

SOLAR ENERGY INSTALLATION AND TARIFF OPTIONS IN INDIA: CENTRAL VS STATE GOVERNMENT

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Abstract

India has a huge potential of solar energy, which can fulfill the gap of electricity demand and supply of the country. Presently harnessing the solar energy through solar PV technology is more popular than solar thermal technology in India because of easier installation and less maintenance. As solar PV technology is expensive and under developed, it requires special support by the administration body or government through its dedicated policies intending to promote it. Similarly in India also there are various schemes launched by government to promote solar energy installation and these can be divided in two parts under central government and under state government. Each of them has their own targets, policy, action plan and their installations. This paper describes and analyses the progress of both schemes (Central and State government) for solar installation in a comparative manner, and also find the required changes in policy for improvement. This paper also describes various tariff schemes adopted by the government (Central and State) like reverse bidding, FIT etc. and installations under them, again in comparative manner, also shows the best tariff option. Ultimately this paper figures out the loose points of solar policies in India, and suggests the improvement options in the policy side including better tariff scheme.

1. INTRODUCTION

India is solar rich country as of its geographical location. India has a potential of producing 5000 trillion units (kWh)[1] of clean energy. If we talk about the government solar policies in India it can be divided broadly in two types, first is central government solar policy, second is state nodal agency's solar policies under control of their respective state governments. Solar installation development in India started rapidly after launching the Indian NAPCC plan on June 30, 2008. In this there 8 national missions were launched, in which Jawahar Lal Nehru National Solar Mission (JNNSM)[1] also launched in year 2010, to harness India's

solar power. It is a fully central government owned scheme in which certain states were chosen for establishing the solar power plants but funding and all operational mechanism was under control of central government. On the other hand individual state like Gujarat was the first state to start its own solar policy to develop on grid MW scale solar power plants. After that, some other states also came with their state solar policy for adding solar capacity parallelly, which were Karnataka (Feb – 2011) and Rajasthan (April – 2011). The solar installation growth from year 2010 march 2014 is shown in figure 1, which also describes the breakups for various responsible policies.

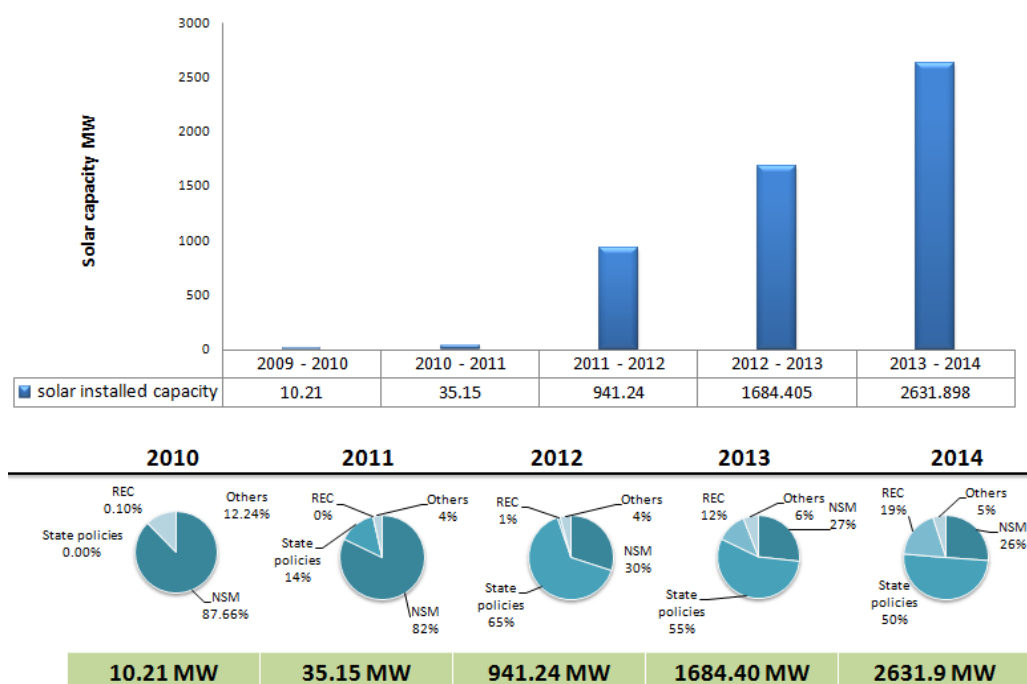


Fig 1: Solar Installation timeline in India (policy wise)

2. PRESENT INSTALLATION

Current scenario of solar installation status on pan India basis is 2631.9 MW[2] by the march 2014. Here we can segregate this installation of solar in four main categories which is Central Level (MNRE), State level (All State renewable agencies), under Renewable purchase obligation (RPO), and under Renewable Energy Certification(REC).

