Chapter - III

Solar Power

1. Introduction

India is endowed with vast solar energy potential. About 5,000 trillion kilo Watt hour (kWh) per year energy is incident over India's land area with most parts receiving 4-7 kWh per square meter per day. Hence both technology routes for conversion of solar radiation into heat and electricity, namely, solar thermal and solar photovoltaic, can effectively be harnessed, providing huge scalability for solar energy in India. Solar energy also provides the ability to generate power on a distributed basis and enables rapid capacity addition with short lead times. From an energy security perspective, solar is the most secure of all sources, since it is abundantly available.

1.1. Solar resource assessment

MNRE sanctioned (2010), to National Institute of Wind Energy[1] (NIWE) a mission mode project for setting up a network of Solar Radiation Resource Assessment (SRRA) stations all over the country to overcome the deficiencies in the availability of investor grade ground measured solar radiation data. This data was crucial for planning and implementation of solar power projects. NIWE had done an assessment of the solar potential of India and also prepared a solar atlas of the country.

2. Potential, target and achievements

The targets fixed by MNRE and achievements there against during 11th FYP (Five Year Plan) Period (2007-12) and 12th FYP period (upto 2014) are given in Table 6. **Annexure VII** contains State wise details of potential, targets and achievements.

Table 6: Targets and achievement under 11th and 12th FYP

S.No.	Year	Target (in MW)	Achievement (in MW)	Excess(+)/ Shortfall(-) (in *per cent*)
11th Five Year Plan Period (2007-12)				
1	2007-08	Nil	Nil	Nil
2	2008-09	14	Nil	-100
3	2009-10	2	8	+300
4	2010-11	200	27	-87
5	2011-12	200	905	+353
	Total	416	940	
12th Five Year Plan Period (upto 2014)				
6	2012-13	800	754	-6
7	2013-14	1,100	962	-13
	Total	1,900	1,716	
	Grand Total	**2,316**	**2,656**[2]	

Source: MNRE.

[1] Formerly Centre for Wind Energy Technology (C-WET), Chennai.

[2] While the target and achievement in the table above are reflected year wise, the **Annexure VII** contains these figures State wise.

Based on the analysis of data in Table 6 and examination, the following observations are made:

i. At the commencement of the 11th FYP period, the grid interactive solar power installed capacity in the county was `Nil'. During the 11th FYP the target of solar power capacity addition was set at 416 MW which was 0.06 *per cent* of the total potential of the country. Against a target of 416 MW the achievement in solar power capacity addition was 940 MW. MNRE set the target of 1,900 MW for the first two years (2012-14) of the 12th FYP and achieved 1,716 MW up to 31 March 2014.

ii. MNRE did not provide any record based on which these targets were set and State wise breakup of the targets. As can be seen from Table 6 and **Annexure VII**, the consolidated year wise targets set by MNRE for 2007-14 (2,316 MW) did not match with the aggregated targets set State wise for the same period (4,409 MW). Similarly, the achievements as reported by SNAs for the period 2007-14 was 2,412.56 MW as against 2,656 MW reported by MNRE based on year wise aggregate and 2,631.14 MW on State wise aggregate. Thus, there was inconsistency in respect of the data maintained by MNRE and SNAs.

iii. Based on the analysis of State wise details given in **Annexure VII**, it was observed that:

a) As against an estimated potential of 7,48,990 MW, in 29 States and Union Territories, the installed capacity was only 2,631.14 MW[3] (0.35 *per cent*).

b) Only 18 States had installed grid connected solar power but it was a very small *per cent* (0.09 to 2.56 *per cent*), of the estimated potential of the State.

c) Seventeen States had not fixed any targets during the period 2007-14. In the seven States that had fixed targets, there was shortfall in achievement of the targets in each of them.

d) Based on the solar potential assessed in all the State/UTs listed in the annexure, Audit identified that ten States listed in Table 7 accounted for 78 *per cent* of the solar potential of the country.

[3] As per MNRE and 2,412.56 MW as per SNAs.

Table 7: Estimated potential and installed capacity (Grid connected) for the States endowed with 78 *per cent* of country's solar energy potential.

(in MW)

S.No.	State	Estimated potential[4]	Installed capacity	Percent installed
High[5] potential States with 59 *per cent* of the estimated National solar energy potential				
1	Rajasthan	1,42,310	730.10	0.51
2	Jammu & Kashmir	1,11,050	Nil	Nil
3	Maharashtra	64,320	249.25	0.39
4	Madhya Pradesh	61,660	347.17	0.56
5	Andhra Pradesh	58,850	131.84	0.22
	Total	**4,38,190**	**1,458.36**	**0.33**
Medium[6] potential States with 19 *per cent* of the estimated National solar energy potential				
6	Gujarat	35,770	916.40	2.56
7	Himachal Pradesh	33,840	Nil	Nil
8	Odisha	25,780	30.50	0.12
9	Karnataka	24,700	31.00	0.13
10	Uttar Pradesh	22,830	21.08	0.09
	Total	**1,42,920**	**998.98**	**0.70**

Source: MNRE.

The installed capacity in these ten States varied from zero to 2.56 *per cent* of their potential. Gujarat had the highest exploitation of solar energy potential at 2.56 *per cent* followed by Madhya Pradesh. Jammu & Kashmir and Himachal Pradesh had not exploited the potential at all. Gujarat and Rajasthan alone had created more than 50 *per cent* of the total capacity installed in the country.

Thus, unless MNRE and the State Governments of these ten States prioritise exploitation and development of solar power, the impact of the progress made in the sector will remain insignificant.

MNRE accepted the audit observation.

3. Programmes of MNRE for promotion of Solar Power

Between January 2008 and February 2010, MNRE introduced three programmes for promoting generation of electricity from solar energy. These are discussed below:

3.1. Demonstration programme

Under MNRE's Demonstration programme (approved in January 2008), Generation Based Incentive (GBI) of ₹ 12 per kWh for the electricity fed into the grid by Solar Photovoltaic (SPV) power projects[7] was promised. The project had to be commissioned by 31 March 2010, which was subsequently extended up to 31 March 2012. The incentive was available

[4] As per NIWE.
[5] States with estimated potential higher than 50,000 MW.
[6] States with estimated potential between 20,000 MW and 50,000 MW.
[7] With total installed capacity ≥ 1 MW and ≤ 25 MW.

for a maximum duration of 10 years for approved projects. The programme lapsed at the end of 11th FYP.

Seven projects of 20 MW capacity were commissioned during the period September 2009 to March 2012 under this programme.

3.2. Jawaharlal Nehru National Solar Mission (JNNSM)

JNNSM was launched in January 2010 with the aim to deploy 20,000 MW of grid connected solar plants and 2,000 MW of off-grid solar applications by 2022.

During Phase I (upto 2012-13) of the Mission, the target was to set up 1,100 MW grid connected solar plants which included 1,000 MW of large grid solar plants connected to 33 kV and above grid line, and 100 MW of rooftop and small solar power plants connected to grids below 33 kV, to be completed by March 2013.

3.2.1. 1,000 MW capacity from Grid connected Solar Power Plants-JNNSM Phase I

NTPC Vidyut Vyapar Nigam Limited (NVVN) was the nodal agency to purchase 1,000 MW of solar power from the RE project developers, bundle it with the unallocated power made available from the NTPC coal-based stations and sell this "bundled" power to the Distribution Utilities. It was decided to select projects of 1,000 MW capacities based on solar thermal and SPV technologies. The capacity to be installed was equally divided (i.e. 500 MW) between the two technologies. The selection of Solar Thermal projects for 500 MW was completed in FY 2010-11. The selection of SPV grid power projects of 500 MW capacity was done in two batches over two financial years i.e., 2010-2011 and 2011-2012. The projects were selected on reverse bidding[8] basis.

3.2.2. 100 MW capacity from Roof top PV and Small Solar Power Plants

MNRE announced (June 2010) guidelines for Rooftop PV and Small Solar Power Generation Plants (RPSSGP) connected to distribution network below 33 kV. This component of JNNSM was designed essentially as a State driven scheme to encourage the States to declare their solar policy for grid connected projects focusing on distribution network and to strengthen the tail end of the grid. Another purpose of the scheme was to encourage as many States as possible to set up small solar grid connected projects. The RPSSGP projects were selected on *first-come-first* serve basis by IREDA.

