

**File No. 5/38/2013-14/RT**  
**भारत सरकार / Government of India**  
**नवीन एवं नवीकरणीय ऊर्जा मंत्रालय / Ministry of New and Renewable Energy**  
**(ग्रिड संबद्ध सौर रूफ टॉप, सौर शहर एवं हरित भवन प्रभाग)**  
**(Grid Connected SPV Rooftop, Solar Cities & Green Buildings Division)**

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**Block No.14, CGO Complex,  
Lodi Road, New Delhi-110003,**

**Dated: 19<sup>th</sup> September, 2014**

To,  
Pay and Accounts Officer  
Ministry of New and Renewable Energy  
New Delhi – 110003.

**Subject: Sanction for Installation of Grid Connected Rooftop Solar Photovoltaic Power Plants with aggregate 52 MWp capacity through Multi Government Agencies (MGAs) in Government/ commercial/ institutional/ residential buildings in various States across the Country on Pilot Basis under National Clean Energy Fund (NCEF).**

Sir,

With reference the minutes of the 10<sup>th</sup> meeting of the Inter Ministerial Group (IMG) constituted by D/o Expenditure, Ministry of Finance, Govt. of India, to approve/appraise the projects under the National Clean Energy Funds conveyed to this Ministry vide letter no. 3/04/PF-2/2014 dated 29<sup>th</sup> May 2014 and this Ministry's proposal submitted vide no. 5/38/ 2013-14/RT dated 13.01.2014, I am directed to convey sanction of President of India for total CFA of **Rs. 143.20 crore** for Installation of Grid Connected Rooftop Solar Photovoltaic Power Plants with **aggregate 52 MWp** capacity in various States across the Country on Pilot Basis under National Clean Energy Fund (NCEF).

2.0 This sanction is also conveyed for utilization of funds of 2% towards field visits, technical guidance, inspection IT enabled monitoring and evaluation publicity orientation, awareness programme, trainings site visits of stakeholders, inspection monitoring etc.. The breakup of the funds is as per follows:

Sl. No.	Item/Component	Estimated Cost
(i)	Estimated Central Financial Assistance (CFA) of total @ 30% i.e. Rs 2.70 crore/MWp with Plant average cost of Rs. 9.0 crore / MWp	Rs. 140.40 crore
(ii)	2% for the field visits, technical guidance, online monitoring and evaluation publicity, orientation, awareness programme, trainings site visits of stakeholders etc.	Rs. 2.80 crore
	<b>Total</b>	<b>Rs. 143.20 crore</b>

3.0 The individual project will normally range from 10.0 kWp to 500 kWp size. The individual project will normally range from 10 kW to 500 kW size. The projects below 10 kW upto 1.0 kWp may also be considered for residential/small office sector. For minimum 1.0 MW project allocation, the projects will be set up on open tender basis.

4.0 The projects will be implemented by MNRE in the Government/ commercial/ institutional/ residential buildings through Multi Government Agencies (MGAs) i.e. Govt. Deptts. Govt. Institutions, PSUs & their subsidiaries, DISCOMs, DMRC, National Housing Bank, Commercial Banks, Railways, Army, Financial Institutions/Financial Integrators, etc..



5.0 The projects will be implemented as per the terms and conditions and guidelines contained in the proposal approved by NCEF and the guidelines enclosed in **Annexure – I**. The actual cost of these projects should be firmed up through open competitive bidding by MGAs. The MGAs will submit cost of the project along with copy of the work orders, completion report of the projects, utilization certificate and Audited Statement of expenditure and the details of interest accrued to MNRE. The locations/distributions of the projects will be finalized by MGAs in consultation with MNRE.

6.0 The duration of implementation of the project is 18 months. The funds towards CFA will be released as soon as received from the Department of expenditure under NCEF during 2014-15, commensurate with the progress of work.

7.0 The MGAs will maintain and present their annual accounts in the standard format as required under GFR 209 (xiii). These accounts shall be open for inspection by the sanctioning authority and audit, both by the Controller and Auditor General of India under the provision of C& AG (DPC) act, 1971 and internal audit party by the Principle Accounts Office of the Ministry whenever called upon to do so.

8.0 The related expenditure will be debitible to Demand no 69, Major Head 2810- New and Renewable Energy, Sub Major Head-00, Minor Head 101- Grid interactive and Distributed Renewable Power, Sub Head 02- off grid/Connected and Distributed and Decentralized Renewable Power, Detailed Head 04, Object Head 31 Grants –in –Aid during the year 2014-15 out of the funds received under NCEF. Financial sanction will be issued separately after concurrence and receiving of budget allocation and in accordance with the requirements of funds.

9.0 This issues in exercise of the powers conferred on this Ministry and with the concurrence of IFD dated 12.09.2014 vide their Dy. No. IFD/709/2014-15 dated 22.07.2014. This sanction order has been noted at Sl. No. 2 Page No. 26 in the Register of grants for 2014-15.

