

**OPERATIONAL GUIDELINES FOR IMPLEMENTATION OF
OFF-GRID AND DECENTRALISED SOLAR APPLICATIONS SUB
SCHEME “OFF-GRID AND DECENTRALISED SOLAR PV
APPLICATIONS” DURING 12TH PLAN PERIOD**

I. Background:

The Government had launched Jawaharlal Nehru National Solar Mission during 2010-11, which is a major initiative of the Government of India and State Governments to promote ecologically sustainable growth while addressing India's energy security challenge. It will also constitute a major contribution by India to the global effort to meet the challenges of climate change.

The immediate aim of the Mission is to focus on setting up an enabling environment for solar technology penetration in the country both at a centralized and decentralized level. The first phase (up to 31st March 2013) focused on promoting off-grid systems including hybrid systems to meet / supplement power, heating and cooling energy requirements. Based on the experience gained during the 1st phase of the Mission, the programme is being expanded with a focus on energy access and replacement of fossil fuels with renewable energy. 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. The scheme is completely demand driven.

Solar thermal is second largest renewable energy source after wind energy. Around 60 million households worldwide use solar hot water collectors. Total Worldwide installed capacity is 235 GWth (335 million sqm.). India was ranked 4th in the world in terms of new capacity addition during the year 2011. Installed capacity for India stands at 7.281 million sq m² equivalent to 5082 MWth till 30th October 2013. Worldwide these achievements were possible with interventions in the form of capital subsidy/incentive in Electricity bill/ mandatory provision through heat laws.

In India Fossil fuels are being used for process heating, drying, distillation/ desalination, water heating, space heating, refrigeration and power/electricity generation. Nearly 25 million households are using electric geysers, consuming ~7500 GW-hr of electricity (assuming minimum annual consumption of ~600 kWh/ year/ geyser) and 15 million tons/year of petroleum fuels are used in industries in thermal form at temperatures below 300°C. It is assumed that 30% of energy consumed in industry is used for heating water, which shows that there is a huge potential.

There is a large potential available for generating solar power using unutilized space on rooftops and wastelands around buildings. Small quantities of power generated by each individual household, industrial building, commercial building or any other type of building can be used to partly fulfill the requirement of the building occupants and surplus, if any, can be fed into the grid. The roof-top SPV systems on building's roof space can be installed to replace DG gensets for operation during load shedding.

The price of power generated from solar plants installed today is at par with or lower than the commercial tariff for consumers. The cost of solar power is on the decline trend while the cost of fossil fuel based electricity is increasing day by day.

The cost of generating solar power at present is a little higher than the tariff charged from consumers by Distribution Licensees/DISCOMS in most cases (other than commercial). With the capital subsidy (upto30%) or so, it may be possible to generate power between Rs.5.0 -6.50 per unit for the next 20 years, which is cheaper than the diesel gen-set based electricity and this could also be cheaper than the cost at which most Distribution Licensees/DISCOMS would make power available to the same consumer. It is therefore important to popularize the use of solar energy so that people gain confidence and then its use can increase on its own.

II. Scheme

Off-grid and Decentralised Solar PV Applications.

1. Objectives:

- 1.1 To promote off-grid applications of Solar photovoltaic (SPV) systems for meeting lighting, electricity requirements of individuals, institutions, communities, commercial and industrial establishments.
- 1.2 To create awareness and demonstrate effective and innovative use of Solar systems for individual/ community/ institutional/ industrial applications.
- 1.3 To encourage innovation in addressing market needs and promoting sustainable business models.
- 1.4 To provide support to channel partners and potential beneficiaries, within the framework of boundary conditions and in a flexible demand driven mode.

- 1.5 To create a paradigm shift needed for commoditization of off-grid decentralized solar applications.
- 1.6 To support consultancy services, seminars, symposia, capacity building, awareness campaigns, human resource development, etc.
- 1.7 To encourage replacement of kerosene, diesel, electricity and other fuels wherever possible.