3.3. Migration scheme

Migration scheme was launched (February 2010) to facilitate quick start-up of the JNNSM. Under the scheme 16 projects of 84 MW capacities[9] were approved to be commissioned by end of October 2011. Of the 16 approved projects, 11 SPV Projects of 48 MW capacity and one solar thermal project of 2.5 MW capacity had been commissioned by February 2012 and February 2013, respectively.

[8] Developers quoting the lowest tariff rate are selected.
[9] 13 projects of 54 MW of SPV and three projects of 30 MW for solar thermal

The detail of projects sanctioned and commissioned under these schemes is given at Table 8.

Table 8: Scheme wise details of projects sanctioned and commissioned as of April 2014.

Scheme	Type of project	No of projects (capacity in MW) sanctioned	No of projects (capacity in MW) commissioned
Demonstration	SPV	6 (18)	6 (18)
JNNSM Batch- I	SPV	30 (150)	28 (140)
	ST	7 (470)	1 (50)
JNNSM Batch-II	SPV	28 (350)	26 (330)
RPSSGP-SPV	SPV	78 (98)	71 (90.80)
Migration	SPV	13 (54)	11 (48)
	ST	3 (30)	1 (2.50)
Total		**165 (1,170)**	**144 (679.30)**

Note: SPV – Solar Photovoltaic and ST – Solar Thermal.

3.4. Anomalies in design of the schemes

Multiple schemes to develop Solar Power offering assured Generation Based Incentive[10] (GBI) were introduced between 2008 and 2010 as discussed below. The period of these schemes overlapped. The salient features of incentives offered under each scheme are given in Table 9.

Table 9: Comparison of features and incentives offered by the various schemes.

Year	Scheme	Incentive/ Tariff	Government liabilities
January 2008 to March 2012	Demonstration Programme	Maximum GBI of ₹ 12 per kWh for 10 years to be paid through IREDA.	Liability of ₹ 388.55 crore over 10 years.
January 2010 to March/ May 2013	JNNSM Phase I Batch I	Lowest tariff of ₹ 10.85 per kWh for SPV and ₹ 10.49 per kWh for ST as per reverse bidding.	Projects under JNNSM were selected on reverse bidding process by NVVN. Hence, there was no tariff liability on GoI. Tariff assured under Migration scheme was also to be borne by NVVN. However, a Payment Security Scheme with a corpus of ₹ 486.05 crore was set up by MNRE for payment to Solar Power Developers in case of default by Discoms[11].
January 2010 to March 2013	JNNSM Phase I Batch II	Lowest tariff of ₹ 7.49 per kWh for SPV as per reverse bidding.	
February 2010 to March 2013	Migration Scheme	CERC tariff of ₹ 17.91 per kWh for SPV and ₹ 15.39 per kWh for ST, to be paid by NVVN for 25 years.	

[10] GBI is an incentive provided by MNRE to support grid RE power projects connected to the distribution grid.
[11] Electricity Distribution Company.

Year	Scheme	Incentive/ Tariff	Government liabilities
June 2010 to March 2013	RPSSGP	Difference between CERC tariff of ₹ 17.91 per kWh and the base rate of ₹ 5.50 per kWh (for FY 2010-11), to be escalated by three *per cent* every year for 25 years.	Liability for Centre of ₹ 3,899 crore and States of ₹ 3,766 crore created over 25 years.

Audit analysed certain inconsistencies in the schemes due to which the developers could derive unwarranted benefits. These are discussed below:

3.4.1. Increase in tariff in the period registering a downward trend in costs

As can be seen from Table 9, MNRE launched (January 2008) Demonstration programme in which maximum GBI of ₹ 12 per kWh was provided for a maximum duration of 10 years to approved projects. RPSSGP launched in January 2010[12] as part of JNNSM, assured tariff of ₹ 17.91 per kWh for 25 years. The Migration Scheme launched in February 2010 assured ₹ 17.91 per kWh for SPV and ₹ 15.39 per kWh for ST for a period of 25 years. Hence, both the assured tariff/GBI as well as the period of commitment increased between 2008-10 in the schemes devised by MNRE.

Audit observed that:

i. The cost of the SPV plant as well as the tariff as determined by CERC had been decreasing as indicated in the Table 10.

Table 10: CERC estimated cost of the SPV plants and the tariff fixed during 2009-14.

Year	CERC estimated cost of SPV plant (₹ crore per MW)	CERC tariff (₹ per kWh)
2009-10	17	
2010-11	16.90	17.91
2011-12	14.42	15.39
2012-13	10.00	10.39
2013-14	8.00	8.75

ii. Between 2010-12, the lower SPV tariff discovered under JNNSM reverse bidding process was ₹ 10.85 per kWh in 2010-11 and ₹ 7.49 per kWh in 2011-12.

iii. Further, it was observed that as per the Solar Power Policy 2009 of the Government of Gujarat the tariff was fixed in a phased manner and in alignment with the decreasing capital cost of the systems. The tariff structure as per this policy is given in Table 11.

[12] Guidelines were issued in June 2010

Table 11: Tariff structure as per Solar Power Policy 2009 of the Government of Gujarat

Date of commissioning	SPV (₹ per kWh)	ST (₹ per kWh)
Prior to January 2010	₹ 13 for first 12 years and ₹ 3 for next 13 years	₹ 10 for first 12 years and ₹ 3 for next 13 years
After January 2010 and before 31 March 2014	₹ 12 for first 12 years and ₹ 3 for next 13 years	₹ 9 for first 12 years and ₹ 3 for next 13 years

Based on these facts it can be seen that:

a) The tariff in Migration and RPSSGP programmes was for long durations of 25 years. While designing the schemes, MNRE had not provided for any flexibility to review the tariff being assured. The schemes committed GoI to liabilities at a high rate for long periods i.e. 25 years without maintaining any provision for revisions in tariff based on changes in costing structures. The schemes were changed for higher tariffs but kept inflexible at a peak tariff rate with no room of downward review.

MNRE stated (April 2015) that CERC tariff was not available at the time of announcement of Demonstration Scheme and in the year 2010-11, CERC had announced a fixed levelised tariff of ₹ 17.91 per kWh for SPV projects and ₹ 15.31 per kWh for ST projects for 25 years and the same was incorporated in the scheme guidelines.

The reply is not tenable as maximum tariff in Demonstration scheme was ₹ 15 per kWh for 10 years and in the subsequent schemes MNRE increased it to ₹ 17.91 per kWh for 25 years. Further, CERC tariff undergoes frequent revisions to adjust it to the changes in cost as was reflected in the subsequent tariff notifications; whereas, the MNRE schemes committed to inflexible tariffs for a long term i.e. 25 years.

b) The details provided by NVVN disclosed that the Power Purchase Agreements (PPAs) were entered into between the developers and Discoms in advance[13], and the projects were not commissioned as per the scheduled commissioning period. Thus, due to delay in commissioning, the developers could take the benefit of the reduction in capital cost of the plant. Therefore, the tariff should have been fixed on the basis on the tariff of the year in which the project was commissioned instead of the year of signing of the PPA.

MNRE stated in April 2015 that the fixation of tariff based on the year of signing of PPA was a policy decision. It further stated that if MNRE would have fixed the tariff based on year of commissioning, and tariffs could have increased, MNRE would have had to bear increased liability. Reply of MNRE was not tenable because it did not foresee the market trend of decrease in capital cost, which apparently was anticipated by the Gujarat Government in 2009.

[13] JNNSM and Migration schemes.

3.4.2. Case study of M/s Azure power (Punjab) Private Ltd

Audit noted that M/s Azure Power (Punjab) Private Limited (Developer) executed PPA with Punjab State Electricity Board (PSEB) on 27 May 2009 under the New and Renewable Sources of Energy (NRSE) Policy of Punjab 2006. The Developer there after first shifted to Demonstration scheme and later shifted to the Migration scheme of MNRE. The chronology of events is given in Table 12.

Table 12: Chronology of events for M/s Azure Power (Punjab) Private Limited.