10.0 This issues with approval of the competent authority.

Yours faithfully,



**(Dr. Arun K Tripathi)**

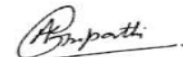
Director/Scientist 'F'

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Copy to :-

1. The Principal Director of Audit, CW&M - II (Scientific Deptt.) DGACR Building ITO, New Delhi.
2. The Principal Director (Local Bodies Accounts) or Director (Local Bodies), Office of the Comptroller and Auditor General of India, 9, Deen Dayal Upadhyaya Marg, New Delhi – 110 002
3. The Accountant General, Govt. of Delhi
4. Managing Director, Solar Energy Corporation of India, D-3, A-Wing, First Floor, Religare Building, District Centre, Saket, New Delhi – 110017.
5. CMD, Indian Renewable Energy Development Agency (IREDA), New Delhi.
6. Heads of all SNAs with request that they may guide and encourage Multi Government Agencies (MGAs) to develop suitable proposals for Grid Connected SPV Rooftop plants.
7. Heads Govt. Deptts./ Govt. Institutions/ PSUs & their subsidiaries/DISCOMs/DMRC/ National Housing Bank /Commercial Banks / Railways / Army / Financial Institutions/Financial Integrators.
8. JS&FA/ DS (F)/ US(F)
9. JS(TK)/Dir(GP)/ Sci B (HCB)
10. Cash Section (2 copies)
11. Guard File/Spare Copies



**(Dr. Arun K Tripathi)**

**Director/Scientist 'F'**



**Annexure - I****Government of India  
Ministry of New and Renewable Energy****Pilot Scheme for Grid Connected Rooftop Solar Power Generation****Background**

While India has huge potential for generating solar power, India also has large number of buildings where space on the roof is lying unutilized. Several of these buildings are using diesel for generating power to meet part of their requirement. The cost of generating power using solar power has come down considerably in the last one year and we have offers of as low as Rs. 7.49 per kw/hour for a 5 MW project in the first phase of JNNISM. In countries like Germany and US where solar power generation capacities have increased considerably in the last couple of years, it has been observed that a major part of this capacity is coming in the form of rooftop solar projects which are grid connected. In most cases, the power is primarily for self-consumption and only surplus power is fed into the grid whereas in certain countries where high feed in tariff has been declared, all the power generated through rooftop is being fed into the grid. In India, this system has somehow not taken off in a big way primarily because the owners of rooftops have not realized how beneficial this could be in a country where acute power shortages are common. It is, therefore, proposed to do a pilot project in order to demonstrate and create awareness and build volume so that costs can also come down in rooftop solar generation.

**2.0 Grid Connected Rooftop SPV System – Concept**

In grid interactive rooftop or small SPV system, the DC power generated from SPV panel is converted to AC power using power conditioning unit and is fed to the grid either of 33 kV/11 kV three phase lines or of 440/220 Volt three/single phase line depending on the system installed at institution/commercial establishment or residential complex. They generate power during the day time which is utilized fully by powering captive loads and feeding excess power to the grid as long as grid is available. In case, where solar power is not sufficient due to cloud cover etc., the captive loads are served by drawing power from the grid. The grid-interactive rooftop system can work on net metering basis wherein the beneficiary pays to the utility on net meter reading basis only. Alternatively two meters can also be installed to major the export and import of power separately.

Ideally, grid interactive systems do not require battery back-up as grid acts as the back-up for feeding excess solar power and vice-versa. However, to enhance the performance reliability of the overall systems, a minimum battery back-up of one hour of load capacity is recommended. In grid interactive systems, it has, however to be ensured that in case the grid fails, the solar power has to be fully utilized or stopped immediately feeding to the grid (if any in excess) so as to safe-guard any grid person/technician from



getting shock (electrocuted) while working on the grid for maintenance etc. This feature is termed as 'Islanding Protection'.

In short these are SPV systems installed on rooftops of residential, commercial or industrial premises connected to the local grid where the Electricity generated could be fed into the grid at regulated feed-in tariffs or used for self-consumption with net-metering approach.

### **3.0 Advantages**

The advantages of Rooftop System includes Savings in transmission and distribution losses, low gestation period for installation, no requirement of additional land, improvement of tail-end grid voltages and reduction in system congestion with higher self-consumption of solar electricity. It generates the local employment and the network losses can be avoided as each kWh of SPV electricity generated can save 1.25 kWh electricity generated at source by conventional fuels.

