PV ROOFTOP PROGRAMME

NATIONAL SOLAR MISSION

# GRID CONNECTED SOLAR ROOFTOP PROGRAMME IN INDIA

सत्यमेव जयते

Ministry of New and Renewable Energy
Government of India

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सत्यमेव जयते

विद्युत, कोयला, नवीन और नवीकरणीय ऊर्जा एवं खान
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## Message

Solar is one of the fastest growing and talked about energy generation technologies globally. Increasing awareness of climate change, energy security needs, facilitation from Government, decline in solar energy costs and emergence of new and innovative business models are some of the prime drivers for the large-scale development and deployment of solar energy.

As a result, the Government of India's target of 1,00,000 MW from solar power is realistic and eminently achievable. The 40,000 MW from Rooftop Solar (RTS) is an important step to rapidly develop the solar sector. This segment is attractive to State Governments, utilities and cities, as they do not require pooling of land or separate transmission facilities. At the same time, it makes consumers into prosumers by becoming active participants in the energy sector.

RTS systems have huge potential in India as estimates show that nearly 70% of the building stock in India, which will be required in 2030, is yet to be constructed. The support provided by the Ministry of New & Renewable Energy through skill development programmes, financial assistance and incentives, concessional finance for developers and focused awareness programmes provides an additional impetus.

However, Solar Rooftop in many parts of the country is still at an early stage. There is a need to co-ordinate across all the stakeholders to help this sector achieve its true potential. There is a need to address market-related constraints that hamper smooth implementation and capacity addition.

In this context, this booklet by the Ministry of New & Renewable Energy describes the Grid connected Solar Rooftop Programme, and is a reference guide for those wishing to know more about the sector. I am confident that the Solar Rooftop programme will help India achieve Clean and Green Power.

**Piyush Goyal**

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MINISTRY OF NEW AND RENEWABLE ENERGY

## Foreword

Solar Power has emerged as the fastest growing energy generation technology globally over the past decade, mainly due to large-scale adoption of the technology by utilities and private sector. A number of drivers have accelerated the development and deployment of solar energy generation projects across the globe. These range from increased awareness of climate change hazards, energy security considerations, facilitating policy and regulatory frameworks, decline in solar energy generation costs, and emergence of new and innovative business models.

Rooftop solar (RTS) has led the development of the solar photovoltaic sector across the globe with its ability to replicate rapidly. RTS projects help utilities address critical issues such as high transmission and distribution losses and offer long term national as well as consumer level energy security, while at the same time making the consumer an active investor and a participant in the energy sector.

The Central and State Governments have undertaken various initiatives, including policy, regulatory, fiscal and financial measures to promote RTS installations. Some of the key initiatives/ promotional measures taken by MNRE are:

a) Financial subsidy of 30% of project/bench mark cost for RTS projects in Residential/Institutional/Social sectors;
b) Incentive–cum–Award for RTS projects in Government/PSU sector;
c) Pursuing notification of Gross/Net metering policies in all States/UT;
d) Development of Online Portal for RTS development programmes;
e) Empanelment of agencies / channel partners for installation of RTS systems;
f) Training of 50,000 Surya Mitra and staffs of Discoms/State Nodal Agencies.
g) Provision of concessional credit to project developers through multi-lateral support
h) Development of Online portals for registration of partners, approval of proposals and project monitoring
i) Nationwide programme for training of officials of Utilities, Nodal Agencies, Regulatory Commissions and Banks as also entrepreneurs.

As a result, RTS should be one of the fastest emerging market segments in the energy sector today. However, it is important to enable market eco-system to provide further thrust to the sector and ensure its scale up in an efficient manner. Therefore, substantial coordination of stakeholders including Regulators, Discoms, State Nodal Agencies, Banks, Urban Local Bodies, Developers/Aggregators/EPC contractors, etc. is required for implementation of RTS projects.

This brochure aims to provide information on RTS business models, stakeholders, promotional schemes and policies as also new initiatives at one place to raise awareness amongst general public. I wish that all stakeholders including general public read, share and benefit from this information brochure.