Year	Event
March 2008 to March 2009	Bid under NRSE policy 2006 of Punjab for two MW; Allotment of project via tender; Signing of MoU; Preparation of DPR and its submission; Registration of land lease and Implementation agreement signed.
15 April 2009	Targeted date for commencement of project construction.
May 2009	Signing of PPA with PSEB at Tariff of ₹ 7.71 per unit for 2008-09 with annual escalation of five *per cent* up to 2011-12 for 30 years.
October 2009	MNRE approved transfer of project to Demonstration Programme at the Tariff of ₹ 8.50 per unit with GBI of ₹ 1.14 per unit for 10 years. Targeted date of commercial generation was 15 October 2009.
December 2009	One MW plant commissioned. MNRE approved transfer of partially commissioned one MW under Demonstration Scheme at a tariff of ₹ 15 per unit with GBI of ₹ 6.90 per unit for 2009-10 and ₹ 6.50 per unit for 2010-11. GBI of ₹ 76.57 lakh was paid between December 2009 to September 2010. Thereafter no GBI was paid by MNRE.
October 2011	MNRE approved transfer of the entire two MW project to Migration Scheme at the tariff of ₹ 17.91 per unit. Payment to be made through NVVN.
November 2011	Remaining one MW plant commissioned.

MNRE frequently kept changing its schemes and did not allow the schemes to mature. As can be seen from the case of M/s Azure Power (Punjab) Private Ltd, this resulted in the developer migrating to more profitable schemes. MNRE allowed the Developer to benefit by allowing it to change from State scheme to Demonstration Scheme and further to more profitable Migration Scheme.

MNRE stated (May 2015) that on meeting the eligibility criteria for selection, M/s Azure Power (Punjab) Pvt. Ltd, had been selected as one of the Solar Power Developers (SPDs) under the Migration Scheme of JNNSM Phase-I for their then upcoming two MW capacity SPV Power Project. NVVN signed PPA with them on 15 October 2010. As Migration Guidelines do not have any room for partial commissioning of the solar power project, no such provisions had therefore been made in the PPA signed with the qualified Project Developers under the scheme. It further stated that the earlier PPA with PSEB under NRSE Policy 2006 was for 30 years duration while, with NVVN PPA was entered for 25 years duration from date of commercial operations. Thus, the total duration of supply envisaged,

including period prior to NVVN PPA become operational, was less than 30 years (as envisaged under PPA with PSEB).

The reply may be viewed in the light of the fact that the project was submitted through the bidding process of NRSE Policy 2006 of Punjab and the tender of PEDA was independent of MNRE programme and the decided tariff was ₹ 7.71 per kWh (for the year 2008-09) with five *per cent* annual escalation upto 2011-12 for the period of 30 years. Further, while shifting the project to demonstration scheme, MNRE approved the GBI @ ₹ 1.14 and tariff of ₹ 8.50 and the Developer partially commissioned one MW capacity in December 2009. Also, there was no room for partial commissioning of the solar power project in the Migration Scheme and the project was allowed in a phased manner. Moreover, MNRE had no reason for considering the project for Demonstration Scheme as the Developer had already signed the PPA under NRSE policy of Punjab 2006. Therefore, MNRE permitted frequent changes in the scheme opted to the benefit of the Developers.

3.5. Policies of the States for the promotion of solar power

While the overarching policy and incentives offered by the Government of India to promote solar energy across the States remained common, the comparative and varied development of solar energy in these States was dependent on factors such as State policies, evacuation infrastructure, tariff fixed by the SERC, Plant Load Factor (PLF) generated, enforcement of RPO/ REC and overall commitment of the State Governments to development of Solar RE resources.

The performance analysis of West Bengal is presented below as a Case Study to illustrate that lack of commitment to policy and lax implementation environment in States could lead to poor performance.

Case Study I
Poor implementation of Solar Power programme in West Bengal

West Bengal Green Energy Development Corporation Ltd. (WBGEDCL) approved (September 2009) a work plan to install RE projects of 400 MW, Green Building of five MW, roof top SPV plants of 10 MW and develop evacuation infrastructure of 400 MW, to be achieved by 2015. It involved a total investment of ₹ 4,225 crore.

Government of West Bengal developed (April 2010) a State Action Plan for Climate Change (SAPCC) which identified a solar potential of 16,000 MW.

Subsequently, in June 2012, Government of West Bengal declared its RE policy. In the Policy, estimated potential of each RE sources, except Solar, was mentioned. Regarding solar potential it was stated that the same was under preparation. Significantly, the potential assessed under the SAPCC was not considered in the RE Policy declared in June 2012 and as per assessment made by NIWE (in 2011), the estimated solar potential of West Bengal was 6,260 MW. The RE Policy set out targets for creation of capacity of 100 MW and 500 MW to be achieved by 2017 and 2022, respectively.

During 2007-14, against target of 100 MW solar power, the State could install capacity of two MW only which was 0.03 *per cent* of installed capacity in the State, a negligible achievement.

As per RE Policy, WBGEDCL was to identify Government waste land and the land so identified was to be transferred to WBGEDCL which in turn would be leased to the developers. For projects on private land the developer was to arrange the entire required quantum of land through direct purchase. Audit noticed the following deficiencies in planning and implementation of solar projects in West Bengal:

i) Details of sites identified for setting of RE based projects were not kept in public domain in order to facilitate the developers in assessing the information.

ii) Land could not be acquired by seven developers for setting up 32.5 MW solar projects.

iii) In Bankura district, WBGEDCL identified (September 2012) Government waste land (178 acres) in Mejia block. Department of Power and Non-Conventional Energy Resources (DPNES), WBGEDCL was to carry out the feasibility of grid connectivity and submit proposal on these wastelands. The report was not prepared even after lapse of more than two years.

iv) Audit observed that, since June 2012, WREDA received 11 proposals for solar projects but none were cleared till date (September 2014).

Thus, due to lack of commitment to policy and to business plan, only two MW of the Solar RE capacity could be installed in West Bengal.

4. Audit observations on implementation of schemes for promotion of Solar Power

4.1. Implementation of Demonstration Programme by Indian Renewable Energy Development Agency (IREDA)

4.1.1. Ineligible payment of GBI to Reliance Industries Ltd.

Rajasthan Renewable Energy Corporation Ltd (RRECL) in June 2008 approved a five MW Grid Interactive Solar PV Power Generation Project of Reliance Industries Ltd. (RIL) at District Nagaur, Rajasthan under the Demonstration Scheme. MNRE accorded approval for allowing GBI to RIL through IREDA. As per the terms and conditions of the programme, project developers would not avail Accelerated Depreciation (AD) benefit as per the Income Tax Act 1961. In case of any violation of the conditions, IREDA was to immediately stop releasing the GBI to the project and refer the matter to the Ministry.

The project was commissioned in July, 2010 and a MoU was signed between IREDA and RIL in April, 2011. MNRE directed (June 2013) IREDA to obtain confirmation from all the project developers that Accelerated Depreciation benefit was not availed at their end. MNRE again (August 2013) directed that IREDA should ensure that only 7.69 *per cent* depreciation is

claimed by the project developer in their income tax returns. IREDA observed (July 2013) that RIL was claiming depreciation at a higher rate i.e. 15 *per cent* instead of 7.69 *per cent* in its income tax returns.

Audit observed that RIL had violated the above condition by availing Accelerated Depreciation rendering the project ineligible for claiming GBI under this scheme. In violation of the programme conditions, IREDA disbursed GBI of ₹ 22.49 crore from August 2010 to December 2012 to RIL. IREDA on the request of RIL informed MNRE (November 2013) that the developer had given an undertaking (October 2013) that the claim for rate of depreciation would be revised from 15 *per cent* to 7.69 *per cent* in its income tax returns on or before 31 March 2014 for Assessment year 2011-12 and 2012-13 and requested to consider releasing further payment of ₹ 7.79 crore upto September 2013. MNRE did not respond to the request of RIL and claims of ₹ 18.79 crore (January 2013 to December 2014) were pending.

