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Taking a shine to solar: US states woo manufacturers

Lisa Cohn

With the solar industry growing so quickly, US states are eager to make themselves attractive places for solar manufacturers to set up plants. ***Lisa Cohn*** *looks at what solar companies are looking for in a potential new location and what incentives the states are offering to try to lure them.*

Nearly a year ago, Christopher Dymond, a senior energy analyst for the US state of Oregon's Department of Energy, decided it was time to brief the Oregon Governor's Office and state officials about the huge potential for attracting photovoltaic (PV) solar manufacturers to the state - a potential that the Renewable Energy Project had recently identified as worth $910 million in investment in Oregon by 2015.

In addition to telling the officials about the report - which pegged Oregon as among the top 10 states likely to benefit from the creation of jobs by the solar industry - Dymond stressed the need to move quickly. 'I told them the PV solar manufacturers were looking to build now,' he says. 'The window wouldn't be open long. It seemed right to push harder than I had in the past.'

At that meeting, the Governor's staff and state development officials were shocked to learn that in 2006, solar manufacturing surpassed all other uses of silicon, he says. They were also surprised to learn that the speed at which the PV solar manufacturing industry was doubling its output was increasing. That meant end-user costs were dropping. 'With every doubling of output, you get an 18% reduction in solar costs,' he says. What's more, he told the officials, the PV solar industry was growing at more than 35% per year.

At that time, sitting idle in Oregon was a mothballed semiconductor facility in Hillsboro with enough equipment to 'make your eyeballs pop out of your sockets', Dymond says. It would be a perfect facility for a company that manufactures silicon-based solar products. And Oregon, in the heart of the US north west's Silicon Forest, had plenty of workers skilled at melting, growing and wafering silicon ingots - skills needed to convert silicon into solar cells. A few months later, in March, SolarWorld announced plans to establish in the mothballed plant an integrated solar silicon wafer and solar cell production facility. Once the plant reaches its projected capacity of 500 MW - in 2009 or so - it will become the largest solar factory in North America. At full capacity, it could also create up to 1,000 jobs for Oregonians.

Silicon ribbon growth at an Evergreen plant. The company is to begin construction of a $150 million solar manufacturing plant this autumn in Massachusetts that will create more than 350 jobs when it starts up in 2008
EVERGREEN

Then, in June, Solaicx, a manufacturer of monocrystalline silicon ingots and wafers, announced that it will establish its first high-volume manufacturing facility in Portland, Oregon. 'That really got the state officials' attention,' Dymond says.

Now, a year later, Oregon is following Dymond's suggestion and speed-marketing the state's assets to solar manufacturers. It recently increased its 28-year-old business energy tax credit from 30% to 50%. What's more, the state in July released a new 'PV recruitment plan' aimed at developing a solar cluster in the state. 'This is one of the hottest, if not the hottest, recruitment areas for Oregon right now,' says Nathan Buehler, a spokesman for the Oregon Economic & Community Development Department.

Oregon isn't the only US state anxious to lure PV solar manufacturers to its borders. Massachusetts recently outbid Oregon and drew Evergreen Solar to the state. Evergreen announced in April its plans to begin construction of a $150 million solar manufacturing plant this autumn that will create more than 350 jobs when it starts up in 2008. The plant, in the Massachusetts Technology Collaborative (MTC) campus in Westborough, will be built with the help of state support, including up to $23 million in grants, up to $17.5 million in low-interest loans and a low-cost, 30-year lease of MTC land.

Washington, California, Texas, Oklahoma, Pennsylvania and Nevada are among the states that are also hot to cash in on the industry's booming growth and immediate need to expand capacity. It is common to hear tales of governors dispatching limousines and throwing lavish dinners for solar executives. Ultimately, however, the manufacturers base their decisions on whether the state offers sites that meet their specific needs - not on the quality of the Governors' food.

While mulling over a potential location, solar firms consider government incentives such as tax abatements, tax credits, land grants or the promise to extend railway lines or highways to the

plant, says Michael Fritsch, President & Chief Operating Officer of Confoe, based in Austin, Texas, and help to solar manufacturers and wafer manufacturers to build their plants faster and more efficiently. Companies also consider the availability and wage level of the workforce. It's also important to be located close to suppliers and customers, as well as to have access to reliable power to operate their plants, he adds.