Rajeev Kapoor
Secretary, Government of India

अक्षय ऊर्जा से देश विकास
गांव गांव बिजली, घर घर प्रकाश

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# DEFINITION

| | |
|---|---|
| ADB | Asian Development Bank |
| CAPEX | Capital Expenditure |
| CFA | Central Financial Assistance |
| CPSU | Central Public Sector Undertaking |
| CP | Channel Partners |
| CEIG | Chief Electrical Inspector to Government |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit |
| DGS&D | Directorate General of Supplies and Disposal. |
| DISCOM | Distribution Company |
| EPC | Engineering, Procurement & Construction |
| EU | European Union |
| FiT | Feed-in-Traiff |
| GW | Giga Watt |
| GoI | Government of India |
| INDC | Intended Nationally Determined Contribution |
| INR | Indian National Rupee |
| kW | Kilo Watt |
| MW | Mega Watt |
| MoU | Memorandum of Understanding |
| MNRE | Ministry of New and Renewable Energy |
| MoUD | Ministry of Urban Development |
| NABARD | National Bank for Agriculture and Rural Development |
| NDB | New Development Bank |
| NGO | Non-Governmental Organization |
| PPA | Power Purchase Agreement |
| PCR | Project Completion Reports |
| PMC | Project Management Consultancy |
| PSU | Public Sector Undertaking |
| PNB | Punjab National Bank |
| RESCO | Renewable Energy Service Company |
| RTS | Rooftop Solar |
| SECI | Solar Energy Corporation of India |
| SPV | Solar Photovoltaic |
| SPIN | Solar Power Installations |
| SBI | State Bank of India |
| SNA | State Nodal Agency |
| UT | Union Territory |
| USAID | United States Agency for International Development |
| USD | Unites State Dollar |
| ULB | Urban Local Bodies |
| WB | World Bank |

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# 1 POWER SECTOR IN INDIA

Power is one of the key infrastructures for growth of Industry and economy. Over the past two years, India's economy expanded at an average annual rate of 7.3% to 7.6%, placing it among the top five fastest growing nations in the world.

With about 308 GW of installed capacity (as of November 2016), the Indian power system is among the largest in the world, but per capita consumption of electricity is less than one-fourth of the world average. An estimated 55 million households are not connected to the national grid. Even when connected, many face frequent disruptions and get low quality power. India's power system needs to almost quadruple in size by the year 2040 to catch up and keep pace with electricity demand that—boosted by rising incomes and new connections to the grid—increases at almost 5% per year.

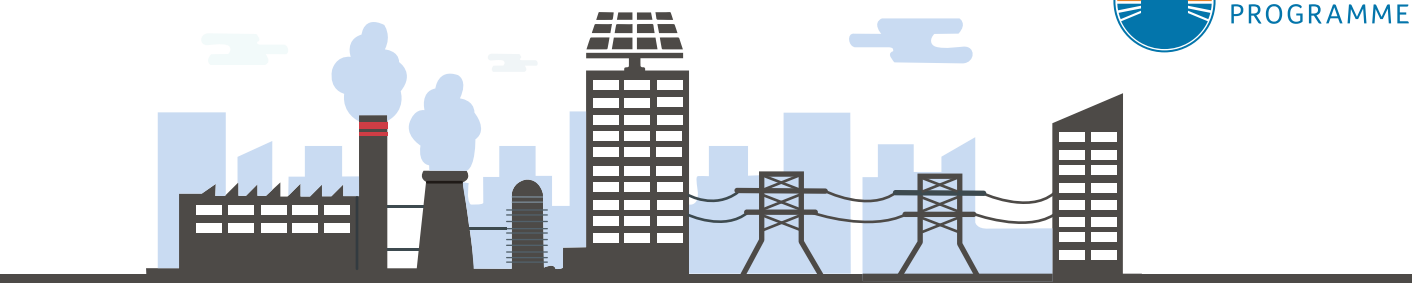
With an average solar insolation of 4-7 kwh/$m^2$ and 300 sunny days in a year, India's potential for harnessing solar power is immense. Government of India (GoI) wants a growing share of the country's electricity generation to come from renewable energy.