While confirming the facts, IREDA stated (May 2015) that the request of RIL was forwarded to MNRE in November 2013**.** However, approval of MNRE was not received to this effect and resultantly no GBI had been released. It further stated that in the Demonstration Programme, there was no prescribed rate of depreciation to be claimed by the project developer.

The reply of the IREDA was not tenable as the specified terms and conditions appended with MoU, *inter alia* states that SPV power project developers would not avail Accelerated Depreciation benefit under Section 32 of the Income Tax Act 1961. This fact had not been ensured by MNRE/IREDA before releasing GBI claims which resulted in passing of undue benefit to RIL. The reply of IREDA was also silent about the revision of Income Tax Returns by RIL. Pending the resolution of this issue, the possibility of recovering the GBI of ₹ 22.49 crore paid irregularly remains in abeyance.

MNRE confirmed (July 2015) IREDA's reply and stated that the request of RIL for releasing further payment was not considered due to non compliance by RIL.

4.1.2. Excess recovery of service charges by IREDA

The terms and conditions of GBI-Demonstration Solar scheme stipulated that a maximum of one *per cent* of the total funds released by IREDA in a year to project developers as GBI, would be allowed as administrative charges for implementation of the program subject to a maximum of ₹ 5 lakh per project per year. This also needed reconciliation while making future releases.

It was however observed that IREDA deducted one *per cent* of each disbursement of GBI even beyond the limit of ₹ 5 lakh per annum per project in case of three projects to the extent of ₹27.39 lakh. The details of year-wise project wise service charges deducted by IREDA are given in **Annexure VIII**.

During the meeting (December 2013) between MNRE and IREDA it was decided that in cases where IREDA had claimed administrative charges more than ₹ 5 lakh per project per year of operation in the past, requisite adjustments were to be made from the future releases. Out of excess service charges amounting to ₹ 27.39 lakh in respect of three projects during the

period from 2011-12 to 2013-14, ₹ 18.28 lakh remained unadjusted by IREDA (September 2014).

MNRE stated (July 2015) that the amount of excess service charge claimed by IREDA has now been reconciled and adjusted in respect of two developers, the excess charges claimed against M/s RIL could not be adjusted. The reply of MNRE is not tenable as the whole amount could have been adjusted while releasing the claims to IREDA.

4.2. Implementation of RPSSGP by IREDA

JNNSM RPSSGP was announced in June 2010. During the period 2007-14, 78 projects were registered by IREDA in its capacity as programme administrator of the scheme. Of the 78 projects, six were dropped after registration due to non-commissioning of the projects on time and one case was kept in abeyance as the case is under investigation by Central Bureau of Investigation (CBI). Of the 71 projects implemented, in three projects GBI was not released due to non-furnishing of complete documents and in one case document were not furnished for claiming GBI till date (September 2014) by the project proponent. Thus, GBI under the scheme had been released to 67 projects. Out of 71 projects, Audit examined 17 projects. The detailed audit findings are given below:

4.2.1. Delay in passing the GBI claims

The RPSSGP guidelines state that if there was shortage of funds, the program administrator would arrange a standby facility to release the funds on time. However, it was observed that IREDA did not avail the facility of alternative funds from commercial banks to ensure timely release of funds to developers.

In four out of 17 selected projects it was observed that IREDA had not released GBI claims within the specified period of 15 days and had passed the claims with a delay ranging between 68 to 405[14] days.

MNRE stated (July 2015) that delay in release of GBI was due to delay in receipt of claim documents/ clarifications from utilities. The reply is not tenable as IREDA was not processing the claims on monthly basis as envisaged in the Scheme but it processed the claims as and when the funds were received from MNRE.

4.2.2. Pendency of claims under RPSSGP scheme

MNRE started releasing funds for GBI in instalments[15] to IREDA. Audit observed that GBI claims (March 2014) amounting to ₹ 84.50 crore were lying pending for payment due to non receipt of funds from MNRE. Further claims of ₹ 24.78 crore were yet to be processed by IREDA.

MNRE stated (July 2015) that the claims were to be processed by IREDA upon receipt of complete documents as per the scheme guidelines. The reply is not tenable because MNRE/IREDA should ensure that the claims are passed in time.

[14] M/s PCS Premier (405 days delay), M/s Saimeg Infrastructure Pvt. Ltd (383 days delay), M/s RV Akash Ganga Infrastructure Ltd (324 days delay) and M/s Soma Enterprises Ltd (68 days delay).

[15] It released ₹ 15 crore (March 2011), ₹ 40 crore (August 2012) and ₹ 100 crore (July 2013).

4.3. Net metering

Net metering was important to make the RPSSGP scheme successful. The advantage of net metering was that payment had to be made only for the difference between the power supplied by the utility and the power produced by the solar panels and there was no need to store the surplus energy in batteries for later use. It would also allow consumers to directly contribute to enhancing the RE capacity of the country.

Audit observed that while Regulatory framework for electricity generation was a State subject, MNRE could have issued guidelines for reference by the States, as an enabling environment for solar technology penetration in the country at a decentralized level. As of May 2015, 19 States/UTs[16] had formulated a net metering policy. In the absence of recommended guidelines, different States had adopted different models in implementing net metering. Audit findings in this regard are given below:

Andhra Pradesh

The State Government introduced net metering in the State in March 2013. But the issues not addressed in the policy were:

- Difference between higher cost of solar generation and applicable retail tariff.
- Provision for restrictive capacity on overall/local grid penetration to address technical, safety and security issues arising out of possible reverse flow of electricity in local grids as the current distribution system was not geared to accommodate reverse power flows in the distribution network.
- Energy accounting and commercial settlements as per the time of day tariff regimes.

Chhattisgarh

In the State, a total 4,640 Solar Power Plants (SPPs) in residences, commercial establishments, hostels, Community Health Centre/Primary Health Centre etc (off- grid and decentralized) were installed, with capacity ranging from one kW to 1,000 kW. The total generation capacity was about 21,238 kW. However, no SPP was connected to grid for export of surplus power to Distribution Companies (Discoms). As per CERC regulation, the above SPPs were also eligible for net-metering. Chhattisgarh Renewable Energy Development Agency (CREDA) stated that list of all the SPPs having capacity of more than 50 kW had been provided to Chhattisgarh State Power Distribution Company Limited (CSPDCL) and the grid connectivity was to be done by them.

[16] Andhra Pradesh, Andaman & Nicobar Islands, Chandigarh, Chhattisgarh, Dadra & Nagar Haveli, Daman & Diu, Delhi, Goa, Haryana, Karnataka, Kerala, Lakshadweep, Odisha, Pondicherry, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal.

Karnataka

The Government of Karnataka approved (January 2013) Solar Roof Top Yojana[17] with subsidy of 20 *per cent* in addition to MNRE subsidy of 30 *per cent*. It was proposed to install solar power packs with battery backups at an approximate cost of ₹ 2.70 lakh per kW.

Audit observed that even though it was proposed as grid connected power plant, there was no proposal to introduce net metering concept and the energy generated was to be used for captive consumption. The scheme was not successful as there was poor response from the beneficiaries with only seven applications received.

4.4. Implementation of Migration scheme and JNNSM (excluding RPSSGP) by NVVN

4.4.1. Non encashment of Performance Bank Guarantee

In JNNSM the projects were to be commissioned within 28 months of the date of signing of Power Purchase Agreement (PPA). In case of failure to achieve this milestone, NVVN was to encash the Performance Bank Guarantee (PBG), followed by levying of Liquidated Damages and finally terminating the project.

Audit observed that only one solar thermal plant of 50 MW capacity was commissioned (March 2014) out of seven of 470 MW allotted, but NVVN neither encashed PBG nor levied liquidated damages.

MNRE stated in June 2014 that the projects were permitted to be commissioned by September 2015 with levy of liquidated damages but the project developers filed petition before CERC *inter-alia* seeking extension and restraining NVVN from encashing PBGs and CERC (March 2014) directed NVVN not to encash the PBGs.

4.4.2. Status of land alienated for the Solar projects under Migration and JNNSM

Under JNNSM (Phase I, Batch I), six Solar Thermal (ST) projects having 420 MW capacity had not been commissioned till date (September 2014). Under Migration scheme, two ST project of 20 MW capacity had not been commissioned and one project had been partially commissioned[18] (February 2013).