Raw silicon as used by SolarWorld. The company is to build its integrated solar silicon wafer and solar cell production facility in a previously mothballed semiconductor plant in Oregon SOLARWORLD

Solar manufacturers include additional items on their must-have list. Like SolarWorld, new manufacturers use much of the same equipment and processes involved in the semiconductor and flat-panel display industries. It is a plus to find a mothballed plant like the one SolarWorld found. In addition, their work often requires expensive equipment and raw materials. For example, Gen 7 glass panels are large at over 1.83 metres by 2.13 metres, which makes them difficult to transport. 'This makes supply lines to the plant critical,' says Fritsch. 'The location must have easy access to rail lines, roadways and other transportation hubs,' he says.

To attract these companies, US states are using two approaches, says John Langdon, Vice-President of Marketing for HelioVolt, a manufacturer of thin-film semiconductors that is based in Austin, Texas. 'There are states that have a programme to create a solar market inside their state - California and New Jersey being two. California is 80% of the market, and New Jersey is 80% of what's left,' he says. In addition, some states offer manufacturing incentives. They include Michigan, Maryland, Pennsylvania and New Mexico.

Solaicx, based in Santa Clara, California, chose Portland in Oregon three years ago in part because of state incentives but more importantly because the region had many workers experienced in the semiconductor industry, says John Sedgwick, the company's co-founder and Vice-President of Sales and Marketing. 'The primary and overriding criteria was that we needed readily available, trained personnel. We came by a unique situation in Portland. A lot of foreign companies had invested in the manufacture of silicon wafers and ingots in Portland. They spent a lot of money building facilities and training people,' he says. At that time, Sedgwick adds, the

solar market was ready to explode. ‘Our primary problem in trying to expand was locating skilled people. Portland was rich in talent,’ he says, adding that Solaicx will employ 200 by the end of next year. In addition, the company viewed the region’s hydroelectricity as reliable and reasonably priced. Oregon also offered the business energy tax credit for investing in renewable energy manufacturing. At the time, it was 30% but has since increased to 50%, with a cap of a $20 million credit.

Just to the north, Washington state is taking a very different approach to luring solar companies. Its goal is to ‘grow’ solar manufacturers, says Mike Nelson, Director of the Northwest Solar Center, based in Seattle. ‘We’re trying to establish a market for solar energy based on reasonable market messages.’ To do this, the state has established a system based on German and Japanese production incentives. The state’s SB 5101 law aims to create a strong market for small renewable energy projects, especially solar PV projects. The law establishes a renewable energy feed-in production incentive, the first such application of this approach in a US state. Homes and businesses with solar PV and wind power systems earn from their utilities a credit of 15 cents per kWh of electricity generated by their renewable energy systems, up to a maximum of $2000 annually. This is roughly tailored to the yearly market output of a typical 3.5 kW PV system.

In addition to this credit, the law established economic multipliers that provide incentives for residents and businesses to use project components manufactured in Washington. This can raise the 15 cent/kWh credit to as much as 54 cents/kWh, says Nelson. This legislation, effective from July 2006, makes solar power attractive to the average homeowner or business, Nelson says. As a result of the legislation, residents and businesses have installed 263 systems that produce about 1 MW, he says. ‘We don’t want to take tax dollars and buy systems for big companies. This way, the systems get installed on residences. Every little system represents a voting family,’ says Nelson. Utilities that make these payments to homeowners and small businesses can claim a tax credit against their public utility tax, says Tony Usibelli, Director of the Energy Policy Division at the state’s Department of Community, Trade and Economic Development.

As a result of Washington’s efforts, module manufacturer Silicon Energy will begin delivering its products in the first quarter of 2008, says Nelson. Since 2002, Washington has been home to the world’s first dedicated plant for production of solar-grade silicon. In August 2002, REC Solar Grade Silicon (SGS) was established as a joint venture between REC and ASiMI, at that time a subsidiary of the Japanese industrial group Komatsu. The plant now employs about 200.

Also on the West Coast, California, the third largest market for solar in the world, has unique attributes that are attractive to solar manufacturers. WorldWater and Solar Technologies - a company that provides integration and some manufacturing of solar systems - has for about six months been based there in an incubator in Fresno. The state’s high electricity loads, especially agricultural loads, and the California Solar Initiative (CSI) drew the company to the state. The CSI provides cash incentives on solar systems of up to $2.50 per watt. These incentives, combined with federal tax incentives, can cover up to 50% of the total cost of a solar system. In addition, Pacific Gas and Electric pays customers up to 26 cents/kWh to produce solar energy and feed it into the system, says David Hakim, Regional Sales Manager for WorldWater. And the state offers a 5-year accelerated depreciation on solar systems, he says.

