Centre for Science and Environment's recommendations for the 2nd phase of the JNNSM

Introduction

On 22nd December 2012, the Centre for Science and Environment (CSE), organized a roundtable to discuss the draft policy document issued by the Ministry of New and Renewable Energy (MNRE) on the 2nd phase of the Jawaharlal Nehru National Solar Mission (JNNSM). Representatives from the industry, NGOs and state government attended the roundtable (see Annexure 1: List of participants).

Based on the discussions at the roundtable, CSE is submitting its final recommendations to MNRE for the 2nd phase of JNNSM. These recommendations are split into off-grid (part A) and grid-connected (part B).

A. Recommendations for the off-grid programmes

The off-grid programme, as envisaged in the draft policy document, is riddled with ambiguities. Also, the learning from past programmes have not been internalized and incorporated. There is a clear need for distinction between the various off-grid programmes based on application and targeted beneficiaries. This will help simplify the programme implementation and calibrate the necessary subsidies in line with the requirements of the targeted beneficiaries.

CSE suggests the following bifurcation of the off-grid programmes for the 2nd phase of the JNNSM (2013-17):

1. Programme on mini-grids
    a. Mini-grids for grid connected rural areas
    b. Mini-grids for remote villages/hamlets/dalit bastis not connected to the grids
2. Off-grid solar applications for urban and rural areas (solar home lighting, lanterns, street lights, traffic lights etc.)
3. Solar heating applications (solar water heaters, solar cookers etc.)
4. Solar water pumps programme for drinking water and irrigation
5. Off-grid solar applications for industries (solar heating/ cooling applications, power plants, power plants for telecom towers etc.)

1. Programme on mini-grids

The program needs to be separated in two parts in order to differentiate between the rural areas with grid connection and remote villages where the grid has not reached/ will not reach in the next 5-10 years. The implementation and the financing structure of these two programmes will have to be different, as explained below. In both the programmes, however, 30 kWh/ month of free electricity should be allocated for the below poverty line (BPL) families.

a) Mini-grids for Grid Connected rural Villages

This programme will be applicable to all villages connected to the grids where power availability is less than 6 hours per day averaged over the year.

We propose that 250 MW of mini-grids power plants (50 MW each year) be implemented under this scheme through commercial project developers and social entrepreneurs. The modalities would be as follows:

- The projects will be implemented through bidding. MNRE would invite states to give names of certain number of villages in districts where this programme would be implemented. Bidding would happen for setting-up projects in specified districts. Bidding could be done by the state nodal agencies based on the benchmarks fixed by MNRE.

- The minimum size of each power plant would be 50 kW. More than one villages, if nearby, could be connected to one power plant.

- In each year (2013-2017), therefore, 1000 villages would be covered under the programme.

- As, the villages are already grid-connected, only household level wiring and meter installation would be required. Also, these mini-grids would be grid-interactive. They will export surplus power to the grid and import power to fulfill deficit.

- A single project developer would be entitled for bidding 2 MW worth of projects. Each state would be entitled for 1-5 MW of projects each year based on size and status of electrification.

- Like large grid connected plants, these mini-grids will be entitled for Generation based incentives (GBI) for 25 years. They however would also be entitled for soft-loan (5% interest) for 80% of the capital cost. They will have to put in 20% equity. This financial model will allow lowering of the GBI.

- Their income would be divided into two parts – tariff on units consumed and GBI. The tariff would be collected from households at the conventional electricity rate (Average pooled purchase cost) or on a flat rate basis according to their consumption. For BPL families, MNRE would pay for 30 units of electricity per month.

- GBI would be paid by MNRE. This would be equivalent to the bid GBI minus the tariff charged from the consumers.

- The project developer would be responsible for running the plant, O&M, distribution, metering and tariff collection. A certain portion of the tariff would be set aside for replacement of batteries.

Assuming the bid GBI of Rs 10 per unit (considering that these projects will also be entitled for 80% soft loans) and collection of Rs. 3 per unit as tariff, the GBI to be paid by MNRE for 50 MW of mini-grid projects in the first year (2013) would be about Rs. 40 crore. By the end of 5th year (2017), MNRE would pay Rs. 200 crore/ year as GBI. This is equivalent to less than 7% of the annual cess collection under the National Clean Energy Fund (NCEF). This

would light up at least 5000 villages and more than half a million households. This would also set-up a revolutionary model of decentralized electrification of the country.

b) Mini-grids for remote villages

For remote villages, a similar model as per JNNSM Phase I to continue, with 90 per cent capital subsidy and the state nodal agencies implementing the program. But the monitoring mechanism needs to be strengthened. States need to be pro-active in providing maintenance and operating the power plants.