These non-commissioned/ partially commissioned ST projects were located in Andhra Pradesh (one), Gujarat (one) and Rajasthan (six and one partially commissioned).

Audit observed that the land for the un-commissioned Gujarat project had been directly acquired by the developer (May 2011). In case of Andhra Pradesh project, the land was partially acquired by the developer (April/June2011) and the land to be provided by the State Government was still in the acquisition process.

[17] A scheme for generation of electricity by installing grid connected Solar Photo Voltaic generators on roof top of buildings. It was initially introduced in Bangalore, Mysore, Hubli and Mangalore.

[18] Against the envisaged 10 MW capacity only 2.5 MW had been installed in May 2011.

In Rajasthan, the State policy gave preferential treatment in allotment of land to these developers as this land was being allocated for public purpose. The preferential treatment included allocating Government land at rates lower than the Collector rate and changing the land use status. The records revealed that in Rajasthan, in four[19] ST projects sanctioned under JNNSM (January 2011) and two[20] ST projects sanctioned under Migration scheme (October 2010), a total of 3,404 acres of Government land was leased to the solar power developers at the rate of 10 *per cent* of prevailing Collector rate in districts of Jaisalmer and Jodhpur. The land had been leased[21] by Rajasthan Government for 30 years to these developers and ST projects had not been commissioned till February 2015. This indicated that these developers had created substantial land banks under the Rajasthan Government policy which had not been put to intended use.

Audit also observed that in Demonstration programme, Rajasthan Government leased (September 2008) 375 acres of land to M/s Par Solar for five MW SPV plant which was commissioned in March 2012. For commissioning of one MW SPV project, approximately six acres of land was required. Hence, 345 acres of land was leased in excess of requirement.

MNRE stated (April 2015) that the information on the status of the land where the allotted solar power projects have either not come up or were cancelled, was not available with the Ministry.

4.4.3. Irregularities in operation of Solar Payment Security Account (SPSA)

MNRE introduced (June 2011) Payment Security Scheme for grid connected solar power projects under Phase-I of JNNSM with Gross Budgetary Support not exceeding ₹ 486.05 crore to MNRE. The main objective of the scheme was to facilitate creating a Solar Payment Security Account (SPSA) and other necessary mechanisms as a payment risk mitigation strategy in the event of default by State Utilities/Discoms in making payment to the developer.

The salient features of the scheme were as under:

- The State utilities/Discoms were to open Letter of Credit (LC) for six month equivalent amount which would be backed by an escrow account[22].

- As per the available provisions of the PPA, NVVN was to raise a provisional bill against the State Utilities/Discoms on the last day of the month. The due date of payment would be 30 days from date of billing. If payment was not made by the 30th day, NVVN was to notify a default and encash the amount from LC. In addition to encashing LC, NVVN had the right to divert and sell the bundled power in the spot/short term market.

[19] M/s Rajasthan Sun Technique Energy Pvt Ltd, M/s Corporate Ispat Alloys Ltd, M/s Diwakar Solar Projects Pvt Ltd and M/s KVK Energy Ventures Pvt Ltd.
[20] M/s Entegra Ltd and M/s Dalmia Solar Power Ltd.
[21] Date of acquisition of land for two projects under Migration Scheme was February 2010 and for the four projects under JNNSM was between May and July 2011.
[22] It is a temporary account held by a third party during the process of a transaction between two parties.

- In case, the realized amount from the market was lower than the cost of the bundled power, the difference was to be paid from the SPSA provided under the scheme.

MNRE released ₹ 58.32 crore in three tranches to NVVN upto December 2013 and recognized interest earned as accretion of ₹ 2.30 crore (August 2014). NVVN had been utilizing the funds for releasing payments to Solar Power Developers (SPDs) and recouping the same on realization from Discoms. Till August 2014, NVVN had utilized ₹ 47.14 crore of which ₹ 28 crore were recouped and balance ₹ 19.14 crore were utilised towards charging of trading margin[23], leaving ₹ 41.48 crore[24] as unutilized balance available with NVVN.

Audit examination revealed the following in the operation of SPSA:

i. NVVN entered into PPA with SPDs with back to back Power Sale Agreement (PSA) with Discoms in 10 States[25] (October 2010 to May 2012) to sell bundled power. NVVN did not obtain adequate LC as per the terms of PSAs from Discoms. Against the total amount of ₹ 1,102.09 crore LCs to be obtained as per the terms of PSA, NVVN had obtained LCs of only ₹ 221.94 crore as of August 2014.

ii. The Discoms did not open Escrow Accounts in any of the States. Thus shortfalls in LCs obtained and non-opening of Escrow accounts, reduced the security available with NVVN to recover the defaulted amount from Discoms.

iii. NVVN did not explore the option of diverting and selling the bundled power in spot/ short term market before drawing the money from SPSA as per the guidelines. NVVN did not maintain records of negotiations with third parties including prevailing exchange prices during such periods in a format specified by CERC, which was to be verified by MNRE and the Ministry of Power through a standing committee.

iv. NVVN was to utilize its working capital from day one of the billing up to 60 days, to pay the claims raised by SPDs and NTPC Ltd. SPSA was to be used only in the event of non payment of dues by the Discoms within 60 days from the billing date. SPSA was to be used only as a 'fall back' arrangement when other payment security provisions, such as, the availability of working capital, Letter of Credit linked with an Escrow account, had been exhausted. However, in case of Rajasthan Discoms, LC of only ₹ 21.97 crore was provided by Rajasthan Discoms against the requisite LC of ₹ 481.38 crore as per PSA. This amount was only four time monthly revolving in a month (August 2014) instead of the mandated six months to cover the risk of default in payment. When these Discoms disputed the payment of trading margin[26], instead of encashing available LCs, NVVN utilized ₹ 19.14 crore from SPSA towards unrecovered trading margin from Rajasthan Discoms. This utilization of SPSA was in violation of the provisions of the scheme because NVVN could utilize SPSA only after accessing alternate sources of funds including letter of credit linked with Escrow account.

---

[23] Margin earned by the person who has been granted licensee by CERC to undertake inter-State trading in electricity.

[24] (₹ 58.32 crore + ₹ 2.30 crore) – ₹ 47.14 crore + ₹ 28 crore = ₹ 41.48 crore.

[25] Andhra Pradesh, Assam, Chhattisgarh, Karnataka, Maharashtra, Odisha, Punjab, Rajasthan, Uttar Pradesh and West Bengal.

[26] The issue of disputed trading margins is discussed in details at para 4.4.5.

NVVN stated (September 2014) that the Discoms were requested to open Escrow account and Discoms had retained the amount on account of pending issues. MNRE stated (May 2015) that the Discoms had been requested many times to open the Escrow account and LCs with proper amount but they have not done the same because of financial resource crunch and limits not available.

4.4.4. Encashed Bank Guarantee not kept in separate Bank account

As per Migration Scheme the Project Developer was to provide a performance guarantee to NVVN in the form of Bank Guarantee (BG) at the rate of ₹ 50 lakh per MW. This BG was to be encashed by NVVN if the SPV power plants were not commissioned within 12 months and solar thermal in 28 months from the date of signing of PPA. During the course of implementation of the scheme, NVVN encashed total BG of ₹ 147.42 crore[27] from March 2011 to March 2014.

MNRE directed (June 2012) that the money so obtained after encashment of BG be kept separately in maximum interest bearing account. It further directed (December 2012) that NVVN may use the funds as working capital for (i) coverage of litigation charges and (ii) releasing payments to SPDs towards settlement of their claims, with the condition that NVVN will recoup the funds by its receipts from Discoms and the total amount will remain the same (i.e. the amount realized from encashment of BGs).

Out of ₹ 147.42 crore, NVVN utilized ₹ 97.79 crore for non-payment of dues by Discoms under JNNSM scheme and ₹ 1.30 crore for legal expenses.

Audit observed that NVVN did not keep the above money in a separate account as directed by MNRE (June 2012) and it cannot be assured in audit that money was not used as working capital.

