

THE NATIONAL SOLAR MISSION

A Practitioner's Perspective



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Executive summary

The development of an ecosystem- through economic, social, institutional arrangements- is of utmost importance in supporting technology dissemination and adequately serving the needs of a community. The National Solar Mission of India has not paid adequate attention to this aspect in its objective to promote off-grid applications of solar energy. This paper brings forward the practitioner's perspective to highlight the barriers within the NSM guidelines, which adversely affect practical implementation.

- Technology specifications curb customization and neglect the needs of the user. Eliminating them and setting more realistic benchmark costs to include maintenance costs would improve effectiveness in dissemination.
- Financing of off-grid applications should be primarily through interest subsidies to make capital more affordable for end-users; lowering the margin requirement on loans for particular economic sections would make financing more accessible.
- Institutional arrangements must ensure that agencies are adequately prepared to effectively handle the solar lending portfolio in order to avoid unwarranted delays in subsidy disbursement. Other relevant ministries of rural development, education or health must capitalize on the positive effects the NSM could have in meeting the objectives of their respective agendas.

Introduction

In the context of developing countries, energy services become catalysts for the socio-economic advancement of communities. The United Nations (UN), by declaring the year 2012 as the 'International Year of Sustainable Energy for All' has brought the focus of attention on the access and provision of these energy services. This initiative is aimed at addressing the Millennium Development Goals by stimulating interest in providing access the underserved populations around the world with access to modern energy sourcesⁱ. India's Jawaharlal Nehru National Solar Mission (NSM)ⁱⁱ under the aegis of the

Ministry of New and Renewable Energy (MNRE) serves as an important policy that could further the objectives of the 'Sustainable Energy For All' campaign. Although originally conceived to improve the country's energy security and address climate change, NSM could be extremely significant in stimulating socio-economic development.

Delivering energy services to the poor requires the establishment of a conducive ecosystem consisting of appropriate technological, financial and institutional arrangements. Although the NSM attempts to address these aspects, there are issues that need to be resolved urgently before implementation through

grass-root level, energy service providers can occur in a sustained fashion. By focusing on a practitioner's perspective, this paper captures the experience on the field and seeks to highlight the obstacles encountered in implementing the NSM. But more importantly, the paper suggests constructive recommendations that will serve to strengthen the NSM moving forward. These recommendations are aimed at being applicable beyond the guidelines of the National Solar Mission to decentralized applications of other renewable energy sources as well.

Technological aspects

The technology requirements of different users are unlikely to be met by a 'one size fits all' approach. Establishing specifications on system components or costs and overlooking the diversity in energy requirements of rural households and commercial establishments would lead to a failure in appropriately meeting user-needs.

- **System Specifications:** The guidelines on eligibility for subsidies lay down model specifications including the wattage of solar panels, battery sizes and fixtures to be used for off-grid productsⁱⁱⁱ. In doing so, the possibilities for customizing technology based on local requirements and using more energy efficient appliances are very limited. This negates the basic belief that users (especially the poor) must be offered choices in the technology being purchased. It also limits the exploration of models more suitable to the financial conditions and energy needs of a vast number of target households.
- **Benchmark costs:** In addition to specifying models and components, the NSM, as it exists today, lists benchmark costs for each available model. The costs are pegged to large Alternating Current (AC) Inverter-based systems, effectively working out to Rs.270 per Watt peak^{iv}. However, off-grid solar for rural applications require smaller Direct Current (DC) based systems where the initial investment is comparatively higher as it includes the cost of fixtures, wiring and DC appliances in addition to the basic system. By using estimates for larger AC-based systems to determine benchmark costs for all Solar Photo Voltaic (SPV) models, the Mission has grossly underestimated the cost of solar electrifica-

tion in existing off-grid rural areas.

- These benchmark costs also fail to consider servicing and maintenance costs of systems in the long run. And in so doing, perpetuate low quality service. A mere mention of a 5 year warranty on the entire system without any attention to details of necessary maintenance, discharge the project implementer of any accountability in ensuring the technical soundness of the system. More importantly, the cost component involved for the implementer or channel partner, in running a financially sustainable enterprise with up-gradation and innovation, has been overlooked in determining benchmark costs.

Recommendation

Solar off-grid systems come with inbuilt provisions of flexibility and scalability, making it is possible to customize solar energy based products prior to their dissemination by assessing the specific needs of users. Guidelines must avoid specifying components to be used within particular models and allow users and project implementers more freedom in making decisions based on requirements and cost-benefit considerations. Ideally, benchmark costs must also be avoided completely to provide the market with an opportunity to include quality components and servicing as part of the complete package for the user. If, however, these costs must be established for budgeting and determining the quantum of subsidies, they must be based on more robust estimations that include costs of solar powering off-grid areas and future system maintenance. Given the above, benchmark costs working out to anything less than Rs. 450 per Watt peak for smaller home lighting systems would make the implementation unsustainable in the long run

Financing aspects

A well-established banking system of more than 70,000 nationalized and rural

bank branches spanning various parts of the country merits active engagement. Leveraging this large network to support disbursement of subsidies and financing for solar is essential in facilitating better access. However, the following issues make implementation problematic.

