PV power finds a place in the sun

Photovoltaic power is emerging as a Brazilian energy option.



Solange Monteiro

WITH RESIDENTIAL ELECTRICITY rates skyrocketing 51% on average in 2015 and more attractive rules for distribution of small amounts of solar generation (up to 5 MW), photovoltaic (PV) panels are spreading across Brazilian roofs. In the first half of 2016, the National Electric Energy Agency (Aneel) recorded 2,250 new small private power generation connections to the distribution network, bringing the cumulative total from 2012 to 2015 to 3,981, with total installed capacity of 28 MW. This year São Paulo, Rio Grande do Sul, and Rio de Janeiro states are leading the solar generation trend, but they fall far short of the leader, Minas Gerais state, which has 974 connections. "Minas Gerais was already leading in solar heating, [solar power] is part of its urban planning, and it has taken the lead in incentive policies," says Paulo César Fernandes da Cunha, consultant to FGV Energy.

So far the solar power breakthrough has mostly depended on imported equipment, but government policy today is to build the local production chain, attracting investment in the manufacture of such items as PV modules, power inverters, and power monitors. What is needed now is to achieve scale, which can be done with the help of solar power plants. So far, Brazil's four auctions have contracted for R$13 billion in investment, promising 3 GW of capacity, most of which will start operating in 2017. One auction planned for this year was canceled, but another is scheduled for

October. "Our biggest problems are that we have no idea of the volume of energy up for auction and whether the government will continue to incorporate solar power in the total energy supply," says Rodrigo Sauaia, executive president of the Brazilian Association of Photovoltaic Solar Energy (Absolar).

According to Absolar, it will take annual procurement of about 2 GW of PV generation to ensure competitive local production of supplies and equipment. BNDES projects a gradual increase of local content in solar power projects, by 2020 reaching domestic production of PV cells—the most expensive and highest-value-added item. "It is an ambitious expectation. For competitive production, a company would have to be confident that there will be demand for about 500 MW. Taking into account a market without a monopoly and that not every project gets BNDES support, we calculate that at least 2 additional GW a year would be necessary," Sauaia comments. In July, BNDES president Maria Silvia Bastos said that the bank would review financing conditions for electricity infrastructure projects but did not specifically address renewable energy.

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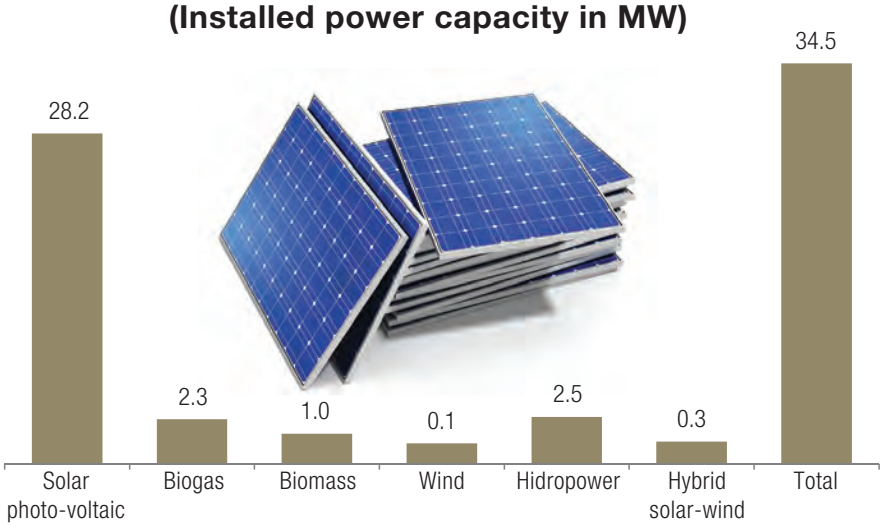
Cost issue

