

## India's solar programmes

### The Jawaharlal Nehru National Solar Mission

*Launched on January 11, 2010, the Mission aimed at achieving 22 gigawatts (GW) of installed solar capacity by 2022 – 20 GW grid-connected and 2 GW small off-grid applications. The JNNSM also aimed at creating a strong solar technology manufacturing base in India*

The Mission – or JNNSM as it is referred to – is divided into three phases, which are further subdivided into batches. The first phase extends from 2010 till 2013, with the aim of installing at least 1,000 MW of grid-connected solar capacity. The second phase is from 2013 till 2017, and the third from 2017 to 2022 (see Table 2.1: *Phase-wise goals*).

The first phase has been split into two batches; the aim is to allow the second batch to learn from the first. Under the first batch of the first phase, concentrated solar power (CSP) or solar thermal projects totalling 470 MW and solar PV projects worth 150 MW were auctioned in November 2010. Under the second batch, 350 MW of solar PV projects were auctioned in December 2011.

Solar thermal power projects have a longer construction period; to ensure that they are up and running by 2013, all solar thermal projects were awarded in the first auction. About 30 MW of solar thermal projects had already been approved before JNNSM was launched – these are now being 'migrated into' (brought under) the Mission. Similarly, some PV projects that had already been contracted and were under construction have also been migrated into the Mission.<sup>1</sup>

A related programme under JNNSM – the Roof-top PV and Small Solar Power Generation Programme (RPSSGP) – has been initiated in this period to set up smaller 1-MW projects (see Box: *Roof-top PV and Small Solar Power Generation Programme*).

**Table 2.1: Phase-wise goals**

Application segment	Target for Phase 1 (2010-13)	Target for Phase 2 (2013-17)	Target for Phase 3 (2017-2022)
Solar collectors	7 million sq m	15 million sq m	20 million sq m
Off-grid solar applications	200 MW	1000 MW	2000 MW
Utility grid power, including roof top	1000 – 2000 MW	4000 – 10000 MW	20,000 MW

**Source:** Anon, 'Jawaharlal Nehru National Solar Mission – Towards Building SOLAR INDIA', india.gov.in/allimpfrms/alldocs/15657.pdf

### ROOF-TOP PV AND SMALL SOLAR POWER GENERATION PROGRAMME (RPSSGP)

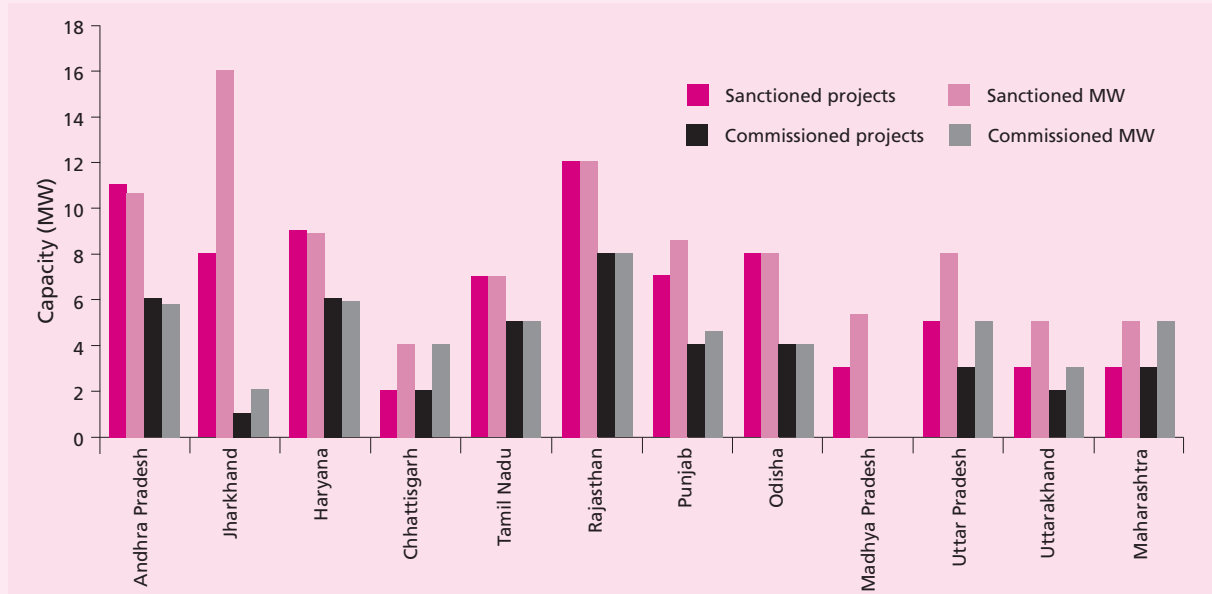
The RPSSGP was set up under the Jawaharlal Nehru National Solar Mission (JNNSM) in order to meet the market demand for smaller 1-2 MW projects that could be set up on roof-tops. The Programme is administered by the Indian Renewable Energy Development Agency (IREDA), which is under the ministry of new and renewable energy.