- **Subsidies:** The existing guidelines provide for a 30% capital subsidy on the benchmark cost and a 5% interest subsidy on a loan taken by the user to finance the remaining amount- once again, the benchmark cost determines the maximum loan amount eligible for such a subsidy^v. Given that the most basic system costs twice the established benchmark cost, users are having to take two separate loans- one at a subsidized interest rate of 5% and another at the market rate of approximately 12%. This not only makes the purchase of a solar system more cumbersome to the user than is estimated by the NSM, it also increases the paper work that banks must engage in to process such loans. Hence, underestimated benchmark costs coupled with the complications of two separate financing schemes have disincentivised lending for small scale solar applications. Reluctance on the part of banks to finance these systems, given the above-mentioned complications, has led to a substantial dip in the adoption of solar systems by rural households- contradictory to the objectives of the National Solar Mission.
- **Margin requirements on loans:** Availing of solar systems today has become harder for the poorest sections as the margin requirement has increased from 15% prior to the NSM to 20% today. From the point of view of the banking sector, this would, understandably, reduce the financial risk and increase the security of lending to the low-

est income groups. However, from the borrower's point of view, the increased margin adds another eligibility criterion in purchasing solar home lighting systems and increases the barriers to accessing energy. Consequently, the task of convincing poorer households to opt for such a technology becomes an arduous task for any channel partner keen on introducing and increasing energy access to the poor.

Recommendation

Decentralized procedures, localized financing and simple, user-friendly mechanisms of availing subsidies and accessing capital will support the dissemination of solar off-grid technology. As a matter of fundamental policy to increase access to energy for all, particularly for the lowest economic sections, the NSM should aim to reduce, rather than increase, the barriers to access. This includes 1) Reduction in the margin requirement on any loan taken for off-grid solar applications, and 2) Eliminating the complications of processing two separate loans at two separate rates of interest by diverting all earmarked subsidies towards interest rates and doing away with the capital subsidy altogether. This would provide access to loans at more favourable rates of interests and could simplify the process, benefitting users as well as implementing organizations. Removal of capital subsidies also prevents the likelihood of any bogus sales and on paper installations undertaken purely for the purpose of availing the subsidy.

Institutional arrangements

Institutional capacity must support rural development as a whole with due attention to reducing the procedural constraints involved in programme implementation. The number of agencies directly involved in the channel for flow of money and in implement-

ing the NSM guidelines must be balanced with the transaction costs involved and time consumed in the process. Provision of solar-based rural electrification to poorer households would be futile without the presence of supportive economic and social infrastructure. In this context, an integrated approach to rural development, where efforts of all relevant ministries are complementary, is more likely to lead to significant improvements in rural living standards.

- **Role of NABARD:** The MNRE has designated the Indian Renewable Energy Development Agency (IREDA) as the fund-manager for funds allocated annually under the NSM, while the National Agricultural and Rural Development Bank (NABARD) acts as the intermediary between the IREDA and various nationalized and rural banks in disbursing allocated subsidies^{vi}! While this may have been done to add liquidity in the banking system and reduce paper work for the MNRE, NABARD with little expertise or experience in lending under the solar portfolio has formed an additional tier in the process. Despite this portfolio being handled for more than 18 months, the process of subsidy disbursements has not been systematized, adversely affecting implementation. Routing subsidies through the banking system of the country is acknowledged as an effective financing mechanism that improves access to capital amongst rural users and financial institutions. However, the inclusion of NABARD has increased the tiers of decision making and paper work and slowed down the delivery process. Although a decision was taken to sanction advance subsidies on a yearly basis to banks that are actively engaged in solar lending, the implementation has been far from satisfactory. Thus banks are forced to wait for months together post project implementation for subsidies to

be sanctioned by the government. Such experiences have led to the withholding of subsidies at different levels in the process despite completion of the project affecting the financials of local banks, channel partners and project implementers. The entire approval process is time consuming and NABARD's lack of expertise in the area only exacerbates the situation.

- **Synergies across Ministries:** The onus of meeting targets and objectives of the National solar mission is laid exclusively on the MNRE. Other relevant ministries including the Ministry of Rural Development, Ministry of Education, Ministry of Power in partnership with the MNRE could contribute to goal-achievement and benefit from impacts of the NSM. These ministries should capitalize on the benefits that can be acquired through rural solar-based electrification in forwarding their own agendas.

