks, silicon shortage, etc) as well as decreases.

Given the limited market impact of Oregon’s 25MW solar pilot with capacity deployment over four years, we ask the Commission to consider a biennial review model with possible annual adjustments such as Ontario is using (conducting ongoing market research to check price development along with formal biennial reviews) In preference to an automatic “hardwired” annual degression.

10. *Capacity Reservation Activity*: What information about the level of activity, e.g., percent of available capacity reserved, should be made public? Why?

As much information as possible should be made available so that producers contemplating installation can plan. Large and medium sized projects especially may take multiple years to plan and finance and this information is needed to accommodate planning ahead.

We request that the Commission provide notification to the service list and on a public website when capacity allocation has been fully reserved for any project category for the year.

### **Additional Questions Posed by Commissioner Savage on February 2, 2010**

1. **Capacity Allocation**: How should the PUC allocate capacity between the <10kW and 10-100 kW size classifications?

Throughout the stakeholder process, we have expressed our concern that the legislature’s original intent to target 75% of the pilot’s 25MW capacity as residential projects, a target in keeping with the Governor’s original goal of “making solar more affordable for individuals and communities” has been gradually whittled down to the current 50% of capacity ≤10kw.

We understand that this has been done in order to make additional capacity available to test the effect of the FIT approach on medium size systems. However, we have two key concerns about this trend toward reducing capacity allocation for residential scale projects (≤10kw):

**Perceived fairness:** The vast majority of retail consumers are residential customers (86%). Residential customers contribute 51% of utility revenues. If the pilot programs to acquire more expensive solar are to be palatable to its main funders – residential ratepayers – the programs must enable them to participate in and benefit from the programs directly. The perception must be created that the programs’ costs and benefits are being equally shared. In order for this perception to penetrate the residential customer class in a way that creates wide public acceptance and support, the pilot must be able to create enough projects to be able to be spread out over in many geographic locations, in urban and in rural communities, and still remain visible.

**Public acceptance via education:** The pilot programs need to be visible to as many residential ratepayers as possible. We urge the Commission to adopt a 15% capacity carve-out at a higher VIR for non-taxable entities at project sizes from 10kw-100kw. This should be done to ensure that schools, libraries, a range of religious congregations, community centers, and other public buildings can install systems. This will enhance the visibility of the pilot, increase public awareness of the program’s potential benefits, and serve to educate the public about the need for renewable energy and create greater acceptance of the price tag involved in making the switch from fossil fuels. As the program is rolled out, attention should be paid to how such projects could serve as positive marketing opportunities. Ensuring that meters are placed in the lobbies of such buildings could greatly enhance these effects.

**Sufficient community scale capacity:** Provided that the above conditions prevail, we believe that the original intent of the program to target individuals and communities will be preserved.

**2. Conservation:** Should the PUC encourage/impose conservation or energy usage conditions for pilot program participants?

We heartily agree with linking the concepts of energy conservation/efficiency and renewable energy production. They are both essential pieces of the jigsaw puzzle that is the “switch from fossil fuels”.

Imposing requirements for conservation as a condition of eligibility for the pilot regardless of the producer’s ability to afford those measures could reduce program uptake and prevent a perfectly productive rooftop from sending energy to the grid. However, even if there is no legal requirement, a recommendation would help steer homeowners in this direction, especially toward low-cost and behavior change modifications that could lower energy usage.

Where there are programs designed to help Oregonians afford energy efficiency retrofits, we urge the Commission to consider coordinating implementation of the FIT pilot with such programs. One that could be easily linked is the EEAST (Energy Efficiency and Sustainable Technology) bill, HB2626, sponsored by Rep. Jules Bailey. The EEAST program will create teams of auditors who will do home energy assessments that provide homeowners with specific suggestions for conservation measures and efficiency upgrades. The program will make monies available to pay for the efficiency measures and show homeowners how to repay these costs with savings in their monthly energy bills. The audit teams could be trained to provide information that educates the homeowner about the FIT pilot for solar PV at the same time.



We endorse efforts to link renewable energy production to conservation and energy efficiency. We encourage the FIT program to promote a message to homeowners to maximize their production and minimize their consumption so as to create the highest possible production to load ratio.

As in our response to Question 3 above, we direct the Commission's attention to the UK's innovative use of feed-in tariff incentives to encourage conservation by offering a bonus over the standard incentive rate for production that exceeds usage (UK tariff table <http://www.wind-works.org/FeedLaws/Great%20Britain/BritainToLaunchModestFeed-inTariffProgramin2010.html>).

