JAWAHARLAL NEHRU NATIONAL SOLAR MISSION

BUILDING SOLAR INDIA

GUIDELINES FOR OFF-GRID AND DECENTRALIZED SOLAR APPLICATIONS AND ROOFTOP AND OTHER SMALL SOLAR POWER PLANTS

The Government of India has recently launched the JNNSM (Jawaharlal Nehru National Solar Mission). It is a major initiative of the central and the state governments to promote ecologically sustainable growth, while addressing India's energy security challenge. It will also constitute a major contribution by the country to the global effort to meet the challenges of climate change.

Guidelines for off-grid and decentralized solar applications

The immediate aim of the JNNSM is to focus on setting up an enabling environment for solar technology penetration in the country, both at centralized and decentralized levels. The first phase (up to March 2013) will, inter alia, focus on promoting off-grid systems, including hybrid systems to meet/supplement power, heating, and cooling energy requirements. These systems still require interventions to bring down costs, but the key challenge is to provide an enabling framework and support for entrepreneurs to develop markets.

In order to create a sustained interest within the investor community, it is proposed to support viable business models. Flexibility is an integral feature of this scheme. The scheme is completely demand-driven, as it offers a bouquet of incentive instruments, from which eligible entities can tailor a package appropriate to their needs and circumstances, within the boundary conditions of the scheme.

Objectives

1. To promote off-grid applications of solar energy [both SPV (solar photovoltaic) and solar thermal] for meeting the targets set in the JNNSM for Phase-I.
2. To create awareness and demonstrate effective and innovative use of solar systems for individual/community/institutional/industrial applications.
3. To encourage innovation in addressing market needs and promoting sustainable business models.
4. To provide support to channel partners and potential beneficiaries, within the framework of boundary conditions and in a flexible demand driven mode.
5. To create a paradigm shift needed for commoditization of off-grid decentralized solar applications.
6. To support consultancy services, seminars, symposia, capacity building, awareness campaigns, human resource development, and so on.
7. To encourage replacement of kerosene and diesel, wherever possible.

Scope of the scheme

The scheme would be applicable to all parts of India and would, to begin with, be co-terminus with Phase-I of the JNNSM and will, inter alia, focus on promoting off-grid and decentralized systems, including hybrid systems to meet/supplement lighting, electricity/power, heating, and cooling energy requirements. In respect of hybrid systems for which there is a specific scheme (for example wind solar), provisions thereof would apply. However, in respect of hybrids for which there is no specific scheme [that is with other RE (renewable energy) components], the scheme for the respective off-grid renewable source would be the basis for calculating the subsidy. Initially, only solar wind–solar hybrid and solar bioenergy hybrids would get considered under the scheme, but the PAC (Project Appraisal OR APPROVAL Committee) could also examine other feasible hybrid technologies for inclusion in the scheme.

Various off-grid SPV systems/applications up to a maximum capacity of 100 kWp (kilowatt-peak) per site and off-grid and decentralized solar thermal applications, to meet/supplement lighting, electricity/power, heating, and cooling energy requirements would be eligible for being covered under the Scheme. For mini-grids for rural electrification, applications up to a maximum capacity of 250 kW per site would be supported.

Soft loans for projects, including a component for working capital, will be available to SME (small and medium enterprises) manufacturers of solar thermal systems and balance of systems manufacturers for SPV (excluding battery manufacturers), in order to promote technology upgradation, improvement in technology, expansion in production facilities, and so on through refinance facility implemented

through IREDA (Indian Renewable Energy Development Agency).

Boundary conditions for the scheme are given at Annexure IA and IB.

A provision of 3% of the annual budgeted outlay for scheme shall be made for administrative expenditure; evaluation and other studies; seminars; information dissemination; information, education, and communication (IEC) activities; capacity building; support for putting in IT-enabled (information technology-enabled) monitoring mechanisms; and so on. An incentive scheme for banks has been detailed out in Annexure 2.

Implementation arrangements

The Scheme would be implemented through multiple channel partners for rapid upscaling in an inclusive mode. It is envisaged that the channel partners would enable significant reduction in transaction cost and time, as without these arrangements, individuals and small groups of clients may not be in a position to access the provisions of the scheme. Channel partners that would be used for implementation may include the following.

a) RESCOs (renewable energy service providing companies)
b) FIs (Financial institutions), including MFIs (microfinance institutions) acting as aggregators
c) Financial integrators
d) System integrators
e) Programme administrators

The details of the channel partners are as under.

a) RESCOs

These are companies that would install, own, and operate RE systems and provide energy services to consumers. These entities may tie up with FIs for accessing the financial support under the scheme.

b) FIs, including MFIs acting as aggregators

These would be institutions that are involved in consumer finance and have established base of customers in rural/urban areas and outreach through self help groups and so on. These would typically access interest subsidy through refinance facility, as also credit-linked capital subsidy on behalf of their borrowers from IREDA.

c) Financial Integrators

These are entities that would integrate different sources of finance, including carbon finance, government assistance, and other sources of funds to design financial products/instruments, and make these available to their clients at an affordable cost. These entities would tie up with manufacturers and service providers.

d) System Integrators

These are companies/entities that would provide RE systems and services to clients, including design, supply, integration and installation, O&M (Operations and Maintenance), and other services. These entities may tie up with FIs for accessing the financial support under the scheme.

e) Programme Administrators

These would include, inter alia, central and state government ministries and departments and their organizations, state nodal agencies, utilities, local bodies, PSUs (Public Sector Undertakings) and reputed NGOs (non-governmental organizations). These entities would directly implement the scheme and access capital subsidy (non-credit linked) from the MNRE (Ministry of New and Renewable Energy).