Special thrust will be given on important applications especially in rural areas such as solar lighting, solar water pumping and mini/micro-grids. Thrust will also be given in encouraging new technologies like LED, Lithium ion batteries, high efficiency modules etc. MNRE may give job of disbursement of subsidy to SECI in a phased manner as may be considered appropriate after working out a mechanism.

2. Scope of the Scheme:

- 2.1 The scheme would be applicable to all parts of India during Phase II of the Jawaharlal Nehru National Solar Mission and thrust areas would be as follows
 - i. Energy Access
 - ii Diesel Replacement
 - iii Promote agriculture based applications like solar pumps
 - iv Encourage Renewable Energy Service companies (RESCOs)
 - v Make solar products freely available in the market
- 2.2 Various off-grid/grid-connected and decentralized photo voltaic systems/ applications up to a maximum capacity of **500 kW** per site to meet/ supplement lighting, electricity/power and industrial heating requirements would be covered under the Scheme. Solar photovoltaic power plants having unit capacity up to 500 kWp in mini-grid mode for rural electrification would also be supported SolarStreet / Home lights have been very popular during Phase I. However, it is now felt that we must move towards mini grids and micro grids so that the systems are sustainable over a longer period and higher quantities of energy are provided to each household to cover all their basic needs. This would also ensure better maintenance.
- 2.3 A provision of up to 3% of the annual budgeted outlay for Scheme shall be made for administrative expenditure, evaluation and other studies, seminars, information dissemination, IEC activities and strengthening of test labs, capacity building, promotional activities/incentives to banks and support for putting in IT enabled monitoring mechanisms, strengthening service and marketing etc.

3. Implementation Arrangements:

3.1 The Scheme would continue to be implemented through multiple implementing agencies for rapid up-scaling in an inclusive mode. These agencies would enable significant reduction in transaction cost and time, since individuals and small groups of clients would be in a position to access the provisions of the scheme. The following Categories of implementing agencies would be involved in the implementation of the Scheme: -

- a) State Renewable Energy Development Agencies (State Nodal Agencies)
- b) Financial Institutions/Financial Integrators (e.g. NABARD and Regional Rural Banks, Commercial Banks, IREDA and NHB)
- c) Channel Partners including RESCO
- d) Solar Energy Corporation of India
- e) Other Large Govt. Departments/PSUs

3.2 The details of the implementing agencies are as under:

a) State Renewable Energy Development Agencies

State Nodal Agencies will implement the programme through tender only. These agencies will submit project proposals directly to MNRE for approval.

b) Financial Institutions/ Financial Integrators including NABARD and Regional Rural Banks, Commercial Banks, IREDA and NHB

The Ministry will provide a subsidy of 40% of the benchmark cost of the systems to individuals for installation of small capacity(up to 300Wp) power packs/plants and solar water pumping systems(up to 5kWp). The Ministry will also provide a subsidy of 30% of the benchmark cost of the systems to individuals for installation of small capacity power plants (from 300Wp to 1.0 kWp capacity). These subsidies will be provided through NABARD /SECI /NHB. NABARD /SECI /NHB will pass on the subsidy to RRBs and scheduled commercial banks/ Cooperation banks after due shortlisting based on their interest and capacity to be extended to individuals. RRBs and Scheduled commercial Banks/Cooperation banks will extend loan at normal interest rates or special interest rates up to the balance cost of the systems as per their own provisions or refinance available.

c) Channel Partners including RESCOs

Channel Partners may be manufacturers of cell/Modules, inverters, batteries, luminaries or system integrators with good track record. They could be government companies/ societies, private companies/ societies or reputed NGO's. These are companies/ entities which would provide solar photovoltaic systems & services to clients including design, supply, integration and

installation, O&M and other services. These could approach the Ministry directly for accessing subsidy.