NVVN (September 2014) stated that there was no direction from MNRE to open the separate account for this money and that it was keeping its accounting separate from NVVNs business money/revenue. Reply of NVVN was not tenable, as the order of MNRE (June 2012), clearly stated that the money should be kept separately in maximum interest bearing account which had not been done by NVVN.

4.4.5. Non-quantification of trading margin

A trading margin is earned by person/ entity who had been granted license by Central Electricity Regulatory Commission (CERC) to undertake inter-State trading in electricity. CERC (Fixation of Trading Margin) Regulations 2010, stated that, "the licensee shall not charge trading margin exceeding seven paise per kWh in case the sale price exceeded rupees three per kWh and four paise per kWh where the sale price was less than or equal to rupees three per kWh."

MNRE fixed (June 2013) the trading margin of seven paise per kWh on the power sold by NVVN to State Utilities/Discoms from JNNSM Phase-I projects.

[27] ₹ 17.50 crore in six projects under Migration Scheme, ₹ 116.18 crore in 19 project of Batch I, ₹ 2.66 crore in one project of Batch II of JNNSM and LD of ₹ 11.08 crore in three projects.

NVVN signed PSA with three[28] Rajasthan Discoms and with Grid Corporation of Odisha Limited (GRIDCO) in January 2011 for the sale of bundled power. Audit observed that though the CERC's regulations for fixation of trading margin were already notified (January 2010), NVVN did not incorporate the rate of trading margin in PSA signed from October 2010 to May 2012. Instead there was only a provision to charge trading margins in the PSAs, but the rate at which NVVN would charge trading margin was not stipulated in the PSA.

Consequently, Discoms disputed the trading margin of seven paise per kWh fixed by MNRE and charged by NVVN, stating that any subsequent memorandum through which rate of trading margin is unilaterally imposed on the procurer after signing of PSA defeats the very sanctity of PSA. This ambiguity in the PSA resulted in a disputed claim of ₹ 25.07[29] crore.

NVVN (22 September 2014) stated that it was envisaged that the Discoms would pay to NVVN trading margin i.e. CERC cap trading margin as mentioned in the expression of interest against which quotes were received from the Discoms and this matter was being pursued with the Discoms. NVVN's reply was not acceptable as the fact remains that although charging of trading margin was mentioned in expression of interest but the PSA, which was a legal binding document between NVVN and Discoms, it was silent on the rate of trading margin.

NVVN further stated (July 2015) that it had recovered outstanding ₹ 19.14 crore on account of trading margin and other dues from the funds provided under the Payment Security Scheme. However, this recovery made by NVVN was not in line with the terms and conditions of the Payment Security Scheme as discussed in para 4.4.3 (iv).

4.4.6. Non synchronization of supply of thermal power with solar power

NVVN and Discoms executed PSA (January 2011) setting out the terms and conditions for the sale of bundled power[30] up to the agreed contracted capacity. Audit observed instances in which the supply of solar power started from the commissioning of SPV project without simultaneous commencement of supply thermal power from NTPC Ltd. (NTPC) as required under the bundling arrangement. Consequently, the power supplied during initial period was billed at average rate of solar power which was higher than the bundled rate. As the PSA was for bundled power, the Discoms did not accept the claims raised by NVVN at average rate of solar power as detailed below:-

i. **Rajasthan**: In 45 projects delay ranging between 11 days to 160 days was noticed in allocation of NTPC-thermal power resulting in non-supply of bundled power to the Rajasthan Discoms. Consequently, these Discoms did not accept claim of ₹ 26 crore which was still outstanding (March 2014).The details of delay in supply of bundled power in JNNSM is given in the **Annexure IX**.

ii. **Odisha**: The supply of NVVN thermal power started after 84 days of commissioning of SPV project. The power supplied during initial period from 7 February 2012 to 30

[28] Ajmer Vidyut Vitaran Nigam Limited, Jaipur Vidyut Vitaran Nigam Limited and Jodhpur Vidyut Vitaran Nigam Limited.
[29] Rajasthan (₹ 24.77 crore) and Odisha (₹ 0.30 crore).
[30] Solar component + equivalent thermal component from unallocated quota of NTPC.

April 2012 from SPV project commissioned in Odisha was admitted by GRIDCO at ₹ 5.154 per kWh at the bundled energy rate though NVVN raised the bill at average solar power rate of ₹ 12.35 per kWh, resulting in outstanding dues of ₹ 1.11 crore.

Thus, inability to synchronize supply of thermal power with solar power resulted in disputed claim of ₹ 27.11 crore as the same was not in accordance with provisions of PSA.

NVVN (September 2014) stated that the implementation of the allocation and scheduling of NTPC thermal power was done by Regional Power committees /Regional Load Dispatch Centres on submission of commissioning certificates issued by SNAs. The scheduling of power inter-state, co-ordination was to be done by NVVN with the distribution companies.

The simultaneous flow of solar power in the grid with the equivalent thermal power does not happen due to the system procedures requirements carried out by State/Central authorities. In view of above, simultaneous supply of solar power and NTPC Power from beginning for bundling was not contemplated which has been claimed by Rajasthan Discoms and GRIDCO.

NVVN's reply is not acceptable because "bundling" mechanism was devised to lower the average cost of power and such delays and billings are not only in contravention of the PSA but skew the costing structure for NVVN and impose a burden on Discoms.

4.4.7. Non availability of Long Term Access (LTA) to inter-State transmission system

NVVN requested (November 2012) the Ministry of Power for allocation of power from the unallocated power of coal based stations of NTPC for bundling the same with Solar Power in anticipation of commissioning of 295 MW Solar power projects (Phase-I, Batch-II) in Rajasthan by February 2013, under JNNSM.

The Ministry of Power allocated (12 February 2013) equivalent (295 MW) thermal power for bundling with the solar power. Out of 295 MW bundled power, 85 MW was to be supplied within Rajasthan and remaining 210 MW bundled power was to be supplied to other States.

However, since PGCIL did not permit LTA to inter-State transmission system of 210 MW solar power which was allocated to other States. This 210 MW power was reallocated (1 April 2013) to Rajasthan till the receipt of LTA with the prior approval of Rajasthan Discoms Power Procurement Centre (RDPPC) (19 March 2013).

Audit observed that RDPPC withdrew its consent (30 May 2013) for temporary allocation of additional 210 MW power from 1 July 2013, citing the reason that there was reduction in requirement of power in the State. Despite this NVVN continued power supply to Rajasthan till the granting of LTA on 12 August 2013.

However, in view of prior intimation of withdrawal of consent, RDPPC decided to make only partial payments for the above energy supplied for the said period (1 July 2013 to 15 August 2013).

Thus, non-availability of LTA for evacuating solar power outside Rajasthan resulted in disputed claim of ₹ 66 crore. More importantly, this also indicated that there was no proper

coordination between NVVN, Discoms and PGCIL, due to which NVVN could not obtain LTA for evacuation of solar power outside Rajasthan as planned.

NVVN stated (19 September 2014) that the procedure to obtain LTA of 210 MW started on 14 February 2013 and LTA was signed on 8 July 2013. While the inter–state scheduling of solar power was commenced by Regional Load Dispatch Centre (RLDC) from 16 Aug 2013 after persuasion by NVVN, bundled power remained within Rajasthan from 1 July 2013 to 15 Aug 2013.

5. Other Audit findings

Gujarat

5.1. Incorrect tariff fixation – Central Excise and Custom exemptions not considered

The Gujarat Government Solar policy 2009 proposed that the energy generated from a solar power project would be sold to the distribution licensees in the State at a levelised per unit tariff for the period of 25 years. Gujarat Electricity Regulatory Commission (GERC) in exercise of power conferred under Electricity Act 2003 issued tariff order (29 January 2010) for procurement of power by the distribution licensees and others from Solar Power Generators (SPG) for 25 years which determined the levelised tariff[31] of ₹ 12 per kWh and ₹ nine per kWh for SPV and Solar Thermal project, respectively.

MNRE vide office memorandum dated 3 June 2010 issued procedure for issue of the certificate for exemption of Excise Duty, on items manufactured for Solar Thermal and SPV power generation projects. The SERCs were required to factor in these exemptions while determining the tariffs.