According to IREDA, as of April 17, 2012, 52.05 MW out of the total 98.05 MW (the total capacity of the sanctioned projects) has been commissioned. The

projects are spread over 12 states, with the highest capacity awarded to Jharkhand and Rajasthan. By July 3, 2012, Jharkhand had commissioned one project while in Rajasthan, 10 projects have been commissioned (see *Graph: RPSSGP progress report*).

According to KS Popli, director technical at IREDA, contrary to the programme name, none of the projects that have been commissioned so far has actually been installed on roof-tops. All of the projects commissioned are erected on ground.

Graph: The RPSSGP progress report, April-May 2012



Source: Anon, 'Status of commissioned solar power projects under Rooftop PV & Small Solar Power Generation Programme (RPSSGP)', as on April 17, 2012 (updated daily on <http://www.ireda.gov.in/>)



PHOTOGRAPHS: JONAS HAMBERG / CSE

JNNSM phase I aims at installing at least 1,000 MW of grid-connected solar capacity

## The agencies involved

The JNNSM's policy for large-scale grid-connected solar power has been formulated by the Union ministry of new and renewable energy (MNRE). The contracting, buying and selling of solar power, however, is handled by a nodal agency, as assigned by the Union ministry of power (MoP). Currently, this nodal agency is the National Thermal Power Corporation's Vidyut Vyapar Nigam (NVVN).

The NVVN is also the monitoring agency for assuring that the contracts are fulfilled. Ground-level monitoring, however, is done by state nodal agencies. Recently, the MNRE has set up the Solar Energy Corporation of India (SECI), which will take over the supervision of implementation and execution of the Solar Mission (see Boxes: *The Solar Energy Corporation of India and What SECI may do*).

## The economics of it all

To achieve its targeted grid-connected solar capacity, the JNNSM has strategised on bringing the per unit prices down by developing a very competitive solar market.

For the first phase (funding for phases II and III have been left unspecified), the NVVN has been given a specific amount of MW capacity of 'unassigned' electricity from the NTPC's coal thermal plants; this amount corresponds to the capacity that is awarded in solar.<sup>2</sup> For example, if 1,000 MW of solar projects are awarded, the NVVN receives another 1,000 MW of power generated from coal-based thermal power projects. This is what happened in phase I. Since coal is more efficient per MW (around 70-80 per cent) compared to solar (around 20 per cent), this makes for about 4 kWh of coal per kWh of solar.

### THE SOLAR ENERGY CORPORATION OF INDIA

The ministry of new and renewable energy (MNRE) has set up a private limited company owned by the government to take over the supervision of the implementation and execution of the Solar Mission. This company has been named the Solar Energy Corporation of India (SECI). The SECI will assume the responsibilities of the NVVN in the first phase.

Anil Kakodar, member of the Atomic Energy Commission, has been assigned to head the SECI.

Today, the authorised capital of SECI is stated to be Rs 2,000 crore with a total of two crore equity shares of Rs 1,000 each as per the information furnished to the ministry of corporate affairs. The subscribed capital of the "company" is stated to be Rs 600 crore with a total number of 10 lakh equity shares. Several officials of the MNRE are directors or nominated directors in the company. As and when the officials retire, they cease to be directors and new ones are appointed.

Despite being incorporated almost a year back, there is still no clarity on exactly what functions and specific responsibilities will the company fulfil. When a separate entity to govern solar energy in the country was envisioned a few years back, there were talks of an autonomous commission on the lines of the Atomic Energy Commission. However, what

finally emerged was something absolutely different; a company incorporated under section 25 of the Companies Act, 1956. Therefore there is, till date, no clarity on the level of autonomy this company will get or whether the MNRE would be the parent body with the company under it.

Recently, the first board meeting of the company was held; going by the minutes of the meeting, SECI "may" do almost everything under the sun for the solar sector. From "setting up mini grid based on hybrid" to linking "up with housing developers to develop integrated architectural designs that incorporate water heating, air-conditioning and refrigeration as well as electricity systems based on solar power", from managing "security fund to provide support to the solar power project developers" to the almost ridiculous prospect of acting "as a wholeseller/distributor or devise some scheme so that solar products are available in the market net of subsidy". Is the purpose of an agency which was originally conceptualised to be an autonomous body to implement the solar schemes of the government, to be a wholeseller/distributor of solar products? Till date, the specific responsibilities and the level of autonomy of SECI continue to be a mystery.

