

Note on
Solar Energy Policy
in Andhra Pradesh

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Abbreviations

AP	Andhra Pradesh
APERC	Andhra Pradesh Electricity Regulatory Commission
APPCC	Andhra Pradesh Power Coordination Committee
APTRANSCO	Andhra Pradesh Transmission Corporation
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
DISCOM	Distribution Company
GoAP	Government of Andhra Pradesh
IEP	Integrated Energy Policy
JNNSM	Jawaharlal Nehru National Solar Mission
NAPCC	National Action Plan on Climate Change
NREDCAP	New and Renewable Energy Development Corporation of Andhra Pradesh
NTPC	National Thermal Power Corporation
NVVN	NTPC Vidyut Vyapara Nigam Ltd.
PMGER	People's Monitoring Group on Electricity Regulation
PPA	Power Purchase Agreement
PFC	Power Finance Corporation
REC	Renewable Energy Certificate
RPPO	Renewable Power Purchase Obligation
RTSS	Roof Top Solar Systems
SLDC	State Load Dispatch Centre
SWH	Solar Water Heater

Introduction

Dangers emanating from global warming are forcing policy makers as well as civil society to search for alternatives to meet human society's needs. While electricity has become an essential part of modern day living electricity generation itself has become biggest contributor to global warming. Power generation contributes more than one-third carbon emissions in the world. India has become third biggest emitter of carbon dioxide in the world, next only to United States of America and China. Within India Andhra Pradesh stands third in carbon dioxide emissions.

Increasing electricity needs in the country as well as state and looming environmental crisis are beckoning to the need to search for alternatives. It is in this context that renewable energy sources have come to occupy important place in electricity policy and planning.

The Preamble to The Electricity Act, 2003 states that one of the important objectives of this Act is 'promotion of efficient and environmentally benign policies'. Following this the Section 61 (h) of the Act states that the Appropriate Commission while determining electricity tariff shall be guided by 'promotion of generation of electricity from renewable energy sources'. Section 86 (1) (e) of the Act states that one of the functions to be discharged by the Commission include "promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures of connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee". In other words the Electricity Regulatory Commission is mandated to facilitate evacuation of electricity from renewable sources of energy, facilitate its market and also stipulate that a minimum percentage of electricity supplied in the area is procured from renewable energy sources in the form of Renewable Power Purchase Obligation (RPPO).

The National Electricity Policy announced on February 12, 2005 and the National Tariff Policy dated January 6, 2006 also at length dealt with the need as well as measures to promote renewable energy sources. These policies underlined the need for differential prices for electricity produced from renewable energy sources as they could not compete with conventional sources of electricity like coal and hydel energy. They also stipulated that renewable energy should be procured through transparent bidding process. The National Tariff Policy specifically laid down that while stipulating RPPO availability of renewable sources of electricity and its impact on electricity tariffs should be taken in to account.

In the background of shortage of energy sources in the country the Integrated Energy Policy (IEP) formulated by the Planning Commission in 2006 also recognized the paramount importance of deployment of renewable sources of electricity. While emphasizing the importance of promoting special policies for renewable sources of electricity it underlined the need to encourage outcomes not just outlays. The IEP also suggested that the environmental subsidy for renewable energy sources could be financed by a cess on non-renewable sources causing environmental damage.

The National Action Plan on Climate Change launched on June 30, 2008 is a national strategy to enable the country to adapt to climate change and enhance ecological sustainability of countries development interventions. According to this national plan renewable energy procurement may be set at five percent of total power procurement and it should be increased by one percent every year so that it reaches 15 percent by 2020.

The National Action Plan on Climate Change also constituted eight national missions to carry its mandate forward. This action plan represents multi-pronged, long-term and integrated strategy for achieving key goals in the context of climate change. These eight missions include national mission on sustainable habitat, national water mission, national mission for sustaining the Himalayan eco-system, national mission for a green India, national mission for sustainable agriculture, national mission on strategic knowledge for climate change, national mission on enhanced energy efficiency, and national solar mission.

Jawaharlal Nehru National Solar Mission

The Jawaharlal Nehru National Solar Mission (JNNSM) was launched in November 2009. It is one of the eight National Missions laid out in India's National Action Plan on Climate Change. This mission was launched under the brand "Solar India". Its objectives are:

To establish India as a global leader in solar energy

To focus on setting up an enabling environment for solar technology penetration in the country both at a centralized and decentralized levels.