RESCO companies are those which would install, own & operate RE systems and provide energy services to consumers. These companies will sell power to the consumer at mutually agreed rate or at rates arrived through bidding process. These entities could approach MNRE/IREDA/ SECI for accessing the financial support under the scheme. Street / Home Lighting Systems have been popular during phase I. Now it was felt that promotion of mini/micro grids is suitable on long term basis to cover each household all their basic needs.

d) Solar Energy Corporation of India:

Solar energy Corporation of India will implement the programme through tender mode only. SECI will submit project proposals directly to MNRE for approval.

e) Other larger Govt. Deptts /PSUs

In addition, Central and State Govt. Ministries/Departments/ Organizations, other PSUs, autonomous institutions, utilities may also approach Ministry to implement the systems for their own use or for implementation of CSR activities. PSU's/ Government departments who are mandated to implement these programmes in their defined areas of operation may also approach MNRE directly and can be considered if found suitable and competent. Implementation of the programme through these entities will be through tender only. (by the implementation agency)

3.3 All Private Channel partners including RESCOs and reputed NGOs would need to get themselves accredited by rating agencies and the Ministry. For Govt. PSUs with manufacturing of Cell or module activity the accreditation of rating agencies is not required to become channel partners. The methodology for rating/accrediting these entities by MNRE has been put in place.

4. Funding Pattern.

4.1 State Renewable Energy Development Agencies and Solar Energy Corporation of India

The programme will be implemented through SNAs only by inviting tenders. The Ministry will provide subsidy @ 30%of bench mark cost for solar lanterns, solar home lights, street lights, power packs/plants and solar pumps. Funding under the scheme would be in Project mode for systems larger than 5kWp or equivalent, i.e. there must be a project report which would, inter alia, include client details, technical & financial details, O&M and monitoring arrangements. Project proposals shall be

submitted to the MNRE in the prescribed formats for small capacity systems, stand-alone SPV power plants and Mini-grid SPV power plants. For lower capacity systems, this would be operated in programme mode.

4.2 **NABARD/ SECI/ RRBs/Commercial Banks/IREDA/NHB:**

The Ministry will provide subsidy @ 40% of bench mark cost for solar lanterns, solar home lights, street lights, small capacity power plants etc. up to 300Wp unit capacity. For more than 300Wp to 1 kWp capacity Ministry will provide subsidy @ 30% of bench mark cost. Loan from the bank is mandatory to avail subsidy under the category. Only individual beneficiaries are eligible to avail subsidy under this category.

4.3 **RESCOs/ Channel Partners**

The Ministry will provide 30% subsidy of the bench mark cost decided for the particular category of application as CFA. Project proposals shall be submitted to the MNRE in the prescribed formats be put up to Project Appraisal Committee for approval. MNRE will accept proposals on a QUARTERLY basis ONLY with proposals for each quarter being accepted only in the first fortnight of the quarter. Prospective applicants will ensure that the applications for each quarter are submitted to the Ministry within the prescribed time limit in each quarter. The Project Appraisal Committee will appraise the submitted the proposals by RESCOs and channel partners including Govt. PSUs with solar cell/module manufacturing facility and take necessary action on the submitted proposals. Proposals more than 1kWp and above will be considered under the category. Funding under the scheme would be in Project mode for systems having capacity 5kWp and above , i.e. there must be a project report which would, inter alia, include client details, technical & financial details, O&M and monitoring arrangements. The private channel partners will raise the invoice to the customer net of subsidy. MNRE will prepare guidelines for appointment of channel partners. In case capacity applied for by the channel partners exceeds the available capacity in the quarter, MNRE will devise a transparent mechanism to decide on the allocation of capacity to the various channel partners. **However, in no case shall the total capacity allocated through Channel partners exceed 50% of the total off –grid allocation in any particular year.**

4.4 **Other Large Govt. Departments/ PSUs**

The programme will be implemented through other large Govt. Departments/PSUs for own use or extension activities by inviting tenders. The Ministry will provide subsidy @ 30% of bench mark cost as CFA. Funding under the category would be in Project mode i.e. there must be a project report which would, inter alia, include client details, technical & financial details, O&M and monitoring

arrangements. Project proposals shall be submitted to the MNRE in the prescribed formats.