The various channel partners who can participate in this Scheme have been described above and a transparent methodology for accrediting these entities by the MNRE would be put in place. The parameters for accrediting an entity could comprise of the following.

a) Net worth/turnover of the participating entity
b) Technical capability for carrying out services which would, inter alia, include site selection, feasibility study, design, value engineering, cost optimization, time scheduling, procurement, installation/commissioning, and O&M functions
c) Credit rating, if any
d) Track record
e) Tie-ups with equipment providers

The accreditation process would categorize the various entities into grades, which would determine the quantum of work in terms of financial limits that they could undertake under the Scheme. This process would also enable inclusion of start ups with the requisite technical and installation skills. There would be a provision for upgradation and down-gradation, commensurate with their performance in implementing projects under this Scheme. Reputed rating agencies would be involved by the MNRE.

An opportunity would be provided for young entrepreneurs to participate as channel partners, in order to tap their creative potential as innovators. Separate templates on eligibility of different channel partners would be evolved.

Funding pattern

Funding under the Scheme would be in 'project mode', that is, there must be a project report which would, inter alia, include client details, technical and financial details, and O&M and monitoring arrangements. The total project cost shall be funded through a mix of debt and incentives, where the promoters' equity contribution would be at least 20% (unless otherwise specified). Techno-economic specifications for a minimum cut-off level for the requirement of the project mode would be specified by the MNRE.

The MNRE would provide financial support through a combination of 30% subsidy and/or 5% interest bearing loans. The benchmark project cost for 2010/11 have been worked out for these systems, and the CFA (central financial assistance) of 30% thereof has been defined in the boundary conditions, as detailed in Annexure 1A and 1 B.

For the year 2010/11, the benchmark price for PV systems with battery back-up support is considered as Rs 300 per Wp (watt-peak). In case of systems that do not use storage battery, such as water pumping systems, the installed PV system cost is considered as a maximum of Rs 210 per Wp.

Capital subsidy of 90% of the benchmark cost would be available for special category states, viz. the northeastern states, Jammu and Kashmir, Himachal Pradesh, and Uttarakhand. In addition, it would be extended for setting up only standalone rural solar power plants/ packs (both PV and thermal) in remote and difficult areas such as Lakshadweep, Andaman and Nicobar Islands, and districts on India's international borders. However, for funding solar thermal systems in these areas, the subsidy would be limited to 60% for all categories of beneficiaries. The subsidy pattern detailed above can be accessed by only central and state government ministries, departments, and their organizations, state nodal agencies, and local bodies.

There would be a provision for channel partners, operating in the market mode to access a combination of capital subsidy and a low-cost interest for the end consumer, provided they can tie up with a lending institution. These lending institutions could, then, enter into an agreement for refinance/interest subvention with IREDA. The MNRE would provide IREDA fund handling charges at the rate of 2% for the capital subsidy/interest subvention portion.

Funds received by IREDA from the MNRE without cost may be made available by it for PAC-approved projects, directly at an interest rate not exceeding 5% per annum, as also by way of refinance to the primary lending institutions at a rate of interest not exceeding 2% per annum, subject to the condition that the rate of interest charged by the lending institution to the borrower in respect of the loan does not exceed 5% per annum.

The interest subsidy under the Scheme would be made available to NBFCs (non-banking financial companies) and scheduled commercial banks (excluding regional rural banks) by way of refinance from IREDA.

IREDA would also make available funds received from the MNRE under this Scheme to NABARD (National Bank for Agriculture and Rural Development), NHB (National Housing Bank), SIDBI (Small Industries Development Bank of India), and any other institution as may be specified by the MNRE in this regard, for providing refinance on the same terms, to regional rural banks, housing finance companies, or any other primary lending institutions included by them in their respective refinance schemes. The MNRE would provide a service charge of 0.5% to IREDA for this.

The MNRE would also fund IREDA for meeting the expenditure towards the development of software and hardware, based on an estimate provided by IREDA, for implementing and monitoring the scheme effectively. IREDA would present an audited annual statement of accounts.

Three per cent of the CFA would be admissible as service charges to programme administrators. For projects that involve civil society organizations and are aimed at the poor strata of society – for example, projects for deploying solar lanterns/home-lighting systems with small wattage and solar cookers – up to 10% of the CFA would be admissible as institutional charges. These would be provided by the MNRE, in addition to the CFA.

The CFA from the MNRE would not preclude the channel partners from availing other fiscal and financial benefits being provided by central and state governments and any other agency, so long as the same is clearly disclosed in the project report. This is to avoid multiple financing.

Bouquet of incentive instruments

In the interest of sustaining satisfactory performance and generating output in the envisaged energy forms, a flexible funding approach can be considered from the following bouquet of instruments.

a) RE Voucher/Stamp

A transaction-cost-free redeemable financial instrument, denominated in physical or monetary units. Placed in the hands of ultimate beneficiary, it empowers him by giving him enhanced degree of freedom to choose. Hence, it can be used as an effective instrument to gauge and enhance consumer satisfaction at the retail level.

b) Capital Subsidy (credit linked and non-credit linked)

An instrument that lightens the burden of financing the initial project cost to enable financial closure of viable business proposition.

c) Interest Subsidy

An instrument aimed at neutralizing the high cost of capital given after due diligence of credit appraisal by FIs, NBFC, and MFIs.

d) Viability Gap Funding

Financial support provided mostly in the form of initial grant in one or more installments to finance the project cost, so as to create a viable business model. PPP (Purchasing power parity) scheme of the Ministry of Finance has this arrangement for physical infrastructure projects. It is supplemented by similar arrangement at the state level.

e) Green Energy Bonds

A form of low-interest-bearing, long-term redeemable security, which could be issued by IREDA/MNRE for RE projects. *Analogy: Infrastructure Bond/Gold Bonds*.

These would adhere to the boundary conditions specified and would be available individually or in combination (to the borrowers, in case of credit-linked subsidy) through all channel partners, in addition to any fiscal benefits available to the sector.

