

## Apricum in the media.

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### Solar for more than a thousand islands

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Indonesia: With over 238 million people, the generation capacity growth of electricity has lagged behind the pace of demand growth leading to power shortages and low levels of electrification. But now, things are starting to get concrete on the solar front in the archipelago with the government making solid plans for PV.



As is the case in many emerging PV markets, it is crucial for international PV developers to partner with local companies to get a firm foothold in the Indonesian market.

Photo: Suarga/Schletter

According to the U.S. Energy Information Administration, Indonesia has been reorienting its energy production away from exports to cater to its booming domestic demand. No doubt the country is blessed with natural resources such as oil, natural gas and coal but as is the case in many emerging economies, domestic demand has a way of drastically tilting energy politics.

The Indonesian Investment Coordinating Board, or BKPM, states that the big question now is “how to balance exports with domestic needs for energy.” The consumption rate is growing at 6-7% per year. The National Electricity Planning believes that Indonesia has to generate new capacity at a rate of 9.2% annually up to 2027. At the same time, the electrification rate is only 65%, one of the lowest in the region. About 90 million Indonesians still do not have access to electricity, a majority of them in Java and Bali.

Indonesia has an average solar irradiation of 4.8 kWh/m<sup>2</sup> /day. The figures vary region to region (see graph “Irradiation at different locations in Indonesia”). The sub-head of engineering and environment at the Indonesian Ministry of Energy and Mineral Resources Dr. M. Sjachdirin stated in his presentation given at the last German-Indonesian Solar Energy Day in Jakarta that the policy direction Indonesia is trying to take is to move towards 25% of renewable energy by 2025.

This is the so-called “Vision 25/25.” This vision pushes up the target of 17% set by the previous Presidential Regulation No. 5/2006 on National Energy Policy. The PV Program includes three aspects: rural PV, urban PV and on-grid PV, Sjachdirin states.

Whether or not renewable energy like solar power gets implemented at a rapid pace, the electricity prices are climbing even quicker in the country. The latest regulation shows that electricity rates will be increased every three months in 2013. The last increase is scheduled for October and will end at IDR 1,352 (US\$0.135) per kilowatt hour.

With such increases it becomes all the more possible, and essential for PV to offer some relief on consumer pockets with the promise of grid parity.

Schletter’s Technical Department Senior Manager Johannes Salzeder tells **pv magazine** , “So far the Indonesian market has not brought very big volumes of installed PV capacity. Still the geographical position coupled with a high amount of solar radiation and the fragmentation with thousands of islands will very likely lead to considerable volumes in the future. Whether this development is going to take place in the medium or long term will mainly depend on the political framework and market design.”

### Auctioning and financing

As Salzeder states, the political framework does play a key role. It can be said that the PV market in Indonesia is still in its infancy stages. James Kurz, consultant at Apricum – The Cleantech Advisory, agrees that the PV market is still in the very early stages with the main focus on small- or medium-scale off-grid solutions. Kurz tells **pv magazine** , “All projects so far have been government supported and cumulative installations have been limited to a total of approximately 30 MW.” will be applied to ensure the project is viable and second, projects will be judged on price. Projects with more than 40% local content (how this will be measured has not yet been clearly specified) will be rewarded with an additional US\$0.05/kWh on bids. This program is expected to allocate 150 MW of projects at 72 locations in western and eastern Indonesia to bidding companies and consortia.” Rida Mulyana, the Director General for New and Renewable Energy and Energy Conservation at the Energy and Mineral Resources Ministry said in an interview with The Jakarta Globe that 22 projects are located in western Indonesia and 50 in the eastern part. The details of the first auction have not been released, but are expected to come sometime in mid-August. Market watchers are pegging for a later start though – as late as October even. The 72 location project policy will be to partially substitute the consumption of diesel. The program will now be supporting storage capacity. Diesel will thus still be used at night for electricity production. Mulyana also stated, “Prospective bidders must submit evidence of land ownership to develop the project. Past experience showed that land title is the biggest hurdle in development of solar energy.” Developers and investors looking for large-scale projects might just be disappointed. Apricum’s Kurz says that the large-scale market will be limited in Indonesia. The government’s aim is rather to use PV to electrify rural areas and save fuel by hybridizing diesel-powered grids. “The scope for large-scale solar for these applications is limited and plants larger than 5 MW are not expected,” he adds.