In its NDCs, India aims to increase the share of installed electric power capacity from non-fossil-fuel-based energy resources to 40 % by 2030. With India setting the ambitious target of 175 GW by the year 2022 for Renewable Power, this sector is now poised for a quantum jump.

As a part of clean climate commitments, India plans to install 40 GW of PV Rooftop Solar Systems by 2022. With a market potential of 124 GW, around 506 MW of Rooftop Solar has been installed up to December 2016.

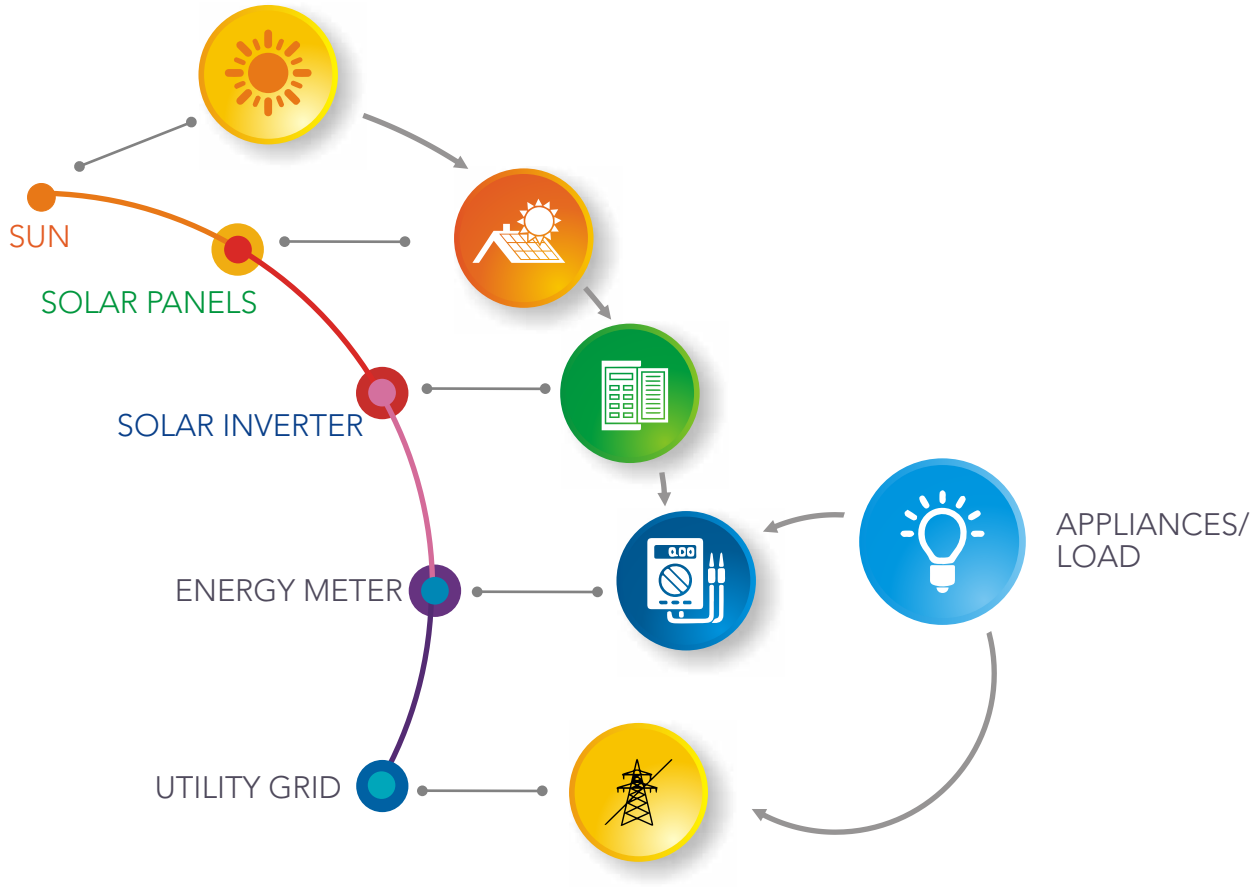
*100 kW, Manufacturing Unit, Raipur*

*100 kW, Educational Institute, Bemetara*



# 2 GRID CONNECTED ROOFTOP SOLAR SYSTEM

In grid connected 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 440V/220V three/single phase line depending on the local technical and legal requirements.