Tariff should be levied on the end user for operating and maintenance and covering other costs like battery replacement. This can be considered towards their replacement of kerosene costs.

In remote villages where the population density is low and a mini grid solution is not feasible, home lighting systems can be dispersed on interest based subsidy and marginal down payments.

Considering there are 9,000 remote villages in India about 1,800 villages can be taken up each year under this scheme with the remaining ones where it is not practical to have mini grids could be covered through Off-grid solar applications for rural areas.

The experience of Chhattisgarh State Renewable energy Development agency (CREDA) show that the benchmarking cost as specified by MNRE is far lower than the actual cost of the mini-grid and power plants. According to CREDA's calculations, the benchmark costs would meet only about 50% of the actual costs of the mini grid. MNRE therefore needs to revise the benchmark costs so that other states (who do not have resources like CREDA) can also participate in the programme.

Considering a 5 kW power plant would be required to suffice electricity requirement of each village (as most remote villages are small) and a cost of Rs 560 per Watt[1] including transmission and distribution network along with other balance of system costs, the cost of electrifying 9000 villages would be about Rs. 2270 crore.

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1 This is as per the actual financial sheet from CREDA for Mini Grid Projects.

2. Off-grid solar applications for rural and urban areas

These areas still demand solar home systems, lanterns, etc., as back up during grid failure. Individual households can be provided these systems with a combination of interest based subsidy and marginal down payment through an efficient market-linked supply chain. Currently the down payment is expected to be 20 percent of the system cost as per the RBI guidelines. This needs to be brought down to 10 percent in order to encourage users and open the market to a wider range of customers. The payback period can be upto 5 years and the interest rate at 5 % or lower. There is no need for benchmark costs in these cases. Government can put maximum amount per household it is willing to give interest rate subsidy. The market and consumer can decide the size and features of the solution.

What is important here is the rating and certification of the products. Under this programme, only certified products would be eligible for subsidies.

MNRE should set-up an infrastructure for testing, rating and certification of all products. However, certification process should be transparent and accountable and should involve independent technical experts, solution providers and manufacturers in the process.

The experience of the Phase I suggests that the whole process of availing financial subsidies takes more than a year time in case of dealing only with NABARD hence it is suggested that other commercial Banks needs to be incentivized (by increasing their profit margins) for providing financial services through line of credit.

3. Solar heating application

The guideline is silent on financial and institutional arrangement for implementing these solutions. It seems that MNRE is contemplating the continuation of the exiting policy. We would like MNRE to do an evaluation of the success/failures of the existing schemes. As a general remark, we would prefer an interest subsidy regime than a capital subsidy regime.

4. Off grid solar application for Industrial applications

The draft policy is completely silent on how it wants to implement the industrial applications. There are no specific guidelines and no basis has been provided on the figure of “30 per cent” subsidy for industrial applications. We should push solar in idustries through the RPO route and not through subsidy

route. For instance, subsidies must not be provided for telecom towers. It should be made mandatory for telecom towers to use solar (as part of RPO).

5. Solar water pumps programme

These programmes must compulsorily be accompanied and dovetailed with rainwater harvesting programme. Solar water pumps should not be given in groundwater dark zones.

B. Recommendations for Grid-connected projects

1. **Financing: Move to Generation Based Incentive**

The Centre for Science and Environment (CSE) recommends that the usage of Viability Gap Funding (VGF) should be replaced with the Generation Based Incentive (GBI) model. VGF, a capital subsidy, does not incentivise developers to build and operate the most efficient power plants possible. Capital subsidies, such as VGF, have been experimented with in the past by the renewable energy sector and are no longer in vogue globally because of the poor/ sub-par performance of plants under these policies.

The draft itself recognizes the drawbacks of VGF. It states, "If VGF is provided as upfront capital assistance, there is a possibility that project developers would bid aggressively ignoring the long term plant performance" (Page 44). The performance is hardly ameliorated by paying out 25 per cent of the VGF after one year; even with substandard equipment a plant can operate well for one year, but it will hardly do so for 15 or 25 years.