To create an enabling policy framework for deployment of 22,000 MW solar power by 2022

Table: 1 Jawaharlal Nehru National Solar Mission Road Map

Segment	Target Phase I (2010-2013)	Target Phase II (2013-2017)	Target Phase III (2017-2022)
Solar Collectors	7 million square meters	15 million square meters	20 million square meters
Off grid solar applications	200 MW	1,000 MW	2,000 MW
Utility grid power including roof top	1,000 – 2,000 MW	4,000 – 10,000 MW	20,000 MW

According to the JNNSM 22,000 MW additional power generation capacity will come from solar energy sector by the end of 13th five year plan i.e., by the year 2022. The Mission adopted a three phase approach. In the first phase ending with 2013 the attempt will be to create 2200 MW solar energy capacity. According to the strategy of the Mission in the second phase after taking in to account the experience of the initial years capacity will be aggressively ramped up to create conditions for up scaled and competitive solar energy penetration in the country. Capacity will be more than doubled during the second phase. The capacity addition during third phase will depend on learning of the first two phases. 90% of the capacity will come in the form of MW scale grid connected solar power plants.

Key driver in implementation of the JNNSM will be Renewable Power Purchase Obligation (RPPO) with a solar specific component. RPPO may start with 0.25% in phase I and go up to 3% in 2022, complimented with solar specific Renewable Energy Certificate (REC). In order to make solar power affordable solar power will be bundled with cheap unallocated power from central power generating stations. With the objective of reducing the cost of solar power tariffs, the Mission has opted for a "reverse bidding mechanism" wherein reverse bids (discounts) on benchmark tariffs set by CERC are invited from

prospective project developers. As the power trading arm of the National Thermal Power Corporation (NTPC), NTPC Vidyut Vyapar Nigam Ltd (NVVN) has been designated as the nodal agency for the execution of the Mission. NVVN invited bids on benchmark tariffs and entered into Power Purchase Agreements (PPAs) with winning bidders. It would purchase the expensive solar power from developers and bundle it with cheaper coal-based power from unallocated NTPC plants before selling the mixed power to the various state distribution utilities at a reduced average price. The JNNSM also includes soft refinance facility through IREDA with budgetary support. The Mission document also refers to decentralized, distributed, off-grid, stand alone, roof top solar power plants, and village electrification using solar power.

Solar Power Policy of Andhra Pradesh

The Government of Andhra Pradesh (GoAP) announced the Andhra Pradesh Solar Power Policy – 2012 on 26 September 2012 through G.O. Ms. No. 39. Another Order was issued by the GoAP (G.O. Ms. No. 44) on November 16, 2012 to make some amendments to the earlier GO. The GoAP has taken this initiative to augment production of energy immediately through non-conventional sources on fast track in the back ground of substantial gap between the demand and supply position of power in the state, and conducive environment present to encourage solar power and the fact that the production of solar power is less time consuming. This policy will be applicable up to 2017.

Main objectives of the Solar Power Policy are:

1. To encourage, develop and promote solar power generation in the state with a view to meet the growing demand for power in an environmentally and economically sustainable manner.
2. To attract investments for establishment of solar power plants in the state.
3. To promote investments in manufacturing facilities
4. To promote off-grid solar applications to meet the power needs on stand-alone basis.
5. To contribute to overall economic development, employment generation and investment in public services by provision of electrical energy for various needs.
6. To encourage decentralized, distributed generation system to reduce T&D losses

According to the policy document the State will promote solar power developers to set up solar power plants for captive use or sale of power to third parties within the state. In order to encourage the immediate production of solar power to reduce the gap in demand and supply of power as a part of this Policy the state government also announced some incentives. These incentives include no wheeling and transmission charges for solar power produced and consumed within the state, cross subsidy surcharge shall not applicable for open access consumers, exemption from electricity duty, refund of VAT paid in the state for the inputs used in the solar power projects and refund of stamp duty and registration charges by the department of Industries. These incentives will be applicable to plants commissioned by June 2014 and will be in force for seven years.

REC mechanism is the cornerstone of GoAP's solar power policy. The state will promote solar power developers to set up solar power plants to sell electricity through solar RECs. SLDC will give clearance for REC application within 15 days from the date of application. The power generated from these plants shall be purchased by DISCOMs in the state at pooled cost as determined by APERC. The remaining cost will be recovered through RECs as per regulations of APERC.