**3. Sensitivity Analysis:** What is the impact on incentive rates of changes in spreadsheet input assumptions?

Six tables follow which analyze the sensitivity of volumetric incentive rates to input and output assumptions. The first table sets out base case input assumptions for smaller, medium, large and public/nonprofit solar projects. The Summary of Results table summarizes the change in VIR for four categories of systems resulting from a changes in installed cost, monthly meter charge, insurance rate, tax preparation cost, loan interest rate, loan fee, risk premium rate, panel degradation rate and solar resource fraction, which is a measure of system output.

The greatest sensitivity was to installed cost, followed by Total Solar Resource Fraction (system output) and loan interest rate. It follows that reducing installed cost per watt and increasing access to low-interest loans are keys to the long-term success of the Feed-In Tariff approach. While the Commission cannot physically change the tilt, orientation and shading of solar project, it should set the Total Solar Resource Fraction at realistic levels (recent ETO experience is .89) so that the projected annual production of solar PV systems is realistic

**VIR Sensitivity Analysis for Zone 1\***  
**Assumptions for Base Case**

<b>System Category</b>	<b>Smaller</b>	<b>Medium</b>	<b>Large</b>	<b>Public and Nonprofit</b>
<b>Size System</b>	<b>3.3 kW</b>	<b>40 kW</b>	<b>200 kW</b>	<b>40 kW</b>
<b>Tax Status</b>	<b>Personal</b>	<b>Commercial</b>	<b>Commercial</b>	<b>Non-taxable</b>
Installed Cost per Watt	\$8.30	\$7.70	\$6.20	\$7.70
Interconnection Cost	\$0.00	\$0.00	\$0.00	\$0.00
Monthly Service Charge for Meter	\$10.00	\$10.00	\$10.00	\$10.00
Annual Insurance Rate	0.22%	0.22%	0.22%	0.22%
Operation & Maintenance	\$0.00	\$0.00	\$0.00	\$0.00
Replacement Inverter Cost	\$0.00	\$0.00	\$0.00	\$0.00
Tax Preparation	\$100.00	\$0.00	\$0.00	na
Contract Term (in years)	15	15	15	15
Loan Interest Rate	7.50%	6.50%	6.00%	6.00%
Loan Fee Rate & Appraisal Fee	1.00%	0.75%	0.50%	0.50%
Risk Premium	1.00%	1.00%	1.00%	0.50%
Annual Panel Degradation Rate	0.70%	0.70%	0.70%	0.70%
Solar Resource Fraction**	89%	89%	89%	89%
Depreciation Rate	6.7%	6.7%	6.7%	na
Allowable Depreciation	85%	85%	85%	na
Marginal State Income Tax Rate	9.00%	6.60%	6.60%	na
Marginal Federal Income Tax Rate	25.00%	35.00%	35.00%	na
Social Security and Medicare Rate	15.30%	na	na	na
Local Income Tax Rate	0.00%	0.00%	0.00%	na
Property Tax Rate***	0.00%	0.00%	0.00%	na
Business License and Fees	\$0.00	\$0.00	\$0.00	na

\* Absolute sensitivity of VIR is lower in zones with higher local production capacity (LPC)

\*\* Solar Resource Fraction includes tilt & orientation, shading

\*\*\* The property tax exemption will expire in 2012

## VIR Sensitivity Analysis for Zone 1\*

### Summary of Results

Smaller 3.3 kW	Medium 40 kW	Large 200 kW	Public and Nonprofit 40 kW		
Change in VIR in Cents				Change in Input Value	
9	9	8	11	per	\$ per watt installed cost
5	1	0	1	per	\$10 monthly service charge
3	2	1	2	per	0.22% annual insurance rate
3	1	0	na	per	\$100 annual tax preparation cost
4	4	3	5	per	% loan interest rate
1	0	0	0	per	% one time loan fee
4	4	3	5	per	% risk premium rate
3	2.5	2	2.5	for	annual panel degradation rate ranging from 0.5% to 1.0%
5	4	3	5	per	5% solar resource fraction

Note: With depreciation optimized to offset income, there is no appreciable effect of state and local taxes beyond tax preparation fee

Note: See Sensitivity Table for effect of system size within class

\* Sensitivity of VIR is greatest in zones with higher local production capacity (LPC)

The next table shows the sensitivity to loan interest rate and risk premium rate. Each ½ point change in interest rate produces a two-cent/kWh change in VIR.