Release of funds

The release of funds for the project shall be back-ended as reimbursement on completion and verification thereof. However, for programme administrators, the release of funds could be front-ended, with installments of 70% on sanction and 30% on completion. This could be extended to other entities on provision of appropriate sureties.

In respect to credit-linked capital subsidy and interest subsidy, the scheme would be implemented through IREDA,

which will be the designated nodal agency for disbursement of funds.

The MNRE would place 50% of the estimated annual requirement of funds with IREDA upfront at the beginning of the year. The balance 50% would be released as second and final tranche of the annual requirement to IREDA, after receipt of Utilization Certificate, of not less than 50% of the first tranche released to IREDA. While releasing the second tranche, the MNRE would take into consideration, revision in initial annual estimate (if any) for appropriate funding. IREDA would present an audited annual statement of accounts.

Approval mechanism

The committee constituted by the MNRE would approve the project within 45 days of receiving the project. Deficiency, if any, would be communicated in writing to the proposer/channel partner within 30 days. The committee would then, on receipt of clear proposal, approve the proposal. The project proposals shall be considered and sanctioned by a PAC. This committee would provide approval, as also review progress. The entire process of receiving proposals, processing them, and giving approvals would be IT enabled. The committee would also frame rules and prescribe formats and so on for project approval, within the overall framework of this scheme, so as to make the process transparent.

PMC (Project Management Consultant)

The government would engage a reputed agency as a PMC. This agency would handle all the processes, like assistance in formulation, appraisal, and screening of proposals preceding the formal approval, which would be a sovereign function of the MNRE. It would assist the MNRE in formulating the detailed implementation guidelines/formats, if any.

Monitoring and evaluation

Information and communication technology must form the backbone of monitoring system. Since the Scheme envisages IT-enabled monitoring and verification protocols, 5% of the total project cost would be available to the various channels partners for compliance. It is proposed that the monitoring is done as under.

i) At the primary level of monitoring, channelpartnerswouldberesponsible for monitoring parameters such as end-use verification and KYC (know your client) compliance, and also, compilation of statistical information as one time MIS (management information system) for all credit linked cases.

ii) As an additional level of monitoring, reputed civil society groups, eminent persons, corporate houses (as an activity under Corporate Social Responsibility), State Nodal Agencies and MNRE officials would be involved for ground-truthing on random sample basis.

iii) For projects with applications above 10 kW, the system providers would also make available generation data to the MNRE at intervals specified.

It is envisaged that certified energy auditors, scheme monitors, and others would be empanelled for certifying whether the outputs of the system correspond to the parameters laid down in the in-principle approval for non-credit linked projects.

Technical requirements

1) The scheme would require the project proponents to strictly adhere to the national/international standards specified by the MNRE from time to time.

2) The use of imported complete PV systems will not be permitted under the scheme. However, use of imported components of a complete PV system would be permitted, subject to adequate disclosure and compliance to specified quality norms and standards.
3) The minimal technical requirements and quality standards in respect of the off-grid SPV power plants/ systems are given in Annexure-3. These will come into effect from 1 September 2010, to allow sufficient time to the SPV industry to gear up for the same. Existing guidelines with regard to technical requirements/ quality standards under the MNRE's SPV programmes will be valid during the interim period.
4) The existing national standards/ MNRE specifications in respect of solar thermal components/systems are given in Annexure-4.

Supporting innovation

The MNRE could provide 100% CFA for undertaking pilot and demonstration projects through manufacturers and other organizations for demonstrating new and innovative applications of solar systems.

Interpretation of the Guidelines

In case of any ambiguity in interpretation of any of the provisions of these guidelines, the decision of the MNRE shall be final.

Review

The scheme would be reviewed by an Internal Review Committee at six month/yearly interval, and modifications therein would be incorporated by the MNRE.

In addition, a platform for experts to discuss best practices, debate over issues to overcome bottlenecks, and provide effective policy suggestions for ensuring widespread off-grid solar solutions deployment would also be established at the national level.

ANNEXURES

ANNEXURE -1A

BOUNDARY CONDITIONS FOR SUPPORT TO OFF-GRID SPV APPLICATIONS

1	Individuals		
A	All applications except 1B	1 kWp	Capital Subsidy and Interest Subsidy
B	Pumps for irrigation and community drinking water	5 kWp	
2	Non-commercial entities		
A	All applications except 2B	100 kWp per site	Capital Subsidy and Interest Subsidy
B	Mini-grids for rural electrification	250 kWp per site	
3	Industrial/Commercial entities		
A	All applications except 3B	100 kWp per site	Capital Subsidy or Interest Subsidy
B	Mini-grids for rural electrification	250 kWp per site	
Scale of Capital Subsidy			
Based on benchmarking annually		Rs 90/Wp	With battery storage
		Rs 70/Wp	Without battery storage
Scale of Interest Subsidy			
		Soft loan @5% per annum	on the amount of project cost
			less promoters' contribution
			less capital subsidy amount
Use of the best/competitive and innovative technologies available globally would be allowed, subject to standards and technical parameters, laid down by the MNRE. To meet unmet community demand for electricity or in unelectrified rural areas, standalone rural SPV power plants with battery storage in a micro grid mode/local distribution network, would be provided Rs 150/Wp of capital subsidy and soft loan at 5%.			