The amendment made to the earlier Order makes it clear that the developers have to decide whether they want to utilize incentives or sell power through REC route.

The state policy also allows banking of 100% energy for one year from the date of banking with the condition that banked units cannot be consumed or redeemed from February to June and also during

TOD hours as amended from time to time. The settlement of banked energy will be done on monthly basis and 2% of the banked energy need to be paid as banking charge.

The policy document also states that it is the responsibility of the developer to acquire the land required for the project.

New and Renewable Energy Development Corporation of Andhra Pradesh (NREDCAP) is designated as the nodal agency for implementation of this policy. It is vested with the responsibility of clearance, facilitation and implementation of the solar power policy.

The policy also provided for a "High Level Committee" to monitor implementation of the policy. It will consist of 9 members drawn from departments of energy, industry, finance, commercial tax, APTRANSCO, One DISCOM, FAPCCI and CII and one solar developer. Managing Director of NREDCAP will be convenor of the Committee. This High Level Committee is authorized to issue clarifications in case any difficulty arises in giving effect to this policy. Implementation of this policy will be reviewed after two years.

After realising that there was no provision for sale of solar power to DISCOMs at regulated price the GoAP came out with another Order (G.O. Ms. No. 46) on 27th November 2012. According to this Order DISCOMs shall select developers through competitive bidding to set up 1,000 MW solar power plants in the state. These plants are expected to be set up by June 2013. DISCOMs will prepare a list of industries willing to purchase solar power at the rate arrived through bidding. For the remaining power the difference between the bid price and pooled price cost will be borne by the state government. APTRANSCO is entrusted with responsibility of conducting the bidding process.

Enabling Regulatory Framework:

The Andhra Pradesh Electricity Regulatory Commission (APERC) laid down the necessary framework for promotion of solar power. Through an Order in O.P. No. 10 of 2010 issued on 6th July, 2010 the Commission stipulated that a quantum of 0.25% out of 5% quantum of RPPO shall be purchased as Solar RPPO. Solar power for this could be sourced from bundled power from NVVN and Roof Top and other small Solar Power Plants. Tariff for this was decided on the same lines as that of Central Electricity Regulatory Commission (CERC) regulated price for solar power. Total tariff for solar power is Rs. 17.91 per unit. Out of this while DISCOMs will pay Rs. 5.50 per unit Indian Renewable Energy Development Agency (IREDA) will pay the remaining Rs. 12.41 per unit. An escalation of 3% per annum is allowed on the above tariff. This tariff will be applicable for 25 years.

The APERC also introduced Renewable Energy Certificate (REC) mechanism through Regulation 1 of 2012 dated: 21st March, 2012 to meet the solar specific RPPO. The solar specific RPPO could be met by procuring Solar RECs. The Commission also decided the initial pooled cost as Rs. 2 per unit. This will change in accordance with the cost of power procured by DISCOMs. However, this pooled cost is also to be approved by the Commission. The Commission also introduced a default provision. In case the DISCOMs fail to procure on their own the stipulated quantum of solar power they have to deposit corresponding amount in to separate fund as decided by the Commission which will be used for

purchase of solar REC from Power Exchange. Besides this, the Commission may also impose a penalty on the DISCOMs for their failure to procure required quantum of solar power.

Progress so far:

Table:2 Status of Solar Energy in AP

Scheme	Sanctioned (MW)	Executed (MW)	
Roof Top Solar Systems	10.5	9.5	
Batch I - PV	15.0	12.0	
Solar Thermal	50.0	Under Execution	
Batch II	20.0	Under Execution	
Total	95.5	21.5	

Source: NREDCAP

Following the national level bidding process for setting up solar power systems under JNNSM, both under Batch I and Batch II, plants with aggregate capacity of 95.5 MW were sanctioned in AP. Out of this RTSS accounted for 10.5 MW. One solar thermal plant with 50 MW was also sanctioned. The remaining capacity is under solar PV. Out of this until now only plants with a combined capacity of 21.5 MW are executed. The remaining are still under execution.

Even before the above bidding process was initiated 37 projects with aggregate capacity of 158 MW was cleared by NREDCAP under the category of demonstration projects. Later they were advised to migrate to JNNSM/NVVN. But not a single plant from AP was cleared for migration. With this the attempt to introduce solar power plants through demonstration plants came to an end.