<b>VIR Sensitivity Analysis for Zone 1 Sensitivity to Loan Interest Rate and Risk Premium Rate</b>				
	<b>Smaller</b>	<b>Medium</b>	<b>Large</b>	<b>Public and Nonprofit</b>
	<b>3.3 kW</b>	<b>40 kW</b>	<b>200 kW</b>	<b>40 kW</b>
<b>Base Case Interest Rate</b>	<b>7.5%</b>	<b>6.5%</b>	<b>6.0%</b>	<b>6.0%</b>
<b>Base Case Risk Premium</b>	<b>1.0%</b>	<b>1.0%</b>	<b>1.0%</b>	<b>0.5%</b>
<b>Loan Interest Rate + Risk Premium</b>	<b>Volumetric Incentive Rate (\$ per kWh)</b>			
<b>base case + 1.5%</b>	\$0.92	\$0.74	\$0.57	\$0.98
<b>base case + 1.0%</b>	\$0.90	\$0.72	\$0.56	\$0.96
<b>base case + 0.5%</b>	\$0.88	\$0.70	\$0.54	\$0.93
<b>base case</b>	\$0.85	\$0.68	\$0.52	\$0.90
<b>base case - 0.5%</b>	\$0.83	\$0.66	\$0.51	\$0.87
<b>base case - 1.0%</b>	\$0.81	\$0.64	\$0.49	\$0.84
<b>base case - 1.5%</b>	\$0.79	\$0.62	\$0.48	\$0.82

Total Solar Resource Fraction produces a change in VIR of about four cents/kWh for each 5% change in TSRF.

<b>VIR Sensitivity Analysis for Zone 1 Sensitivity of VIR to Solar Resource Fraction</b>				
	<b>Smaller</b>	<b>Medium</b>	<b>Large</b>	<b>Public and Nonprofit</b>
	<b>3.3 kW</b>	<b>40 kW</b>	<b>200 kW</b>	<b>40 kW</b>
<b>Solar Resource Fraction*</b>	<b>Volumetric Incentive Rate (\$ per kWh)</b>			
<b>50%</b>	\$1.52	\$1.20	\$0.93	\$1.60
<b>75%</b>	\$1.01	\$0.80	\$0.62	\$1.07
<b>80%</b>	\$0.95	\$0.75	\$0.58	\$1.00
<b>85%</b>	\$0.89	\$0.71	\$0.55	\$0.94
<b>90%</b>	\$0.84	\$0.67	\$0.52	\$0.89
<b>95%</b>	\$0.80	\$0.63	\$0.49	\$0.84
<b>100%</b>	\$0.76	\$0.60	\$0.47	\$0.80

\*Note that ETO gives full incentive down to Solar Resource Fraction of 75% and Oregon DOE gives partial tax credit down to Solar Resource Fraction of 50%

A change of fifty cents in installed cost per watt produces a change of about five cents/kWh in VIR.

<b>VIR Sensitivity Analysis for Zone 1</b>				
<b>Sensitivity to Installed Cost</b>				
	<b>Smaller</b>	<b>Medium</b>	<b>Large</b>	<b>Public and Nonprofit</b>
	<b>3.3 kW</b>	<b>40 kW</b>	<b>200 kW</b>	<b>40 kW</b>
<b>Base Case Installed Cost (\$ per watt)</b>	<b>\$8.30</b>	<b>\$7.70</b>	<b>\$6.20</b>	<b>\$7.70</b>
<b>Installed Cost (\$ per watt)</b>	<b>Volumetric Incentive Rate (\$ per kWh)</b>			
<b>base case + \$1.50</b>	\$0.99	\$0.81	\$0.65	\$1.07
<b>base case + \$1.00</b>	\$0.94	\$0.76	\$0.61	\$1.02
<b>base case + \$0.50</b>	\$0.90	\$0.72	\$0.57	\$0.96
<b>base case</b>	\$0.85	\$0.68	\$0.52	\$0.90
<b>base case - \$0.50</b>	\$0.81	\$0.63	\$0.48	\$0.84
<b>base case - \$1.00</b>	\$0.76	\$0.59	\$0.44	\$0.78
<b>base case - \$1.50</b>	\$0.72	\$0.55	\$0.40	\$0.73
<b>base case - \$2.00</b>	\$0.67	\$0.50	\$0.36	\$0.67

Finally, sensitivity to system size within size category is analyzed. The most salient effect is in the smaller systems category, where increases in size produce marked decreases in the required VIR. Fixed monthly costs produce a disproportionate impact where electricity generation and revenue are constrained. Among larger system categories, increases in size do not produce a significant impact on VIR.

The sensitivity to system size within the smaller category highlights important pilot program design issues. First, it is important to encourage maximizing production for smaller systems. A 4kW system is much more economically efficient than a 2 kW system. This would argue against limiting system production capacity in relation to onsite usage.

Secondly, monthly fees, such as electric meter charges, produce dramatic impacts on the VIR for smaller systems. The Summary of Results table shows this clearly; a \$10 monthly meter charge produces an increase of five cents/kWh in the VIR for smaller systems, but has a negligible impact on larger systems. Monthly meter charges should be waived for smaller systems.