Large size buildings can generate some power using the shareable space on their rooftops and consume that power themselves. If there is spare power they can put that power into the grid. The solar power plant installed on their rooftop would help in reducing dependence on diesel generated power at least during the day time in areas where grid power is not reliable. In places where grid power is reliable, the requirement of grid power would reduce. The building owner would get clean power at a fixed rate over the next 20 years. The rate of grid power is going up every year and, therefore, if calculated over a period of 20 years, solar power may turn out to be cheaper than the grid power. While we understand that it is very much beneficial for every building owner or occupant to install solar power plant on their rooftop, most of the building owners do not realize this and, therefore, there is a need for this pilot project. Besides demonstration, the pilot project would help bring volumes in few selected pockets thereby reducing the cost, bringing in good companies and setting up arrangements for maintenance. Thereafter this can take off in a big way and with expected future cost reductions it may become attractive even without any subsidy or Government support.

### **4.0 Target areas and buildings**

The project will target large buildings of Government offices, PSUs, commercial establishments, hospitals, cold storages, warehouses, industry and educational institutions, financial institutions, DMRC, railways etc..

### **5.0 Plant size**

It is proposed to set up Grid Connected Rooftop SPV power plants between from 10 kWp upto 500 kWp. However for the residential purposes in the campuses, the plants below 10 kWp upto 1.0 kWp may also be considered. These plants would be without battery. They would generate power and this power would be directly brought into the



electricity distribution network in the building with proper system design so that surplus power can flow into the grid wherever possible. If the building already has some battery installed that may also be integrated into the system. If there is a diesel generator or other backup already available, it may continue as such and integrated into the system. A system of metering would be devised so that energy flowing into the grid and flowing from the grid is well accounted for. As subsidy is proposed to be given, therefore, full feed in tariff declared for solar power would not be payable for energy put into the grid. Regulators may declare separate feed in tariff for energy which is generated from power systems which have got Government subsidy. This may come very close to the rate at which power is supplied from the grid and, therefore, the accounting problems would be minimized.

## **6.0 Implementation agency**

The pilot projects will be implemented by Multi Government Agencies (MGAs) i.e. Govt. Depts. Govt. Institutions, PSUs & their subsidiaries, DISCOMs, DMRC, National Housing Bank, Commercial Banks, Railways, Army, Financial Institutions/Financial Integrators, etc. all over the country. These MGAs may, however, engage experts/consultants and involve wherever required.

## **7.0 Initiatives taken by States on Grid Connected Rooftop SPV Plants**

Few States i.e. Andhra Pradesh, West Bengal, Gujarat, Karnataka, Tamil Nadu, Chhattisgarh, Chandigarh, Kerala, Uttarakhand, Punjab etc. have taken initiatives in promoting grid connected rooftop SPV systems through suitable policy measures and incentives. The state wise initiatives taken are given in enclosed concept note on Grid interactive Rooftop and small SPV power plants.

## **8.0 Implementing Strategy**

The targets will be allocated to the MGAs depending upon their requirements and capabilities. The Grid Connected Rooftop SPV plants will be setup in a project mode with minimum 2 MWp and a maximum 10 MWp project size comprising of many grid connected rooftop SPV plants ranging from 10 kW upto 500 kW. The targets of the project capacity will be allocated to these MGAs.

The MGAs will submit their consolidated proposal to MNRE. It is proposed that the pilot project would start with awareness programme. This would be done through advertisements and awareness campaigns. One or more consultants (companies who have experience in this field) may be hired for this job. They will be asked to organize half-day or one-day workshops, make presentations and organize meetings with stakeholders, depute a team of experts for one to one interaction and use such other means as may be considered useful. Approximately two-three months' time would be spent in this. Thereafter, an advertisement would be issued to collect the demand of power plants from various MGAs. The advertisement would indicate that Government



would provide a subsidy of 30% on the cost of system and MNRE would also provide technical assistance as well as guidance. Based on the demand generated some MGAs would be identified for implementation of pilot project.

The demand would be divided into two categories. First, category would consist of those buildings where buildings owners agree to own the power systems and, therefore, pay 70% of the cost. Second, category would be those building owners who do not want to invest the money and would rather pay a fixed tariff for power generated. The MGAs may also develop their own business models for execution of the projects with financial viability. It is expected that many projects ranging between 10 kWp to 500 kWp would be generated in such a manner, that the location of the buildings in one lot is in one town/ city or close by areas. Tenders would, thereafter, be issued by MGAs inviting bids from EPC contractors for category-I. The EPC contractor offering the lowest rate for each lot would be selected and orders placed. The EPC contractor would be paid 30% of the price quoted in progress linked instalments through MGAs. The remaining amount would have to be paid by the rooftop owner/MGAs. The tender would give specifications on quality and also indicate requirements for product service, maintenance, warrantee etc. If sufficient requirement is given for second category also then separate tenders would be issued for that category. These tenders would however, have to be based on tariff at which power will be supplied by RESCOs. A fixed subsidy amount per watt would be offered which would be based on 30% subsidy amount calculated on the basis of rates in the first tender of category-I. It would also be ensured that the subsidy offered would not exceed the benchmark fixed by MNRE.