VGF gives an incentive to set up plants with as low capital expenditure as possible, using sub-standard raw material and engineering costs to make the subsidy as large a part of the project capex as possible and to be able to bid for the lowest possible VGF. Under "1.3.10 Key Learnings from Phase-1" the draft states that one of the lessons that should be 'imbibed' is the need for "Better system designing and construction is required to meet challenges of the local conditions."

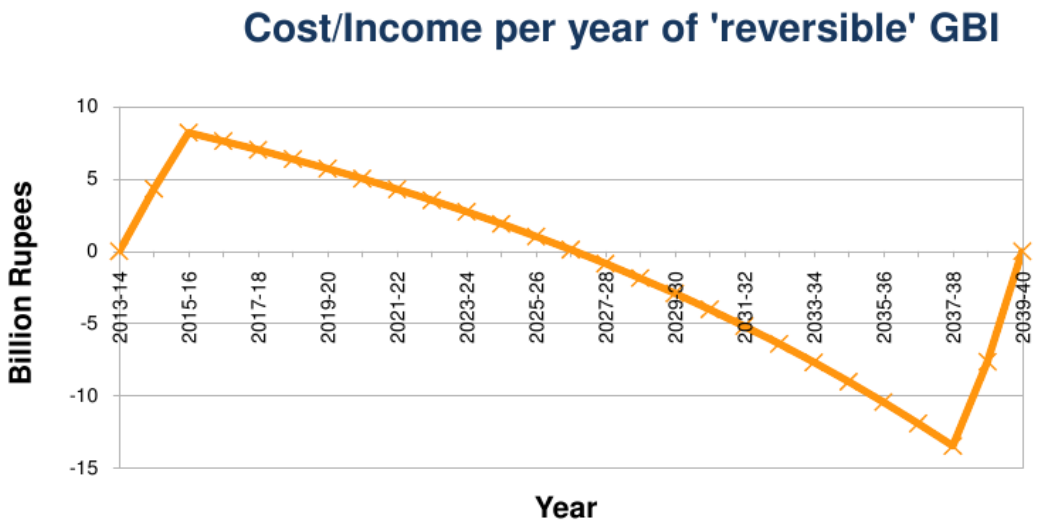
The National Clean Energy Fund (NCEF) does not have to restrict itself to giving capital subsidies like the VGF. Even though VGF is set as NCEFs preferred choice the National Solar Mission is a large enough programme investment that the MNRE, the NCEF IMG and the Ministry of Finance should discuss a change in which financial mechanisms could be allowed.

An alternative to VGF financing directly through NCEF would be for Indian Renewable Energy Development Authority (IREDA) or the Solar Energy Corporation of India (SECI) to set up a financing mechanism that applies for, and receives fixed funding and/or a loan from NCEF either just once or every year and then use this funding to give a GBI (set through reverse bidding for 25 years) to projects on a monthly basis.

A GBI mechanism can be structured in a way that the ministry and the NCEF are able to recover the money paid out in the long run. If SECI/IREDA sign contracts with State Power Utilities (SPUs) stating that the SPU will pay whatever is their averaged pooled power purchase price (as set by the SERCs), or a set tariff with a fixed annual percentage increase, and if the rest of the tariff to the developer is made up of the GBI from the Centre, then the GBI will decrease as the power purchase price increases each year. When the

average power purchase price exceeds the tariff to the developer (as set through reverse-bidding), the difference can be paid back from the state power utilities to the SECI/IREDA managed fund, which in turn could dispense back to NCEF.

According to CSE calculations, the 1520 MW of PV solar now set for VGF would draw about Rs. 3000 crore rupees from the NCEF with no returns. A reversible GBI could on the contrary end up making a compounded total of Rs. 2300 crore rupees.[2]



Alternatively a straight GBI of Rs. 2/KWh[3] would cost the centre about Rs. 500 crore per year, corresponding to about 10-15 % of the NCEF annual collection.

2. **Domestic Content Support: Provide financing package to match the ones being provided by foreign Exim-banks**

CSE recommends that the anti-dumping investigation now ongoing should be fast-tracked to support the Indian solar manufacturing sector in creating a level playing-field. To further create a fair and competitive environment in solar manufacturing CSE recommends that a financing package, in the same style as that of foreign Export-Import (Exim) banks should be made available

2 Assuming a reverse bidding price averaging Rs. 7/KWh, an average power purchase cost for SPUs of Rs. 3.31/KWh in 2013-14 and an increase in power purchase cost of 5.86 per cent per year as per Planning Commission figures.