In this the major portion is covered by first two categories which is Central level and state level development i.e. 687.8 MW and 1322.6 MW respectively, and remaining capacity is about 580.6 under RPO and REC Schemes. The other miscellaneous installation of 41 MW has done under programs like private initiative and CPSUs.

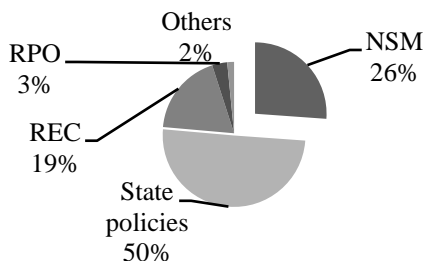


Fig 2: breakup of Installed solar capacity till March 2014[2]

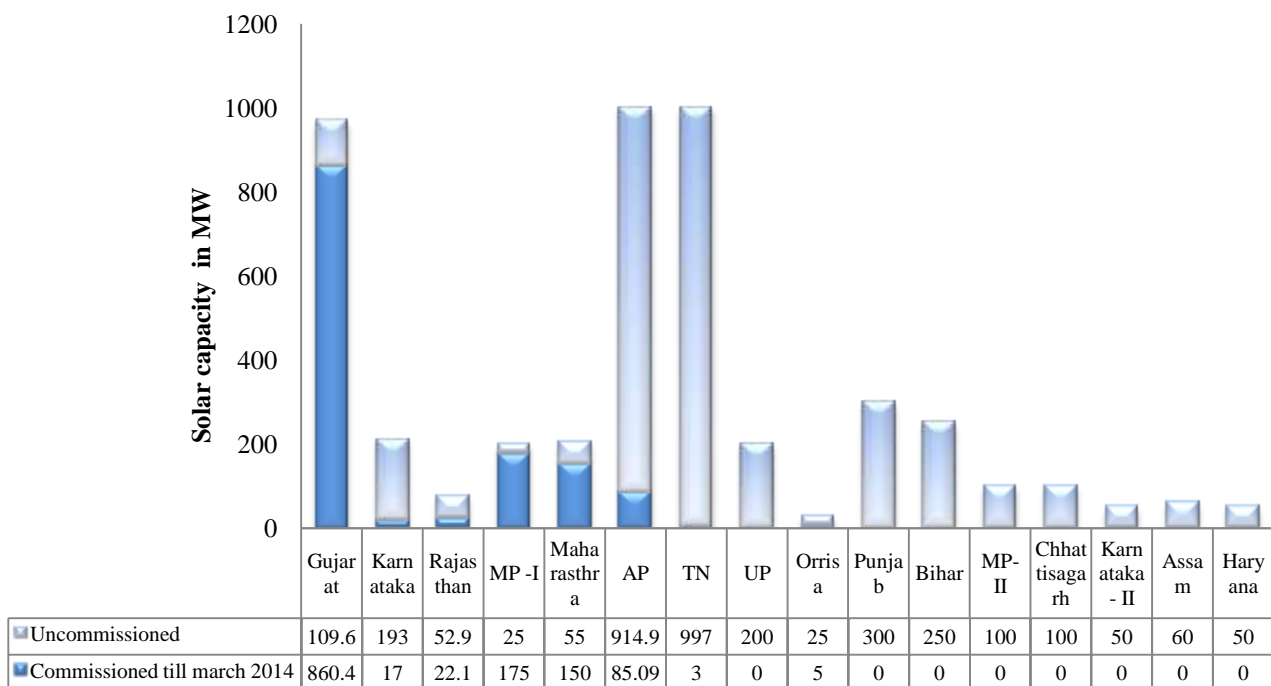


Fig 3: Target and Achievement of solar installation program of various states till Mar – 2014

The total achieved capacity under state bids is about 1168 MW (by march 2014) [2], of 4360 MW bidded capacity. Considering the non bidded capacity, the cumulative target of solar capacity addition under state policies is 5225 MW. Two states of India Maharashtra and west Bengal also have installed capacity of solar of about 150 Mw and 5 MW, but these two has added to state without any open bidding. So the total installed capacity of solar in India under state policies is about 1323 MW, of 5225 MW targeted value.