4.5 Funding Pattern in Special Category states viz. North Eastern States, Sikkim, Jammu & Kashmir, Himachal Pradesh and Uttarakhand, Lakshadweep, A&N Islands, will be as follows:-

1. 90% of the capital subsidy for solar photovoltaic systems will be available only through the State Renewable Energy Development Agencies and SECI for the following categories and ONLY if procurement is made through open competitive bidding by SNA or SECI:-

- i. Solar street lights and small capacity PV systems (100Wp) subject to the condition that State Nodal Agencies will maintain record of beneficiaries to avoid misuse and benefit going to the same beneficiary again and again.
- ii. Central and State Government Ministries and their organizations(Not for commercial organizations and corporations); Government Educational Institutions, Hospitals, community centers, Anganwadis; Panchayat Ghars, State/ Central Government Buildings, Police Stations, Police Posts, vocational training centers and Government hostels up to 100 kWp SPV systems depending on requirement.
- iii. Solar Water Pumping systems in State and Central Government organizations, Autonomous Educational Institutions, Government Schools/ colleges, irrigation departments, horticulture departments, animal husbandry, drinking water supply departments, etc.
- iv. Stand alone and Micro/ Mini-grid solar PV Power plants in rural areas, remote and difficult areas.

4.6 Institutions like NABARD/IREDA/ SECI will be used as intermediary organizations to provide subsidy to beneficiaries through other institutions like RRB's, Banks, societies etc.

Up to 3% of CFA would be provided as service charges to NABARD/IREDA/SECI and State Renewable Energy Development Agencies. This would be provided by MNRE, in addition to the CFA. The amount of CFA to be given to the Nodal Agencies / IREDA, SECI etc. as service charges should be utilized for the following purpose

- a) Efforts made in preparing innovative cases by deploying staff in the field preparing DPRs etc.
- b) Providing technical assistance / help in the implementation of the schemes
- c) Having an IT based monitoring mechanism in place to reflect not only the progress during implementation but also performance after installation
- d) MNRE may retain appropriate amount out of this 3% and provide to SECI or some other organization to give technical support to such Nodal Agencies which may be weak or not having enough technical staff. Experts or qualified professionals may also be placed with SNAs with this money.

4.7 The CFA from MNRE would not preclude the implementing agencies from availing other fiscal and financial benefits being provided by State, Central Governments and any other agency so long as the same is clearly disclosed in the project report/proposal.

5. Release of Funds:

5.1 For solar photovoltaic systems and power plants upto 500 kWp capacity and mini-grid SPV power plants the release of funds for the channel partners will be back ended as reimbursement on completion and verification thereof. The subsidy will be disbursed directly by MNRE to the channel partners. MNRE may specify an accounting system, monitoring mechanism and transparent computer based web enabled data bank with beneficiaries and system details. For Programme Administrators like State Renewable Energy Development Agencies, the release of funds could be on milestone basis on the progress of the project including advance upto 30%. The advance on milestone basis to Programme Administrators is applicable only to Govt. Supported projects.

5.2 MNRE would place up to 30% of the estimated annual requirement of funds with IREDA/NABARD/SECI upfront at the beginning of the year on receiving a project proposal from these organizations. The balance 70% would be released based on the progress of the project and submission of Utilization Certificate and other related documents.

6. Approval Mechanism

6.1 At the beginning of each year MNRE will estimate broadly the capacity available under the off-grid scheme in that year. Not more than 50% of the capacity shall be available for execution through the channel partner route. All the RESCO/Channel Partners shall submit proposals on a QUARTERLY basis as outlined in para 4.3 above. Proposal shall only be accepted once in quarter and within prescribed time limits. The Project appraisal Committee shall then examine the proposals and clear or reject them. Project Appraisal Committee will, as far as possible, clear proposals within sixty days from the date of submission of proposals. In case proposals are received in excess of the available capacity in any quarter a transparent mechanism shall be devised to select the proposals. Once the proposals are cleared those proposals will be send to finance for approval. After financial clearance and approval of competent authority financial sanctions will be issued. Already installed systems are not eligible for subsidy. Proposals from State Renewable Energy Development Agencies and other Large Govt. PSU/Departments where programme will be implemented through tender, and proposals from NABARD, SECI and IREDA will not require PAC approval and will be directly processed by the division.