## WHAT SECI MAY DO

*As per the minutes of the first Board Meeting of SECI, the corporation's work can cover the following areas:*

**Energy access through mini grids:** Several villages and hamlets are without electricity. There are MNRE/government schemes supporting energy access. SECI can work for setting up mini grid based on hybrid (along with bio-digesters capable of using locally available bio-degradable waste) solar power.

**Facilitate retail of solar products:** A wide range of solar products are now being manufactured in the market. Subsidy is available through nodal agencies or through channel partners. It is not possible for a consumer to just go to the market and buy a product of his choice net of subsidy. SECI can act as a wholeseller/distributor or devise some scheme so that solar products are available in the market net of subsidy.

**Turnkey projects for institutions:** Several institutions, Industries and large builders are looking for agencies which can do a complete job of putting various types of solar systems in their premises. There is no such agency at the moment. The company shall tender technical assistance in finalizing a proposal for installing solar systems on government/private institutions and shall arrange for installation of the same. The company would also link up with housing developers to develop integrated architectural designs that incorporate water heating, air-conditioning and refrigeration as

well as electricity systems based on solar power.

**Solar park:** While most of the solar parks will be set up and managed by state governments, SECI could set up and manage one or two large solar parks. The solar park should be in proximity of a large R&D centre that supports a comprehensive academic and research program related to solar energy. While the solar park may be managed by SECI, the R&D centre could be managed by one of the IITs in its campus.

**Grid power scheme management:** SECI will manage future GBI or other schemes on behalf of MNRE in order to encourage solar power projects.

**Project financing:** The company may provide loans to private developers. There are several international organizations which want to route funds for lending through a government organization. This can be done through SECI.

**Pilot and mega scale projects:** SECI may set up solar power generation projects by participating in various government schemes.

**Security fund:** SECI may set up and manage a security fund to provide support to the solar power project developers. Several national and international organizations could contribute to this fund.

**Monitoring and consultancy:** SECI may monitor NSM projects on behalf of MNRE and maintain a data centre to provide information about the solar sector. It could also provide expert technical advice to the government as and when required, as well as consultancy services.

The coal and solar units are then 'bundled' together by NVVN to create a package, which is sold to state utilities and other consumers for Rs 5.50 per kWh.<sup>3</sup> Though this is costlier than what utilities spend on buying electricity, they are legally bound to source at least 0.25 per cent of their electricity from solar as part of their Renewable Purchase Obligation (RPO). RPO is a mandatory scheme under which all utilities must purchase 0.25 per cent of all their electricity from solar sources.

## Implementation – the bidding process

In the first phase, reverse bidding was used to select companies for implementing grid-connected

solar power projects. Overseen by the MNRE, the bidding for the first batch of this phase was done in November 2010, while that for the second batch happened in December 2011.

To be eligible to participate in the bidding process, companies were required to show a net worth of Rs 3 crore per MW. The shortlisted companies had to be the controlling shareholder in the project for one year after its completion. In the first batch, this stipulation was interpreted as 26 per cent of the equity – this was later changed to 51 per cent of shareholding.

Before the bidding began, the Central Electricity Regulatory Commission (CERC) calculated a benchmark tariff of Rs 17.91/kWh giving the approximate costs and reasonable rate



JNNSM provided the necessary impetus to megawatt scale grid-connected projects

of return on the investment (this was reduced to Rs 15.39/kWh for the second batch for solar PV). Each project proponent who cleared the eligibility criteria was asked to give a closing bid – a discount on the benchmark tariff. The lowest bidder would get the first contract and so on, until the capacity auctioned off was completed.

For the first batch of projects, an indigenisation requirement was introduced: solar PV modules based on crystalline silicon technology had to be sourced domestically. In the second batch, both the modules and the cells had to be produced domestically. There was, however, no such requirement in the case of thin-film technology. For solar thermal projects, 30 per cent of the technology needs were to be sourced from India; this excluded the cost of the land.

In the first batch, each company was allowed to bid for only 5 MW (for PV) and 100 MW (for solar thermal) projects; the aim was to increase the number of players in the market. In the second batch, where only solar PV was auctioned, each company could bid for up to 50 MW.

To avoid low bidding and subsequent default by companies, each project proponent had to give a bid-bond – a sum of money which will be refunded after three months of the plant's operation. This bid-bond depends on the discount given – the larger the discount, the higher is the bid-bond. For the first batch of solar PV projects, a company bidding for a 5-MW project had to give a bid-bond of around Rs 10 crore (*see Box: Forfeiting bid-bonds*).

