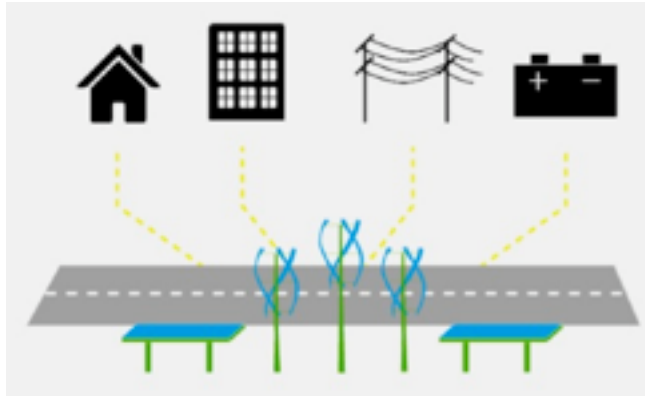


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Harvesting Clean Energy Along the Road

By Leora Broydo Vestel



The Green Roadway

You can get your kicks on Route 66, as the old song goes, but what if you could get your wind and solar power there as well?

A few states are already dabbling in roadside energy production. Last year, Oregon began a “solar highway” demonstration project with a 104-kilowatt ground-mounted solar array situated at the interchange of Interstates 5 and 205. The array powers about a third of the lights on the interchange. Massachusetts recently announced a plan to install a utility-scale wind turbine – big enough to power 400 households – on land adjacent to the Massachusetts Turnpike’s Blandford Rest Area.

Researchers and designers are also toying with ways to generate power along roads, including the use of piezoelectric materials, energy producing speed bumps and integrating wind turbines into road barriers.

And then there’s the Green Roadway — the brainchild of Gene Fein, a former media executive, and Ed Merritt, a sculptor. Neither has any direct experience working in the energy field, but the two hold multiple patents for wind, solar and geothermal technologies that operate alongside and in conjunction with what might be called an alternative-energy roadway system.

The project’s patent portfolio includes specifications for small wind turbines – 25 feet high or less – powered by both natural wind and the “dirty wind” generated by passing cars and trucks. Another patent covers the deployment of millions of tiny turbines an inch in length or less that could be attached to median guardrails, road signs or noise-barrier walls.

A state-by-state auction of their intellectual property portfolio will take place this Friday, with minimum reserve bids that range from \$125,000 for South Dakota to \$1.5 million for California.

According to Mr. Fein, the technologies allow for the creation of a utility-scale system that can plug into the existing grid infrastructure, potentially over hundreds of miles. The power generated could be used for homes, businesses and electric-vehicle charging stations.

Auction documents suggest that each 10-mile stretch of the Green Roadway system could generate enough energy to power up to 2,000 homes. The installed cost would be about \$2.6 million for the solar components and \$4.2 million for wind, but up to 65 percent could be knocked off if federal, state and local subsidies and tax credits are factored in, the documents suggest.

They also say that the solar and wind power generated, given the available incentives, would be cost-competitive with natural gas-fueled power generation.

Whether or not that's overstated remains to be seen, but the Federal Highway Administration does see promise — in general terms — in roadside renewable energy innovations, and it plans to provide funding for various projects.

"Such technologies hold promise as a means not only of improving the nation's energy independence," said Cathy St. Denis, a spokeswoman for the agency, "but of its environmental stewardship as well."

The ODOT Solar Highway

http://www.oregon.gov/ODOT/HWY/OIPP/inn_solarhighway.shtml

Under a layer of snow, the Nation's first Solar Highway project started feeding clean, renewable energy into the electricity grid Dec. 19, 2008. The 104 kilowatt ground-mounted solar array, situated at the interchange of Interstate 5 — a federally designated Corridor of the Future — and Interstate 205, supplies about one-third of the energy needed for illumination at the site.



Aerial view of project site, Dec. 4, 2008.

SunWay 1, LLC, a limited liability company managed by Portland General Electric, owns and operates this solar power plant.

Solar energy produced by the array feeds into the grid during the day. At night, the meter essentially runs backward as energy flows back from the grid to light the interchange. ODOT, through a Solar Power Purchase Agreement with PGE, buys the energy produced by the array at the same rate the agency pays for regular energy from the grid.

Oregon companies supplied the materials, designed, installed, and now operate and maintain this first-of-its-kind project, which showcases what can be accomplished through creative, responsible partnering in the public and private sectors.

* SolarWorld AG of Hillsboro supplied the solar panels and PV Powered Inc. of Bend supplied the inverter.

* The project was designed, constructed and installed by SolarWay, a “turn-key” solar energy EPC (engineer/procure/construct) consortium consisting of four Oregon firms:

- o Aadland Evans Constructors Inc. of Portland, general contractor;
- o Moyano Leadership Group Inc. of Salem, project manager and design leader;
- o Advanced Energy Systems (AES) of Eugene, solar power specialty designer and installer; and
- o Good Company of Eugene, community and sustainability specialist.

This collaborative project showcases the abilities of Oregon small business: the Good Company, Moyano Leadership Group, and AES are all certified as emerging small businesses in Oregon, and Moyano Leadership Group is further certified as a woman-owned business.

Solar Installer Contact Information

ODOT is compiling contact information for solar installers interested in completing solar photovoltaic projects for ODOT and will share that contact information with other state and local agencies for subsequent procurements. If you would like to have your contact information included, please complete the survey ([link below](#)).