<b>VIR Sensitivity Analysis for Zone 1</b>				
<b>Sensitivity to System Size within Size Category</b>				
	<b>Smaller</b>	<b>Medium</b>	<b>Large</b>	<b>Public and Nonprofit</b>
<b>Base Case Size of Installation</b>	<b>3.3 kW</b>	<b>40 kW</b>	<b>200 kW</b>	<b>40 kW</b>
<b>Installed Cost (\$ per watt)</b>	<b>Volumetric Incentive Rate (\$ per kWh)</b>			
<b>System Size VIR</b>	<b>2 kW</b>	<b>20 kW</b>	<b>200 kW</b>	<b>20 kW</b>
	<b>\$0.92</b>	<b>\$0.68</b>	<b>\$0.52</b>	<b>\$0.90</b>
<b>System Size VIR</b>	<b>4 kW</b>	<b>40 kW</b>	<b>300 kW</b>	<b>40 kW</b>
	<b>\$0.83</b>	<b>\$0.68</b>	<b>\$0.52</b>	<b>\$0.90</b>
<b>System Size VIR</b>	<b>6 kW</b>	<b>60 kW</b>	<b>400 kW</b>	<b>60 kW</b>
	<b>\$0.81</b>	<b>\$0.67</b>	<b>\$0.52</b>	<b>\$0.90</b>
<b>System Size VIR</b>	<b>8 kW</b>	<b>80 kW</b>	<b>500 kW</b>	<b>80 kW</b>
	<b>\$0.80</b>	<b>\$0.67</b>	<b>\$0.52</b>	<b>\$0.90</b>

**4. Solar PV Cost in other countries:** What are installed costs in other countries with Feed-In Tariffs compare to installed costs in Oregon?

We have not been able to locate reliable information on systems costs in other countries in the time available. To be useful, the cost data would need to show installed costs for different size categories and technologies and show a breakdown between panel cost, labor and balance of system. We would also need to know permitting costs and financing costs. The only rough figure we have from a credible source, Wilson Rickerson, of Meister Consultants Group, is that the current range of costs in Germany is USD \$3.50 - \$4.70/installed cost.

**Additional OREP Coalition Comments:**

**1. Ratepayer expectation that installations remain in place for the useful life of the PV system.**

We have previously commented on the need to leave in place systems that ratepayers have paid for in order that they may continue to feed solar electricity into the grid for their useful life and continue to provide a return to ratepayers even after the 15-year contract has been terminated.

We believe the intent of the FIT pilot is to increase the number of solar PV systems that are permanently installed in Oregon - Section 2 (1) and to assist Oregon in reaching its Renewable Portfolio Standard – Section 2 (8). The object is to increasingly integrate solar

production into the built environment so that a growing percentage of energy on the grid in Oregon comes from renewable solar.

Ratepayers should not be expected to compensate solar producers at above market rates for 15 years, only to have the grid immediately lose that renewable generation after the system has been paid for.

Feed-In Tariffs have been shown to be especially effective at adding new solar energy to the grid and at maintaining these gains in solar energy production so as to add to the total. If solar systems are lost to the grid after they have been paid for, ratepayers will lose any long-term benefit of their investment and Oregon will have to keep going back to square one to replace solar energy ratepayers paid for but have now lost.

OAR 860-084-0240 - Standard Contracts

We concur with Staff's removal of Section 2, which required the standard contract to include descriptions of termination options that included uninstalling the system at the end of the 15-year contract.

Now removed:

- (2)The standard contract will allow for three options at contract termination:
  - (a) Retail electricity consumers may continue generation in return for payments that are based on the resource value, or
  - (b) Retail electricity consumers may uninstall their contracted system, or
  - (c) Retail electricity consumers may discontinue generation under the pilot program and apply to continue generation under volumetric incentive payment programs then in place, as allowed by Commission Order and by Rule at the time of contract termination”

In order to address this concern further, we request the Commission amend the proposed rules to add the following:

OAR 860-084-0010 – Definitions for Solar. ...Pilot Programs

(13)“Permanently installed” means a qualified system that remains installed and connected to the grid for the duration of its useful life.

## **2. Expectation that incentive rates are calculated assuming reasonable costs for wages and benefits.**

We remain concerned that the increased deployment of solar PV created under the FIT pilot program, as well as the broader effort to “switch from fossil fuels” result in good jobs with reasonable wages and benefits.

HB 3039 aims to create a sufficient incentive for deployment of Solar Photovoltaic energy – chiefly at the level of residential small scale - and the eventual lowering, over time, of the cost barriers that currently stand in the way of widespread Solar Photovoltaic deployment.

As Oregon implements incentives to further the adoption of “green” energy it is vital that rate incentives not be used to exert downward pressure on the labor market or a segment thereof, particularly given the state of Oregon’s economy. It would be a terrible failure if a subclass of lower wage workers and fly-by night contractors grew out of this program due to a failure to establish rates that adequately account for reasonable wages and benefits of the very people who will perform the installation and who pay their own residential electricity bills.