### The bidding results

In the first batch, approximately 300 companies participated in the bidding process for solar PV projects; 30 applications were accepted. The lowest tariff bid was Rs 10.85/kWh, while the tariff cut-off was Rs 12.66/kWh (*see Table 2.2: Tariffs under the first phase of JNNSM*).

Sixty-six companies bid for solar thermal or CSP projects, and seven were accepted. The lowest bid was for Rs 10.49/kWh, and the cut-off stood at Rs 12.24/kWh.

## FORFEITING BID BONDS

The JNNSM and the Gujarat Solar Policy levy fine on projects that are delayed. Ideally, no projects should be delayed; neither should penalties be seen as a steady source of funding.

Under the JNNSM, bid bonds had to be submitted at time of bidding; these bid bonds depended on the amount of rebate that the developers were willing to give and the capacity of the project (see Table: *Bid bond slabs for first phase of JNNSM*). The bid bond consists of three parts: earnest money deposit, performance bank guarantee and bid bond. The earnest money deposit (Rs 20 lakh per MW) and performance bank guarantee (Rs 30 lakh per MW) together account for Rs 50 lakh per MW.

The NVVN has provided a spreadsheet to calculate bid bond.<sup>1</sup> The first 20 per cent of the total bank guarantee is encashed if the project is delayed beyond deadline. A further 40 per cent is taken after one month and the last 20 per cent after a two-month delay. Beyond three months, Rs 100,000 per MW per day has to be paid as liquidated damages.<sup>2</sup>

In January 2012, 14 projects lost the initial 20 per cent of their bank guarantees. According to A K Maggu, general manager of the Power Trading Group at NVVN, a total of 19 projects have had some part of their bank guarantees encashed<sup>3</sup> (see Table: *Bid bonds encashed from JNNSM phase I*). Four projects have had their entire bank guarantees encashed: CCCL Infrastructure, Rithwik Projects Private Limited, Karnataka Power Corporation Limited and Camelot Enterprises Pvt Limited.<sup>4</sup>

The total amount received from the encashed

**Table: Bid bond slabs for first phase of JNNSM**

Discount offered on CERC approved tariff (%)	Bid bond applicable for every paise of the discount (Rs per MW)
Up to 10 or 10	10,000/-
More than 10 & up to 15	20,000/-
More than 15 & up to 20	30,000/-
More than 20 & up to 25	40,000/-
More than 25	50,000/-

**Source:** [http://www.oriarc.org/orders/2011/FINAL\\_RST\\_Order\\_DISCOM\\_fy\\_\(23.03.2012\).pdf](http://www.oriarc.org/orders/2011/FINAL_RST_Order_DISCOM_fy_(23.03.2012).pdf)

**Table: Bid bonds encashed from phase 1**

Project	Amount encashed (Rs)	Delay (in months)
DDE Renewable Energy	72789000	2
Electromech Maritech	24013000	1
Finehope Allied Engineering	23763000	1
Saidham Overseas	23263000	1
Vasavi Solar Power	23763000	1
Newton Solar	23513000	1
Khaya Solar Projects	24513000	1
Karnataka Power Corporation	117815000	3
Greentech Power	23513000	1
Alex Spectrum Radition	58689000	2
Indian Oil Corporation	19313000	1
Amrit Energy	18263000	1
Precision Technik	18213000	1
Camelot Enterprises	136315000	3
Rithwik Projects	110815000	3
Electrical Manufacturing	19563000	1
CCCL Infrastructure	92565000	3
Aftab Solar	18413000	1
Oswal Woolen Mills	18263000	1
Total	867357000	

**Sources:** 1. Interviews with A K Maggu, general manager, NVVN and Tarun Kapoor, joint secretary, MNRE in April 2012; 2. Anon, 'Status of Commissioning of 20 Solar PV Projects located in the State of Rajasthan under JNNSM Phase-I, Batch-I', NVVN, June 1, 2012, <http://www.nvvn.co.in/Notice%20inviting%20Comments.pdf>; 3. Anon, 'RfP opening on November 16, 2010 in descending order of discount offered,' -- The discounts offered in Batch 1 Phase 1 of JNNSM; 4. Anon, 'Bid Bond Calculator', NVVN, <http://www.nvvn.co.in/RfP%20Documents.php>; 5. MNRE, 'Jawaharlal Nehru National Solar Mission Building Solar India' - Guidelines for phase 1, batch 1 of JNNSM

guarantees amounts to Rs 86 crore. Although the amount is not enough to finance 100-200 MW plants, it is sufficient to build a 5-MW solar power project. A minor amount from this money could go into the fund for financing projects using Indian manufactured solar technology. Alternatively, it could fund R&D and testing facilities at the Solar Energy Centre to establish unbiased testing of different manufacturers' panels and their performance in Indian conditions.<sup>5</sup>