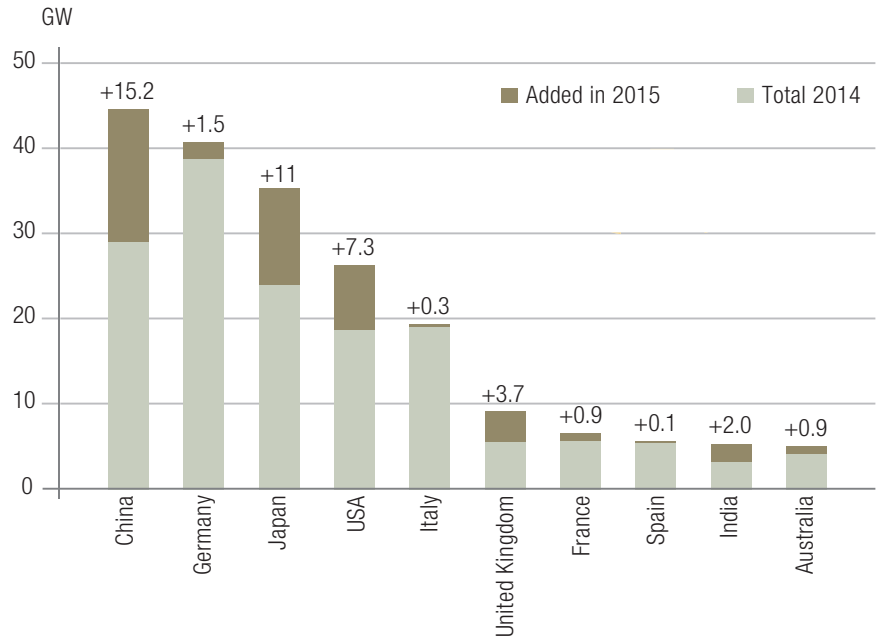
The importance of focusing on the domestic competitiveness of solar power is underscored by the international expansion of PV generation as costs decline. "Over the past decade, the cost of solar power technology has dropped over 70%, and this trend has not slowed down. It is estimated that solar power will become 5% more competitive every year until 2030," says Sauaia. A 2016 Bloomberg Outlook report estimates that by 2040 cheaper equipment, development, and operation of PV power plants will reduce solar energy prices by 43%. Moreover, according to Bloomberg, PVs are expected to represent 43% of the

Distributed generation in Brazil (Installed power capacity in MW)



Source: Aneel, June 2016.

Leaders in solar energy



Source: Renewable Energy Policy Network for the 21st Century (REN21).

additional global power generated from 2016 to 2040, equivalent to US$3 trillion in investments, and to supply 15% of world energy needs.

In Brazil, where solar generation accounts for only 0.02% of the total supply of electricity, the drop in solar energy prices was offset by the exchange rate depreciation, which happened just as investors in solar power plants were starting their projects. "This prompted companies that won contracts to produce solar power in the first federal auction in 2014 to request extension of their contracts. As prices paid for contracted solar energy are adjusted for inflation, an extension would bring companies more revenues," says Nelson Falcão, who is responsible for developing the Latin American energy business at Flextronics. In June, Flextronics partnered with Canadian Solar, which will invest R$80 million in the Flextronics plant in São Paulo state to produce solar panels with annual capacity of 350 MW. Canadian Solar already has production facilities in Canada, China, and Vietnam, accounting for 12 GW of manufactured solar panels in the past 14 years. In Brazil, the Flextronics plant is to manufacture solar panels for the Canadian Solar plants (400MW) in Minas Gerais state.

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Falcão points out there is a limited domestic supply of panels for solar power projects. "The only alternative possible in the short term is to import solar equipment financed externally, which is a currency risk. And in this situation, the products manufactured in Asia become more attractive in terms of cost," he says.

The Brazilian Association of Independent Power Producers (Apine) argues for reducing import taxes to reduce costs: An Apine survey

found that import taxes account for 12% of solar panel module costs and 14% of power inverter costs; and the Tax on Manufactured Products accounts for 15% of the cost of imported power inverters. Apine argues that lower taxes on imports would allow for a significant reduction in solar power costs, making it more competitive, which would accelerate its expansion and thus attract more investments to Brazil.

The solar equipment industry wants also to ensure a positive environment to sustain the expansion of distributed power generation to the point of consumption. Generating power on-site, rather than centrally, eliminates the cost, complexity, interdependencies, and inefficiencies associated with transmission and distribution. Solar power is an important source of distributed power, which is not true of wind power, according to FGV Energy's Cunha. Bloomberg projects that more than a third of the additional energy by 2040 will be distributed power, mostly solar. "In California, investments in energy efficiency and distributed power generation have not only already saved US$190 million but also eliminated the need for new transmission projects, with the help of investments people have made in solar power generation," says Absolar's Sauaia.

Consumer-generator

In Brazil, the major incentive for investing in micro-generation was the review of compensation for small power generators, which expanded the participation of consumers who also generate power and sell their surplus to the power grid. Tiago Correia, director of Aneel, says that

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changes that came into force in March this year introduced more flexibility for compensating small power generators. For example, a company with several branches can invest in solar energy in one location and sell surplus power to other branches. Other changes include reduction of the time electricity distributors have to connect new generators to the power grid from 82 to 34 days, and an increased time limit of 60 months for the use of energy credits transferred to the network.

"The regulatory framework is now well developed: we need to add financing initiatives and government support," says Sauaia. To support distributed power generation, Absolar recommends that all states adhere to the agreement that grants a VAT exemption for transactions related to solar and wind equipment. Regarding financing, Sauaia highlights the credit line launched in May by Banco do Nordeste, a Brazilian regional development bank, for small businesses interested in investing in distributed power generation. Loans from the line are payable in 12 years with a one-year grace period and can finance up to 100% of the investment at an annual rate of 6.5% to 11%.