These systems generate power during the day time which is utilized by powering captive loads and feed excess power to the grid. In case, when power generated is not sufficient, the captive loads are served by drawing power from the grid.

The concept of rooftop solar is based on the scale of the PV plant rather than the fact whether it is situated on a roof/terrace or not. Hence, the definition of RTS also includes small solar plant on the ground.

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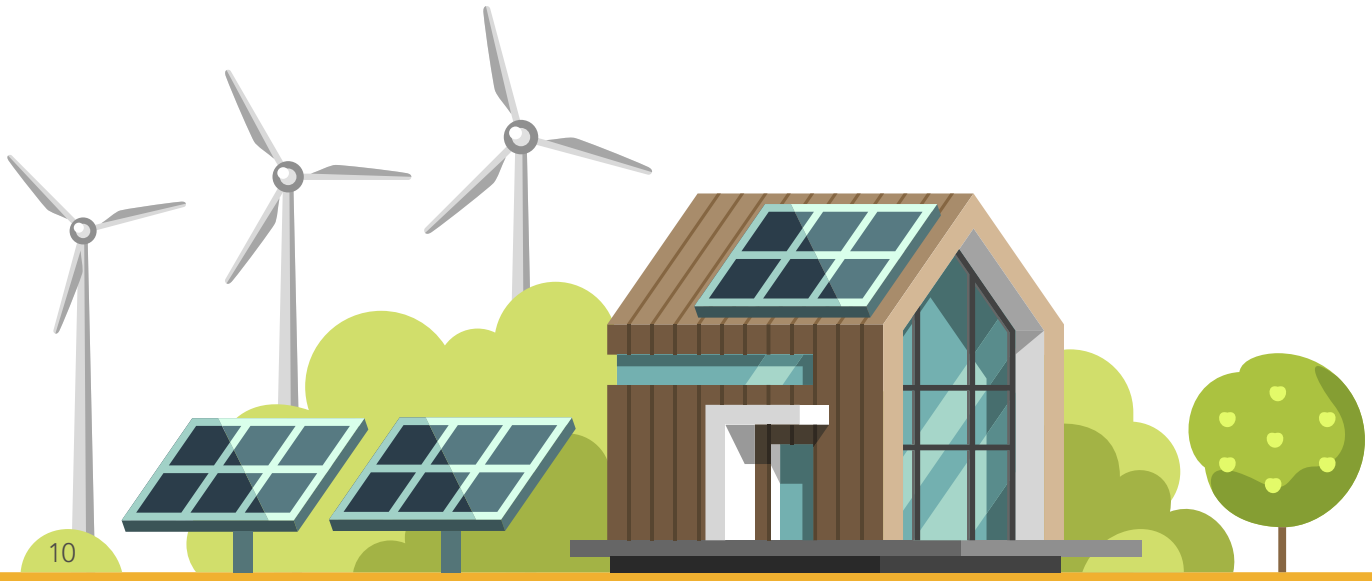
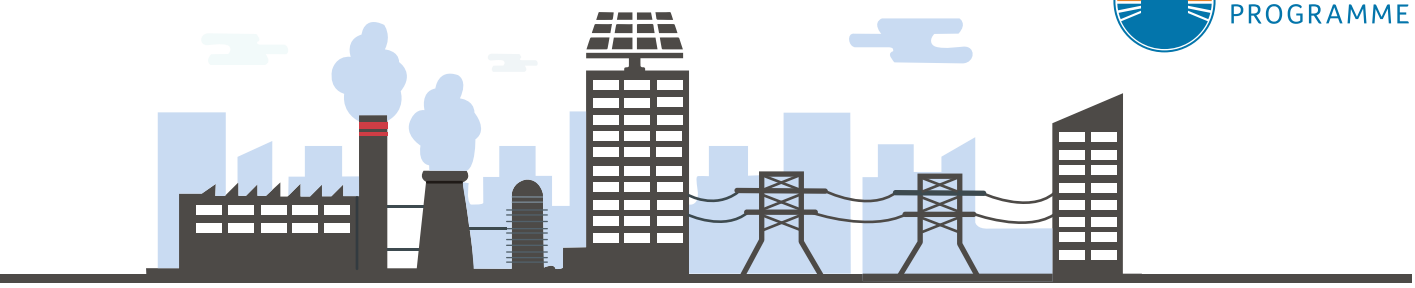
# 3 BENEFITS FROM THE GRID CONNECTED ROOFTOP SOLAR SYSTEM