**Table 2.2: Tariffs under the first phase of JNNSM**

Phase	Benchmark tariff of Central Electricity Regulatory Commission (in Rs per kilowatt hour)	Weighted average tariff after bidding (in Rs per kilowatt hour)
Phase I: Solar thermal	15.31	11.48
Phase I, Batch I: Solar PV	17.91	12.16
Phase I, Batch II: Solar PV	15.39	8.77 (Minimum and maximum tariff is 7.49 and 9.44 per unit)

Source: Union ministry of new and renewable energy

In the bidding for the second batch, around 130 companies bid for solar PV projects; 22 were successful. The lowest bid was at Rs 7.49/kWh and the cut-off was at Rs 9.44/kWh.<sup>4</sup>

In other words, reverse bidding did bring down the cost of solar power significantly. At the same time, evidence of corporate malpractices also emerged during the first phase (see Box: *Solar scam*).

## Some key concerns about the Mission

### Ownership

In the first phase of the National Solar Mission's contract with power producers, there is a clause requiring a majority of shareholding to remain with the winning bidder up to one year after commissioning.<sup>5</sup> This is to ensure that the winning bidder will develop the project and by doing that, will improve its own experience and skills in the sector. Without this clause, there would be a risk of bidders applying only to get the contract and then selling it off without expanding the market of developers. Since the first phase was specifically designed to expand the market of solar power developers, this would not have been acceptable.<sup>6</sup>

There are, however, some concerns about how the clause was written and is interpreted. The initial clause merely stated that the winning bidder needed to hold on to a majority of voting rights – depending on how it was interpreted, it may have meant just 26 per cent of the voting rights. Shares not giving voting rights – preference shares – were not counted.<sup>7</sup> This loophole has been filled to an extent in the second batch of the first phase. The new request for selection document defines majority shareholder as one having 51 per cent of the voting rights; however, whether this includes preference shares or not remains unclear, as

### TECHNOLOGY CHOICES

Of the first batch of the first phase solar PV projects under JNNSM, half (about 70 MW) have opted for the thin-film technology (mostly CdTe), while the other half have gone for crystalline silicon. As for the first phase solar thermal projects, most companies are choosing to go for parabolic trough technology. Multiple reasons have been given for this – it is the most mature technology; and with a cap on the amount of electricity that can be sold from the plant, it may not pay to use the more efficient tower technology.

preference shares do not give voting rights.<sup>8,9</sup>

Under the Gujarat state policy (phase II), the original shareholders of a project need to continue to hold at least 51 per cent of the equity for five years after commissioning.<sup>10</sup> Under Karnataka's solar policy, the consortium or single entity bidder needs to retain 51 per cent of the equity share capital for three years after commissioning and then keep 26 per cent for the full 25 years of the agreement<sup>11</sup> – much longer than any other policy, thus in effect securing that the bidder stays with the project for the full time. This seems to be the best way to ensure responsible bidders.

The problem may, however, persist as companies bid through fronts. It may seem implausible that a few Hyderabad-based women own a large percentage of the projects under the first batch of the Solar Mission, but it is the truth.<sup>12</sup>

The other problem is that although shares may be held by a proper company, a few EPC (engineering, procurement and construction) contractors are doing all the work. There is little incentive for the winning bidders to do more than

## SOLAR SCAM

*An investigation by Centre for Science and Environment (CSE) shows how a company used unfair practices to corner lucrative projects under the first phase of JNNSM*

In July 2010, the Union ministry of new and renewable energy (MNRE) had issued guidelines for the selection of solar power projects. According to these, the ministry will accept only one application for one 5 MW solar PV project “per Company, including its Parent, Affiliate or Ultimate Parent or any Group Company...”. In the case of solar thermal projects, the guidelines specify “total capacity of solar thermal projects to be allocated to a Company... shall be limited to 100 MW”.

As per the guidelines, therefore, one company was allowed to bid for and win one 100 MW solar thermal and one 5 MW solar PV project. In totality, one company was eligible to get 105 MW worth of projects.

CSE investigations revealed that these guidelines were blatantly flouted by LANCO Infratech. This company floated front companies and grabbed no less than nine projects worth 235 MW. This is about 40 per cent of the 620 MW worth of projects auctioned by the government during the first batch of the first phase of the JNNSM. LANCO Infratech is the flagship company of the LANCO group.