What’s next? It takes about 47 million kilowatt-hours (kWh) of electricity annually to run Oregon’s state transportation system, energy used for signals, illumination, buildings, ramp metering and more. The nation’s first solar highway project supplies about 128,000 kWh a year, leaving about 46.9 million kWh still supplied from mostly non-renewable sources. Does Oregon DOT plan more solar highway projects for the future?

The short answer is yes. In 2008, the Oregon Transportation Commission directed ODOT’s Office of Innovative Partnerships to procure up to two megawatts of solar energy on ODOT properties, including along the state highway right of way and the interstate system. Because of falling revenues the procurement process has slowed.

Originally targeted for early this year, ODOT will likely not release the Request for Proposals until the next biennium starting in July 2009.

However, because of the unique contracting authorities available to the Office of Innovative Partnerships, a project proponent doesn't have to wait for an official procurement to interact with ODOT. Potential project developers are welcome to meet with management and staff of the OIPP to share project concepts, which can be kept confidential until the Oregon Transportation Commission makes a determination about going forward. If approved, the non-proprietary elements of the project concept become available to the public.

Back to the Solar Highway...

The concept of generating solar electricity in the highway operating right of way is of keen interest to solar industry providers, state and federal elected officials, the Federal Highway Administration, the Oregon Department of Energy and the U.S. Department of Energy. While "roadside solar" has operated successfully for almost 20 years in Europe, it had not been attempted in the United States until the ODOT project. With its commissioning, the Oregon Solar Highway project extends not just Oregon's role as a leader in the development of alternative energy resources, it also showcases ODOT's vision and leadership to meet the energy challenges ahead creatively.

Policies and strategies adopted in the Oregon Transportation Plan support this renewable energy project. Policy 4.2 – Energy Supply states that it is the policy of the state of Oregon to support efforts to move to a diversified and cleaner energy supply, promote fuel efficiencies and prepare for possible fuel shortages. Strategy 4.2.1 directs ODOT to support efforts to move toward a diversified and cleaner energy supply.

Oregon DOT offers special recognition to Portland General Electric for their contribution to this innovative project. Without their willingness to lead the nation and partner with ODOT, this project could not have happened.

ODOT further recognizes consultant Lynn Frank of Five Stars International, an Oregon management consulting and professional services firm, for his crucial role in bringing this project to life, including project direction, technical and regulatory energy expertise.

Background

The 2007 Oregon Legislature instituted policies for the state of Oregon to arrest its growth of greenhouse gas emissions by 2010, only one year away. In step with this legislative directive, Oregon Governor Ted Kulongoski directed state agencies to meet their electrical needs with 100 percent renewable resources. Given the constitutional limits on allowable uses of the Highway Fund, this directive proved particularly challenging for ODOT.

Fortunately, innovative financing mechanisms using public-private partnerships are available, which can allow ODOT to secure clean, renewable energy — without

paying a premium — from assets it already owns. These public-private partnerships use the 50 percent state Business Energy Tax Credit, the 30 percent federal Investment Tax Credit and utility incentives (available in PGE and PPL territories) to finance projects, credits which ODOT, having no tax liability, cannot take advantage of on its own. Purchasing power in this manner also provides the potential for ODOT to pay below market rates for the energy, resulting in more funds available for mission-critical needs.

This financing structure makes it possible for clean, renewable electricity to make real inroads into the energy portfolio offered to consumers in Oregon.

The Procurement

The solicitation — currently targeted for August 2009 — seeks to procure generation of at least two million kilowatt hours per year of renewable electricity from ODOT-owned rights of way, properties, facilities and other built assets. The solar highway projects will generate electricity at costs potentially lower than what ODOT is currently paying for power, but in no case above those rates. ODOT intends that successful third party or parties will construct, own, operate and maintain the solar systems at their own expense, selling all electricity generated by the systems to ODOT under a Solar Power Purchase Agreement, for a term from six to 20 years, or longer.

The initial procurement will likely occur in Portland General Electric territory, with installations in other utilities' territories to follow upon the success of this first procurement. A successful solicitation will result in scalable and repeatable solar installations on other suitable ODOT properties around the state.

The proposed solicitation to develop solar resources will likely consist of a two step process. As currently conceived, the first step would pre-qualify a short list of bidders and award the first two or three "bid basis" solar installations to the highest ranking proposer. The second step would open additional sites for bidding by the short listed companies. This allows ODOT to develop its solar resource on a competitive basis without requiring a request for proposal for each project; the pre-qualified company with the best bid per offering will be awarded installation. Solar project sites will include operating right of way, ground, pole, and roof mounts, and sound and retaining walls.

The solar companies will be responsible for all costs of each solar installation, including but not limited to design, permitting, construction and commissioning of the systems. The companies will also be responsible for maintenance and successful operation of the arrays, including any damage due to vandalism or crashes.

The Oregon Department of Justice advised ODOT that securing renewable energy through use of ODOT rights of way and facilities is an allowable activity as long as the energy generated offsets ODOT's use of electricity. ODOT, under current legal interpretation, cannot legally generate more electricity than the department uses and sell that electricity at a profit. This is not of immediate concern, since ODOT estimates that approximately 125 miles of solar installations on the right of way will be necessary to offset ODOT's annual electrical use of 47 million kilowatt hours.

What's the Timeline?

As noted above, the RFP will not be released this biennium, but instead must rely on additional budget available in the 2009-11 biennium.

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For more information, please contact:

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