3. DEVELOPMENT UNDER STATE GOVERNMENTS (STATE NODAL AGENCIES)

In India Mega Watt (MW) size installation of solar energy started with the state level policies only, which was Gujarat Solar Policy 2009[3]. Under this policy first time Feed in Tariff (FIT) was offered to the plant developers to encourage them and attract to this solar industry which was very expensive one at that time. After Gujarat, Karnataka and Rajasthan came with its first solar policies. Currently about 15 states has its solar energy programs in which 10 states have its programs with bidded capacity of 4360 MW, on other hand about 710 MW capacity of solar PV is under pipeline of the state policy of which RFP has released but the bidding is in under process (UP 300 MW, Haryana 50 MW, Bihar 250 MW, Assam 60 MW, Rajasthan 50 MW). the target and achievements of state solar policies is shown below

4. CENTRAL LEVEL DEVELOPMENT

After the NAPCC in 2008 India launched its first National Mission for solar energy which was dedicated to the big scale (MW size) solar plants. On February 2010 Central government started the highly ambitious solar mission for India named as Jawaharlal Nehru National Solar Mission (JNNSM) which gave a roadmap to Indian solar industry for its future with a target of 22000 MW installation of solar

power by 2022 (Targets shown in table 1). JNNSM[1] comprises three stages of development solar power under three different categories of a) grid connected solar plants b) Off grid solar plants and c) Solar thermal collectors.

Under the JNNSM before the phase 1, Migration policy came first on February 2010, in this Feed in Tariff (FIT) scheme

were given to all the solar plant developers which had already under construction plants under any other program. MNRE offered them the FIT of 17.91 Rs/ kWh[1]. After that Phase 1 started with two batches as batch 1 and batch 2 which consist of competitive bidding process. The targets and achievements of phase 1 is shown below

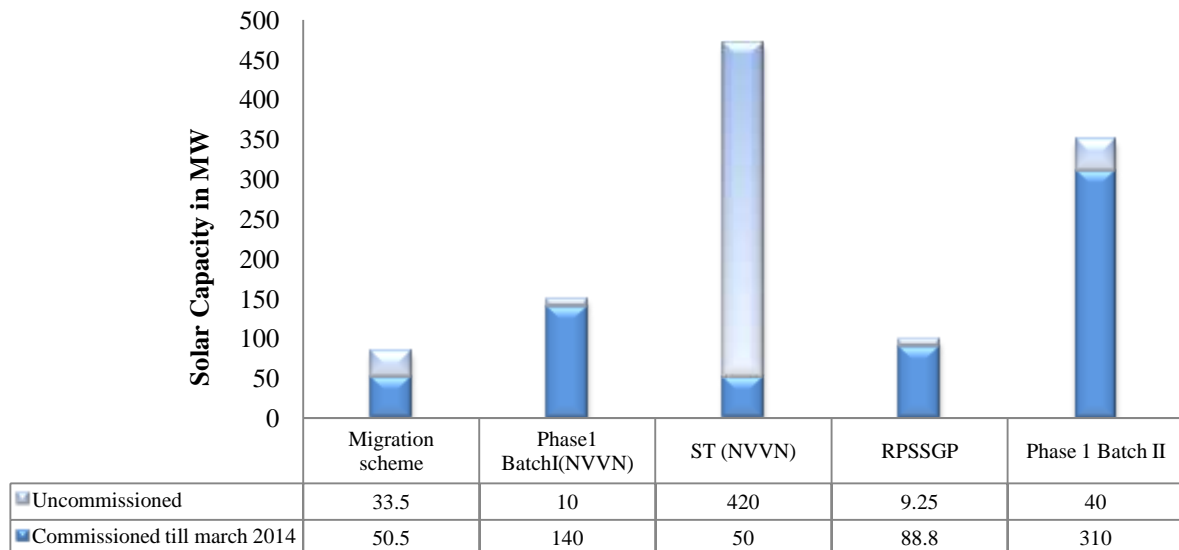


Fig 4: Target and achievement of solar installation under JNNSM phase 1

In the batch 1 of Phase 1, solar thermal (ST) was also the target of 470 MW but it was not achieved successfully (only 50 MW) as of complex technology and construction. Except ST, there was a target of 682 MW of solar PV of which 589.3 MW have achieved (till march 2014).