Vijayawada in AP was one of the cities selected in the country for 'Solar cities' programme under JNNSM. Still this programme is in exploratory stage only.

AP GENCO, the public sector power generation company in the state also planned to set up sole power plants with total capacity of 100 MW as a part of meeting the solar RPO obligation in the state. But ultimately nothing came out of this. Though APGENCO has vast tracts of land suitable for solar power projects it was alleged that pressure was brought on APGENCO not to participate in the bidding. This issue was also raised during pre-bid meeting.

Following the announcement of the new solar power policy by the state many enthusiastic individuals and organizations have come forward to invest in solar power plants. Under the new policy expressions of interest to set up solar power plants with aggregate capacity of more than 2500 MW were received by NREDCAP.

Table:3 Procurement of Solar Power in AP

Particulars	2011-12	2012-13
Solar (MU)	2.43	4.10
Solar (Rs/U)	5.43	5.43
Total NCE (MU)	1598.63	1575.00

Total NCE (Rs/U)	3.22	3.24
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Source: Aggregate Revenue Requirement of four DISCOMs in AP for FY 2012-13

As mentioned above as part of RPPO 5% of power procured in the state has to come from renewable sources and within this 0.25% has to come from solar power plants. During the financial year 2012-13 out of more than 90,000 MU procured in the state from all sources, total power procured from all renewable sources was only 1,575 MU. That is renewable energy sources accounted for only 1.5% of the power procured in the state. Power procured from solar power plants reached 4.10 MU only. Even at the current level of electricity procurement and consumption in the state to achieve solar RPPO of 0.25% about 250 MU of electricity is to be generated by solar power units. In other words the present generation capacity of solar plants has to increase by 60 times to achieve the current solar RPPO. This also indicates the opportunities available for solar power plants.

Faulty and Faltering Steps

AP is one of the states with abundant scope for exploitation of solar energy. 300 sunny days are available in a year with solar insolation of 6kWh per square meter. A large number of agencies dealing with solar power are also present in the state. In fact 25% of the solar developers in the country are from AP. Even then the achievement on solar front in the state is insignificant. Though JNNSM appeared on the scene in 2009 it took three years for AP to come out with its policy document. By this time states like Gujarat and Rajasthan added hundreds of MW of solar energy to their grids. This could be attributed to lack of Political and Administrative leadership in the state. Though the policy is said to be in the making for the last three years the way the new policy is announced through three GOs in quick succession shows that even now the leadership in the state is not clear about how to reap solar power in the state.

A cursory examination of the GOs issued as a part of the policy announcement shows that solar power policy is not being formulated as a part of promotion of renewable sources of energy in the context of greenhouse gas emissions and related global warming issues. It is being given shape to address the present day electricity crisis in the state. It is not being formulated with long term vision but with short term focus. The Preamble to the policy clearly states, "The present situation prevailing in the state with regard to substantial gap between the demand and supply position of power calls for taking immediate measures to augment production of energy through non conventional sources on fast track. Keeping in view conducive environment present to solar power and also the fact that the production of solar power is less time consuming, it has been decided to formulate the following policy to encourage generation of solar power in the state". From this it is quite clear that it is the present power crisis that has forced the decision on the policy rather than long term vision to promote renewable sources of energy. One of the objectives of the policy merely states that it is meant to encourage solar power generation in the state with a view to meet the growing demand for power in an environmentally and economically sustainable manner.

The policy document also shows that the relation between the stated objectives of the policy and action proposed is very weak. Important objectives of the Solar Power Policy apart from setting up solar power plants are: To promote investments in manufacturing facilities, to promote off-grid solar applications to meet the power needs on stand-alone basis, and to encourage decentralized, distributed generation system to reduce T&D losses. The policy document did not propose any action in promoting manufacture facilities. There is no mention even on local content of components in solar power plants. In fact the policy document does not distinguish between solar PV and solar thermal. Components wise and cost wise solar thermal should have been preferred. Many components needed for solar thermal plants could be manufactured locally. Though the above objectives talk about off grid, decentralized solar power plants the real action is about setting up MW scale plants. While JNNSM allocated some capacity to off grid solar plants it did not figure in AP policy. Similarly, there is no mention of solar water heaters in AP policy documents. This clearly shows that there is no relation between objectives of the

policy and action proposed in the same. This also gives the impression that the present policy is being designed under pressure from quarters with interests in MW scale plants but not in small, decentralized plants.