7. Project Duration

7.1 The project duration for completion of the projects will be twelve months from the date of sanction in General Category states and fifteen months in Special category States, North East States and islands . However the project duration will be applicable only to those projects where tender will be called. Extension for first four months with valid reasons will be at Division head level, next four months with 1% penalty at Group Head level and subsequent four months with 2% penalty at Secretary level. Beyond 12 months no extensions will be granted and the projects be scrapped rendering them ineligible for subsidy. The total duration of the project with all extensions will be twenty four months in general category states and twenty seven months in Special Category States, North East States and Islands. For the projects where tender process is not involved the project duration for completion is eight months. Extension for such projects will be given up to two months at Group Head level based on valid reasons. The total project duration in such cases will be ten months only.

8. Monitoring and Evaluation:

8.1 Monitoring and evaluation studies of the Scheme and its implementation will be carried out during the period of implementation of the Scheme as is given below:

- i) At the primary level of monitoring, channel partners would be responsible for monitoring parameters such as end-use verification and KYC compliance and also compilation of statistical information
- ii) Consultants/third party, SNAs and MNRE officials would be involved, for next level of monitoring
- iii) For projects with applications above 10 kW, the system providers would also make available generation data to MNRE at intervals specified.(see section monitoring)
- IV) 1% of budgetary support could be used for seminar/symposia, capacity building, awareness generation, publicity, training and to banks as incentive and studies to be carried out etc. (out of the provision in 2.3)

9. Technical Requirements

9.1 Off-grid SPV power plants and systems should have the minimal technical requirements and Quality Standards as specified by MNRE from time to time. Details Minimal Technical Requirements Standards For SPV Systems / Plants is given at Annexure-1(part-A)

9.2 Only indigenously manufactured PV modules should be used in Solar PV systems and off-grid PV power plants. Ministry may empanel the manufacturers for components of the systems and power plants. However, other imported components can be used, subject to adequate disclosure and compliance to specified quality norms and standards.

10. Supporting Innovation

10.1 In very special and rare cases, the Ministry could consider higher CFA for undertaking pilot and demonstration projects either for demonstrating new and innovative applications or for demonstrating new technologies. Ministry may also consider sanctioning to SECI or other government institutions demonstrative projects with higher CFA with a proviso for recovery of the CFA on savings in fuel usage. Detailed guidelines for such schemes would be separately drawn up if required.

11. Natural Calamities and Disasters

11.1 Ministry could consider providing upto 100% funding in case of very severe natural calamity or crisis for installation/ distribution of solar photovoltaic systems on humanitarian grounds.

12. Interpretation of the Guidelines

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

13. AkshayUrja Shops

The existing AkshayUrja Shops will be encouraged to sell products from all Manufacturers shortlisted by the Ministry to operate in the lighting programme. SECI will monitor these shops for release and settlement of accounts for the sales carried out by these shops. Subsidy could be released to them directly through SECI, so that they can sell net of subsidy.

14. Review

The scheme would be reviewed by an Internal Review Committee on yearly basis and modifications therein would be incorporated by the Ministry. In addition, a platform for experts to discuss best practices, debate over issues to overcome bottle necks and provide effective policy suggestions for ensuring wide spread off grid solar solutions deployment would also be established at the national level.

15. MNRE may frame specific guidelines for various products and various categories based on this scheme to bring in more clarity and easy applicability. In these guidelines MNRE may exclude certain provisions if they are not required for that product category or if it is felt that lesser support is required.

III. Fixing of CFA and Benchmark cost (applicable to all sub schemes of the Off-Grid & Decentralized Solar Applications)

All CFA values will be based on bench mark cost and **would be fixed in absolute value i.e. in Rs/Watt orRs/Lumen**. CFA may be fixed separately for various products like LED, CFL, Lithium ion batteries etc. and for various uses like water pumps, lighting etc. for SPV based systems. Similarly CFA will be on benchmark cost and fixed in absolute value i.e. in Rs./sq. ft. collector area or in thermal energy output basis. There could also be other parameters like efficiency of system. For fixing CFA and bench mark cost, MNRE will set up a committee which will take inputs from rates received in various tenders by SECI and other agencies including Nodal agencies, component market rates, global rate trends etc. The CFA may be fixed annually or biannually. In case of channel partners a correction factor will apply on the bench mark price to determine the CFA.