ANNEXURE-1B		
BOUNDARY CONDITIONS FOR SUPPORT TO OFF-GRID SOLAR THERMAL APPLICATIONS		
S. No.	Solar Collector type	Capital subsidy/Collector area (Rs/sq m)
1	Evacuated Tube Collectors (ETCs)	3000
2	Flat Plate Collectors (FPC) with liquid as the working fluid	3300
3	Flat Plate Collectors with air as the working fluid	2400
4	Solar collector system for direct heating applications	3600
5	Concentrator with manual tracking	2100
6	Non-imaging concentrators	3600
7	Concentrator with single axis tracking	5400
8	Concentrator with double axis tracking	6000

1. The capital subsidy/unit collector area, as given above, is based on 30% of the benchmark costs, which would be reviewed annually. Capital subsidy would be computed based on the applicable type of solar collector multiplied by the collector area involved in a given solar thermal application/project.
2. Besides the capital subsidy as proposed above, the pattern of support could include a soft loan at 5%, as under:

a) Soft loan @5% interest would be available, inter alia, for balance cost, which may comprise installation charges, cost of civil work for large systems, and costs of accessories (viz. insulating pipeline, electric pump, controllers and valves, additional water tanks, blower for air heating systems, drying trays for solar dryers, steam system, and so on), and so on.

b) To meet unmet demand for electricity and thermal energy or in unelectrified rural areas, solar thermal power plants and local distribution network would be provided capital subsidy of 60% and soft loan at 5%. These could be in either stand alone or co-/poly-generation mode.

ANNEXURE 2				
INCENTIVE FOR PROMOTIONAL ACTIVITIES BY BANKS/FIs FOR EXTENDING LOANS FOR PURCHASE OF SOLAR LIGHTS AND OTHER SMALL SOLAR OFF GRID SYSTEMS				
The range of no. of systems to be financed by the banks in a year	3000–8000	8001–16 000	16 001–30 000	Above 30 000
Minimum amount of lending to be eligible for seeking incentives				
Minimum lending amount per year for the system	Rs 3 crores	Rs 8 crores	Rs 16 crores	Rs 30 crores
Incentives for various activities				
Capacity building	Rs 3 lakh	Rs 4 lakh	Rs 5 lakh	Rs 10 lakh
Awareness generation	Rs 15 lakh	Rs 20 lakh	Rs 25 lakh	Rs 40 lakh
Cash prizes for best 3 branches	Rs 3 lakh	Rs 3.5 lakh	Rs 5 lakh	Rs 10 lakh
One time incentive to banks/FIs participating for the first time in the scheme				
Documentation of best practices	Rs 2 lakh	Rs 2 lakh	Rs 3 lakh	Rs 5 lakh
Preparation of manuals for procedures, software, and so on	Rs 2 lakh	Rs 2 lakh	Rs 3 lakh	Rs 5 lakh
Monitoring and Learning	Rs 2 lakh	Rs 3 lakh	Rs 5 lakh	Rs 10 lakh
In addition to above, cash prize will be given @ Rs 1 lakh to the village/village panchayat, wherein village/villages have a coverage of 75% or more through solar lighting systems by the banks/FI. The panchayats will be encouraged to utilize this money to purchase solar street lights or other devices for use of the village community. The prize money could be routed through bank/FI to the village/village panchayat.				

ANNEXURE-3

MINIMAL TECHNICAL REQUIREMENTS/STANDARDS FOR OFF-GRID/STANDALONE SPV POWER PLANTS/ SYSTEMS TO BE DEPLOYED UNDER THE NATIONAL SOLAR MISSION

1. PV Modules

1.1 The PV modules must conform to the latest edition of any of the following IEC/equivalent BIS standards for PV module design qualification and type approval:

Crystalline Silicon Terrestrial PV modules	IEC 61215/IS 14286
Thin Film Terrestrial PV modules	IEC 61646
Concentrator PV modules and Assemblies	IEC 62108

1.2 In addition, the modules must conform to IEC 61730 Part 1 – requirements for construction – and Part 2 – requirements for testing for safety qualification.

1.3 PV modules to be used in a highly corrosive atmosphere (coastal areas, for example) must qualify Salt Mist Corrosion Testing, as per IEC 61701.

2. BoS (Balance of System) items/components

2.1 The BoS items/components of the SPV power plants/systems deployed under the Mission must conform to the latest edition of IEC/equivalent BIS standards, as specified below.

BoS item/component	Applicable IEC/equivalent BIS standard	
	Standard Description	Standard Number
Power Conditioners/ Inverters*	Efficiency Measurements Environmental Testing	IEC 61683
		IEC 60068 2 (6, 21, 27, 30, 75, 78)
Charge controller/ MPPT units*	Design Qualification Environmental Testing	IEC 62093
		IEC 60068 2 (6, 21, 27, 30, 75, 78)
Storage Batteries	General Requirements and Methods of Test	IEC 61427
	Tubular Lead Acid	IS 1651/ IS 13369
Cables	General Test and Measuring Methods	IEC 60189
	PVC insulated cables for working Voltages upto and including 1100 V	IS 694 / IS 1554
	-Do-, UV resistant for outdoor installation	IS/IEC 69947
Switches/Circuit Breakers/ Connectors	General Requirements	IS/IEC 60947 part I, II, and III
	Connectors- safety	EN 50521
Junction Boxes/Enclosures	General Requirements	IP 65 (for outdoor)/IP 21 (for indoor) IEC 62208
SPV System Design	PV Standalone Systems design verification	IEC 62124
Installation Practices	Electrical installations of buildings— Requirements for SPV power supply systems	IEC 60364-7-712
* Must additionally conform to the relevant national/international Electrical Safety Standards.		

3. Authorized testing laboratories/centres

3.1 The PV modules must be tested and approved by one of the IEC authorized test centres. Test certificates can be from any of the NABL/BIS Accredited Testing/Calibration Laboratories. Qualification test certificate as per IEC standard, issued by the Solar Energy Centre for small capacity modules upto 37 Wp capacity will also be valid.

3.2 Test certificates for the BoS items/components can be from any of the NABL/BIS Accredited Testing/Calibration Laboratories/ MNRE-approved test centres. The list of the MNRE-approved test centres will be reviewed and updated from time to time.

4. Warranty

4.1 The mechanical structures, electrical works, including power conditioners/inverters/charge controllers/maximum power point tracker units/distribution boards/digital meters/switchgear/storage batteries, and so on, and overall workmanship of the SPV power plants/systems must be warranted against any manufacturing/design/installation defects for a minimum period of five years.