The company has initiated work on these nine projects on 1,000 hectares at Askandara village in Jaisalmer, Rajasthan. In the winning bids for solar thermal projects, LANCO’s name appears only in the case of Diwakar Solar Projects, which has bagged a 100 MW solar thermal contract. Another LANCO subsidiary, Khaya Solar Projects, appears on the approved list of 5 MW solar PV project proponents.

CSE found that seven more companies had

direct links with LANCO – some have LANCO employees and their family members as directors, while others have strong commercial ties to the company. LANCO’s own annual report indicates that all the seven are firmly in its control.

All seven companies had Rs 100,000 or Rs 1 million in equity, no assets or reserves from the past; all were created for the bidding process; all companies increased their authorised amount of shares and then issued preference shares on the same day (December 31, 2010); the shares did not go to LANCO directly, but show up in its annual report. Then LANCO and front companies bid for the PV projects in a unified fashion, quoting similar tariffs with Rs 0.05 jump between each bid.

The DPR of all projects are almost identical – word for word, page by page. Even the land that has been agreements for the legally distinct and differently owned projects has been signed by one person – a LANCO employee. LANCO bought compulsorily convertible preference shares of the front companies that will give it guaranteed ownership in future. This

helps the company bypass the mission guidelines.

CSE investigators point out that LANCO could pull this off because neither the ministry, nor the NTPC Vidyut Vyapar Nigam (which is responsible for the contracting, buying and selling of solar power), have a mechanism to monitor the activities of companies that win a contract. The two agencies do not even provide the details of the projects and company addresses. The ministry’s non-transparent processes are responsible for the lapses in the renewable energy programme. This has resulted in LANCO winning the bids by unfair means. In doing so, LANCO throttled the competition and stopped genuine players from entering the market.

Source: *Down To Earth*, February 1-15, 2012



just hire an EPC contractor to take care of everything from finding and buying land, acquiring pollution control board clearances, choosing technology and constructing the plant. All the winning bidder needs to do is to sit back with the money, without gaining any experience.

### Commissioning

Commissioning is another grey area. As the deadline for commissioning of the first batch of projects was reached, it became clear that the definition of commissioning in the power purchase agreement was not quite clear.<sup>13</sup> The joint secretary



of the MNRE, Tarun Kapoor, said in an interview with CSE: “The PPA (power purchase agreement) was very faulty.”<sup>14</sup> Commissioning had been defined in different ways in the PPA, in the guidelines and in the clarifications to the guidelines issued by MNRE or NVVN.

In the clarifications, it was made quite clear that equipment for 5 MW had to be constructed and electricity needed to flow from the project. However, developers sign just the PPA contract, in which the only clear definition was that electricity had to flow from the project; there was no mention of what amount, or how much equipment needed to be put up. According to the MNRE, this led the Rajasthan government to issue commissioning certificates to projects that were far from ready, but that had managed to feed a nominal amount of electricity into the grid. This way, projects which had not met the deadlines managed to avoid fines (*see Box: Solar trick*).

There has been some corrective action. The argument that the definition of commissioning was misunderstood has not been accepted by the MNRE or the government of Rajasthan. Four officials have been suspended<sup>15</sup> and projects have had their bid-bonds encashed.<sup>16</sup>

Deadlines had been established to ensure that construction happened on time and in turn, the Solar Mission goals could be met. One of the touted advantages of solar PV is the short time it takes to set up a plant – one year compared to four-six for a thermal coal power plant. But if a project is delayed, then this advantage is lost. Kapoor defended the tight schedule stating that without it developers may have dragged their feet.<sup>17</sup> Developers have been given extra time – 13 months instead of 12 – in the second batch of the first phase of JNNSM.<sup>18</sup>

Gujarat has no definition of commissioning in its PPA. A project needs a certificate of commissioning from GEDA to be considered as commissioned.<sup>19</sup>

This aside, it may be worth considering a somewhat longer commissioning time to enable the project to secure financing and to resolve any land dispute in a satisfactory manner.