It is therefore critical that the “feed-in tariff” rates account for wages and benefits for the installers of Solar PV systems that are consistent with the marketplace and with existing public policy. Rate incentives which are set too low will not only slow deployment of Solar Photovoltaic, but could also serve to provide downward pressure on wages and benefits in what should be a growing industry. It should be noted that throughout the legislative session, on the public record, whenever alternative energy, solar power, or other “green” incentives are discussed, good jobs and economic development are given as public policy goals by lawmakers. This should be explicitly accounted for in the rulemaking process.

We also request the Commission to consider and guard against the potential for downward pressure on wages that might result from a degression procedure that reduces the incentive to below the cost of generation. The installed cost per watt used to calculate the rate should be based on an acceptable price for labor.

We point the Commission to the labor and benefit standards adopted in HB 2626 – and supported by the Oregon AFL-CIO – as a road map for this process. HB 2626 requires wages of 180% of Oregon minimum wage for residential projects, and commercial prevailing wage for commercial projects. We believe that the use of the standards detailed in HB 2626 is a logical, straightforward, and common sense starting point for accounting for wage and benefit standards in this rate-setting process.

We ask that these perspectives be taken into consideration in rules and orders and look forward to continued participation in developing effective solutions.

Thank you.

The following organizations and individuals join in these comments:

Solar Energy Solutions, Inc.  
National Solar, Inc., Justin Lancaster, President  
Sustainable Solutions Unlimited, LLC  
Ecumenical Ministries of Oregon – Oregon Interfaith Power and Light  
Albina Community Bank  
Douglas A. Rich, Financial Consulting and Capital Sourcing  
Environment Oregon  
Environmental Law Alliance Worldwide  
MoveOn Portland Council, Darrel Johannes, Council Coordinator  
Columbia Riverkeeper  
Ray Neff



Oregonians for Renewable Energy Policy

DATED this 12th day of February 2010.

/s/ Mark E. Pengilly

QuickTime™ and a  
decompressor  
are needed to see this picture.

## CERTIFICATE OF SERVICE

I certify that I have caused to be served the foregoing Joint Opening Comments of Oregonians for Renewable Energy Policy, et al., PUC Docket No. UM 1452, by electronic mail to the PUC Service list, and by US mail to the parties listed below who have not waived paper service.

Dated this 12th day of February, 2010.

/s/ Mark E. Pengilly

Mark E. Pengilly

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PORTLAND OR 97204

THERESA GIBNEY  
OREGON PUC  
PO BOX 2148  
SALEM OR 97308

# Limited Warranty (valid from 01.01.2010)

By purchasing the Solar modules from SolarWorld California Inc. ("SolarWorld") (hereinafter referred to as: products), you have chosen a level of quality, which meets the highest requirements. SolarWorld assumes that use in accordance with this Limited Warranty will reliably maintain the function of the products to produce electricity (hereinafter referred to as: functional capability) as well as reliably maintaining the performance of the products. As a sign of our confidence in this quality, SolarWorld is happy to grant you as the end-user of the products (i.e. the person who put the products into operation correctly for the first time or the person who has legitimately purchased the products from such an end-customer without any modifications) a Five Year Limited Product Warranty and Twenty-Five Year Limited Service Warranty as presented below:

## A Five Year Limited Product Warranty:

1. SolarWorld guarantees the functional capability of the products for five years beyond the purchase of the product and that the product

- > will not suffer from any mechanical adverse effects, which limit the stability of the solar module. A condition for this is correct installation and use in accordance with regulations, as described in the installation instructions enclosed with the product.
- > will not be subject to any clouding or discolouration of the glass.
- > with its cable and connector plug will remain safe and operational, if they are installed professionally and are not permanently positioned in water (puddle). However, damage to the cable, which is caused by abrasion on a rough lower surface owing to insufficient fixing or owing to unprotected running of the cable over sharp edges, is excluded. Any damage caused by animals (e.g. rodent bites, birds, insects) is also exempted.
- > with its aluminium frames will not freeze up when it is frosty if it is installed correctly.

The appearance of the product as well as any scratches, stains, mechanical wear, rust, mould, optical deterioration, discoloration and other changes, which occurred after delivery by SolarWorld, do not represent defects, insofar as the change in appearance does not lead to a deterioration in the functional capability of the product. A claim in the event of glass breakage arises only to the extent that there was no external influence.

2. If the products exhibit one of the above-mentioned defects during this period and this has an effect on the functional capability of the product, SolarWorld will repair the defective products, supply replacement products or provide the customer with an appropriate residual value of the products as compensation at its discretion.

