



Markets & Trends

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Blue-sky thinking

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In March, Mexico's President Enrique Peña Nieto inaugurated the showcase 39 MW Aura Solar power plant in La Paz, in Baja California Sur State.

In tentative mode

Mexico: The sunny country is forging ahead with the groundwork to develop solar power, despite the difficulty of doing so without overt state or federal subsidies. Five more 30 MW plants with government PPAs are expected over the coming year, more private sector projects will attempt to run the gauntlet to construction, and more domestic solar panel manufacturing will start up, industry officials say. However, speculators worry that the contents of a long awaited new set of renewable energy regulations could arrive in Pandora's box late this year.

The solar industry already enjoys a high profile in Mexico. In March, Mexican President Enrique Peña Nieto inaugurated the showcase \$100 million 39 MWp Aura Solar plant in the city of La Paz, in Baja California Sur state. The merchant plant, which is the country's first utility-scale solar installation online, also won the Inter-American Development Bank's Infrastructure 360° Award in the Cli-

mate and Environment category in May. Due to Martifer's role as the engineering, procurement and construction contractor of the Aura plant, the Mexican International Renewables Congress (MIREC) in June awarded Martifer Solar the title of the "most innovative firm of the year."

Mexico has notable oil reserves, but it recognizes the need for solar for the long run. The country consumes \$24.7 bil-

lion worth of electricity per year from national utility Comisión Federal de Electricidad (CFE), with industry consuming over 60% of that sum. The country plans to add 16.2 GW of renewables to the grid by 2027, which will equal 35% of total national generation, according to a recent presentation by Benjamin Granados Domínguez, CFE's Sub-Director of Projects and Construction. To help fill

the solar component of this grand plan, there are currently “36 solar projects in development, with a total projected generation capacity of 1,000 MW that will require \$2.3 billion in investment,” according to a summary by Alejandro Peraza, the federal Comisión Reguladora de Energía’s (CRE) Director General of Electricity and Renewable Energy.

On a shorter time line, as part of its 2014 – 2018 national energy strategy, the government will facilitate the development of 14 solar power projects totaling 420 MW, says Héctor Olea, the President of Asociación Mexicana de Energía Solar (Asolmex), in Mexico City. “The first five projects, at 30 MW each, are slated to begin construction next year, and will be financed through PPAs with CFE,” he says.

The supply chain strengthens

One factor that will strongly encourage solar power in Mexico is more domestic manufacturing. With the U.S. Department of Commerce’s continuing review of Chinese panel dumping, many Mexican PV officials are hopeful that foreign investors will bring new panel manufacturing to Mexico, says Alvaro Lentz, the President of the Asociación Nacional de Energía Solar (ANES), in Mexico City.

SunPower’s Mexicali module plant, worth \$33 million, has been in production for several years, and Kyocera has been manufacturing modules in Tijuana for a decade. Now Solartec is reassembling a Belgian Photovoltech solar PV



Aura Solar is Mexico’s first utility-scale solar installation online.

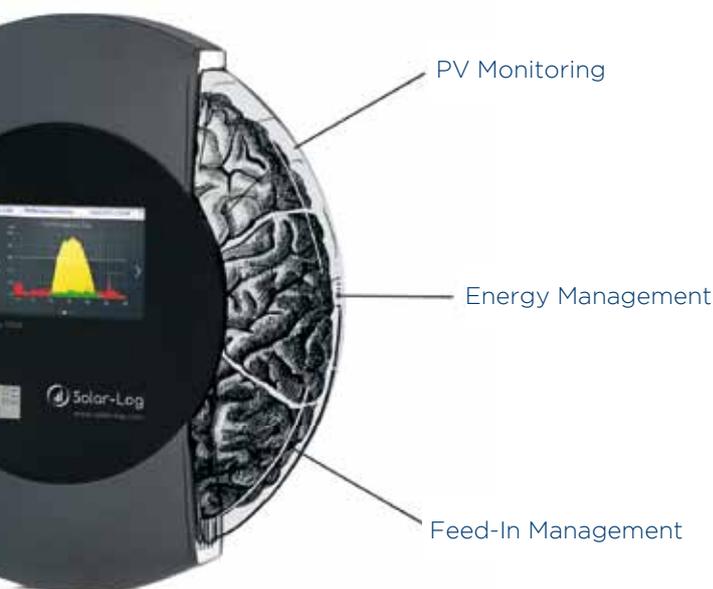
manufacturing plant at Irapuato, in Guanajuato State. And Iusasol, of Mexico City, a unit of smart meter maker IUSA, soon will begin to produce panels, Lentz notes.

Similarly, Mexican steel fabricator Persal, of Mexicali, is supplying framing and racking for a host of PV projects in Mexico and elsewhere in North America. “When the first wind projects came to Mexico they were 99% imported; now 60% to 70% is manufactured locally. That’s exactly what we will see in the PV industry,” says Olea of the solar association Asolmex.