### Third party control

The JNNSM's power purchase agreement article 4.8 ('Third Party Verification') states: “*The third party may carry out checks for testing the CUF of the Power Project.*”<sup>20</sup> As projects feed their power into

the grid which is monitored by the state utility, it may seem superfluous to have third party controls. However, since utilities have to pay an increased tariff for solar electricity it may not be in their interest to check that the projects are producing efficiently as the less power is produced, the lesser the utility has to pay. This has actually been evident in Rajasthan – according to the Rajasthan Renewable Energy Corporation Ltd (RREC), the government of Rajasthan does not care if projects are delayed as this only hurts the developers. An RREC official says, “Once the plant is commissioned, we do not bother to check if it is regularly feeding the grid. It is the company which will lose money because electricity will not be purchased from them.”<sup>21</sup>

A third party, which is not connected to either the state utility, state nodal agency or the project developer, can be assigned to check that plants are living up to the efficiency they have promised. There has so far been no public discussion on who or what this third party would be. This discussion should happen now, before the second phase is implemented as well as for the monitoring of the first phase projects. It must be made very clear that third parties have the right to enter any plant at any time and perform inspection and that they are in no way financially connected to the projects (this will eliminate the conflict of interest and help avoid the ‘CDM’ situation of validators being paid by projects applying for CDM).

### Ceiling on amount that can be sold

Under the JNNSM's power purchase agreement article 4.4 – ‘Right to Contracted Capacity & Energy’<sup>22</sup> – the amount of energy that will be bought from each plant by NVVN is defined as generation of 21 per cent capacity utilisation factor (CUF) of the solar PV capacity (CUF is the actual generation of the project divided by the peak capacity of what the project is supposed to be able to produce under perfect conditions<sup>23</sup>). For solar thermal, the CUF has been put at 25 per cent while for ‘advanced technologies’, it will be the average CUF committed by the developer. However, the document does not clarify what it means by “advanced technologies”.

Stating a ‘maximum’ amount of generation that NVVN will buy removes any incentive for developers to increase efficiency beyond that point through installation of equipment such as trackers or thermal storage or by upgrading

## SOLAR TRICK

*A number of solar mission projects are operational only on paper... Ankur Paliwal and Jonas Hamberg report in Down To Earth (March 15, 2012)*

The government has decided to act tough with 14 companies which did not commission their solar power projects in time. NTPC Vidyut Vyapar Nigam Limited (NVVN), the power trading arm of the state-owned National Thermal Power Corporation, penalised them by encashing a part of their bank guarantees. These erring firms are among the 28 that were awarded solar photovoltaic projects under batch 1 of first phase of the Jawaharlal Nehru National Solar Mission (JNNSM). The date of commissioning of these plants was January 9.

Amrit Energy and Greentech Power are among the companies whose guarantees were encashed on February 16 to recover a total of Rs 30 crore (see table). But some project developers have managed to escape penalty by obtaining commissioning certificates from states without completing projects.

Lanco Infratech happens to be the engineering, procurement and construction (EPC) contractor for three of the companies that have been penalized — DDE Renewable Energy, Electromech Maritech and Finehope Allied Energy. A recent investigation by Centre for Science and Environment had shown that Lanco Infratech is in possession of seven projects, including the above three. All these projects are located in Askandra village in Nachna Teshil of Jaisalmer, Rajasthan.

In keeping with JNNSM guidelines, the companies were asked to submit bank guarantees of Rs 9 to Rs 12 crore at the time of signing power purchase agreements on January 9, 2011. It was agreed that if a project developer misses deadline, NVVN would start encashing the bank guarantee in parts over three months, after which the project would be fined Rs 5 lakh per day for another three months. If still incomplete, the project would stand cancelled.

In the present case, NVVN encashed bank guarantees because the 14 companies did not commission the projects in the given time. But many more may have escaped NVVN's notice.

Take the case of seven solar photovoltaic projects of 5 MW each in Askandra village; Lanco is the EPC contractor for all of them. NVVN encashed

the bank guarantee of three of them because they were commissioned a day after the deadline of January 9. The remaining four were commissioned between January 7 and 9, according to Rajasthan Renewable Energy Corporation (RREC). The Rajasthan Discoms Power Procurement Centre (RDPPC), the nodal agency for the state discoms, issues a commissioning certificate to a 5 MW plant "only when it is operational to feed the full 5 MW into the grid", says its chief engineer N M Chauhan. Going by RREC and RDPPC claims, all the seven solar projects in Askandra have been commissioned to produce a total of 35 MW.

But a closer look reveals a different picture. When *Down To Earth* (DTE) visited Askandra on February 12, a month after the commissioning deadline, it found that less than half the works seemed complete. It was past the second penalty period, meaning NVVN should have encashed the next part of the bank guarantees. These seven project sites are located cheek by jowl in an area of 49.5 hectares. There were no sign boards to distinguish one site from the other. Solar panels were fully installed and connected only at two sites. In the remaining five sites, they were either being connected to inverters or the inverters were being connected to transformers. Two sites had only metal poles sticking out of the ground. A site engineer said, "a lot of work remains. We are only feeding 10-20 per cent of the commissioned capacity of 35 MW."