## B Twenty-Five Year Limited Service Warranty:

1. The products which you have purchased have a performance specification within a certain tolerance range of 3% with regard to the power output (the so-called effective output). The relevant effective output can be found on the nameplate on the reverse of the product. SolarWorld assumes that the actual output of the products will decline only slightly over a period of 25 years as of the purchase of the product.

2. SolarWorld guarantees that the actual output of the product will amount to at least 97% of effective output during the first year of operation of the product and as of the second year of the operation of the product, the effective output will decline annually by no more than 0.7% for a period of 24 years, so that by the end of the 25th year of operation an actual output of at least 80.2% of effective output will be achieved. In the event of a negative deviation of actual product performance from the so-called threshold values, SolarWorld will either supply you with replacement products, which make it possible to maintain actual performance, take other measures, which make it possible to achieve actual performance or reimburse you with the time value percentage of your product exclusively at its discretion.

3. When replacement products are supplied, there is no entitlement for the use of new products or those which are as good as new. On the contrary, SolarWorld is authorised to also supply used and/or repaired products as replacements.

## C Further conditions of entitlement

1. The period of the Limited Service Warranty under B) is restricted to a period of 25 years as of the purchase of the product and will not be extended even in the event of a repair or exchange of a product.

2. The effective output and the actual output of the products are to be determined for the verification of any guarantee case using standard test conditions, as described under IEC 60904. The decisive measurement of performance is carried out by a recognised measuring institute or through SolarWorld's own measurements (the assessment of measurement tolerances is undertaken in accordance with EN 50380). The guarantee does not cover transport costs to return the products or for a new delivery of repaired or replacement products. It also does not cover the costs of the installation or re-installation of products, as well as other expenditure by the end-customer or seller.

3. All products which have been replaced pass to the ownership of SolarWorld.

4. The term of the rights granted to you in this Limited Warranty in paragraphs A) and B) starts with the original purchase of the products, insofar as they were purchased by the original end-customer after 01.01.2010. SolarWorld retains the right to adjust voluntary special services in accordance with this document at any time. However, any product purchases, which have already been concluded, remain unaffected by this – including the voluntary special services in accordance with this document. You can find out about the current status of this document at any time at [www.solarworld-usa.com](http://www.solarworld-usa.com).

## D Assertion of claims

The assertion of the services specified under A) and B) requires you (i) to inform the authorized seller/dealer of the product of the alleged defect in writing, or (ii) to send this written notification directly to the address mentioned in G), if the seller/dealer who should be informed no longer exists (e.g. owing to business closure or insolvency). Any notification of defects is to be added to the original sales receipt as evidence of the purchase and the time of the purchase of the SolarWorld products. The assertion should take place within 14 days of the occurrence of the defect. The return of products is permitted only after the written consent of SolarWorld has been obtained.

## E Use in accordance with this Limited Warranty

1. The services described above can additionally be ensured only if the product is used and/or operated in accordance with this Limited Warranty as well as not having been dismantled and re-assembled in the meantime. Services provided by SolarWorld must therefore be with-

drawn if the defects to the product are not exclusively based on the products themselves. This is e.g. the case if:

- a Delays on your part or on the part of the fitter in observing the assembly, operational and maintenance instructions or information.
- b Exchange, repair or modification of the products by persons who were not authorised by SolarWorld.
- c Incorrect use of the products.
- d Vandalism, destruction through external influences and/or persons/animals.
- e Incorrect storage or inappropriate transport before installation.
- f Damage to the customer system or incompatibility of the customer's system equipment with the products.
- g Use of products on mobile units such as vehicles or ships.
- h Influences such as dirt or contamination on the face-plate; contamination or damage by e.g. smoke, extraordinary salt contamination, or other chemicals.
- i Force majeure such as flooding, fire, explosions, rock-falls, direct or indirect lightning strikes, or other extreme weather conditions such as hail, hurricanes, whirlwinds, sandstorms or other circumstances outside the control of SolarWorld.

2. The entitlements referred to under A) and B) will not be granted if and as soon as the manufacturer's labels or serial numbers on the PV modules have been changed, deleted, peeled off or made unrecognizable.

## F Exclusion of liability

The remedies set forth in this Limited Warranty are the exclusive remedies available to you as a product purchaser. SolarWorld shall not be liable for damage, injury or loss arising out of or related to a product except as set forth in this Limited Warranty. In particular, under no circumstances shall SolarWorld be liable for incidental, consequential, special or other indirect damages in any way connected with a product. SolarWorld's aggregate liability, if any, shall be limited to a product's purchase price or any service furnished in connection with a product, as the case may be.

## G Your contacts

To receive service under this Limited Warranty, please contact the authorized seller/dealer of your product or SolarWorld at the following address: Customer Service, SolarWorld California Inc., 4650 Adohr Lane, Camarillo, CA 93012, USA.

## H Choice of law

The rights and responsibilities granted under this Limited Warranty shall be governed and construed in accordance with the laws of the State of California, without regard to its conflict of law principles.