Inconsistency:

The solar power policy of AP is also characterized by inconsistency. The first two Orders emphasized two aspects. One is to facilitate setting up of solar power plants under Renewable Energy Certificates (REC) and another one is related to incentives for captive or third party sales. But main emphasis was on RECs. An examination of the File Notes of these Orders shows that procurement of solar power through competitive bidding was an important part. But this aspect did not figure in the first two GOs. In fact main focus was on REC. First Order gave the impression that same developer was entitled for both RECs and incentives. But the regulations issued by the APERC clearly mentions that those availing themselves of incentives will not be eligible for RECs. In the second Order it was mentioned that the developers had to choose whether they want to utilize incentives or go in for RECs. This also shows that those who formulated or drafted the GO are not familiar with some of the fundamental aspects of the rules and regulations governing the power sector.

Institutional capacity:

Energy Department of GoAP, NREDCAP, DISCOMs and APERC are responsible for formulating, facilitating, implementing and enforcement and compliance of the policy. Energy department is responsible for designing or formulating the policy. The way in which the policy was formulated and announced raised doubts about the ability of the department in grappling with the policy formulation. NREDCAP is designated by the policy as the nodal agency for clearance, facilitation and implementation of the policy. But NREDCAP does not have sufficient personnel strength to take up this responsibility. One officer looks after renewable sources of energy in this body. He has limited support to look after promotion of renewable sources of energy in the state. As part of the policy being designated as nodal agency NREDCAP is expected to register and facilitate setting up solar power plants in the state. Instead immediately after announcement of the policy posted notice titled 'Procedure for filing of applications to set up solar power plants' on its website asking the prospective solar energy developers to submit grid connection applications to APTRANSCO if connectivity required is at the voltage level of above 33 kV and to respective DISCOM if connectivity required is at the voltage level of 33 kV or below, with a copy to NREDCAP. It also advised the developers, "For all details regarding setting up of solar power projects the respective agencies may be contacted". With this NREDCAP nearly washed off its hands of its responsibility as the nodal agency under the policy. DISCOMs are expected to implement the policy through purchase of power from solar power developers. But the experience or expertise of DISCOMs in dealing with power purchase is limited. The APTRANSCO and APPCC use deal with the power purchases. In the case of renewable energy the DISCOMs are asked to deal with these units in their areas. As the DISCOMs do not have experience and expertise in power purchases they are directing the solar power developers to NREDCAP for clarifications. The developers are shuttling between NREDCAP and DISCOMs for information and clarifications. In the end they are no wiser than in the beginning. APERC according to its own regulations the responsibility and powers to enforce compliance of the policy on procurement

of electricity from renewable energy sources is with the Commission only. One officer of Deputy Director rank deals with all the issues related to power purchases. Already scores of cases related to power purchase are pending before the commission. Lack of enough manpower at the disposal of the Commission is one of the reasons for the pending cases. In this background to expect any proactive action from this body on monitoring and enforcing compliance may not be wise.

The solar power policy also provided for a High Level Committee to monitor the implementation of the policy as well as provide clarifications in the course of implementation of the policy. Within a short time of two months the state government issued two more GOs providing amendments and additions to the original GO on the policy. The High Level Committee had no role in formulating the amendments or/and additions to the existing policy. Whether it will take up any proactive step in this regard is also doubtful.

Coordination:

The way the solar power policy is formulated and implemented in the state shows that there is lack of coordination among the agencies responsible for these roles. The time taken in formulating the policy itself shows that there is no coordination between the Energy Department and the nodal agency NREDCAP. The shape and implications of the policy that has come out also is an indication of lack of coordination. Even though there was no provision for procurement of solar power through bidding under the initial GOs issued by the state the Chief Minister of the state was regularly talking about bidding for 1000 MW solar plants. Even the File Notes show that the main discussion was on procuring solar power through competitive bidding. After some time a separate GO was issued on procurement of solar power through bidding. But even at this stage there was no clarity on the way this power would be procured. APTRANSCO was entrusted with the responsibility of drafting bidding documents and conducting the bids. In the first place, as the body dealing with wires business under the Act APTRANSCO is not supposed to deal with power purchases. Apart from this, when pre-bid meeting was held with prospective solar power developers on 14th December, 2012 neither the APTRANSCO officials nor NREDCAP personnel were in a position to give proper clarifications. More than 250 solar developers attended the pre-bid meeting. The issues related to high processing fee of Rs. 2,00,000, benchmark price for solar power, status of subsidies and tax benefits, lack of transparency were raised during the pre-bid meeting. But the developers did not get satisfactory responses from the officials. Combined with the fact that the developers had to shuttle between the offices of NREDCAP and DISCOMs for clarifications the pre-bid meeting shows that at the end the enthusiastic developers are made to run from pillar to post. Though three GOs were issued on promotion of solar power in the state there is no clarity on roles and responsibilities of different agencies involved – Energy department, nodal agency, utilities and the regulator. No one is ready to take the responsibility. One does not know where the buck stops, or where the buck starts!