First bankable merchant plant

Under the government’s Small Electricity Producers’ Program, CFE will purchase up to 30 MW of power from solar projects. The first plant built under that scheme was the Aura Solar plant, developed by Gauss Energía, of Mexico City. The plant was financed as a merchant project, with \$25 million from the International Finance Corporation (IFC) and \$50 million from the Mexican development bank Nacional Financiera (Nafin). The IFC explained its financing rationale saying, “By providing and mobilizing a project finance debt package for the

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i NEW PROJECT PROPOSALS FLOURISH

Despite the challenges, new solar project proposals flourish. A number of large projects announced two years ago – some with CFE permitting in place – have since disappeared from the radar, but more follow in their place. Among current announcements for PV projects are the following, by state:

- In Aguascalientes state, Spain's Alten Energias Renovables plans to build a 144 MW PV complex comprised of four arrays of 36 MW in El Llano at an estimated cost of \$280 million. Including some 480,000 solar panels, the plant is expected to begin operations in mid-2015, when it will sell the electricity generated to state utility CFE.
- In Baja California Sur state, Grupotec Energy, of Mexico City, gained permission to build a 27.6 MW PV plant at La Paz, including 112,500 modules.
- In Durango state, Spain's Eosol Energy recently inaugurated a 16.8 MW solar power park at the Centro Logístico Industrial de Durango, with 70,000 solar panels. The company has plans to develop six more projects of this design, ranging from 5 MW to 60 MW, according to comments made by Oscar

Bernal, Eosol's Director of Development, at a recent trade show.

- In Sonora state, the first of four \$75 million, 20 MW units of Sonora80M Group's proposed 80 MW solar park in Hermosillo was expected to come online in the first quarter of 2014. Ford Motor Company has agreed to purchase 15% of the power generated from the first phase. Sonora80M also reported that it already has 25 year PPAs signed with seven local municipalities, including Alamos, Caborca, Splice, Etchojoa, Guaymas, Santa Ana, and Hermosillo. Martifer Solar is contracted for engineering, procurement and construction as well as for operations and maintenance on the project.

Elsewhere in Sonora State, Sonora Energy Group has signed a PPA with CFE for the power from a 47 MW project being developed at Puerto Libertad.

- In Zacatecas state, the 30 MW ZacSol 1, the first phase of a project of up to 90 MW, is being developed by Boston's Vertex Companies, Inc., Panel Claw and Solectria, along with Mexican partners Constructora e Inmobiliaria Zacatecana and Grupos Domos.

project, IFC will have an important demonstration effect and will signal that the Small Producer model is bankable.”

The Aura plant has also been touted as a model for solar development elsewhere in the country. “The availability of capital is not an issue in the Mexican solar sector; plants now are very bankable. Rather, the commercial nature of the deal is key – to whom large plants will be able to sell and at what price,” says Olea, also the President of Gauss Energia. CFE currently offers 20 year PPAs for solar plants that are pegged at 98% of the area's average cost of power generation in the preceding year.

Within the commercial and small industrial segment there is a strong demand for PPAs within the fence of industrial parks from the more than 3,000 maquiladoras, or export assembly plants, located along the 2,000 mile long U.S.-Mexico border, which import over \$50 billion worth of supplies into Mexico annually. Many of these and other plants are located in the North and Northwest of Mexico where insolation is the highest in the country.

Larger plants in limbo

But the market is still in a cautionary mode for a large-scale roll out. “Develop-

ers of larger plants are in a wait-and-see situation now, awaiting a better understanding of the long awaited new energy reforms,” says Olea. “As long as energy rates for commercial and industrial consumers are in the \$0.30/kWh range, we can compete with CFE, but we don't know if that will be status quo in the future, because soon CFE is considering participation in the non-regulated utility market,” Olea notes.

Hope is that the new federal regulations on renewables will be finalized by the fourth quarter of this year, says Alvaro del Río, Martifer's Managing Director Mexico, in Mexico City. However, the contents of the new regulation could be stifling, del Rio warns: “The main perceived problem that could arise from the new regulation is that it might make it possible for CFE to sell renewable energy to private off-takers and compete with private renewable power plants. If CFE decides to offer clients a five year to eight year PPA for solar power, we in the private sector can't compete.”

Apart from nervousness about the future of solar competition and energy rates, the need to include the cost of grid interconnection in a plant proposal also limits development speed. To help revitalize the country's limited grid,

the government plans to add \$40 billion worth of infrastructure, including 17,000 kilometers of transmission lines and 45,000 megavolt amperes of substations, said Nicolas Puga, a lawyer at Bates White, in Washington. “Unfortunately, this does not include new infrastructure specifically for renewables,” he adds. Thus large wind projects in remote locations will be more problematic to site in the future than solar. “Being able to locate solar plants next to substations that can take the power near the consumers will be a real boon for solar,” he says. “Interconnection will be the trump card for solar power,” he explains.