Ernst & Young highlighted this switch to auctioning in place of FITs or other forms of financial subsidy as a dramatic change that can be noted of late. Countries like Brazil, India and South Africa are already actively inviting bids for solar power projects in their countries. The auction system has driven the solar tariff rates to some of the lowest worldwide. Still such a bidding system is not without challenges.

With the reverse auction system, one of the biggest challenges is financing. With aggressive bidding, funding becomes a challenge as profit margins become thin or non-existent. Under severe price pressure the risk is also that developers who have won bids, but have lack of experience in the field, take shortcuts to execute projects. Apricum’s Kurz adds that Indonesia could easily face similar problems. He adds that in the past, poor project execution and maintenance have been issues in the country.

Schletter’s Salzeder elaborates more adding, “The problem of severe price pressure in auctions leads to quality cutbacks of PV systems. This is one disadvantage of an auctioning model. As experiences in other countries show, another serious challenge of such a system is the risk of a privileged treatment of some of the applicants, which means that the projects may be given to the applicants with the best relations instead of those

with the best solutions. Of course a reliable procedure of solar auctions should potentially avoid such risks but, as mentioned, experiences in other countries do not show that to be the case so far." Borrowing costs play a part as well. How willing are banks in Indonesia to lend credit to project developers when margins become so low? Local banks are not well-versed in the area of solar power. Kurz explains that borrowing costs could play a major role if local companies participate in the bidding process without an international investment partner. Moreover PV solar systems need to be introduced to banks and bankable projects and suppliers are required to succeed with creditors. He adds, "Interest rates for project financing are still unknown but need to be in the range of not more than four to five percent in order to have a viable project taking a kWh rate of US\$0.20 to US\$0.25 into account."

## Challenges

The business environment in Indonesia is one that is challenging. As is the case in many emerging PV markets, it is crucial for international PV developers to partner with local companies to get a firm foothold into the market. Furthermore the awareness and knowledge of PV still need to be worked on. This starts at the grassroots level with the population, all the way up to decision makers. "Some know-how has been built and a few global competitors are present. The market overall, however, needs to be further developed and best practices need to be learned. There will be a great need for educating local companies on solar power production and finance. The importance of quality products, installation with better workmanship, long-term maintenance and monitoring of electricity production needs to be emphasized," Kurz adds. There are a few local enterprises who deal with solar products, however still on a small scale and there are also quality issues that need to be ironed out. System costs are still higher than in developed PV markets since the market is still in infancy and thus does not enjoy the benefits of economies of scale.

Additionally the geographical spread of Indonesia adds a logistical challenge. The delivery of solar components to the many scattered and at times remote islands can be a trial. "Especially the foundations of free area systems and carports require either cast-in-place concrete foundations or piles which are driven into the soil with heavy machinery. Both options are not always available locally, which brings along higher efforts, mounting times and costs," adds Schletter's Salzeder.

Salzeder also highlights a challenge from an engineering point of view, "Typical for projects in Indonesia are high to very high wind speeds, which bring about the need for very stable and mechanically reliable mounting structures. Also, as many projects are close to the seaside, the salty atmosphere leads to high corrosion risk. Hence it's often necessary to give the material surfaces a special treatment, such as anodizing for aluminum structures." As the government moves into its mission to improve its electrification rate, it also needs to convince its citizens that solar is better. Electricity prices are highly subsidized in the archipelago, hence there is no value proposition to end consumers as Apricum asserts. Kurz adds, "Therefore, the market will have to pass through regulators and public utilities that are bearing the cost of the subsidies."