Following procedure is used to determine the benchmark cost under Solar Off Grid Scheme:-

1. Benchmark cost will be determined separately for the following main categories of products:-

i. Off Grid Photovoltaic (PV)

II. Solar Water heaters

iii. Concentrated solar thermal (high temperature application) and Solar cookers

Other than these broad categories, sub – categories would be drawn uplike (grid connected without battery), solar pumps, lanterns with LED, with lithium ion etc. The benchmark cost for solar Thermal system may include following components given below

a. Solar water heater – solar collectors, storage tanks, connection between collector and tank, heat exchangers, as per the site requirements.

b. Solar air heater– solar collector, frame, blower, duct, ss dryer, axial fan, other accessory as per requirement.

c. Solar concentrating system – concentrator, frame mounting, pressure reduction station, receiver with inter connection between receiver and header/storage tank. Accessories, gauges, / valves / control panel, backup boiler, piping, as per the site requirement.

d. Solar Cooker - Solar Collector Systems for Direct Heating / cooking applications and Concentrator with Manual tracking (Dish solar cookers)

2. Three separate committees would be constituted in MNRE for these three categories.

3. The benchmark cost would be fixed based on the following two main criteria:

a) Price determined through tenders done by SECI, State Nodal Agencies and other Government Departments/ organizations in 12 months preceding the date when the committee starts working for determining the benchmark cost for next year.

b) Component wise cost breakup to arrive at an estimated price of each of the products for which benchmark cost is determined. The committee will collect data about all the tenders floated with MNRE subsidy. These would then be clubbed into different categories depending on the product, technology etc. Thereafter the committee may develop criteria for arriving

at a rate out the price or by calculating median. The benchmark so determined through tendered price will then be compared with values arrived at through costing by clubbing the price of various components. In case of wide difference, the committee may go into the reasons and if need be, apply correction factor.

4. The committee may take into account all relevant factors and also co-opt experts if necessary to adopt a benchmark price as close to the actual price as possible. The committee may also relook the benchmark cost after 6 months in case it is felt that there is a major change in the market.

5. It is hoped that price of the system will come closer and closer to benchmark cost as time progresses and after few years the price coming through tenders would not be very different from benchmark cost. Benchmark cost will also get rationalized as technologies improve.

III. Tatkal Scheme

There would be provision for reserving quantities of various solar systems at lower subsidy levels along with the facility of disbursal on priority basis in a definite time period. This would, however, be done within the upper subsidy cap as laid down in the scheme for the particular component. A committee will be set up to decide the scheme separately.

IV. Hybrid systems

There would be a provision to promote hybrids like Wind-solar etc. within the defined CFA and subsidy limits for that particular component in this scheme.

V. Specification and standards

Ministry will set the technical specification and quality standards from time to time and rationalize them as may be required. Technical specification and standard for each part of the scheme is specified in Annexure-1 Part- A as currently applicable.

VI. Monitoring and System life

Online monitoring will be compulsory for all systems more than 10 kWp capacity for PV and equivalent of 10 kW capacity for thermal systems. Real time

monitoring may be specified by MNRE for large systems and online monitoring would be eventually extended to 1 kWp systems as well.

Life of systems and products will be specified from time to time and efforts will be made to ensure that no systems or products are discarded before full life usage.

VII. Guidelines for Channel Partners

The Channel Partners are an important implementing agency. It is essential to ensure that guidelines for selection, rating and appraisal of channel partners are transparent and simple. It shall also be ensured that there are no restrictions on the number of channel partners and all otherwise eligible agencies are empanelled subject to their rating and appraisal. In case of overcapacity of applications, the projects shall be allocated among channel partners in a transparent manner. MNRE shall issue detailed guidelines for channel partners covering all these aspects.

VIII. Redundancy and interpretation

In case of a particular application being eligible for CFA under more than one of the sub-schemes outlined above, the same shall be considered for sanction under that sub-scheme which involves lesser minimum CFA.

In case of any ambiguity regarding interpretation of the guidelines, the decision of MNRE shall be final.