4.2 PV modules used in solar power plants/systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.

5. Identification and traceability

5.1 Each PV module used in any solar power project must use a RFID (RF identification tag), which must contain the following information. The RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions.

I. Name of the manufacturer of PV module
II. Name of the manufacturer of solar cells
III. Month and year of the manufacture (separately for solar cells and module)
IV. Country of origin (separately for solar cells and module)
V. I-V curve for the module
VI. Peak Wattage, Im, Vm, and FF for the module
VII. Unique serial number and model number of the module
VIII. Date and year of obtaining the IEC PV module qualification certificate
IX. Name of the test lab issuing the IEC certificate
X. Other relevant information on traceability of solar cells and module, as per the ISO 9000 series.

ANNEXURE 4

PRESENTLY AVAILABLE NATIONAL STANDARDS/MNRE SPECIFICATIONS ON SOLAR THERMAL COMPONENTS/ SYSTEMS

A) Indian Standards

National Standards are brought out by the BIS. The details of these standards, which contain minimum performance requirements, along with test methods, are as follows.

1. Solar Flat Plate Collectors

a) IS 12933 (Part 1): 2003, Solar flat plate collector - Specification, Part 1- Requirements.
b) IS 12933 (Part 2): 2003, Solar flat plate collector -Specification, Part 2 -Components.
c) IS 12933 (Part 3): 2003, Solar flat plate collector -Specification, Part 3 -Measuring instruments.
d) IS 12933 (Part 5): 2003, Solar flat plate collector -Specification, Part 5 -Test methods.

These standards do not apply to concentrating and unglazed collectors and built-in storage water heating systems.

2. Box-type Solar Cookers

a) IS 13429 (Part 1): 2000, Solar cooker-Box type - Specification, Part 1 -Requirements.
b) IS 13429 (Part 2): 2000, Solar cooker- Box type - Specification, Part 2 -Components.
c) IS 13429 (Part 3): 2000, Solar cooker- Box type - Specification, Part 3 -Test methods.

B) MNRE Specifications (Available on the MNRE website www.mnre.gov.in)

1. Test Procedure for solar dish cookers
2. Test procedure for Thermosyphon-type domestic solar Hot Water Systems

C) Testing Laboratories/Centres

1. In order to make available quality product in the market, the MNRE works with BIS and Quality Council of India. Presently, Indian standards are available for solar flat plate collectors and box-type solar cookers, and the BIS implements a testing and certification programme, which forms the basis of the certification of these products by the BIS.

2. For domestic-size solar water heating systems based on thermosyphon mode of operation, the MNRE has supported development of a test protocol, with certain minimum performance requirements. For solar dish cookers, the ministry has defined minimum specifications and has brought out a test procedure. In addition, the ministry empanels manufacturers of solar water heating systems based on evacuated tube collectors.
3. There is a network of test centres in the country, which is recognized by the BIS for carrying out certification testing, as per the Indian standards. The detail of these test centres are available on the MNRE website and is updated from time to time.
4. The solar thermal devices/systems must be tested at one of these test centres.

Guidelines for rooftop and other small solar power plants connected to distribution network (below 33 kv)

In order to give a thrust to rooftop PV and other small solar power plants connected at distribution network at voltage levels below 33 kV, as envisaged under Phase I of the JNNSM, the MNRE proposes to launch a programme on GBI (generation based incentives). Hereinafter, the programme shall be referred to as 'RPSSGP (Rooftop PV and Small Solar Power Generation Programme)'. The key features of the programme are as under.

- The project proponents would be selected as per these guidelines for development of solar power projects to be connected to distribution network at voltage levels below 33 kV.
- The projects should be designed for completion before 31 March 2013.
- The local distribution utility, in whose area the plant is located, would sign a PPA (Power Purchase Agreement) with the project proponent at a tariff determined by the appropriate SERC (State Electricity Regulatory Commission).

Explanation: Project schemes from states wherein tariff tenure for duration of 25 years with tariff structure on levellized basis has been determined by SERCs shall alone be considered to be eligible to participate in the RPSSGP.

GBI will be payable to the distribution utility for power purchased from solar power project selected under these guidelines, including captive consumption of solar power generated [to be measured on AC (alternating current) side of the inverter]. The GBI shall be equal to the difference between the tariff determined by the CERC (Central Electricity Regulatory Commission) and the base rate of Rs 5.50 per kWh (for the financial year 2010/11), which shall be escalated by 3% every year.

Explanation: Base rate of Rs 5.50/ unit to be considered for the purpose of computation of GBI shall remain constant over the duration of 25 years. Thus, the GBI determined for a project (which is the difference of CERC-determined tariff and base rate) shall remain constant for the entire duration of 25 years.

Base rate for projects to be commissioned during each subsequent year shall also be modified at escalation factor of 3% per annum, and such escalated base rate shall remain constant over duration of 25 years.

- GBI shall be payable to the distribution utility for period of 25 years from the date of commissioning of the project.
- IREDA has been designated as the 'Programme Administrator' by the MNRE for administering the GBI programme for rooftop PV and other small solar power plants.

Classification of project scheme(s) and eligibility conditions

The projects under these guidelines fall within two broad categories—the projects connected to HT (high-tension) voltage at distribution network (below 33 kV); and the projects connected to LT (low-tension) voltage, that is 400 volts (3-phase) or 230 volts (1-phase). Accordingly, the projects have been divided into the following two categories.

Category 1: Projects connected at HT level (below 33 kV) of the distribution network

The projects with proposed installed capacity of minimum 100 kW and up to 2 MW, and connected at below 33 kV shall fall within this category. The projects will have to follow appropriate technical connectivity standards in this regard.