Because the Fresno area struggles with air pollution, farmers and other large users are interested in renewable energy, says Hakim. ‘In the valley here, going off fossil fuels is critical. Any way to avoid releasing air pollution is important here,’ he says.

Acciona Solar’s $110 million, 54 MW solar power plant in Nevada ACCIONA

HelioVolt is less interested in pollution and load issues as it searches for a site for its 20 MW manufacturing plant, says Langdon. ‘The primary concern we have is workforce. That’s number one,’ he says. ‘We’re also looking to see if there are enough trained technicians in the area. Is it a place we will be able to recruit people? Is the cost of living in line enough to help us recruit people to the area? We’re also looking at local incentives on issues like taxation and electricity rates. We put all this into one big equation, adding other factors like accessibility to road and rail.’

In part because HelioVolt wants to establish its first manufacturing plant within a day’s travel of its Austin R&D headquarters, the company has narrowed its search to Texas and Oklahoma, Langdon says. Both states offer a trained workforce and low cost of living, as well as some incentives from municipalities. Austin’s workforce is particularly appealing because the city is home to the University of Texas and boasts a large semiconductor manufacturing industry. ‘More people manufacture equipment in Austin than in Silicon Valley,’ Langdon says. IBM and Intel have installations in Austin. ‘People trained to maintain systems for semiconductors could work with our equipment,’ Langdon adds. ‘We also look for engineers. We need more chemical engineers and people who have not traditionally worked in PV. We also need manufacturing engineers who can adapt and improve the manufacturing methods.’

Like California, Texas has impressive solar resources. ‘If we put some incentives in place in Texas, it could very soon be a bigger solar market than California,’ Langdon says.

Interestingly, European countries are now courting HeliVolt much more aggressively than US states, Langdon says. ‘None of the states in the US is nearly as aggressive as the least aggressive country in Europe. The European community has a basic framework of incentives, and then regions can add to that. If you build in the far east of Germany, you can get more incentives than in the west of Germany, for example.’

Langdon notes that Oregon and New Mexico seem to be the most aggressive states that are targeting solar manufacturers. In New Mexico, legislators signed into law on 5 March a new renewable portfolio standard (RPS) that expands the fraction of utilities' total energy purchase that must be renewable to 20% by 2020. Oregon also has a new and similar RPS. Legislators there recently expanded the state's RPS to 25% by 2025. New Mexico also offers an Alternative Energy Product Manufacturers Tax Credit that is 5% of the taxpayer's qualifying expenditures. It also offers a solar market development tax credit, a customer solar PV production incentive, a solar energy gross receipts tax deduction and an energy efficiency and renewable energy bond programme.

In spite of these efforts to court solar manufacturers, HelioVolt will establish its second manufacturing plant in Europe, says Langdon. 'Many of the European countries have published incentive programmes. You can log on to government websites and see maps of what's available in different areas. They have formulas for unemployment, for example. In Europe, you can get incentives for 30%-50% of the cost of starting up a plant.'

Like sun-kissed Texas, California and New Mexico, southern Nevada is courting solar manufacturers - in part due to a suggestion from former president Bill Clinton, says Somer Hollingsworth, President and Chief Executive Officer of Nevada Development Authority. A few years ago, when Clinton spoke at the authority's annual luncheon, he suggested Hollingsworth focus on solar research and development and manufacturing, relates Hollingsworth. At that time, the 51-year-old non-profit development agency was already focused on recruiting non-gaming technology, life sciences and renewable energy manufacturers. The state now offers a sales and tax abatement on capital equipment, an incentive that saved Solargenix $15 million when it (now Acciona Solar) built its $110 million, 54 MW solar power plant in Nevada. In addition, Nevada has in place an RPS of 20% by 2010, and the state advertises the fact that it's blessed with sunshine more than 300 days of year.

'The other thing the companies look at is corporate income taxes. In Nevada, there is no corporate income tax, state or personal. That's a benefit. And we're probably number four in the nation as far as not taxing companies too much,' says Hollingsworth. He adds that providing an attractive setting for solar manufacturers is just as important and is the 'right thing to do'. And it feels especially right at this point in time, given that the PV solar industry is growing so fast and is so eager to meet its increasing demand quickly.

Says Dymond of the Oregon Department of Energy, 'Until about five years ago, the solar industry was basically a custom hand industry. Everything was kind of hand made. Now players are getting into the game, players like plasma screen makers and wind manufacturers. I've been waiting for this for a long time.'

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