Solar Rooftop System provides following technical benefits:

- Utilization of available vacant roof space;
- Low gestation period;
- Lower transmission and distribution losses;
- Improvement in the tail-end grid voltages and reduction of system congestion;
- Loss mitigation by utilization of distribution network as a source of storage through net metering;
- Long term energy and ecological security by reduction in carbon emission;.
- Abatement of about 60 million tonnes of $CO^2$ per year over its life cycle;
- Better Management of daytime peak loads by DISCOM/ utility;
- Meeting of the renewable purchase obligations (RPOs) of obligated entities which are targeted at 8% of electricity consumption;
- Minimal technical losses as power consumption and generation are co-located.





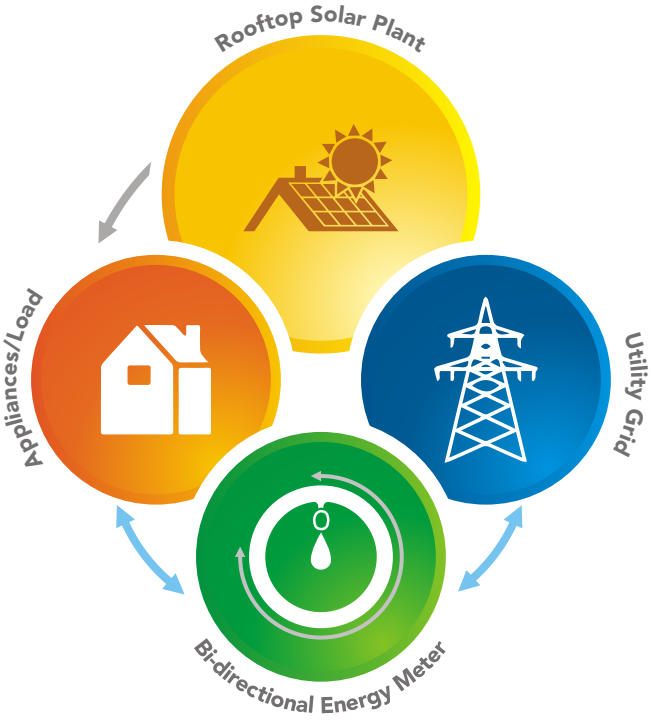
# 4 TYPES OF METERING ARRANGEMENTS

The way how electricity is billed strongly influences profitability of the PV investments. To fully harness the benefits of the investments, the final user should be able to make the most of metering system.

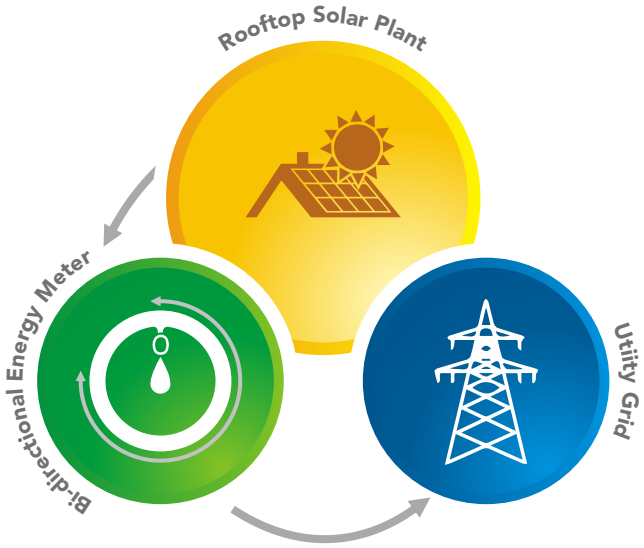
## 4.1 Net Metering

Net metering systems are primarily aimed at providing an opportunity to consumers to offset their electricity bills, wherein a single meter records both import of conventional energy from distribution grid and export of solar energy into distribution grid. Thus, net metering allows the final user to credit produced energy in the grid and is also promoted as a preferred option.