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## First solar in Indonesia

Adding more fodder for headlines are also the numerous announcements that have been made by PV companies. **pv magazine** spoke with First Solar that has signaled interest in the Indonesian market as well.

Furthermore Indonesia has decided to go down the same path as India and Brazil where competitive bidding in terms of auctions is used to award solar power projects. The Indonesian government has announced plans to allow developers to bid at a discount to the state-set top price of US\$0.25 per kWh of electricity produced. This tariff can be US\$0.05/kWh higher if the developer can source over 40% local content for their project. The winners of the auctions will go on to sign a 20 year contract with state utility PLN (PT Perusahaan Listrik Negara) for power sale, Sitompul added. Kurz says, "Bids will be submitted via an online platform and will be evaluated in a two-step process. First, elimination criteria

First Solar announced the signing of a memorandum of understanding with Indonesia's PT Pembangkitan Jawa Bali Services (PJB Services) to work on the development of utility-scale photovoltaic projects in Indonesia. The aim has been said to establish a 100 MW PV pipeline in the country, which includes hybrid solutions. Won Park, First Solar's Senior Manager

of Business Development and Sales in Southeast Asia, states, “This MOU underscores First Solar’s belief that the Indonesian market has great potential as a sustainable market where solar power can be a meaningful part of the energy mix.”

Park tells **pv magazine** that he believes in Indonesia’s solar vision and is optimistic about the future growth of the market. He adds Indonesia is one of the key markets where it is critical to plan for medium- to large-scale capacity addition of utility-scale solar to complement other forms of generation in the energy mix of the country.

Park also adds that he believes that the success of the solar model in the country is not determined by FITs or a solar auction.

“What is key is that underlying policies drive infrastructure that matches generation capacity creation, and allows export of solar energy from resource-rich areas into demand centers.” He adds that debt capital should be made available at prices that make investment sustainable. Additionally it is important that bankable, internationally certified technology is used and there is long-term certainty and transparency.

First Solar’s capabilities in Indonesia span the entire value chain from project development to module manufacturing to O&M and the company is keen to work with a limited portfolio of quality partners with the objective of complementing Indonesian companies operating in the solar utility space, and bringing in the skill sets required, since the company “believes in working as locally as possible.”

### 1,000 island scheme

Taking into consideration the remote islands where electricity access is difficult, the state utility PT Perusahaan Listrik Negara (PLN) launched a program to develop communal solar power generation plants in 1,000 islands of Indonesia. The replacement of diesel as the main fuel source is the core aim behind this plan. Diesel generators can be replaced through hybrid solar power solutions.

Apricum tells **pv magazine** based on feedback from the German government-owned development bank KfW, that the green light has been given by the German government to provide credit directly to PLN. However this is limited only for a pilot phase. The pilot phase consists of 94 locations in Nusa Tenggara Timur (NTT) with capacities of 200 kW on average (mostly all solar-diesel hybrid solutions). A detailed survey of these locations is in progress. Local and international companies shall be invited to participate in tenders, which might be published internationally, but not before Q3/Q4 2014.

Optimal Power Solutions (OPS) and OPS Indonesia, for example, have worked with PLN to commission several projects in Indonesia in islands like Pulau Panjang, Pulau Balang Lompo, Pulau Tankake and Pulau Kelang. The 100 kWp PV array in Pulau Kelang, for example, serves the village of Kampung Tahalupu. The solar array, which also encompasses a 1,000 Ah battery and two 75 kW inverters, provides 400 families with clean electricity.

OPS Project Manager Andrew Mitchell states, “The local operators are trained in basic troubleshooting of the systems and anything they cannot overcome themselves is dealt with by OPS service teams across Southeast Asia. This project was one of the first round installations that came under the 1,000 islands scheme and its success will surely pave the way for many more to follow.” OPS has also worked on other hybrid solar solutions that include a 360 kWp system at a remote grid network on Bunaken Island in North Sulawesi among others.