Stakeholder engagement:

Various stakeholders with stakes in the promotion of solar power are not involved in the formulation and implementation of the solar power policy in the state. The state government of AP constituted a Group of Ministers to examine and advise on issues related to promotion of renewable energy in the

state. Some of the ministers who are part of this Group have interests in one or the other source of renewable energy. While one has investments in wind power units, another one has personal stakes in solar power, another one has interests in mini hydel power units, and still another one has investments in biomass based power plants. When a committee is constituted by the government the members of the committees are expected not to have conflict of interests. But in this case the whole committee is constituted by ministers who have conflict of interests. During the tenure of the Group of Ministers the People's Monitoring Group on Electricity Regulation (PMGER) requested for an opportunity to make a presentation on renewable energy related issued but in vain. Some of the solar power developers were heard on some occasions. But overall there is no serious and proper consultation of stakeholders in promotion of solar energy in the state. This is evident from the final shape of the solar power policy in the state. The G O's issued by the state government as well as Note Files of these GOs shows that even inputs from this Group of Ministers were not taken seriously. Its recommendations were mentioned only in the third G O.

Transparency:

The solar power policy formulation as well as implementation is characterized by lack transparency. Even for the serious developers who are ready to put their hard earned money in to promotion of solar power it has become difficult to figure out the contours of the policy. This is also compounded by lack of awareness of different promotional schemes for solar power. Some of the GOs issued in the past by the state government made it mandatory for households to set up solar water heaters. Added to this there was also a central government scheme that provides 30% subsidy for setting up these solar water heaters. This lack of transparency and awareness on different aspects of the solar power policy is leading to doubts about the policy. The delay in announcing the policy as well as final shape of the policy gave rise to a feeling that some powerful players were trying to influence final shape of the things. The way APGENCO, which already successfully launched 2 MW solar PV plant in the state, withdrew from the scene further strengthened this feeling.

Finance:

There is need to strengthen all the agencies involved in formulating and implementation of the solar power policy. Particularly, the working of NREDCAP needs to be reoriented to see that it takes proactive role in promoting renewable energy sources including solar power. Along with this, capacity personnel of DISCOMs need to be strengthened to implement solar power policy effectively. In the case of APERC apart from filling all vacancies it is important to reassess the personnel entrusted with the responsibility of overseeing power purchases. Power purchases account for more than 70% of the tariff burden. It is important to create additional posts to help the existing staff to deal with power purchases including enforcing compliance of RPPOs. All these needs further financial costs. In view of returns from efficient implementation of policies related to promotion of renewable sources of energy including solar power costs involved will not be significant, and the same could be recovered through efficient implementation of these policies. In sum, it is important increase allocation for capacity building of agencies involved in promotion of solar power policy in the state.

Mobilising finances for taking up solar power projects is as important as providing finances for strengthening of agencies involved in the policy implementation. The contours of policy also have implications for obtaining finances for solar power projects. Initially the Policy gave main focus on promoting plants through REC route. But getting finances for projects under REC mechanism is problematic. There are issues of uncertainty of recovery of investments including minimum returns under REC as it depends on successful sale of RECs in the power market through power exchanges. Also there is no certainty in the current REC prices to continue. The review of REC prices is due in 2017. After 2016 the present REC prices may not continue. This also injects uncertainty in obtaining finances for solar power plants under REC mechanism. In this background promotion of solar power plants through competitive bidding and long term PPAs appears preferable. But the pre-bid meeting organized by DISCOMs and state government with prospective solar developers showed that both the state government as well as utilities in the state need to have clarity on several issues related to promotion of solar power plants through PPA mode. There is also 'chicken-egg' kind of situation in providing finances to solar power or any other renewable energy related unit. The financiers insist that the developers should have been selected by the utilities to be eligible for financing. On the other side the utilities insist that the developers shall show that they have financial resources to take up the project. Even when developers win bids to set up plants financial institutions hesitate to finance them on the pretext that the developers have quoted very low and uneconomical prices to win the bid and that at that price the plant will not be viable. Nodal agencies like NREDCAP can work as agencies to facilitate finances and provide comfort to small investors. The number of developers who participated in the pre-bid meeting shows that there are a large number of individuals as well as entities to plunge in to solar power sector. The nodal agencies have to create conducive atmosphere to see that investments are actually pumped in to the field, not just intentions. Along with this the state government has to take initiatives to tap resources including external/multilateral sources to provide finances to the solar power developers.