Small projects move quicker

The residential and small commercial markets in Mexico will also grow quickly, thanks to lower rates set for PV generators, says Lentz. PV systems that provide sufficient energy to keep the host house or building consumption under 500 kWh within a two month period are given a special rate of about \$0.18/kWh, Lentz says. Consumption over that level can result in rates three times as high, he adds. Off-grid rural projects also are expected to flourish, since some two million Mexicans now have no access to the grid. “Nafin and some non-profits are looking at bringing solar power to one million rural residents that now have no access to electricity,” Lentz says. The Inter-American Development Bank and the World Bank traditionally support such projects.

In Yucatan state, Martifer and France's Citelum will develop a 1.5 MW street lighting system named Girasol, in Ixamal, a small city near Mérida. And across Mexico, Hanwha Q Cells will develop solar arrays at 120 Soriana retail stores beginning in 2015. The total capacity of the locations will be 31 MW, financed by Hanwha, Soriana notes.

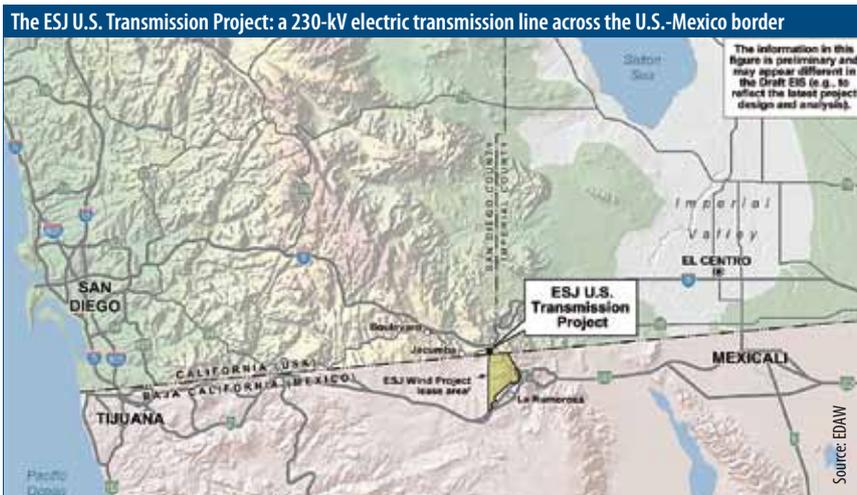
MIREC also awarded Solartec and Schneider Electric for “best collaborative partnership” for their development of a 350 kW PV facility in Apodaca, in Nuevo León state. In September, Schneider Electric opened its \$65 million R&D center Centro de Desarrollo e Innovación in Apodaca.

Cross-border transmission

“Everyone in solar power in Mexico talks about exporting energy to California; that's where the market is,” says

Lentz. Enhanced U.S.-Mexico cross-border solar power transmission will become a higher priority in Mexico as more PV capacity comes online in the North. The Western Electricity Coordinating Council (WECC) shares a common border of about 800 miles with CFE, while the Electric Reliability Council of Texas (ERCOT) shares a border of about 750 miles. In 2012, Mexico exported a net 683,000 kWh, representing a 16% increase from the previous year, according to the U.S. Energy Information Administration (EIA). “Electricity sales from Mexico to the United States could increase in the midterm, as the U.S. Department of Energy recently issued a Presidential permit to a subsidiary of Sempra International for construction, operation, maintenance, and connection of a 230,000 volt transmission line across the U.S.-Mexico border,” the EIA indicated in April.

That most recent approval of a cross-border line came in 2012 from the Department of Energy to connect wind turbines in Baja to the U.S. grid, requiring a presidential approval. San Diego Gas & Electric’s parent company Sempra Energy was slated to initially build 52 wind tur-



Graphic: Solarpraxis AG/Harald Schütt. Sources: EDAW, Sempra Generation, U.S. Department of Energy (DOE)

bines generating 156 MW for transmission into California, coming online during the first half of 2015, financed by a 20 year PPA with San Diego Gas & Electric.

The project will permit “Energía Sierra Juárez U.S. Transmission, LLC (ESJ), to construct, operate, maintain, and connect a double-circuit, 230 kV electric transmission line across the U.S.-Mexico border in eastern San Diego County, California.” The line will be 1.7 miles long

and interconnect the Sunrise Powerlink line with the Energía Sierra Juárez wind project near La Rumorosa in Baja California. Funding for the first phase came in June of this year, through a syndicate of banks led by Mizuho Bank, including the North American Development Bank, Nacional Financiera, Norddeutsche Landesbank Girozentrale, Sumitomo Mitsui Banking Corp., and Banco Santander. ♦ Charles W. Thurston

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