Even the grid sub-station to which these seven projects are supposed to be connected is not complete. "Fifty per cent of the work remains," said Dheeraj Singh, engineer at the sub-station.

Vijendra Panchal, Lanco's site head at Askandra, said all the seven plants are operational and are feeding the 33 kv grid sub-station at Ajasar village, 8km away. A visit to Ajasar belied this claim. "No, they are not feeding our grid," said B R Vishnoi, assistant engineer of the Ajasar grid sub-station. DTE found that Lanco is feeding the sub-station at Chandsar village, 3 km from Ajasar. The meter reading taken from the 33 kv Chandsar grid sub-station confirmed how little power these seven sites are generating. "Lanco's seven plants in Askandra have fed only 65,385 kWh power in a month," said Vishnoi who also looks after Chandsar sub-station. This is only 1.3 per cent of the promised output, and just enough for 210 households. If the plants were

functioning at full capacity they can meet the needs of 15,800 households. What's more, Lanco has taken 4,042 kWh from the grid station to power its site at night.

Then how is it that these seven plants obtained commissioning certificates? "Do not ask about commissioning. It is complicated. Besides, it is the job of RDPPC," said Anil Patni, project manager with RREC. "Once the plant is commissioned, we do not bother to check if they are regularly feeding the grid. It is the company which will lose money because electricity will not be purchased from them," said Patni. This attitude defeats the purpose of the ambitious solar mission. JNSSM aims to generate 20,000 MW by 2020.

There are around 20 projects under batch 1 of JNSSM in Rajasthan; 17 were commissioned by February 10. A visit to four more 5 MW commissioned solar plants in Phalodi tehsil in Jodhpur in Rajasthan and their readings noted from the Bap village grid sub-station showed they are transmitting sufficient power into the grid. For example, Mahindra Solar and Punj Lloyd were transmitting up to 30,000 and 23,000 kwh respectively a day.

So, while NVVN may have encashed bank

guarantees of three of the seven projects in Askandra, the remaining four seem to have escaped because on paper they were commissioned before the deadline. "We encashed bank guarantees from the 14 firms because they were either not commissioned or were commissioned after the deadline. And for this data we depend on the state governments. We do not have mandate to go and check the sites," says A K Maggu, general manager with NVVN. But it clearly is a matter of investigation, he adds.

#### **Ambiguity in interpretation**

According to Tarun Kapoor, joint secretary, MNRE, such things happen because the word commissioning seems to be interpreted differently by the Centre and states. According to NVVN, a project is considered commissioned when the full 5-MW capacity is installed and is feeding the grid.

"The Rajasthan government has now written to us that many of their plants are partly commissioned," says Kapoor. "For MNRE, these projects are not commissioned. We are investigating the matter and if found guilty, bank guarantees will be encashed from them. We will soon release a clarification defining the word commissioning," he adds.

**Table: 14 solar firms that were penalized**

<b>Bidder's name</b>	<b>Location of plant</b>	<b>Penalty (in Rs)</b>
DDE Revenable Energy Pvt Ltd	Rajasthan	24,263,000
Electromech Maritech Pvt Ltd	Rajasthan	24,013,000
Finehope Allied Energy Pvt Ltd	Rajasthan	23,763,000
Karnataka Power Corporation Limited	Rajasthan	23,563,000
Greentech Power Pvt Ltd	Rajasthan	23,513,000
Alex Spectrum Radiation Pvt Ltd	Rajasthan	19,563,000
Indian Oil Corporation	Rajasthan	19,313,000
Amrit Energy Pvt Ltd	Rajasthan	18,263,000
Precision Technik Pvt Ltd	Rajasthan	18,213,000
Camelot Enterprises Pvt Ltd	Maharashtra	27,263,000
Rithwik Projects Pvt Ltd	Andhra Pradesh	22,163,000
Electrical Manufacturing Co Ltd	Uttar Pradesh	19,563,000
CCCL Infrastructure Ltd	Tamil Nadu	18,513,000
Aftab Solar Pvt Ltd	Odisha	18,413,000

**Source:** NTPC Vidyut Vyapar Nigam (NVVN)



One of the touted advantages of solar PV is the short time it takes to set up a plant – one year compared to four-six for a thermal coal power plant

panels to (for example) the more efficient mono-crystalline ones. Although the risk of heightened costs because of removal of this clause would be minimal (as few PV projects reach

a CUF of 21 per cent while solar thermal projects hardly reach more than 40 per cent), it may help open up the market for R&D and innovation by developers.