



## Oregon Solar Highway – West Linn Project Updated December 10, 2009

### Further Q&A Specific to the Proposed West Linn Solar Project

#### ***Can you put the scale of the proposed West Linn solar highway project in perspective?***

Yes. The proposed West Linn solar highway project will produce about 3.2 million kilowatt-hours of electricity annually. On the average, the 7,497 single family homes in West Linn use more electricity in 16 days than what will be produced annually by the proposed solar highway project. For further comparison, the annual electricity use in the 290 single family homes in the nearby Barrington Heights, Hidden Creek Estates & Tanner Woods Neighborhood Association (BHTNA) is about the same as the electricity which will be produced every year by the proposed solar highway project.

What does this mean? It means the electrical distribution system running through the West Linn neighborhoods already supplies more electricity than the solar highway project will produce. So while the proposed solar highway project is significant in terms of the electricity needed to power the state transportation system, it represents a small percentage of the electricity flowing through the neighborhoods. Together those homes use more electricity than the entire state transportation system not just throughout the Portland area, but throughout Oregon.

#### ***I understand the solar project will only produce around 20 percent of its rated capacity – or around 600 kilowatt hours instead of 3,000,000 kilowatt hours. Is that correct?***

No, but an explanation is useful. The proposed West Linn Solar Highway project will have a “nameplate” capacity of 3 megawatts, which means it has the capacity to produce 3,000,000 kilowatt *hours* of alternating current electricity per year. An estimate for a solar array’s energy output in the Portland area is available through the US Department of Energy’s website: [http://rredc.nrel.gov/solar/codes\\_algs/PVWATTS/version1/US/Oregon/Portland.html](http://rredc.nrel.gov/solar/codes_algs/PVWATTS/version1/US/Oregon/Portland.html). By entering 3,000 kW (which is 3 megawatts) as the DC (direct current) capacity, the USDOE model will show you the annual AC (alternating current) production of more than 3,000,000 kilowatt hours. However, solar facilities like the solar highway demonstration project may do even better than the basis for that estimate because of the high quality of the Oregon-made solar panels.

#### ***Will the energy produced by the solar project go to ODOT?***

Yes, it will. Under Oregon law, utility regulatory rules, and by legal contract, every kilowatt hour produced by the proposed solar array will be credited to ODOT.

Imagine that the utility grid is like the Willamette River and electrons on the utility grid are like molecules in the water. If a small stream trickles five gallons per minute into the Willamette River upstream in Molalla and you have a pipe in West Linn downstream that diverts five gallons per minute from the river, the pipe flow probably contains only few molecules from that stream in Molalla out of the billions of molecules present in the entire river. But West Linn has a legal, binding agreement, in keeping with Oregon law and utility regulations, with the river-keepers that guarantees that it gets those five gallons per minute, regardless if the molecules come from Molalla or a creek emptying into the Willamette somewhere else. That *amount* of water is legally West

Linn's – no one else can have it. The *amount* of electrons produced by the solar array are ODOT's, no one else can use them according to the law, and ODOT will use that amount to power the transportation system, providing illumination to Interstate 205 in the West Linn area and elsewhere in PGE territory.

***Some say it would take over 100 years to pay off this project using energy cost savings alone. Is this really a smart financial move?***

It's true that new technologies and new applications cost more when they are first created, tested and then deployed. When comparing the costs of the solar highway to the status quo (fossil fuels) or to other potential resources (nuclear power), it is critical to take into account values such as long term environmental damage and carbon impacts, as well as public subsidies for nuclear and fossil fuels. For example, a solar project will produce significant relative net benefits immediately in terms of carbon emissions when compared to any fossil fuel plant.

For a longer view, consider the President's 2009 US Department of Energy (DOE) budget. It included \$156 million for the Solar America Initiative to help make solar cost competitive with conventional resources. It also included \$595 million to continue *development* of (not implementation) a nuclear waste repository and more than \$600 million for technology *development* (not implementation) to capture carbon from coal plants, plus another \$1.65 *billion* in tax credits and low interest loan guarantees to accelerate development of such technologies. (See <http://www.whitehouse.gov/omb/rewrite/budget/fy2009/energy.html>) With multiple subsidies in place for both renewable and "conventional" resources, it is difficult to make an "apples to apples" cost comparison.