Category 2: Projects connected at LT level (400 Volts–3ph or 230 Volts–1ph)

The Projects with proposed installed capacity of less than 100 kW and connected to the grid at LT level (400 Volts for 3-phase or 230 V for 1-phase) shall fall within this category.

Capacity allocation to different project categories

It is proposed to develop solar capacity of 100 MW under these guidelines. This capacity addition shall be achieved by developing the projects in the above-mentioned two categories in the following manner.

Project category	Capacity limit
Projects connected at HT level of distribution network, with installed capacity of 100 kW and up to 2 MW	90 MW
Projects connected at LT level of distribution network, with installed capacity lower than 100 kW	10 MW

Applicability of these guidelines

The issues related to grid integration, metering, measurement, and energy accounting for projects to be connected at LT level, with installed capacity lower than 100 kW, is complex. Detailed guidelines for such project schemes will have to be issued once the clarity on such grid integration standard emerges. As a result, the present guidelines are applicable to Category 1 projects (projects with installed capacity of 100 kW and up to 2 MW, with grid connectivity at HT level (below 33 kV) of the distribution network).

Methodology for registration and ranking of project(s)

Pre-registration with the State Competent Authority

The project proponent fulfilling the 'Eligibility Criteria' as outlined under the Clause 5 of these guidelines shall submit application for Pre-registration to their respective State Competent Authority at the state level, along with requisite supporting documents to establish fulfillment of the eligibility conditions. The State Competent Authority shall adopt the standard procedures for Pre-registration of applicants.

The process of pre-registration at the state level by competent authorities may remain open until the programme administrator announces the closure of programme, after receipt of applications aggregating to 110 MW capacity. The State Competent Authority shall issue 'Certificate of Pre-registration' to projects aggregating to not more than 20 MW capacity in their respective states.

Upon pre-registration with the State Competent Authority, the project proponent shall enter into MoU (memorandum of understanding) with the concerned distribution utility for sale/deemed sale of power from the proposed project.

The date for commencement of registration process for initial short listing by the programme administrator shall be 15 July 2010, which provides sufficient time period to states to undertake preparatory activities at the state level, such as designation of the State Competent Authority, regulatory process for determination of tariff for rooftop/small solar generation systems by the concerned SERC, and so on.

Registration with the Programme Administrator (IREDA)

- All applications fulfilling four conditions viz. (a) Issuance of relevant Tariff Order from concerned SERC (b) MoU with Utility, (c) Pre-registration Certificate from State Competent Authority and (d) Commitment Guarantee of requisite amount shall

be eligible for registration with the Programme Administrator.

- The project proponents shall submit applications for registration with programme administrator under the RPSSGP. Programme administrator shall provide format for application. The application for registration shall be accompanied by a copy of the MoU between the project proponent and the local distribution utility and certificate of pre-registration issued by the State Competent Authority. The applications from the project proponents from any state shall be considered only if the concerned SERC has issued the order determining tariff for rooftop/ small solar generating systems for purchase of electricity by the distribution utilities in that state.
- The project proponent shall also provide the commitment guarantee for an amount of Rs 10 lakh/MW on a pro-rata basis, in the form of an irrevocable bank guarantee from any scheduled commercial bank, valid for period of 24 months for SPV and 30 months for solar thermal from date of filing application, along with the application for consideration for registration to the programme administrator.
- In order to facilitate the process of application for registration, it is envisaged that a web-based application portal shall be developed by programme administrator (details to be made available on the website of the MNRE/programme administrator). Upon fulfillment of requisite conditions for pre-registration, the applicant shall submit an online application through an electronic form with details of pre-registration certificate, commitment guarantee, MoU with distribution utility, and so on. The web portal system would generate unique acknowledgement number for each application confirming submission of application with system generated date and time of submission. The applicant shall print the acknowledgement and submit the application in physical form, along with all the necessary enclosures within seven days from the date of submission of online application.
- The initial list of projects considered for registration shall be prepared based on projects fulfilling above conditions considering principle of 'first-come-first-served'. This shortlist shall be subject to physical verification of the requisite documents received by programme administrator.
- The process for initial shortlisting of applications for registration with programme administrator under Category 1 shall be closed upon reaching shortlist of proposed installed capacity of 110 MW for projects on all-India basis. The aggregate project capacity in the initial shortlist for a particular state shall be restricted up to 20 MW.
- The Initial List (Shortlist-M0) of shortlisted projects shall be updated depending upon the accomplishment of following milestones by shortlisted Project Proponents:

1) Milestone-1: Signing of PPA with the concerned Distribution Utility
2) Milestone-2: Project Commissioning.

- Only those projects, which are shortlisted, shall be considered during subsequent process for registration. No new projects will be considered even if the project has achieved multiple milestones subsequently. This is being done to provide certainty to the project proponents already shortlisted. Upon accomplishment of Milestone-1, a registration

certificate and letter confirming eligibility to avail GBI for the project shall be issued by the programme administrator to project proponent not later than one month from intimation by project proponent about accomplishment of Milestone-1 (execution of PPA), to facilitate accomplishment of Financial Closure, subject to the condition that project proponent submits Additional Commitment Guarantee for an amount of Rs 40 Lakh/MW on a pro-rata basis, in form of an irrevocable bank guarantee from any scheduled commercial bank to be submitted in the form of four bank guarantees of equal value, with validity co-terminus with validity period of bank guarantee submitted at the time of application for registration.