## I Validity

The following table contains all the current products to which this Limited Warranty is to be applied. Products, which do not appear in this list, are not subject to this Limited Warranty.

### Sunmodule/Sunmodule Plus/laminate/black

SW 135 mono	SW 195 mono	SW 170 poly	SW 120 Compact poly
SW 140 mono	SW 200 mono	SW 175 poly	SW 125 Compact poly
SW 145 mono	SW 205 mono	SW 180 poly	SW 130 Compact poly
SW 150 mono	SW 210 mono	SW 185 poly	SW 135 Compact poly
SW 155 mono	SW 214 mono	SW 190 poly	SW 140 Compact poly
SW 160 mono	SW 215 mono	SW 195 poly	SW 145 Compact poly
SW 165 mono	SW 220 mono	SW 200 poly	SW 150 Compact poly
SW 170 mono	SW 225 mono	SW 205 poly	
SW 175 mono	SW 230 mono	SW 210 poly	
SW 180 mono	SW 235 mono	SW 214 poly	SW 130 Compact mono
SW 185 mono	SW 240 mono	SW 215 poly	SW 135 Compact mono
SW 190 mono	SW 245 mono	SW 220 poly	SW 140 Compact mono
		SW 225 poly	SW 145 Compact mono
		SW 230 poly	SW 150 Compact mono
		SW 235 poly	SW 155 Compact mono
		SW 240 poly	SW 160 Compact mono

## J State Law

This Limited Warranty is expressly intended to exclude all other express or implied warranties, including without limitation the warranties of merchantability and fitness for a particular purpose, to the periods set forth herein. This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on implied warranties or the exclusion or limitation of damages, so some of the above limitations may not apply to you.

Revised January 2010



Kevin Kilkelly  
President  
SolarWorld California, LLC



Raju Yenamandra  
Vice President, Sales and Marketing  
SolarWorld California, LLC



January 29, 2010

OREP  
Attn: Mark Pengilly  
Sent via e-mail to mpengilly@gmail.com

Subject: Market interest rates for solar PV project financing

Dear Mark:

In response to your recent request for information concerning what would be considered current market interest rates and fees as it relates to the financing of various solar PV projects, I hope the following will serve to answer this for you. As I understand it, the size of these projects will vary and in my opinion this can affect the costs associated with the loan. For instance, a small project with a lower cost may in fact have a much higher rate and/or fee (on a percentage of the loan basis) than a large project. Following is a table that outlines my opinion of what a typical rate and fee would be for the sizes of projects you detailed in your e-mail to me:

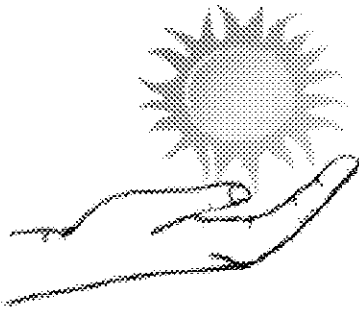
<u>Project Size</u>	<u>Estimated Cost</u>	<u>Rate</u>	<u>Fee</u>
3 kW	\$ 24,000	8.5-9.0%	2.0-2.5%
100 kW	\$ 700,000	7.5-8.0%	1.5-2.0%
500 kW	\$ 3,000,000	6.5-7.0%	1.0-1.5%

The reality is that rates in general are misperceived as low right now. This is definitely the case in the residential mortgage industry and the Prime rate, both of which are at historical all time lows. However, the economy and increased risk to banks/lenders has led to the desire to generally have higher spreads over whatever the cost of funds for that bank or lender is. Thus, the end rate to the borrower, while maybe somewhat lower than where it was a couple years ago is not commensurate with the same decline seen in say the Prime rate. This has led to some disconnect between lenders and borrowers on where the rate should be.

If you have any more questions on this – please feel free to give me a call.

Sincerely,

Scott Bossom  
Vice President  
Credit Administrator  
Phone – 503-285-0224  
Email – sbossom@albinabank.com



# SOLAR ENERGY SOLUTIONS

*The BRIGHT Choice*

To Whom It May Concern:

The solar industry is both consumer driven and contractor driven. Solar installations will increase to the extent that it becomes profitable for investors and producers, and is not limited to altruistic environmentalists.

Likewise, Oregon's residential solar industry will grow and prosper to the extent that small solar developers are able to make a decent living. If mainstream electricians and contractors are to participate in the implementation and growth of the solar industry, they will need an installed cost that supports a livable wage, health insurance, paid vacations and holidays as well as covering costs like overhead for warehouse and office space, support staff and running multiple vehicles. An incentive rate derived from an installed cost that is too low will perpetuate solar installation as the domain of a relative few devoted advocates who work under less mainstream conditions and are willing to sacrifice a decent living for their beliefs.

