The launch of the Jawaharlal Nehru National Solar Mission (JNNSM), which envisages the generation of 20 GW of power by 2022, has given a big impetus to the solar energy market in India. To accomplish this, the government is taking all necessary steps to boost both grid and off-grid solar segments.

By December 2010, 30 companies were granted permission to generate 5 MW each, adding up to a total of 150 MW of grid connected solar PV power. An additional 350 MW of solar PV power projects will be allotted during 2011-12. For Stage II of the Mission, the minimum capacity of a single PV plant is restricted to 5 MW while the maximum capacity has been raised to 20 MW. To tap the potential of this technology, there needs to be a combined effort on the part of the solar power players and the government. While, on one hand, the government needs to create an ecosystem to develop the segment, the players need to develop the right technology to ensure financial returns, while maintaining quality.

As a result of the Mission and the successful completion of the first stage, it is expected that solar PV-based power plants will become an exciting business opportunity. Building a solar grid connected plant and selling energy to ‘obligated entities’ as defined by the Central Electricity Regulatory Commission under the Renewable Power Obligation (RPO) rules, is fast emerging as a good investment option. The Ministry of New and Renewable Energy (MNRE) has issued a number of guidelines around solar and solar grid power systems, which can easily be accessed and downloaded from http://www.mnre.gov.in/

HOW TO ENTER SOLAR GRID BUSINESS

Solar grid business offers good opportunities for SMEs as well as large enterprises. The government should ensure that SMEs benefit from this business as much as big corporate enterprises. However, to enter and explore this field, players need to understand and focus on some key requirements.

By Richa Chakravarty

SMEs can take this opportunity and get into the power generation business. The ministry of MSMEs (micro, small and medium enterprises) should seriously use this opportunity to ensure that SMEs benefit from this as much as big corporate enterprises. However, to enter and explore this new opportunity, players need to understand and focus on some key requirements.

Components of grid connected business

Right technology mix: As the sun shines on solar panels, they generate DC electricity. This DC current is routed into the inverter that converts it to AC electricity, the same as the conventional electricity supply. Thus, a grid connected solar plant is a combination of various components—photovoltaic panels,
solar inverters, transmission and distribution systems, transformers, electrical systems, chemicals used, etc. The plant should be designed for interconnection with the transmission network and ensure a useful life of 25 years. The key building blocks for solar power plants include the solar module (the power generating device), solar inverters (that convert the power produced into AC power), and power evacuation (that steps up the voltage to specified kV levels and injects it into the grid). So it is important that SMEs have a complete knowledge of this entire cycle of generating power.

Right talent to undertake solar energy projects: Another factor that is important to run a solar power plant is to have the right manpower to execute the project. This is a major challenge in the solar sector because enough skilled hands are not available. When you hire candidates, they should have a good understanding of energy, the environment and economics. Look for people who can take care of the design and engineering of the systems or for production engineers, who can oversee production as well as look after quality control measures.

The plant needs to be fully loaded: It is very important to ensure adequate returns on investment in every plant. This is possible only when the plant runs to its full capacity at all times, as a result of its good harvesting capacity throughout the time sunlight is available. This is never possible in off-grid plants, since self use power needs vary widely and rated capacity is kept high to primarily meet peak demand. Thus, all such plants have a large portion of their peak capacity available to feed into the grid and thereby ensure the harvesting of its full capacity. Only when all such excess power is injected in a grid can more solar power be harvested.

Start with a smaller plant: The experiences of solar power installations across the world show that smaller solar power plants are easier to maintain than bigger plants. This also helps in generating local employment. Most importantly, there is practically no financial advantage in having large plants. The cost per watt of solar power remains the same, irrespective of the size of the plant invested in. Setting up a 10 kW plant will cost 10 per cent of a 100 kW plant; and the cost of a 1 MW plant will be 10 times the cost of a 100 kW plant. This is because the basic PV panel constitutes a significant part of the plant’s cost and its power capacity is about 230 Wp to 250 Wp.

