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Why Not California?

*New solar manufacturing plants
coming to four states- Arizona,
Michigan, Pennsylvania, and
Oregon.*

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The Dow Chemical Company announced on February 3 that it has picked Midland, Michigan, as the site for the first full-scale production facility for its Dow Powerhouse solar shingle, if the company obtains sufficient local, state, and federal funding. That became more likely on February 25, when the Michigan Economic Development Corporation (MEDC) awarded \$61.3 million in tax credits over 15 years to Dow for a variety of projects, including the manufacturing plant. The proposed facility will produce solar shingles that can be integrated into rooftops with standard asphalt shingles. The devices employ low-cost, thin-film solar modules made from copper indium gallium diselenide, or CIGS. The CIGS materials are deposited on a flexible stainless steel substrate by Global Solar Energy, which recently confirmed that its solar modules can convert 13.2% of the sunlight hitting them into electricity, setting a record for thin-film, flexible solar modules. Dow forms the shingles by encasing the modules in a proprietary plastic. The company is already manufacturing solar shingles in a small-scale market development plant in Midland, thanks to a DOE grant of \$20 million awarded in 2007 under the Solar America Initiative Pathways Program. The full-scale plant could be operational by 2014, bringing more than 1,200 jobs to the area. See the press releases from Dow and MEDC.

The Dow news follows several recent announcements of new solar photovoltaic (PV) manufacturing facilities. China's Suntech Power, the world's largest manufacturer of crystalline silicon PV modules, announced in January that it would build a manufacturing plant in Goodyear, Arizona. The site will have capacity to make 30 megawatts (MW) of solar panels per year, but can grow to more than 120 MW. In November 2009, Pennsylvania Governor Edward Rendell announced that Heliosphera US plans to build a thin-film solar plant in Philadelphia's Navy Yard, creating 400 jobs. The State

of Pennsylvania helped the project with a \$49 million incentive package of loans and grants. And SolarWorld, a global solar manufacturing firm, said in October 2009 that it will add a new solar module assembly line to its manufacturing plant in Hillsboro, Oregon. The addition will make the Hillsboro plant the first fully integrated crystalline silicon PV plant in the Americas. With the new addition, the facility will handle the full production cycle, starting with polysilicon rock and ending with finished solar modules. SolarWorld completed its initial 480,000-square-foot factory in 2008, and a new, adjacent 210,000-square-foot building will house the module assembly line, which will have the capacity to produce 350 MW of solar modules per year. See the press releases from Suntech, the State of Pennsylvania, and SolarWorld.

New solar technologies are also entering the commercial arena, as G24i, a manufacturer of dye-sensitized solar cells, announced its first commercial shipment of solar modules in October 2009. Mascotte Industrial Associates (MIA), a Hong Kong-based manufacturer, is integrating the flexible solar modules into bags and backpacks for on-the-go recharging of mobile electronic devices, such as cell phones. The relatively new solar cell technology employs dyes that absorb sunlight and generate electrons, which are captured by nanoparticles of titanium dioxide and channeled to an electrode to create current. The G24i solar modules are manufactured in Wales and are flexible enough to be integrated into a wide range of products. See the G24i press release and technology description and the MIA Web site.

As dye-sensitized solar cells start to gain a foothold in the solar market, thin-film solar cells have become firmly established. Last year was a banner year for U.S.-based First Solar Inc., which reports that it manufactured and shipped more than 1 gigawatt of its thin-film solar modules in 2009, becoming the first PV company to attain this production volume.

First Solar modules use cadmium telluride semiconductor material deposited on glass. One gigawatt of solar modules produces enough electricity to serve the needs of approximately 145,000 average U.S. homes and saves roughly 1 million metric tons of carbon dioxide emissions annually. First Solar's successes also reflect a global trend of rapid expansion in the PV industry. According to the eighth annual PV status report from the European Commission's Joint Research Centre (JRC), worldwide production of PV solar modules and panels leapt to about 7.3 GW in 2008, an 80% increase over 2007. The JRC noted that a significant slowdown in PV investment in the second half of 2008 and early 2009 started to reverse itself by the second quarter. China became the leading producer of solar cells with an annual production of about 2.4 GW, followed by Europe with 1.9 GW, Japan with 1.2 GW, and Taiwan with 0.8 GW. If production continues to grow at the 2009 rate, the JRC predicts that China could have 32% of the world-wide PV production capacity by 2012.

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