5. COMPARISON AND ANALYSIS

The state policies account for about 50% of total capacity addition till march 2014 [2], and JNNSM accounts for only 26%. It depicts that the state policies have more capacity installations than central level and hence states are more

successful to achieving the targets, but it is not correct observation as, in the state policies development of 1323 MW, in which only Gujarat accounts for 860 MW. It means that only 463 MW of solar installation has done under all state policies except Gujarat. Here except Gujarat all other states have a huge uncommissioned capacity. On the other hand capacity addition under JNNSM is much successful and the achievements are near to targets (Except solar thermal because more complex technology and construction and less resources availability).

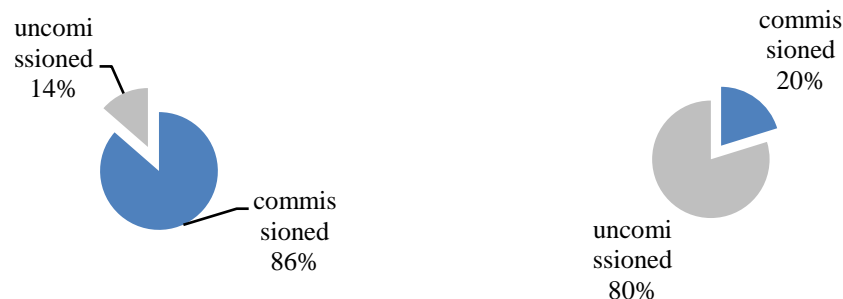


Fig 5: Solar installation under central government scheme and state government schemes

Here it can be stated that installations under central schemes are more successful than under most of the state schemes, and for this pattern both state government policy and bidder (investor) are responsible. The reasons behind this are aggressive bidding from bidder side (excessively lowering the tariff), and poor land acquisition process, less

coordination in central and state level government, instability of state governments, without resources or with less resources set the targets for much higher values are the reasons from state government side. Some other financial reasons are also affects this like delay in PPA agreements, delay in regular and subsidy payments, poor infrastructure.

6. TARIFF OPTIONS IN INDIAN SOLAR MARKET

In Indian solar market there are various types of tariff schemes have adopted like feed in tariff (FIT), reverse bidding process, viable gap funding (VGF) etc. Firstly Gujarat solar policy offered Feed in Tariff first time to the MW size solar projects, the levelised tariff for the solar projects in Gujarat was Rs 12.54/ kWh, after this Migration scheme under central level offered FIT to the existing or under construction solar projects. But then because of cost declining in solar panels and competitive environment in solar industry the competitive bidding / reverse bidding emerged in which benchmark tariff was defined by CERC or respective SERCs.

If we compare in the competitive bidding and FIT, the success rate of FIT is much higher than any other methodology. If we take an example of Chhattisgarh bidding for solar project of 100 MW, the lowest bid offered was 6.3 Rs/ kWh and the highest bid was 7.9 Rs/ kWh. The weighted average of this bid is about 7.2 Rs/ kWh. Government has to bear the cost of 7.2 Rs/ Unit in any case, but there is a possibility that the lowest bidder can create any problem by giving reason of non bankability of project or less financial viable project, which create a problem to both developer and government to achieve its target. The alternate of this problem is government can give a FIT, which applicable to all the developers equal to the average price which is 7.2 Rs/ kWh. This create an environment of equality by which less chances of arising problems in development of project.

7. CONCLUSION

As presented above it is fact that, the success rate of installation and achieving the targets for solar capacity addition is much higher in the central government programs (MNRE), as compared to the development under state policies (except Gujarat. Learning from the JNNSM phase 1 like better land acquisition policies and support, better financing options and support of EXIM banks, providing FIT if required, rigid and concrete policy framework, less time delay process of auxiliary permissions, better power evacuation infrastructure provision, can work as catalyst for country's solar energy programs. In case of tariff option for bidding, from all the available methods it is seen that FIT is the most suitable method for successful completion of the project (Ex. Gujarat solar program). As FIT and weighted average tariff is approximately same for a government, so FIT should be given to the developers than any other alternative.

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