- After fulfillment of requisite conditions for registration, the applicant shall submit an online application through a web-based portal maintained by the programme administrator. The online application shall include details of PPA with distribution licensee, additional commitment guarantee, and so on. The web-based portal system would generate a unique project code for each application, confirming submission of application for final registration, with system-generated date and time of submission. The applicant shall print the project code details and submit the application in physical form, along with all the necessary enclosures within seven days from the date of submission of online application. The inclusion in the final registration list shall be subject to physical verification of the requisite documents received by programme administrator. The issuance of registration certificate and letter confirming applicability of GBI for the project shall be undertaken on a first-come-first-served basis until cumulative capacity of projects under Category-1 reaches 90 MW. The programme administrator shall ensure that final registration of projects per state shall normally not exceed 20 MW.
- The Commitment Guarantee for Projects not selected for inclusion within the 'Registered List' (90 MW) shall be returned after the date of announcement of selected projects, if so desired by the project proponent. Projects where Commitment Guarantees are not withdrawn would be considered for continued participation in the programme, subject to availability of capacity arising due to removal/ withdrawal of any project out of 'Registered List'.
- The project proponent shall accomplish Milestone-2 (Project Commissioning) within 12 months in case of SPV projects and 24 months in case of solar thermal from the date of issuance of Registration Certificate.
- The project proponents of all registered projects shall submit the quarterly status update about the project progress, including achievement of important milestones, such as financial closure, placement of order for critical components, site development activities, and so on to programme administrator. Upon accomplishment of the Milestone-2, the project proponent shall intimate the programme administrator with supporting documentary evidence for accomplishment of such milestone.
- In case of delay in accomplishment of Milestone-2 (Project Commissioning) beyond the stipulated time limit of 12 months for SPV and 24 months for solar thermal from date of registration, 20% of bank guarantee (total Commitment Guarantee) shall be invoked by programme administrator. Delay in accomplishing Milestone-2 (Project Commissioning) beyond two months from stipulated time limit, another 20% of bank guarantee (total Commitment Guarantee) shall be invoked by programme administrator. Further, delay in accomplishing Milestone-2 (Project Commissioning) beyond four months from stipulated time limit, another 20% of bank guarantee (total Commitment Guarantee) shall be invoked by programme administrator. Failure to accomplish Milestone-2 (Project Commissioning) beyond six months beyond stipulated time limit shall disqualify the project proponent from further

participating in the programme, and the programme administrator shall invoke all the bank guarantees (total Commitment Guarantee) of such project proponent and as a consequence, the project shall be removed from the list of the registered projects and shall not be eligible for GBI under this scheme. Provided that in case of part commissioning of the project (not lower than 100 kW capacity) at the end of 6 months beyond the stipulated period of 12 months for SPV and 24 months for solar thermal from the date of registration, the partly commissioned capacity shall be considered to be eligible for GBI. The applicable tariff rate for such project and computation of GBI thereof shall be reckoned from the above date.

- The programme administrator shall inform respective State Competent Authority and state distribution utility regarding continued eligibility of GBI for the project proponent, corresponding to partly commissioned capacity. The uncommissioned part of the project shall, however, not be eligible for consideration for GBI.
- Upon elimination of a project from the final registration list, the next project in the queue of the initial shortlist shall be considered for inclusion in this list, provided it meets the state-wise capacity limit of 20 MW. Further, the project should meet all other requirements including PPA, commitment guarantee, and so on, as outlined above.

Roles and responsibilities of various entities

Role of state government

The programme has been designed taking into account active participation by the state governments in the previous GBI programme of the MNRE. As a first step, the state government is required to designate a 'Competent Authority' under this programme, empowered to issue pre-registration certificate required for registering the projects with the programme administrator, and subsequently, reporting progress on implementation of these projects.

Role of Distribution Utility

The distribution utility shall enter into MoU-1 with the project proponent (as defined in the subsequent paragraph) for purchase of power at rates to be determined by the concerned SERC. The MoU shall clearly specify the rate of purchase of power and tenure of the proposed PPA. Further, the distribution utility shall provide necessary approvals and infrastructure for evacuation of the power generated. The PPA would supersede the MoU.

The distribution utility will have to enter into another MoU-2 with IREDA for availing GBI. The distribution utility will make payments for the power purchased (including deemed purchase corresponding to captive consumption met from solar generation) directly to the project proponent, as per the terms and conditions of the PPA.

The distribution utility shall provide certificate of power purchased (including deemed purchase corresponding to captive consumption met from solar generation) from the project to the programme administrator on a monthly basis. It may be noted that this scheme envisages purchase by the distribution utility of entire energy generated by the solar system. The certificate shall be based on the joint meter reading taken by the project proponent and the distribution utility.

Role of Programme Administrator (IREDA)

Under this programme, IREDA would act as a 'Programme Administrator'. IREDA shall enter into MoU-2 with concerned state distribution utilities for disbursement of GBI, as per the conditions outlined for operationalizing this programme. IREDA shall be

responsible for following activities under this programme.

1. Registration of the projects seeking GBI.
2. Maintenance of a transparent system of the registered projects based on progress made by them against specified milestone events.
3. Issuance of Certificates confirming GBI.
4. Disbursement of GBI to the distribution utilities.

Role of Project Proponent

The project proponent shall mean developer/owner of the rooftop PV or other small solar generation project who wishes to participate in the RPSSGP. The project proponent shall be responsible for the following activities.

1. Apply for pre-registration with their respective State Competent Authority
2. Execute documents such as MoU and PPA with the concerned distribution utility where its solar power generation facility is situated.
3. Apply for registration with the programme administrator to participate in the RPSSGP.
4. Intimate the programme administrator about the achievement of milestones, along with supporting documents.
5. Comply with all its obligations and reporting requirements, as desired by the State Competent Authority and programme administrator from time to time.
6. Fulfil its financial obligations in terms of payment of processing fees, provisioning of security/bank guarantees, as necessary.
7. Operate the solar power plant as envisaged under PPA.
8. Provide appropriate facility/ instrumentation/metering arrangement to enable remote monitoring of generation.