Conceptual Issues:

While it is important to promote renewable sources of energy to address concerns related to global warming the strategic decision need to be on the kind of renewable sources to be explored and exploited. Among the renewable sources of energy solar energy continues to be costly. The tariff impacts on the consumers will demand choice of less costly renewable sources. In this context the endeavours of both the central government and state government shall be to promote indigenous R&D to bring down cost of solar power rather than invest heavily in high cost solar power plants at this stage.

Between solar PV and solar thermal the latter is cheaper. This is also evident from the solar power tariff fixed by CERC. Solar thermal is cheaper than solar PV by three to four rupees per unit. This difference itself is higher than pooled cost of power in AP. This cost difference should have led to preference for solar thermal plants. But neither central government's JNNSM nor GoAP's solar power policy make any distinction on this account. In fact major capacity addition should have been under solar thermal.

The GoAP's solar power policy on the lines of JNNSM also emphasized MW scale plants. But the real story is in small scale roof top, stand alone systems. By nature solar power lends itself for decentralized small scale plants. Germany's experience in promoting solar power upholds this. More than 90%

Germany's PV installations are less than 1 MW capacity. The total installed capacity of solar PV plants in Germany is nearly 7 GW. In AP context also the strategic decision should have been in favour of decentralized, distributed generation by stand alone systems.

Grid connected solar RTSS would have been one of the ideal mechanisms to capture solar power. Resort to "net metering" would encourage in situ generation of electricity for self consumption combined with provision for grid interconnection to supply surplus power to the grid. This has multiple benefits. It provides peaking supply of power, reduces T&D losses, improve voltages, and create employment. Though both GoAP's policy and JNNSM talk about decentralized, distributed generation actions on the ground do not corroborate this.

Also as one of the steps to promote solar power tariff of high end commercial and residential consumers should be aligned with RTSS costs.

One of the important aspects/initiatives neglected in the solar power policy is related to use of solar water heaters (SWH). Unlike solar PV or solar thermal power plants these SWH involves simple technology. These SWHs are particularly important in the context of AP. In AP morning peak power demand is higher than evening peak. Use of electricity to heat water is one of the reasons for this. Use of SWH will help to address this morning peak demand for power. If 2,50,000 households install SWHs of 100 liters capacity 270 MW of electricity can be saved. In AP there are 5.23 lakh households which consume more than 300 units of electricity per month. If these households install SWHs more than 500 MW power can be saved. Similarly, there are 13.6 lakh households which consume more than 200 units of electricity per month. If these households install SWHs 1350 MW of power can be saved. A comparison with China also shows the potential of this intervention. In China SWHs with 125 million square meters collection capacity are in use. Compared to this in India SWHs with 3.53 million square meters collection capacity only are in use. In AP though there were some initiatives in this regard they were not taken to their logical end. The GoAP issued Orders (G O Ms. No. 302 MA and UD Dept) on 3rd August, 2004 making installation of SWH mandatory. But no attention was paid to its implementation. In the course of time even these Orders were diluted. People are also are not aware about promotional programmes related to solar power, particularly the ones related to subsidy for installation of SWHs. The cumbersome procedures involved in claiming the subsidy also is deterring people to go for these SWHs.

Conclusion

Lack of political and administrative leadership with vision and foresight dogged the policy formulation as well implementation of solar power policy in the state. Added to this, absence of effective coordination among various agencies involved in implementation of the policy almost turned it in to a still born baby. Lack of transparency combined with inadequate involvement of all stakeholders in different phases of the policy led to doubts about the policy. In the coming days coordination and transparency need to be improved for effective implementation of the policy. Given the world wise experience in promotion of solar energy in the coming days it is also very important to reorientation of the policy in favour of decentralized, small scale solar power plants in the place of MW scale plants.

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