Only when solar installations are sufficiently rewarded and offer trained electricians compensation equivalent to their conventional fee scales will it be embraced by the mainstream electrical industry and adopted as part of a profitable business model.

One measure of the success of the FIT pilot is by the number of households and businesses install solar systems. Another will certainly be how many electrical contractors enter the field.

Thank You for This Consideration,

**Andrew Koyaanisqatsi**

President

**Solar Energy Solutions, Inc.**

Since 1987,

Moving Portland and Beyond

to an Environmentally Sustainable Future.

**503-238-4502**

**[www.solarenergyoregon.com](http://www.solarenergyoregon.com)**

**"Better ones house too little one day  
than too big all the year after."**

**[www.solarenergyoregon.com](http://www.solarenergyoregon.com)**

3730 SE Lafayette Court \* Portland, OR 97202 \* 503-238-4502

Stapleton Electric & Solar LLC

2314 SE 12TH AVE.  
Portland, OR 97214

# Quote

Date	Quote #
11/10/2009	4801

Name / Address
Mike Greenfield 2341 SE 12 Ave. Portland, Or. 97214

Rep	Project
PS	

Description	Qty	Total
Cleaning and wirer inspection of 3000 watt solar array	3	330.00

Phone #	Fax #	E-mail	Web Site	<b>Total</b> \$330.00
503-970-2976	503-236-0410	PIS@IPNS.com	Stapletonsolar.com	

Hi Mark,

Further to the PUC's request, a couple of comments and data points to consider or pass on:

- Solar PV (consumer renewable energy generally) is a nascent market while FIT financing doesn't yet exist. The GreenStreet Lending program offered by Umpqua Bank in partnership with Energy Trust offers the following rates/Terms on two loan programs:

1. Unsecured 5 yr amortizing term loan. Amount: \$1,000 to \$50,000, covers up to 100% of solar PV project cost. Rate: 8.75% fixed. Borrower must maintain minimum liquid assets at least as much as the loan amount.

2. Secured 15 yr amortizing loan, basically an HEL secured by a second lien on borrower's home: Amount: \$5,000 to \$50,000, up to 100% of project cost. Rate: 7.0% fixed. Maximum loan amount plus existing debt cannot exceed 80% of appraised home value plus project cost.

- Current base lending rates (cost of funds to banks) are at an **all-time low** in order to stimulate the economy. So the 6% rates on HEL loans will rise when base rates return to historically "normal" levels as the economy recovers. Since 1992, the average 15 yr fixed-rate mortgage rate (first position) has ranged from 9% – 4.5% today. HEL's carry a 1 – 2% rate premium since the lender is in the second position. Accordingly, a 9% rate is not high by historical standards, or even today for unsecured lines of credit (e.g. 8.75% on the GreenStreet Program).

- The financing model for Solar PV enabled by FIT need not rely on securing the borrower's home via an HEL structure. The long-term power purchase agreement and predictable cash-flow pledged to repay the loan should preclude the need to take a second mortgage on the property. Otherwise, home-owners who lack sufficient equity or other assets to pledge, will be excluded.

I hope this helps make your case. Did you make the point that the income from power sales under FIT is taxable, which means 9% of FIT revenue will go back to the State? Not to mention the taxes generated from the contractor installations, employee income tax etc. Please call me with any questions.

Many thanks for all your effort and good work.

Regards,

Douglas A. Rich

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**From:** Jonathan Cohen <[j.cohen@imagineenergy.net](mailto:j.cohen@imagineenergy.net)>  
**Date:** February 1, 2010 7:23:00 AM PST  
**To:** Steven McGrath <[steve@solutions21st.com](mailto:steve@solutions21st.com)>  
**Cc:** Judy Barnes <[jbarnes@hevanet.com](mailto:jbarnes@hevanet.com)>  
**Subject:** Re: System prices and the feed-in tariff

Hi Steve,

Thanks for the update on the FIT policy development. I'd be curious to get more involved with OREP...

As far as residential pricing, it has definitely declined in the last year, but the pricing we've offered with Solarize Portland is a very special structure. It is only possible because a group of 350 individuals got together to purchase in bulk from one contractor (us). We still offer standard one home solar pricing, which ranges from \$7-\$10/W, depending on system size, complexity, equipment choices, mounting solutions, etc (grid-tied only)...I would say a typical 3kW system ranges from \$7.5/W - \$9/W right now....Larger systems cost less \$/W, and smaller systems cost more \$/W...

Obviously community-based purchasing plans are great for folks, but those not participating in such a program should not be penalized by a lower FIT rate based on those programs pricing.

I'd be happy to comment more, if needed, and can be reached at 971.404.9671

Thanks,

Jonathan

Jonathan Cohen  
Engineer, Principal

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