3 Assuming a bid price averaging at Rs. 7/KWh and a willingness of utilities to buy solar power at Rs. 5/KWh, as per the draft, a GBI of Rs. 2/KWh would be needed.

to developers choosing to use Indian solar cells and modules. Right now a developer taking a loan from an Indian bank may pay up to 13 per cent interest on their loan while Exim banks have given effective rates at 5 per cent, including exposure fees. CSE believes loans at 5 per cent should be provided to solar power developers under JNNSM willing to use Indian solar modules and cells.

Any DCR mandating developers to buy Indian modules and cells will not only lead to higher costs for developers, and thereby higher solar electricity tariffs but may also encourage a stagnant and protectionist industry with little incentive to invest in improving their product. There is also the risk of any DCR being circumvented through re-branding imported cells and modules and forging documentation.

To support all 2520 MW of PV projects under the central commitment a line of credit of Rs. 16000 crore would be needed.[4] This could be extended from the Ministry of Finance through regular banks. This way competition is still open and solar power tariffs are not hit but the field is made level for Indian manufacturers.

Solar Thermal should continue with the DCR from phase-1 but increase the percentage of material sourced from India to 50 per cent of total cost.

3. **Innovative program: Use NCEF funds support for potentially game changing projects instead of solar parks**

CSE recommends that instead of using NCEF funds for solar parks, which removes the benefit of distributive solar power those funds should instead be used to promote innovative projects. NCEF funds should be used for a GBI with a separate reverse-bidding quota for Solar Thermal with thermal storage and canal-top PV projects. Both these technologies have potential to solve some of the largest issues with solar power – dispatchability during evening peak and land-use, respectively.

4. **Land: Leasing and local incentives can create solar farmers**

The 2nd phase must discuss how to improve the benefit to local stakeholders, including farmers. A model should be set up where farmers can lease out their land to solar developers for a monthly fee. This will increase acceptance of solar power projects and give added benefit to those living near solar power projects. Working with local community should be a win-win situation.

4 8 crore/MW as per CERC guidelines, 80% loans give 6.4 crore per MW loan. 6.4 crore by 2520 MW is Rs 16128 crore.

Land subsidies should be avoided as it leads to usage of land-inefficient technology.

5. **Scheduling: Evaluate Solar Thermal and stretch schedule**

The inclusion of Solar Thermal projects in the second phase must depend on whether the projects in the first phase are successful. The majority of the projects would need to be commissioned and a year of generation data would be needed to ascertain if Solar Thermal technology is viable in India. Furthermore a more spread out schedule of commissioning would benefit the manufacturing industry. CSE therefore recommends that the quota for Solar Thermal should be split up evenly over 2015-16 and 2016-17. These quotas should however be converted to PV if it is shown that the 1st phase was not successful in commissioning and generation.

To create a more sustainable demand curve for developers and manufacturers and avoid a spike and then crash market, CSE recommends that the bidding for projects should be stretched over four years rather than two.

CSE recommendation for scheduling 2nd phase of JNNSM:

	2013-14	2014-15	2015-16	2016-17	Total per financing mechanism:
Rooftop - GBI (For Solar Cities)	60 MW PV				60 MW
Bundling	800 MW PV				800 MW
Generation Based Incentive		1100 MW PV	560 MW PV and 540 MW Solar Thermal*	540 MW Solar Thermal*	2740 MW
Total per year:	860 MW	1100 MW	1100	540	3600 MW

*To be converted to PV if 1st Phase Solar Thermal plants are not successful

6. **Rooftop support: Merging RPSSGP, Solar Cities and promoting net-metering**

CSE recommends that the Rooftop PV and Small Solar Power Generation Programme (RPSSGP) should be merged with Solar Cities, giving each city 1 MW capacity for projects only on rooftops. These should be should only be given to cities willing to promote and use net-metering with these projects. The Indian Solar industry needs experience in developing rooftop projects with net-metering and Indian cities need to curtail the growth in energy use; a combined Solar Cities and RPSSGP programme can provide this learning.