Audit observed that 47 developers sought excise duty exemption for an amount of ₹ 83.77 crore and customs duty exemption amounting to ₹ 104.53 crore. Gujarat Energy Development Agency (GEDA) forwarded the information to MNRE but no data regarding exact amount of exemption actually availed by respective developers was maintained and forwarded to Energy and Petrochemicals Department of the Government of Gujarat and/or GERC for working out its impact on the levelised per unit tariff. In absence of receipt of any data on exemption of duties GERC did not factor in the exemptions and fixed the capital cost as ₹ 16.50 crore per MW for SPV and ₹ 13 crore per MW for Solar Thermal which were on the higher side as compared to the levelised tariffs of ₹ 12 per kWh and ₹ nine per kWh for SPV and Solar Thermal project, respectively. Thus Gujarat Urja Vikas Nigam Ltd. (GUVNL) a State Government company engaged in the business of bulk purchase and sale of electricity continued to pay the higher tariff.

The State Government stated (November 2013) that the GERC had set aside (8 August 2013) a petition (1320 of 2013) for revision in solar tariff filed by GUVNL considering determination of appropriate capital cost, actual equity-capital deployed for servicing at 14 *per cent,* but did not mention the duty exemption parameter. The reply was not

[31] The tariff was worked out taking into account the benefit of Accelerated Depreciation under the Income Tax Act, Rules and the then prevailing applicable duties and taxes including Excise and Customs Duty.

acceptable as the non-consideration of exemptions in the capital cost of the project led to passing of undue benefit on to developers and burdens the consumers of the State.

Rajasthan

5.2. Delays in installation of projects

The State Government sanctioned 177 grid connected solar projects for a capacity of 1,379.67 MW of which 140 power plants with capacity of 725.50 MW (52.59 *per cent*) could be installed by March 2014. Audit analysis of the projects under execution disclosed that the projects were held up due to the following reasons:

Type of hindrance	Details of projects
Non-allotment of land	In a case of 150 MW project under Policy 2011 (open access), land could not be allotted to the power producer and consequently the power producer expressed inability to execute the project. Six projects totalling 55 MW approved through Competitive bidding under Policy 2011 could not be commissioned by the stipulated period of March 2014 due to land not being made available or delay in making available the land for the projects (one project of five MW out of the six was commissioned in August 2014).
Financial difficulties	In respect of another 50 MW project, the lead banker for the project requested MNRE to substitute the existing promoter with the new promoters owing to serious liquidity crunch.
Abandoned projects	In respect of two solar thermal projects of 100 MW each, under JNNSM Batch-I (Letter of Intent issued in December 2010), only part of the foundation work had been carried out and no progress was reported (till March 2014).

5.3. Incorrect tariff fixation under GBI scheme by MNRE

In Rajasthan two projects were sanctioned by MNRE under Demonstration programme, details of which are given in Table 13.

Table 13: Details of two projects under Demonstration programme

Particulars	Name of developer	
	M/s Reliance Ind. Ltd.(RIL)	M/s Par Solar
Date of application to RRECL	4-1-2008	27-11-2007
Capacity approved by RRECL	5 MW	5 MW
Schedule completion date	30-11-2008	30-6-2009
Date of approval by MNRE	30-10-2009	9-12-2009
Capacity approved by MNRE	5 MW	3 MW
Date of actual commissioning	31-3-2011	28-3-2012
GBI approved by MNRE	₹ 11.33 per kWh vide letter dated 31-3-2011	₹ 10.76 per kWh vide letter dated 14-8-2012

The MNRE took a period of 13 to 15 months in sanctioning the projects after recommendations by Rajasthan Renewable Energy Corporation Ltd. (RRECL) which ultimately delayed the establishment of projects. This showed that MNRE itself did not adhere to the guidelines of the programme.

As per MNRE guidelines, the amount of GBI was to be determined after deducting the power purchase rate of PPA from the maximum permissible tariff of ₹ 15 per kWh. Maximum permissible GBI was ₹ 12 per kWh for the projects commissioned up to 31 December 2009 and ₹ 11.40 per kWh for projects commissioned after 31 December 2009. Also, the GBI was to be reduced by 5 *per cent* i.e. (₹ 10.76 per kWh), in case the project was commissioned after 31 December 2009.

MNRE granted extension to both the developers (RIL up to 31 March 2011 and M/s Par Solar up to March 2012) but it did not follow identical policy for both the developers as it allowed reduced GBI of ₹ 10.76 per kWh to M/s Par Solar but in case of RIL, the MNRE allowed GBI of ₹ 11.33 per kWh despite the fact that plant was commissioned on 31 March 2011. This resulted in an additional payment of tariff by ₹ 0.57 per kWh to RIL and creating an additional burden of ₹ 4.55[32] crore during the period of 10 years on the Discoms at the net expected power generation of 79.89 lakh units per annum for a five MW plant.

5.4. Non recovery of development charges

Para 13 of the Rajasthan Solar Energy Policy 2011 provided that for Solar power projects established for sale of solar power to parties other than Discoms of Rajasthan, the power producer shall deposit non-refundable development charges of ₹ 10 lakh per MW to RRECL within one month from the date of issue of 'in-principle clearance'. In case of failure, 'in-principle clearance' shall be cancelled without any notice. During the period of finalisation of new Policy-2011, RRECL registered 25 projects of 500 MW capacities under JNNSM guidelines which were approved by NVVN in November 2010 and PPAs were signed on 15 January 2011. NVVN had also confirmed allocation of 225 MW power to Rajasthan and the remaining 275 MW power was to be sold to States other than Rajasthan.

Audit observed that development charges recoverable under the Policy from 25 projects were not recovered. RRECL submitted (October 2011) a proposal for waiver of development charges to the Energy Department, of the State Government stating that these projects were registered under Policy 2004 which did not have any provision for recovery of development charges. The Energy Department agreed with the proposal. The Finance Department, however, stated (June 2012) that it was a case of amendment/relaxation in the Policy and would require approval of the Cabinet which was not obtained. Hence, issue of recovery of the development charges of ₹ 27.50 crore from the power producers remained unresolved.

5.5. Non recovery of processing fee

As per Rajasthan Solar Energy Policy, 2011, with effect from 19 April 2011, the solar power producer was to deposit a non-refundable processing fee of ₹ 50,000 per at the time of application for the project. Amendments (September 2012) to the policy also stipulated that

[32] ₹ 0.57 x 79.89 lakh kWh per annum x 10 years.

any 'Parent', 'Subsidiary' or 'Ultimate Parent Company' may distribute/transfer the project capacity between them for setting up maximum four projects at any time against one application. Thus, the project capacity and processing fee was non-transferable to another project prior to the amendment (September 2012) in the Policy.

Audit observed that in ten[33] cases RRECL transferred the registration of the projects from one company to another without recovery of the processing fees of ₹ 2.98 crore.

5.6. Non forfeiture of security deposit

Clause 12.2 of Rajasthan Solar Energy Policy 2011 required the power producer to deposit security amount of ₹ five lakh per MW by cash and ₹ 20 lakh per MW in the form of bank guarantee within one month from the date of issue of `in-principle' clearance of the project and in case the power producer failed to commission the power plant in scheduled time, including extension granted, the security deposit and bank guarantee were to be forfeited.

Audit observed that in case of M/s VS Lignite the project was not commissioned by scheduled date (8 February 2014) but the bank guarantee and security deposit of ₹ 2.50 crore was not forfeited.

Tamil Nadu

5.7. TANGEDCO denied permission to sign Power Purchase Agreements

As per Section 63 of the Electricity Act 2003, an Appropriate Commission shall adopt the tariff if such tariff has been determined through transparent process of bidding in accordance with the guidelines issued by the Central Government[34].

Government of Tamil Nadu in its Solar Policy 2012 committed to generate 3,000 MW solar power by the year 2015.

TANGEDCO invited (December 2012) bids from developers for establishing solar power plants of one MW or above capacity totalling 1,000 MW in the State through long term PPAs. Based on the offers received, Letters of Intent (LoI) were issued (April-June 2013) to 52 developers for procurement of a combined capacity of 708 MW of solar power at rates upto ₹ 6.48 per unit for 2013-14, subject to escalation as per terms and conditions of the tender.

