

The Future of the CSP industry in India

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CSP Today has been serving the concentrated solar power industry since 2007 with focused events, news briefs and reports in a direct relationship with the industry in Europe, USA, MENA, India, South Africa and Latin America. The 4th edition of the CSP Today India conference will take place in New Delhi the 12th & 13th of March.

Jugaad (Hindi: जुगाद) describes a creative idea, a quick, alternative way of solving or fixing problems. Jugaad is popularly used in India and is now used by many other countries too. Jugaad, in its colloquial use, refers to the circumnavigation of commercial, logistical, or law issues as a means of solving the problems of everyday life in a cost-effective way.

Those familiar with India are only too aware of Jugaad as examples are commonly found in all areas of life in the region. Jugaad is not just a way of life, it is also a concept that perfectly encapsulates what needs to happen to the CSP technology industry in India: we need it to work, we need it to be cheap, and we need it to be local and innovative.

It would be an understatement to suggest that the CSP industry is going through a hard time in India. The Jawaharlal Nehru National Solar Mission (NSM) had much promise when it took off in 2008. However, time has exposed obvious flaws with no easy remedy: insufficient accurate DNI data, expensive financing leading to very difficult financial closure, unclear future of government subsidies, difficulty securing land and water, the need for a local manufacturing, the tight profit margins and even tighter time limitations etc, the inability to use gas at all in CSP to name but a few.

The truth is that many developers in India underestimated the difficulty of developing CSP projects. From the first batch of 500MW, all are still in construction, and only one 2.5MW CSP plant is working – the ACME Telepower solar tower in Rajasthan, which at the moment is unconfirmed to continue for the extra 7.5MW of the whole project, citing difficulties with DNI in the

area and underperformance of the plant.

On the other hand of the Phase 1 allotted 650MW of solar projects, the 150 MW for solar PV (most of the PV projects), the Migration scheme and the Rooftop PV and Small Solar Power Generation Programme (RPSSGP) have been commissioned.

Although developers have until May 2013 to commission CSP projects under the first batch, it is unlikely that the whole 500MW will be commissioned. At most 470MW might be constructed and CSP Today forecasts that besides a couple of singled-out projects, the rest will face severe delays with some cases leading to financial crippling and cancelling of the projects altogether. Tarun Kapoor confirmed in an interview for a CSP Today article that some companies had requested time extensions “due to the availability of heat transfer fluids”, but at CSP Today we have held conversations with numerous industry players in India that confirm that the development of the plants is severely delayed or have come to a stand-still due to some of the different issues pointed out earlier.

Phase II Postponed

The highly anticipated JNNSM Phase II allocation's details and procedures were released in December 2012. Although the announcement made for some difficult reading, it also brought up a much needed reality check.

In postponing the bid for 2014, the MNRE seems to have taken the decision for all the right reasons, moving it to have a chance to have sufficient learning from implementation and operationalization of solar thermal projects during Phase I. Therefore the bidding is moved to 2014-

15 which seems to point towards how long the MNRE anticipates the Phase I plants to finish completion. The responsibility for implementation has also mostly been moved to the states, and the technological ratio CSP-PV goes down from 50:50 to about 30:70. If what you need is power quickly that is the most reasonable decision.

Above and beyond, the government has also worked in some [separate] hybrid programs to encourage investment in this particular technology.

In a poll conducted during a recent CSP Today webinar, over 1 in 4 participants believed that delaying the CSP bidding for Phase II until 2014 was a ‘wise choice – [the industry] needs to learn the lessons from Phase I’. A further 42% indicated that it was a ‘practical move – not ideal but the reasons are understood’.

However, the challenges are widespread. Talking to CSP Today, Gopal Somani former Whole Time Director in RRECL and a CSP expert, expressed his view that “in the present cost competitive market affordability are the key drivers and therefore cost cutting in CSP technology is a challenge in India. Low DNI, long gestation, variability in weather conditions, the absence of fossil back up, bankability, affordability of rate payers and limited experience in technology are the issues which will restrict the investment and interest of developers in Phase II”

Outside the NSM the CSP projects under independent state portfolios are making strides. Gujarat, the first solar state to launch a solar policy in 2009, has a project called Gujarat Solar One in Kutch district of 25MW and 9h of thermal storage by Cargo

Solar Power. According to Dhruv Batra, director at Cargo Power & Infrastructure, parent company of Cargo Solar, in an interview with CSP Today, the plant is scheduled to go live in the third quarter of 2013.

Rajasthan Bidding Process Fails

Rajasthan issued a bid for 100MW PV and 100MW of CSP capacity development under the Rajasthan Solar Policy 2011, with a deadline of the 11th of January. 25 bids were received for PV, but no bids were received for CSP. Where did it go wrong?

The Rajasthan bidding process failure is hardly surprising. There are no projects finished on the ground to be able to check performance and cost economic viability still. Furthermore although the government has started a national program with weather stations all over the country to harvest real DNI data (and a year of this data is already available), DNI data is still patchy.

Another 2 major factors in Rajasthan for example are the cloud conditions vary

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largely, as well as the intense sand storms. The data appears to have really variable values which come in lower than expected at around 1672Kwh/m² (According to a Technical Report from November 2012). This DNI is lower than that of Spain which is coming in at about 2070Kwh/m² and much lower than US at 2560 Kwh/m².

However since the first NSM came out much has been learned in this regard. Both CSP developers and the MNRE now have valuable experience to devise a coherent strategy to develop CSP in the future if they are willing to confront the issues head on.