Any other business model will also be accepted with due discussion with the MGAs. The suggestive guidelines proposed for implementation are given in Annexure enclosed. However, site specific modifications may be carried out while implementing the project by the MNRE/ MGAs.

### **9.0 Monitoring evaluation and technical help**

MGAs will be required to submit quarterly progress report. MNRE would monitor the projects during implementation as well as after implementation for at least two years. It would collect generation data and prepare reports to give feedback about the success of the programme. It would also continue to provide technical help and guidance to the project developers during setting up and running of the power projects. The online system for monitoring and evaluation will be developed and the efforts will be made to collect the real time generation data of each projects.

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## ANNEXURE

### Suggestive Guidelines for

#### Installation of Grid Connected Rooftop Solar Photovoltaic Power Plants with aggregate 52 MWp capacity by MGAs on Pilot Basis under NCEF

- The project includes Installation of Grid Connected Rooftop Solar Photovoltaic Power Plants with aggregate 52 MWp capacity in various States across the Country on Pilot Basis. The project aims to reduce the fossil fuel based electricity load on main grid and make the buildings self-sustainable to the extent possible.
- Projects can be set up on the concept of Net Metering/ Feed-in-Tariff on Pilot Basis. The individual project will normally range from 10 kW to 500 kW size. The projects below 10 kW may also be considered for residential sector.
- The project envisages installation of Grid connected Rooftop Solar Photovoltaic Power Plants on the roofs of Government /Commercial/ Institutional/residential/ Industrial buildings located in various States across the country. It is targeted to be expanded in various buildings of corporate houses, schools and colleges, private houses etc. all over the Country.
- The pilot projects will be implemented by Multi Government Agencies (MGAs) i.e. Govt. Deptts. Govt. Institutions, PSUs & their subsidiaries, DISCOMs, DMRC, National Housing Bank, Commercial Banks Financial Institutions/Financial Integrators, etc. all over the country under overall coordination of MNRE.
- The generated solar power will be utilized for captive application and the surplus power will be fed to the grid.
- The total cost of the project is estimated to be Rs. 143.20 crore for aggregate 52 MW including 2% for the publicity, orientation, awareness programme, trainings site visits of stakeholders projects technical guidance, monitoring and evaluation.
- The Solar PV System on the rooftop of the selected Buildings will be installed for meeting upto 90% of the annual energy requirements depending upon the area of rooftop available and the remaining energy requirement of the office buildings will be met by drawing power from grid at commercial tariff of DISCOMs.
- This project would demonstrate the grid interactive/ integrated renewable energy application. In this way the project would achieve the objective of the National Clean Energy Fund by reducing the GHGs emissions substantially.
- The ministry has earmarked the present benchmark cost of Rs. 90/- per Wp for Grid Connected Rooftop SPV Power Plants of Above 100kWp capacity and Rs. 100/- per Wp for Grid Connected Rooftop SPV Power Plants of upto 100kWp capacity. The benchmark cost may be revised time to time. However, the MGAs will implement the projects on open tender basis.
- Time frame will be 18 months for execution of the project from the date of sanctioning for each Project.



- The rooftop will be owned by the beneficiary; however, the roof renting model may also be adopted. The major equipment include-SPV panels, inverters, meters, panel installation structures etc. which will be procured under respective project as per rules.
- About 30% CFA for each project can be provided from National Clean Energy Fund and balance will need to be met by the beneficiary/investment by MGAs or any other source.
- Energy Generated above the requirement may be fed to grid at commercial tariff @ about average of Rs. 6.00 per unit. However the actual tariff will vary from state to state and may be decided by DISCOMs/Regulators/developers.
- This NCEF funded project will help in demonstrating the technology, functioning of grid connectivity and metering mechanism. It will also demonstrate various business models for sustained functioning of the projects which will motivate the private users/common man to adopt in their available rooftop. This will also help the States to formulate/ modify their Grid Connected Rooftop SPV plants policy.
- An agreement between the implementing agency, beneficiary and the DISCOM may be entered into for supply of power by the developer to the user on agreed tariff for about next 15-20 years.
- The balance cost will be provided by the respective beneficiary. The RESCO model will also be tried in which the selected RESCO will invest balance project cost and will recover from user on agreed terms/tariff.
- MGAs will submit the quarterly progress report to MNRE indicating the physical and financial progress made. The report will contain the site details, contact person/beneficiary/correspondence address. The site should be available for the inspection/verification purpose by the MNRE of third party inspection.
- Regarding the technical standards of the SPV panels, inverters, meters and other balance of systems, the guidelines of MNRE issued under relevant schemes, time to time will be followed.
- In case of any dispute, the decision of the MNRE will be final.

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