It's not difficult, however, to consider the benefits of solar energy over other energy sources. Experts agree our current energy supply will not meet the increased demands of the future. The US DOE expects electricity consumption in the US to increase about 30 percent in the next 20 years. Meeting this challenge with renewables increases our energy security. Coal (which supplies around 40 percent of Oregon's electricity) and most natural gas come from out of state; the money we spend on that energy leaves Oregon, and we are dependent on others to source it for us. Burning coal and natural gas also produces carbon dioxide, the most dangerous greenhouse gas. Developing our own clean green sources of energy provides energy stability and security, and the money – and jobs – stay here in Oregon.

***Why doesn't ODOT just put this solar project in the desert? There's more sun there.***

Oregon law requires that solar projects be located on customer-owned property in the utility service area that serves the customer; in this case, the solar panel must be located on ODOT property and ODOT must use the electricity generated, and both the property and the energy use must be in the same utility service area. The transportation system in eastern Oregon doesn't need that much electricity, so it doesn't make sense to put a solar array in eastern Oregon. It does make sense to put it in PGE territory, in the Portland metropolitan area because that's where ODOT uses the most electricity.

Here's some perspective: The 2006-2008 US Census American Community Survey reports there are 10,117 housing units in West Linn. Of those, 7,346 are detached (single family). The Energy Trust of Oregon says that the average electric consumption in all electric homes is 19,164 kWhs per year and in gas heated homes it's 9,336 kWhs per year. Not considering all other households, commercial, public or other uses, just the detached homes in West Linn will use between 67 million kWhs annually if all were gas heated and 141 million kWhs if all were electrically heated. The scale of the 3 million kWh solar project now has context.

The ODOT solar highway project being considered represents 2 percent to 4 percent of the electricity used just by these homes in West Linn, if the homes in West Linn average about 1800 square feet (the median size used by the Energy Trust). According to that same US Census community survey, homes in Oregon have 5.3 rooms on average while homes in West Linn have 6.6 or 25 percent more rooms on average – which might suggest a higher average square foot size and therefore even higher electricity consumption as noted by the Energy Trust.

For those concerned about the project scale, it is worth noting that there is simply no comparison between what the solar highway will produce and what West Linn households alone consume today. Those 7,346 West Linn households use from 1.5 – 3 times the electricity required by the entire state transportation system. In just 8 –16 days, these households will use more electricity than the solar highway project will produce in a year – and yet through this project the sun shining on the ground around a highway maintenance yard could sustainably supply one-sixth of the electricity needed for the state highway system throughout PGE's service area.

***What about the controversy surrounding the Business Energy Tax Credit (BETC)? People seem to be questioning its public benefit.***

The Oregon Legislature established the BETC as a financing tool specifically to encourage public and private sector investment in renewable energy and conservation technologies. While there may be other financing tools to encourage renewable energy, from the standpoint of public policy the legislature preferred the BETC.

The BETC enables ODOT to engage the private sector to invest in and construct solar highway projects on the highway right of way. The BETC allowed ODOT and PGE to develop the nation's first solar highway project at the I-5 and I-205 interchange (see [www.oregonsolarhighway.com](http://www.oregonsolarhighway.com)).

ODOT can only use the financing tools the Oregon legislature makes available to construct solar highway projects. Right now, that means ODOT will use the BETC for the solar highway projects. If the legislature alters its policies on renewable energy development, ODOT will use whatever financing tools the Oregon legislature provides.

***I heard that solar panels only have an expected life of only 25-30 years with a 20 percent degradation in output near the end of that period?***

It's interesting to note solar panels produced over 50 years ago are still producing energy today. The solar highway projects under contemplation are expected to produce clean, renewable, home-grown energy easily and efficiently for at least 30 years, and likely far past that. ODOT will have the option to extend the solar power agreements with PGE at the end of the first 25 year period, for up to 3 five year terms. If conditions allow, projects may extend past then as well.

Even though the warranty would be for 25 years, a considerably longer performance period is anticipated, and although the warranty is based on degradation of less than 19 percent over 25 years, a considerably lower degradation is anticipated. For the solar highway demonstration project, the conservation financing assumptions were based on a degradation of 0.5 percent per year, or less than 12 percent over 25 years (since the first year is at 100 percent).

If this project is viewed in terms of future energy resources, it's valuable to note that all the energy stored in the Earth's reserves of coal, oil and natural gas is equal to the energy supplied by just 20 days of sunshine...and on the 21st day, the sun is still shining.