One just has to add more panels to build a larger plant. Since the economies of scale do not operate to any advantage in starting with a large plant, experts consider that smaller but more effective solar energy plants are more viable and can be set up by small and medium sized enterprises.

Location of the feed: The location of the feed into the copper grid...
Business Opportunity

QUALIFICATION CRITERIA FOR SHORT LISTING OF SOLAR PROJECTS

To make a solar power plant viable, certain qualifying criteria for the players have been laid down by the MNRE.

**Financial criteria:** Any company that plans to venture into this segment needs to have a net capital worth of Rs 30 million per MW of the project capacity up to 20 MW. The company is required to submit annual audited accounts for the last four financial years, indicating the year that should be considered for evaluation along with a net worth certificate from a chartered accountant to demonstrate fulfillment of the criteria.

**Domestic content:** One of the important objectives of the National Solar Mission is to promote domestic manufacturing. In view of this, players are expected to procure their components from domestic manufacturers, as far as possible.

**Technical criteria:** Under the MNRE list, it is proposed to promote only commercially established and operational technologies that will help minimise the technology risk and achieve quick commissioning of projects. This is the most important criterion for players entering this field. Efficient modules enhance the useful life of grid solar power projects. So it is necessary that the technology adopted passes the latest edition of any of the IEC PV module qualification tests or meets with equivalent BIS standards. The current demand for modules on the grid is around 1GWp, and the PV modules used should be approved and tested by authorised test centres. Also, the mechanical structures, electrical works and overall workmanship of the grid solar power plants must be under warranty for a minimum of five years. Identification and traceability of solar PV panels is another important technical criterion. Each PV module used in any solar power project must use an RF identification tag.

All grid solar PV power plants must install the necessary equipment to continuously measure solar radiation, ambient temperature, wind speed and other weather parameters, and simultaneously measure the DC power as well as the AC power generated from the plant. Apart from that, the companies that plan to execute the project will also have to prove their financial credibility before undertaking the project.

It is necessary that the investors should ensure compliance to the qualification criteria laid out by the JNNSM policy. The MNRE website has a comprehensive list pertaining to the capacity of plants, the transmission of power, etc. Thus, only after fulfilling the mentioned criteria, is a company short listed to undertake the project.

is an important aspect to consider. Feeding power at high impedance nodes will cause immediate power quality improvement. Consider a 10 to 50 kW solar plant in an area near a town, feeding power into the local lower voltage grid. This will immediately improve the stability and reliability of the power available to the local people served from that feeder. In such a case, many local investors will come forward to invest in several smaller power plants within a town or a village. Investment in these plants will also be profitable if the government buys power from these plants at the same rate that it currently pays to big plants feeding power into the 33 kV grid.

**Right location of the plant:** One major problem with solar power plants is that an unusually large area is required for each kilowatt of power. As much as 1 sq m of space is needed to generate 100 W of peak power. The location has to be such that there are no trees and tall structures casting shadows on a solar array. The place also needs to be secure and free from bird and monkey menace. It is easier to find such locations in barren non-arable land around towns and rural areas—each accommodating plants of 10 to 100 kW plants.

**Strong financial backing:** Costs involved in setting up a solar power plant are multiple which can be in terms of time, money, effort and knowledge. In terms of money, developing a solar power plant requires a huge investment. Estimated costs can easily vary from Rs 150-250 million per MW capacity. The total investment as per JNNSM target of 2000 MW is about Rs 400 billion. Financing of solar energy projects in India is a huge problem. During the first phase of the solar mission, many companies failed to get licences as they could not meet financial closure amounts. Power purchase agreements (PPA) are another obstacle in funding projects. JNNSM provides for a ‘trader PPA’ with NTPC Vidyut Vapar Nigam Ltd, which passes on the risk of a default by state discoms to the developer. Given that many state discoms are notorious for delaying payments and even defaulting, financial institutions and banks refuse to consider these PPAs bankable.  

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