Eligibility conditions for project proponent

Technical Criteria

The project schemes proposing to deploy PV modules and inverter systems shall be considered to be technically qualified and eligible for participation in the RPSSGP scheme only if they comply with relevant IEC/BIS (Bureau of Indian Standards) standards and/ or applicable standards as specified by CEA (Central Electricity Authority). For SPV Projects to be selected under this scheme, it will be mandatory for projects based on crystalline silicon technology to use the modules manufactured in India, while there will be no mandatory domestic content requirement for projects based on other technologies. For solar thermal technology, it will be mandatory that the technology is demonstrated and such projects have been in operation for one year. Project proponent should submit the documentary evidence and undertaking in this regard, along with application to the State Competent Authority.

Metering arrangements: Metering arrangements shall be made by the project proponent in consultation with the distribution utility keeping in view guidelines/regulations notified by the respective SERCs, if any. Meters shall comply with the requirements of CEA regulation on 'Installation and Operation of meters'.

Financial Criteria

The project proponent shall submit the letter of commitment, along with Board Resolution for equity investments in the project, calculated on the basis of Rs 4 crore/MW on a pro-rata basis.

Infrastructure Criteria: Land Requirement

The project proponent should have made arrangements for land required for the project, as per the conditions outlined by respective State Competent Authority.

Infrastructure Criteria: Grid Connectivity Requirement

The plant should be designed for interconnection with the grid at distribution network at the voltage level depending on installed capacity of rooftop PV or small solar system generator

- Less than 100kW: LT-single/three phase
- 100 kW and up to 2 MW: HT level (below 33kV) at distribution network

Further, the interconnections should be at the nearest distribution transformer/substation. In this regard, the project proponent shall submit a letter from the concerned distribution utility, confirming technical feasibility of connecting the plant to the distribution transformer/substation.

Modalities of disbursement of gbi by programme administrator

Certification of generation

For claiming the GBI, the distribution utility shall submit the Certificate of Generation to the programme administrator. The basis for claim shall be in accordance with the guidelines under the RPSSGP. The Certificate of Generation shall pertain to monthly meter readings.

Processing and disbursement of claims for GBI

The claim for GBI by state distribution utility may be submitted on a monthly basis (by 15th of each month) to the programme administrator. It shall be accompanied by documentary evidence of having made payment for the electricity generated by the project for the corresponding month. The programme administrator shall

disburse the claimed amount to the concerned state distribution utility after preliminary scrutiny, within a period not exceeding 15 days. All payments made against Monthly Bills shall be subject to quarterly reconciliation (detailed scrutiny) at the beginning of following quarter and the monthly disbursement pertaining to the first month of that quarter shall take the same into account.

Funding support to Programme Administrator

To ensure release of timely payment to the state distribution utilities, the MNRE would place 50% of the estimated annual requirement of funds with IREDA upfront at the beginning of each financial year. The balance 50% would be released as second tranche of the annual requirement to IREDA within a reasonable period of time, after receipt of Utilization Certificate, of not less than 50% of the first tranche released to IREDA. While releasing the second tranche, the MNRE would take into consideration, revision in initial annual estimate (if any) for appropriate funding. The MNRE would also fund IREDA for meeting the expenditure towards development of software and associated hardware costs, based on an estimate provided by IREDA, for implementing and monitoring the scheme effectively. IREDA would present an audited annual statement of accounts.

In the eventuality of delay in receipt of funds from the MNRE, the programme administrator shall ensure access to an alternative funding source, such as a standby facility with a commercial bank so that payment of the GBI amount to the DISCOMs (distribution companies) is disbursed within the specified timeframes. The mechanism of a standby facility would entail additional costs, which would be reimbursed to the programme administrator on actuals. This would facilitate timely release of funds by programme administrator to utilities towards their GBI claim. The programme administrator shall be entitled to receive service charges/fund administration charges @2% of the funds handled under the programme. The interest earned on surplus funds, if any, shall be credited to the fund account by programme administrator.

Timelines for programme management

- Commencement of registration by programme administrator: 15 July 2010
- Announcement of initial shortlist: 16 August 2010

Power to remove difficulties

If any difficulty arises in giving effect to any provision of these guidelines or interpretation of the guidelines, the committee to be constituted by the MNRE shall meet and take decision, which will be binding on all parties.

The technical requirements for grid solar power plants are same as mentioned in Annexure 3.

For more details visit <http://mnre.gov.in>

GLOSSARY

1. CERC or Central Commission shall mean Central Electricity Regulatory Commission.
2. State Competent Authority shall mean a 'Designated Agency' appointed by the state government for pre-registration of the rooftop PV projects or small solar power projects at the state level to be eligible to participate in this programme.
3. GBI shall mean Generation Based Incentive to be paid by the Programme Administrator to local Distribution Utility under this programme.
4. Local Distribution Utility shall mean distribution licensee within whose area the rooftop PV or small solar power plant is located and interconnected with distribution network of such distribution licensee.
5. MoU-1 shall mean Memorandum of Understanding to be entered into between Project Proponent and local Distribution Utility for sale/purchase of electricity generated from proposed Rooftop PV or small solar power project subsequent to pre-registration of the project with State Competent Authority, but prior to Registration of Project with Programme Administrator.
6. MoU-2 shall mean Memorandum of Understanding to be entered into between Programme Administrator and local Distribution Utility for disbursement of GBI under this programme.
7. MNRE shall mean the Ministry of New and Renewable Energy, Government of India.
8. PPA shall mean Power Purchase Agreement to be entered into between Project Proponent and local Distribution Utility for sale/purchase of electricity generated from proposed Rooftop PV or small solar power project.
9. Project Proponent shall mean developer of the rooftop PV and/or small solar power project, who shall own and operate such solar power generation project and wishes to participate in the Rooftop PV and RPSSGP in accordance with these guidelines.
10. Programme Administrator shall mean IREDA for administration of RPSSGP in accordance with these guidelines.
11. RPSSGP shall mean Rooftop PV and Small Solar Generation Programme, as outlined under these guidelines.
12. SERC or State Commission shall mean State Electricity Regulatory Commission.