When TANGEDCO sought Tamil Nadu Electricity Regulatory Commission's (TNERC) permission for signing PPA with the solar developers who were issued LoI, TNERC declined (September 2014) TANGEDCO's request on the ground that in the absence of guidelines issued by the Central Government, the bidding process adopted by TANGEDCO for

[33] M/s Dhanu Solar Power Pvt Limited (₹ 25 lakh), M/s Reliance Green Power Pvt. Ltd (₹ 150 lakh), M/s Kiran Energy Solar Power Ltd (₹ 12.50 lakh), M/s Field Energy Pvt Ltd (₹ 10 lakh), M/s Global Power Infra Ltd (₹ 25 lakh), five cases (M/s North Delhi Power Ltd, M/s Bhanu Solar Projects Pvt. Ltd, M/s KVK Energy Ventures, M/s Chenab Securities and M/s GMR Rajmundry)(₹ 75 lakh).

[34] Ministry of Power within the GoI was to notify/ approve the guidelines for the bidding process.

procurement of solar power had no legal sanctity for consideration under Section 63 of the Electricity Act 2003.

The solar projects which were expected to be commissioned before April 2014 were thus delayed without any reasonable chance of commissioning in the near future.

5.8. Stalling of tender process

In line with the State Solar Policy, the Government also planned (November 2012) for setting up of Solar Power Parks in different locations of the State for generating 1,000 MW of solar power in five years. The first such park (for 100 MW) was being developed in the Ramnad district, with an investment of around ₹ 920 crore through the Tamil Nadu Industrial Development Corporation in association with a private promoter. Expressions of Interest were also received (February 2013) from various developers for a total of 55 MW. Consequent to the stalling of TANGEDCO's tender process, the development of this project became uncertain as of September 2014.

5.9. Deficient scheme for domestic consumers

The Government of Tamil Nadu announced (April 2013) capital incentive of ₹ 20,000 per kW for 10,000 domestic consumers who installed one kWp[35] solar roof tops and generated power. TEDA proposed (May 2013) installation of a battery less Grid Tie Solar Rooftop Photovoltaic (PV) system of one kW capacity and accordingly, the Government issued (October 2013) orders for implementation of the scheme.

Under the scheme, the beneficiaries were entitled to CFA at 30 *per cent* on the cost of the solar plant limited to the bench mark cost of ₹ one lakh fixed by MNRE and in addition, the State Government would also provide a subsidy of ₹ 20,000 per system. The anticipated generation from each plant was 1,600 units per year and the scheme envisaged coverage of 5,000 beneficiaries in the first year. As of June 2014, TEDA received applications from 1,864 beneficiaries but the system had been installed in only 51 houses (including three houses with net metering).

Audit observed that:

i. The scheme was intended only for the domestic Low Tension (LT) consumers and did not cover other LT consumers like Educational Institutions, Hostels and Commercial establishments.

ii. The scheme provided for a battery less grid - tie system, which would generate power only when there was supply of power from the grid and in the absence of such supply from the grid, the solar PV system would not work.

TEDA stated (June 2014) that a system with battery involved additional cost of procurement and maintenance. The reply was not acceptable as the minimum expectation of a common man going in for a supplementary power generation unit in his premises was to mitigate the

[35] Wp - means Watt peak. It is the maximum amount of power a *solar panel* could produce in perfect conditions.

effect of power cuts. This was evident from the fact that against the anticipated target of 5,000 systems, only 51 had been installed till June 2014.

Uttarakhand

5.10. Solar power plants not connected to grid since May 2011

Uttarakhand Renewable Energy Development Agency (UREDA) installed (March 2004) two Rooftop Solar Power plants of capacity of 25 kW each at Secretariat premises, at a cost of ₹1.29 crore with a production capacity up to 150 units per day. The plants were shifted (May 2011) to Energy Park, Dehradun, and were non-functional because of delay in installation of 100 kVA transformer.

6. Conclusion

The installed capacity of grid interactive solar power in the country at the beginning of the 11th Plan period was `Nil'. During the 11th Five Year Plan period and 12th Five Year Plan (upto 2013-14), 2,656 MW of solar power capacity was added in the country, which was 0.35 *per cent* of the country's solar energy potential. In the 24 States test checked in audit, it was observed that 17 of the 24 States did not set any targets for grid connected solar power generation. There was no installed capacity in 10 of these States. The remaining 14 States had a total installed capacity of 2,413 MW which was only 0.36 *per cent* of the total estimated potential of these States. In the ten States endowed with 78 *per cent* of the national solar potential, the exploited potential varied from zero to 2.56 *per cent*. Gujarat and Rajasthan alone created more than 50 *per cent* of the capacity installed in the country but had exploited only 2.56 *per cent* and 0.51 *per cent* of their respective potential.

MNRE introduced three schemes between 2008 and 2010 for promoting the use of solar energy. There was a shortfall in achieving targets under all the schemes except in Demonstration programme. The major shortfall was in achieving targets in setting up Solar Thermal power plants. Against the target of creating 500 MW of Solar Thermal power capacity, plants of 447.50 MW (approximately 90 *per cent*) had not been commissioned (February 2015).

Government land of 3,404 acres leased at preferential rates to the developers for six Solar Thermal projects in Rajasthan had not been put to intended use so far. In Demonstration Programme, in one case, 345 acres of land had been leased in excess of requirement for a Solar Photovoltaic power plant.

The three schemes launched between 2008 and 2010 for promoting grid linked solar power projects came in quick succession and the GBI assured increased from ₹ 12 to ₹ 12.41 per unit, the tariff assured increased from ₹ 15 to ₹ 17.91 per unit and the period of commitment from 10 years to 25 years, under these schemes.

While the MNRE schemes pegged the GBI at ₹ 12 per unit and tariff at ₹ 17.91 per unit, during the period 2011-12, the Central Electricity Regulatory Commission tariffs fell from ₹ 17.91 to ₹ 10.39 per unit and the rates obtained in the reverse bidding under Jawaharlal

Nehru National Solar Mission were ₹ 10.85 and ₹ 7.49 per unit. The programmes also did not have any scope for revision of GBI periodically to reflect changing costs. This also created an opportunity for the Developers to shift from programmes to seek better benefits.

While Regulatory framework for electricity generation was a State subject, MNRE could have issued guidelines for reference by the States, as an enabling environment for solar technology penetration in the country at a decentralized level. In the absence of such guidelines the States adopted different models for net metering.

There were deficiencies in the implementation of MNRE programmes by IREDA such as irregular payment of GBI to developer, delays in passing GBI claims and also delays by MNRE in releasing funds to IREDA resulting in pendency and settlement of GBI claims.

The Solar Payment Security Account introduced to safeguard solar power developers/ NTPC Vidyut Vyapar Nigam Limited from default in payment by distribution companies was not operated as envisaged. Distribution companies did not provide required Letter of Credits, open escrow accounts and opportunity to sell power on spot were not explored prior to accessing the funds.

Under the `bundling' of power arrangements for lowering the average cost of power, supply of thermal power could not be ensured in time, resulting in NTPC Vidyut Vyapar Nigam Limited billing distribution companies at higher rates and leading to disputed claims. Delays in providing Long Term Access to inter-State transmission system also created disputes between distribution company and NTPC Vidyut Vyapar Nigam Limited.

7. Recommendations

- *MNRE should focus on development of solar energy in the States endowed with high solar energy potential.*
- *MNRE, while formulating schemes that commit the Government to long term liability for incentives like Generation Based Incentives, must ensure that these are kept flexible to match changes in tariffs and costing structure to avoid unwarranted burden on public exchequer or developers.*
- *MNRE must formulate guidelines for net metering so as to provide an enabling environment for solar technology penetration in the country at a decentralized level.*
- *MNRE must ensure that the solar projects are completed as per schedule. In case of delays, the Central/ State Governments must review the status of the public resources like land allotted to the solar power developers and take necessary corrective measures.*
- *MNRE, in coordination with other Central Government agencies, should ensure timely arrangement for making available conventional power for bundling and Long Term Access to inter-State transmission system, for smooth operation of the schemes.*