(Dr.S.K.Sharma)
Scientist-D

Annexure-1(Part-A)**Boundary conditions for Support to Off grid Solar PV Applications**

S.NO.	Category of beneficiaries	Size
1	Individuals	
A	All applications Except 1B	Upto 3 kWp
B	Pumps for irrigation and community drinking water	Upto 5 kWp
2	Non Commercial entities	
	All applications including Mini-grid for rural applications	Upto 500 kWp per site
3	Industrial/Commercial entities	
	All applications including Mini-grid for rural applications	Upto 500 kWp per site

Minimal Technical Requirements /Standards for SPV Systems / Plants to be deployed under the Programmes of Ministry of New and Renewable Energy**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 / IS14286, Thin Film Terrestrial PV Modules IEC 61646 / Equivalent IS (Under Dev.), Concentrator PV Modules & Assemblies IEC 62108.
- 1.2 In addition, the modules must conform to IEC61730 Part 1- requirements for construction & Part 2 – requirements for testing, for safety qualification or Equivalent IS (Under Dev.)
- 1.3 PV modules to be used in a highly corrosive atmosphere (coastal areas, etc.) must qualify Salt Mist Corrosion Testing as per IEC 61701 / IS 61701.

1.4 IDENTIFICATION AND TRACEABILITY

Each PV module must use a RF identification tag (RFID), which must contain the following information:

- (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, I_m , V_m and FF for the module
- (vii) Unique Serial No and Model No of the module
- (viii) Date and year of obtaining IEC PV module qualification certificate
- (ix) Name of the test lab issuing IEC certificate
- (x) Other relevant information on traceability of solar cells and module as per ISO 9000 series.

Until March 2013, the RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions.

1.5 VALIDITY :

The validity of the existing Certificates/Reports in the old format/procedure shall be valid till March 2013 only. Manufactures are advised to get their samples tested as per the new format/procedure before 31st March 2013, whose validity shall be for five years.

1.6 AUTHORIZED TESTING LABORATORIES/ CENTERS

PV modules must qualify (enclose test reports/ certificate from IEC/NABL accredited laboratory) as per relevant IEC standard. Additionally the performance of PV modules at STC conditions must be tested and approved by one of the IEC / NABL Accredited Testing Laboratories including Solar Energy Centre. For small capacity PV modules upto 50 Wp capacity STC performance as above will be sufficient. However, qualification certificate from IEC/NABL accredited laboratory as per relevant standard for any of the higher wattage regular module should be accompanied with the STC report/ certificate.

- 1.6.1 Details of Test Labs are given in **Annexure- 1 (Part- 1A)**
(Any other Test Lab that has set – up for testing and wants to get included may contact Director, MNRE)

- 1.6.2 While applying for Testing, the Manufacturer has to give the following details:
- A copy of registration of the company particularly for the relevant product/ component/ PV system to be tested
 - An adequate proof from the manufacturer, actually showing that they are manufacturing product by way production, testing and other facilities
 - Certification as per JNNSM standards for other bought out items used in the system
- Without above proof test centers are advised not to accept the samples.

1.7 WARRANTY

PV modules used in solar power plants /systems must be warranted for their out put peak watt capacity, which should not be less than 90% at the end of 12years and 80% at the end of 25 years.

2. BALANCE OF SYSTEM (BOS) 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 / MNRE specifications / as specified below:

BOS Item / System	Applicable BIS /Equivalent IEC Standard Or MNRE Specifications	
	Standard Description	Standard Number
Solar PV Lighting Systems:	Solar PV Home Lighting System Solar PV street Lighting System Solar PV Lantern	As per MNRE latest Specifications
Solar PV Systems (more than 100 Wp and up to 20 KWp Capacity only) : Charge Controller/MPPT units		IEC 60068-2 (1,2,14,30)

