

## India's insatiable PV market: An interview with Astonfield Co-Chair Sourabh Sen



Sourabh Sen

Sourabh Sen is responsible for aligning operational endeavors with government policy at Astonfield, a leading provider of renewable energy in emerging markets. As Co-Chairman of Astonfield, Mr. Sen oversees all government relations and lobbying efforts and provides macro-level operational and strategic guidance to Astonfield's Global Executive Committee.

### **Solar Server: How does India's "insatiable" demand for electricity and supply/demand gap affect the nation's PV industry?**

**Sourabh Sen:** Numbers always paint a vivid picture to answer to this kind of question. India's Planning Commission estimated in 2006 that installed energy capacity in the country would need to reach 960 GW by 2031-32 in order to support 9% annual GDP growth. As of September 2012, India's installed capacity base stood at only 206 GW.

It is believed that for India to achieve 700-800 GW of power capacity in the next two decades, solar power will have to consist of at least 100 GW of that overall pie. The Jawaharlal Nehru National Solar Mission (JNNSM), which has a target of 20 GW by 2022, was established in part to help reduce India's energy shortage and energy security problems. However, there really was no PV industry in India before a few years ago.

From that perspective of needing new power to match GDP growth, solar is not competing with any other power source for a seat at the table in India's energy mix. New power capacity from solar, coal, nuclear and gas (as well as wind and hydro) will all be necessary for India to achieve its power capacity targets. There's obviously a huge opportunity to develop much more PV, both utility-scale and rooftop, to fill the gap.

However, coal's cost and risk profile is steadily climbing, and solar energy is becoming increasingly attractive (i.e. more economically viable). The PV industry should begin to experience organic growth at a much faster pace than it is now, which is good because the market opportunity is generally believed to be much higher than 20 GW.

**Solar Server: In your presentation at the recent Solar Power International (SPI) trade show, you said that "India is truly a price-elastic market". Can you comment on the dynamics of cost in India and the impacts that this has on the nation's solar market?**

**Sourabh Sen:** Essentially, the faster we can reduce the solar tariff, the more significant natural market-driven demand will be. Solar is now cheaper than the estimated 30-40 GW of diesel generation capacity in the country. In addition to it being a fueling for transportation, diesel is also heavily-relied upon for electric generators. It has been price competitive with captive diesel power for over 24 months, and we are seeing tremendous adoption from large captive diesel consumers.

Solar is also now within striking distance of parity with coal too. Coal's cost and risk profile is steadily climbing. Its predicament is based mainly on domestic fuel scarcity and fuel price volatility driven by increasing reliance on fuel importation, which affects both existing plants and those under construction.

When you factor in the added costs of disruptions, defaults, imported fuel, national security, environmental damages from air pollution and climate change, and the Comptroller & Auditor General of India's report that the government may have lost Rs.1.6 trillion, around \$33 billion, by giving away mining blocks rather than auctioning them, an LCOE of Rs. 4.8/kWh is probably significantly under-stating coal's true cost of generation to the country.

Solar energy is becoming increasingly more attractive (i.e. more economically viable). Module prices have fallen 72 percent since 2009, and the LCOE of most solar plants under construction is in the Rs.8-9/kWh range. To put this in perspective, recent peak demand prices on the spot market have reached Rs.12/kWh.

**Solar Server: What are the greatest challenges to building PV projects in India?**

**Sourabh Sen:** Financing is probably the biggest one. But generally speaking, there is no room for error in the Indian solar market. Utilities are now planning their demand on an annual fiscal cycle which means that projects of 25 MW and larger must be financed and executed within a 12-month cycle. Project development, initial site preparation and project financing all need to be processed in parallel, which creates new challenges for project developers at such large scales.

**Solar Server: Can you talk briefly about financing PV projects in India, and the challenges that developers face?**

**Sourabh Sen:** A huge differentiator of developers has been the ability to secure local, non-recourse project financing. Indian banks are historically very conservative in their lending. I think a combination of lingering misconceptions that solar is too expensive, with the relative newness of India's operating solar plants, have produced onerous lending policies that make it challenging to get decent loan terms.

Astonfield was successful in securing rupee financing for a 5 MW project we built in Rajasthan and a 12.3 MW project in Gujarat, however that financing came at a steep cost. India's interest rates are around 11-13% currently, whereas American banks are lending in the mid-single digits. One might think American banks are the way to go based on that, but currency fluctuations and hedging costs increase the risk-adjusted cost of overseas lending. Our opinion is that for India to scale its solar sector to meet and surpass JNNSM goals, local project finance will be the only source of debt to meet such significant capital requirements.

**Solar Server: You have said that it is critical to identify demand outside the JNNSM. Can you talk a little about the dynamic between state and federal programs, and the market outside these programs?**

**Sourabh Sen:** The market outside the JNNSM has really grown. There are now more than eight states that have either implemented or announced their own independent solar programs. Gujarat's feed-in-tariff program has clearly been the most visible example of this independent state initiative. It's the only state to do a FIT rather than an auction. While it was unable to achieve its goal of 968 MW installed by the end of last year, 279 MW worth of projects are now due to be installed by the end of this year.

I believe Tamil Nadu is probably the most recent state to formally announce a solar development plan. Other states include Rajasthan, Karnataka, Orissa, Madhya Pradesh, Uttar Pradesh, Jharkhand, and Maharashtra. All of these states want to develop solar to meet their Renewable Purchase Obligations so that they are not subject to harsh penalties from the regulators for non-compliance.

**Solar Server: At SPI 2012, you described three phases of the Indian solar market. Can you briefly explain this concept, and what you see for the future of the Indian PV market?**

**Sourabh Sen:** I think India's solar development can be visualized in three stages, or eras, of growth. Before 2007, solar equipment was extremely expensive because the supply chain was immature and utility scale solar plants were commercially unviable pretty much at any scale, especially given the lack of government support available for the sector. Only around 2 MW were installed. Stage 2 really began in late 2009 when JNNSM was announced. JNNSM initiated a series of "demonstration" policies from 2010 to early 2013, and Astonfield was one of the first companies to be awarded a MW-scale solar project under it.

The JNNSM projects being developed right now are the final batch from this first phase of the program. During this second era, though, solar has become much more affordable, dropping from 17.5 Rs per unit to 8.5 Rs in only 36 months. That's about 14-16 US cents per kilowatt-hour. India has achieved over 1,000 MW of installed capacity during this time. That's a compound annual growth rate of over 240%. The next phase of JNNSM from 2013-2017 will be characterized by significantly larger project sizes and much more ambitious targets.

I reckon the third era in Indian solar will be characterized by explosive growth driven by continued lowering tariffs. This country without question has the potential to install 100 GW over the next twenty years.

by Solar Server International Correspondent Christian Roselund  
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