The future is still for the taking

There is definitely still much potential to be realized by the CSP industry in India. First and foremost India still is, for all intents and purposes, a country that is in high need for energy which has increased rather than decreased in the last few years.

High costs of imported coal and gas will make it increasingly difficult for energy developers to keep costs artificially low. The national coal supply chain is struggling to keep up with demand and has suffered problems over the past few months. Diesel generation is still really very expensive, costs the government a lot in subsidies and the long term sustainability of these incentives is a question mark.

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Furthermore, the availability of DNI data in the country is improving day by day with weather stations by C-WET from the MNRE shedding light over a previously obscure issue. This means that price and technology adjustments can be made by developers to adapt to the real DNI conditions and respond accordingly.

CSP has also seen over the past months many Indian manufacturers attempt to develop a local supply chain. Companies in the dozens are starting to specialize in tube receivers, frames, curved mirrors and other key components. This is more than a good side-effect of the NSM as it provides a strong cost reduction potential for developers; and in the future it means a possible strong manufacturing base for key components to be exported, strengthening India's balance of payments. This carries the provision that the components produced pass international standards testing, which some manufacturers such as Thermosol Glass are already following.

Even more exciting is the match between international experience and automation with the Indian nous for cost-reduction. Spanish giant Ingeteam is a great example of this symbiotic relationship which results in quality components manufactured below Indian market costs.

Furthermore, many CSP components are already being used in other industries. For example power block components and the manufacturing of steel, power components, control systems and civil construction are integral to the CSP industry. Other areas of potential for entry include hydraulic drives, Heat Transfer Fluids (HTF) and of course CSP adapted turbines. In terms of localization, creating jobs and a potential export market the CSP industry is unrivalled. Up to 90% of the key components could be manufactured in India in 5 years' time. Even in the best scenarios is difficult to imagine other industries, such as wind and PV, to be able to localize to such percentage so quickly.

Above and beyond local manufacturing, the Indian market is bringing large scale Fresnel technology into the international spotlight, through the Reliance plants that are using AREVA Solar's technology for plants of a 125MW scale, considerably larger than the 30MW Puerto

Errado in Spain. Clearly the Indian plants will be used as a demonstration for Fresnel technology at large scales.

Hybridization is Key

Hybridization is by far, the biggest opportunity for CSP technologies in India. There is a huge niche of opportunity right there and the MNRE have clocked onto it. Last year they released a program to target demonstration CSP hybrid plants ranging in size from 20-50 MW. The plants will each be located in different states (Rajasthan, Gujarat, Tamil Nadu and Andhra Pradesh)

The government shall oversee the provision of land, water resources, grid connectivity, geo-technical reports, PPA distribution licenses and the environmental clearance, which will speed up the process to complete the plants. Furthermore, the technology of the plant may specialize in CSP with hybrid cooling to reduce water consumption, CSP with steam temperatures higher than 500°C, CSP plant with more than 10 hours of storage to achieve 24/7 operation and CSP with 30% natural gas support.

AS COMPLICATED AS THE PROPOSITION FOR CSP IS FOR THE NEXT FEW MONTHS, THE INDUSTRY WILL GET THROUGH IT AND COME OUT SHINING. THERE ARE PLENTY OF OPPORTUNITIES STILL FOR THE TAKING AND MANY LESSONS HAVE BEEN LEARNT

This program has worked through many of the challenges, including the strict time limitation in which CSP projects in Phase I faced, in order to ensure that they are timely. The program aims to demonstrate the main CSP technological innovations that will "Indianize" the technology according to market needs. For example, water is difficult to secure in India which will give hybrid and mixed cooling technologies an edge. Storage hasn't been proven in India yet either, and temperatures higher than 500°C are unlikely to be trialed in a commercial plant at this stage.

But this is just the beginning. Many of the existing coal plants could be to a certain extent hybridized with CSP, but also with PV and wind. This would ensure the CAPEX and

the cost of energy is lower. Small changes could have a huge knock-on effect on the amount of imports needed for coal and gas in the mid-term. Overall India's balance of payments and energy independence would reflect the positive change.

And then there is biggest opportunity of all, which is the off-grid and non-electricity generation side of the industry. This is a huge untapped market. With the right idea and business model the opportunity is staggering, whilst also improving the lives of millions of people, both in India and outside. And it is this market precisely that bears the most need and the most opportunity for Jugaad, off-grid electricity solutions to replace diesel generation, as well as cooling & heating, steam for small industrial processes and even poligeneration where the byproducts of the process are reused for different purposes.

With more collaboration from the MNRE we will be able to utilize the Phase I experience to make a real difference to Phase II and aid it in its development. By then much more DNI data will be available. There will be much more technical knowledge in Indian firms who know how to put a project together and some quantum leaps can be made in terms of time and where cost cuts can and should be made. Many local manufacturers are lining up as we speak and they should be ready to produce the required components on time.

What the government needs to be realistic about is the time the projects take and to encourage serious developers that take calculated risks, rather than favoring those that have simply come in unrealistically cheap. Improving the financing options and making it cheaper will also help the industry along and secure projects, ensuring that the financial models can be sustainable over time.

As complicated as the proposition for CSP is for the next few months, the industry will get through it and come out shining. There are plenty of opportunities still for the taking and many lessons have been learnt. It is time for all the stakeholders to get their act together and push forwards towards the innovation, insightfulness and resourcefulness that has characterized India with its millions of entrepreneurs creating some of the most dynamic global companies in the world. And this means that it is time for some Jugaad. The rewards are plentiful.