Power Conditioners/ Inverters**including MPPT and Protections	Environmental Testing Efficiency Measurements Environmental Testing	/ Equivalent BIS Std. IEC 61683 / IS 61683 IEC 60068-2 (1, 2, 14, 30) / Equivalent BIS Std.
Storage Batteries	General Requirements & Methods of Testing Tubular Lead Acid / VRLA / GEL Capacity Test Charge/Discharge Efficiency Self-Discharge	As per relevant BIS Std.
Cables	General Test and Measuring Method PVC insulated cables for working voltage up to and including 1100 V and UV resistant for outdoor installation	IEC 60227 / IS 694 IEC 60502 / IS 1554 (Pt. I & II)
Switches/Circuit Breakers /Connectors	General Requirements Connectors –safety A.C. /D.C.	IEC 60947 part I,II, III / IS 60947 Part I,II,III EN 50521

Junction Boxes /Enclosures for Inverters/Charge Controllers/Luminaries	General Requirements	IP 54(for outdoor)/ IP 21(for indoor) as per IEC 529
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**In case if the Charge controller is in-built in the inverter, no separate IEC 62093 test is required and must additionally conform to the relevant national/international Electrical Safety Standards wherever applicable

2.2 AUTHORIZED TESTING LABORATORIES/ CENTERS

Test certificates / reports for the BoS items/components can be from any of the NABL/ IEC Accredited Testing Laboratories or MNRE approved test centers. The list of MNRE approved test centers will be reviewed and updated from time to time.

2.3 WARRANTY

The mechanical structures, electrical works including power conditioners/inverters/charge controllers/maximum power point tracker units/distribution boards/digital meters/switch gear/storage batteries, etc. and over all workmanship of the SPV power plants/ systems must be warranted against any manufacturing/ design/ installation defects for a minimum period of 5 years.

Annexure- 1 (Part- 1A)

Accredited Test centers for MNRE Off-Grid Programme

Lab/ Organizat ion	PV Module	Lighting Systems		Battery	Inverter >100 W		Charge Controller		Solar Pumping Systems
		as per MNRE Specificatio ns	Environment al		Efficiency	Environmental	protections	Environmental	
NISE	Yes (IEC61215u p to100W _p) NABL Accredited	Yes MNRE Accredited	Yes (Including IP) MNRE Accredited	Yes MNRE Accredited	Yes (upto 10KVA) MNRE Accredited	Yes (Including IP) MNRE Accredited	Yes MNRE Accredited	Yes (Including IP) MNRE Accredited	Yes MNRE Accredited
ERTL (east)	STC Test Facilit y	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes Up to 1000AH	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	NO
ETDC (B)	Yes (IEC61215) u nder ICEEE- CB, IEC 61701 (upto100W _p)NABL	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes Up to 100 AH	Yes (up to 3KVA) NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	NO

CPRI (B)	No	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes Up to 1000 AH	Yes (up to 10KVA) NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	Yes NABL/ MNRE Accredited	NO
ERTL (N)	No	Only Electronics & luminaire NABL	Yes NABL Accredited	No	Yes (up to 5KVA)	Yes NABL Accredited	Yes (up to 5KW)	Yes NABL Accredited	NO
		Accredited			NABL Accredited		NABL Accredited		
UL (B)	Yes (IEC61215 IEC 61730 Pt.II and IEC 61701) upto400W _p NABL Accredited	Yes (except battery) NABL Accredited	Yes NABL Accredited	No	Yes (up to 6KVA) NABL Accredited	Yes NABL Accredited	Yes (up to 6KW) NABL Accredited	Yes NABL Accredited	NO
TUV Rhineland	Yes (IEC61215 & 61730 Pt-II) upto400W _p NABL Accredited	NO	Yes NABL Accredited	No	Yes (up to 10KVA) NABL Accredited	Yes NABL Accredited	Yes (up to 10KW) NABL Accredited	Yes NABL Accredited	NO

Inter Tek	No	Only Electronics & luminaire NABL Accredited	Yes NABL Accredited	No	Yes (up to 5KVA) NABL Accredited	Yes NABL Accredited	Yes (up to 5KW) NABL Accredited	Yes NABL Accredited	NO
EQDC (Gandhi Nagar)	No	No	No	No	No	No	No	No	Yes MNRE Accredited

*Beyond 10KVA self- certification by the manufactures is acceptable.