Recommendation

MNRE should work on direct subsidy disbursement during this first phase of the NSM by developing a group of in-house financing experts, to reduce the number of levels of approvals and decision making. In the past, the Ministry successfully disbursed interest subsidies on loans for solar water heating systems, circumventing all other agencies. A single branch functioned as a nodal agency for the bank, consolidating all subsidy claims made by that particular bank's branches across the country and submitting them for sanction to the IREDA on a quarterly basis. A similar model could be used in this initial phase of the Mission. Once established and systematized, NABARD could take over the process. This would also give NABARD the time required to familiarize itself with the operational and financial details of lending under the solar portfolio.

Alternatively, NABARD as an agency for rural development must be apprised, at the earliest, on the latest technological developments and other details in the field of solar power. This would help increase their capacity and efficiency in handling off-grid solar project financing. Other relevant ministries and departments must be made aware of the value-added to their respective agendas in encouraging the objectives of the Solar Mission. They should capitalize on the beneficial impacts- socio-economic including improvements in education, health of users or additional income generation; financial inclusion; access to new technology. And this would motivate them to actively campaign for the implementation of off-grid solar projects in suitable areas. They must also work towards establishing a foundation where solar dissemination would be a sustainable means of providing energy services in the long run. Better coordination would help reap the benefits of synergies among Government bodies and departments.

Conclusion

A policy of the magnitude of the National Solar Mission cannot hope to be successful without the creation of an appropriate ecosystem. This paper highlights the various facets involved in developing this ecosystem that have been overlooked by the guidelines on off-grid applications of solar energy. Making appropriate technology available for the poor requires that their needs be assessed and customized technology choices offered. Eliminating component specifications for solar models and applying more robust estimations to include maintenance and servicing costs to arrive at benchmark costs for such models would aid efficient technology deployment. This technology must be supported by financing mechanisms that are practical and effective. Diverting all capital subsidies towards interest subsidies on loans and lowering margin requirements would benefit the end-user and reduce the paper work involved for banks. For all of the above to function effectively, the institutional mechanisms must be well

established. Agencies actively involved in the Mission must be apprised on the technological aspects of solar and the initial phases of the NSM should, ideally, be implemented through tried and tested administrative processes. This would facilitate systematization, reduce time consumed in procedural aspects and increase efficiency in the near term. Finally, Government Ministries whose agendas coincide with the incidental benefits arising through solar must be made aware of the same and must play an active role in increasing support for decentralized applications of solar and other renewable energy technologies. The suggestions made through this paper on technological, financing and institutional arrangements go beyond solar energy and are aimed at being applicable across the board to decentralized applications of other renewable energy sources as well. They emphasize the urgency in enhancing the effectiveness of the NSM, in general and improving energy service provision to under-served communities of the country, in particular.

Endnotes

- i United Nations General Assembly (2012), "The Sustainable Energy For All Initiative", Last accessed January 5, 2012 from <http://www.sustainableenergyforall.org/>
- ii JNNSM (or simply, NSM), an initiative by the government of India launched under the National Action Plan on Climate Change, aims at deployment of 20,000MW of solar energy in the country by 2022, of which 2000MW will be through off-grid solar applications. <http://www.mnre.gov.in/>
- iii NABARD (2010), "Capital Subsidy-cum-Refinance Scheme for Installation of Solar Off-grid (Photo-voltaic and thermal) & Decentralised applications under the Jawaharlal Nehru National solar Mission of the Ministry of New and Renewable Energy, Government of India", NABARD, Last accessed January 6, 2012.
- iv MNRE (2011), "Revised Capital Subsidy and Benchmark Cost of the SPV System [with effect from] 1 April 2011", Government of India, Last accessed January 6, 2012.
- v NABARD (2010), "Capital Subsidy-cum-Refinance Scheme for Installation of Solar Off-grid (Photo-voltaic and thermal) & Decentralised applications under the Jawaharlal Nehru National solar Mission of the Ministry of New and Renewable Energy, Government of India", NABARD, Last accessed January 6, 2012.
- vi MNRE (2011), "Jawaharlal Nehru National Solar Mission- Marching Ahead", Akshay Urja 4 (2):13-15.

About SELCO

SELCO Solar Pvt. Ltd. is a social enterprise, providing sustainable energy solutions and services to under-served households and businesses. It was conceived in an effort to dispel myths associated with the affordability of sustainable technologies by the poor and the rural sector. SELCO aims to empower its customers by providing a complete package of product, service and consumer financing through Grameena (rural) banks, cooperative societies, commercial banks and micro-finance institutions.

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