Opening up the finance markets for merchant solar

Future solar finance | As the economics of solar improve, merchant projects are already in place in Chile and various parts of the US. However, as lawyers from Chadbourne explain, financing them is not a straightforward business

Credit: First Solar

As a result of the risk inherent in merchant arrangements, few merchant utility-scale solar projects have been constructed, and only a handful of them have received debt financing. The dearth of merchant projects in the solar market may be contrasted to the relative prevalence of the merchant model in the wind sector; in the United States, around one fifth of wind power is sold by projects operating on a merchant or quasi-merchant basis, whereas almost all solar electricity is sold through PPAs. Merchant solar projects have been limited to projects in a limited number of locations with a confluence of favourable factors, including transmission constraints, fluid spot markets, high electricity prices and high insolation.

The north of Chile, where the electrical grid is not connected to the grid in the more populous centre and south of the country, which receives high levels of insolation (around 7kWh/m2/day), and where electricity prices were historically very high and expected to remain so, has seen the construction of the largest number of merchant solar projects. These have included the 70MW Salvador project, sponsored by Solventus, Etrion and Total and financed by the Overseas Private Investment Corporation (OPIC), the 51MW San Andres project, sponsored by SunEdison and financed by OPIC and the International Finance Corporation (IFC), the 73MW Crucero project, sponsored by SunEdison and financed by OPIC, the Interamerican Development Bank (IDB) and Corpbanca, and the 141MW Luz del Norte project, sponsored by First Solar and financed by OPIC and the IFC.

Another Latin American merchant project of note, the 30MW Aura Solar 1 project in Mexico, built by Gauss Energía and financed by the IFC, shares similar features. The project is located at the southern end of Baja California Sur, where insolation is on par with levels in northern Chile, the electrical grid is not connected to grids in the rest of the country and electricity prices have historically been relatively high.

First Solar's Barilla project in Texas is one of the few merchant PV project operating in the US.

In the United States, First Solar has constructed and is operating the 30MW Barilla project in Pecos County, Texas. The Barilla project was financed on balance sheet, and was conceived in part as a proof of concept for merchant solar in the Electric Reliability Council of Texas (ERCOT) market.

White Camp Energy also reportedly plans to develop a 135MW merchant project in Kent County, Texas. Although it does not receive the same amount of sunlight as the projects located in Northern Chile and Baja California Sur, West Texas, where these projects are located, benefits from relatively high insolation. Moreover, the ERCOT grid features a fluid spot market, is relatively easy for a merchant project to connect to and is not connected to grids in the rest of the country, resulting in the potential for high peak prices. In the ERCOT market, spot energy prices can reach such heights during hot days in the summer

that selling electricity into the grid for a few hours can bring in as much revenue as weeks of production during other times of the year.

Financing merchant solar projects

To date, it has been difficult for sponsors to find debt financing for merchant solar plants. Although development finance institutions and a handful of local banks were involved in the financings of utility-scale merchant solar projects in Latin America in recent years, there has yet to be a utility-scale merchant solar project in the United States financed with debt.

Given the greater degree of risk involved with selling on the spot market, lenders to such projects typically require more conservative terms in their financing agreements. Lenders may require sponsors to contribute more equity up front than they do for traditional solar projects. Where projects with long-term PPAs may have debt-to-equity ratios of 80:20 or 70:30, lenders to a merchant project may require ratios closer to 60:40 or 50:50.

Lenders also incorporate cash traps and cash sweeps into their financing agreements, using relatively conservative debt service coverage ratios. A typical cash trap or cash sweep may be based on both the project's historical debt service coverage ratio and its prospective or projected debt service coverage ratio. Prepayments resulting from cash sweeps are typically applied in inverse order of maturity, as the merchant risk to lenders is greater for later periods, for which forecasts of spot prices are less likely to be accurate.

Quasi-merchant arrangements

Developing a merchant project may be attractive to sponsors who are hoping to take advantage of the upside of the merchant market or are having a difficult time attaining long-term PPAs on sufficiently attractive terms, but exposing an entire project to merchant risk may not be palatable to risk-adverse investors or lenders. Sponsors may consider limiting, but not entirely removing, their merchant exposure by contracting for a portion of their revenues, either by obtaining PPAs for a portion of their output, entering into non-traditional PPAs or hedges or separately contracting for the sale of renewable energy certificates (RECs).

Several of the projects described above have entered into PPAs for some of their output. The Barilla project, for instance, has entered into PPAs for about half of the output of the plant currently in operation, although these agreements have a tenor of only a couple years, as opposed to the 10- to 20-year tenor of traditional PPAs.

Another method for mitigating the risk inherent in a merchant project is to enter into a "synthetic" or financial PPA, a contract with a hedge provider (which may be either a financial institution, a power marketer or a buyer of electricity, like a mine, factory, computer company or other large user of electricity) that provides a predictable price. While they have been used in some Chilean merchant solar projects, they have yet to catch on for solar projects in the United States, where wind projects are leading the way.

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Synthetic PPAs are generally of a shorter term than traditional PPAs, so do not typically remove all merchant risk from a project. Their term is typically five to 10 years, as opposed to 10 to 20 years for a typical PPA. Synthetic PPAs are often structured as contracts for differences, under which the project sells its power into the wholesale market, and the hedging counterparty buys the power it needs on the wholesale market. The parties agree on a strike price; if the spot market sale price is greater than the strike price, the project pays the difference to the hedging counterparty, and if the spot market sale price is lower than the strike price, the hedging counterparty pays the difference to the project. There may be any number of variations on this arrangement – for instance, the strike price may be fixed or may adjust, and the timeframe over which it is calculated may vary.

While hedging arrangements mitigate merchant risk, they come with risks and complications of their own. For example, hedge providers may require a letter of credit or other credit support to secure the project's obligations, and they may demand a security interest in the project's assets, leading to tension between secured lenders and/or tax equity investors and the hedge provider. Synthetic PPAs also face regulatory uncertainty. The Commodity Futures Trading Commission (CFTC), has not yet indicated to what extent they will be subject to CFTC regulation under the Dodd-Frank Act. However, there is an exemption from regulation if one of the parties to the hedge is an "end user" – i.e., is not a "financial entity" – is using the hedge to mitigate commercial risk and notifies the CFTC regarding how it will meet its financial obligations regarding the swap.

A third method for obtaining some revenue certainty is for a project to unbundle the sale of RECs from the sale of electricity, selling RECs under a long-term contract while selling electricity on the spot market. There have been long-term REC offtake agreements in the US wind market, but this arrangement has also not yet gained a foothold in the solar power market.

Looking to the future of the merchant solar market

For solar projects, particularly in areas with a highly variable spot market resulting from constraints on transmission or variations in demand, selling on the wholesale market may be attractive, as the peak in electricity production during the day generally coincides with the hours of peak electricity use and prices. Moreover, solar power tends to be at the top of the dispatch stack, because it has no fuel costs. As development and construction costs for solar projects continue to decrease, it is likely that as in the wind market, quasi-merchant projects utilising the arrangements discussed above will become a more viable option that sponsors are willing to develop and construct and lenders are willing to finance. ■

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