### Net Metering




### Gross Metering




## 4.2 Gross Metering

Gross metering systems are aimed at rooftop owners/third party investors who will like to sell energy to the DISCOM by using roofs owned by them or another party. It is also known as feed-in metering wherein, all the energy generated from the system is exported to the grid and is separately recorded through a different 'feed-in meter'. The developer exports the solar energy to the utility at a predetermined feed-in-tariff (FiT) approved by the regulator, and the third party investors/RESCO developers enter into a long term Power Purchase Agreement (PPA) with the utility. Only grid-connected PV systems can be gross-metered.

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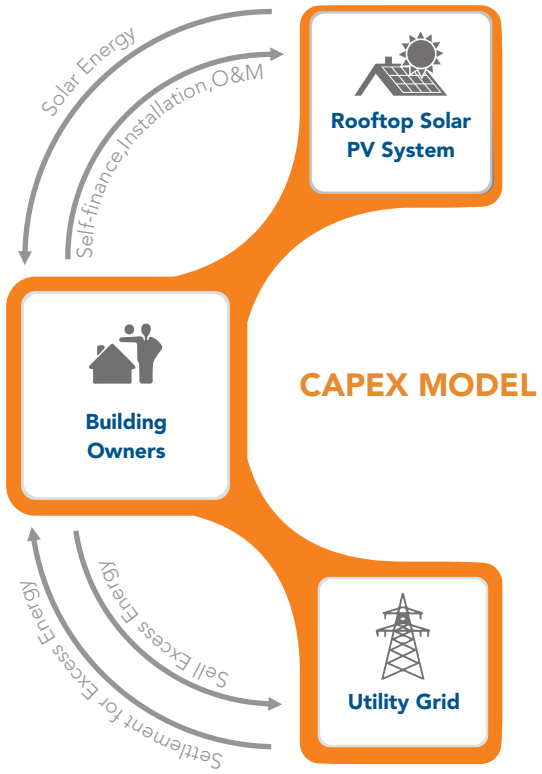
# 5 BUSINESS MODELS

In India principally there are two major business models:

- CAPEX – capital expenditures are provided by the rooftop owner;
- RESCO – capital expenditures are covered by third party.

## 5.1 CAPEX Model

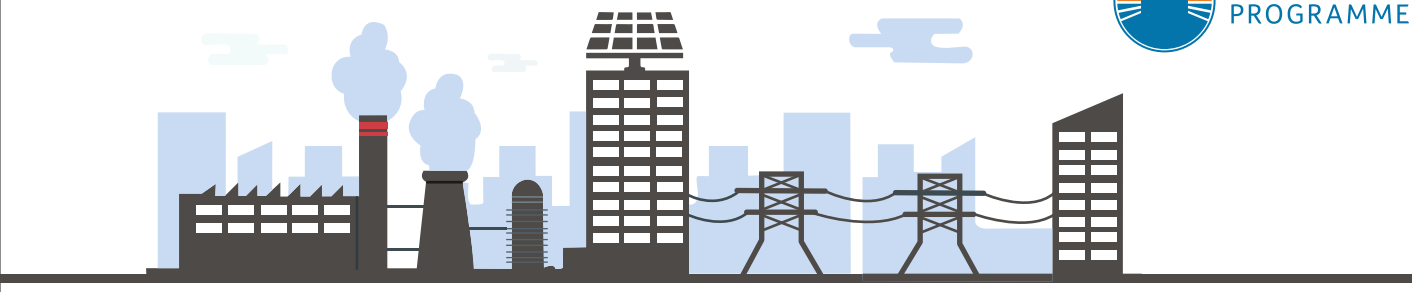
CAPEX mode is the most common business model for solar deployment in India. In this model the consumer purchases the solar system, by making 100% of the payment upfront or financing the system, often through a bank.




## 5.2 Renewable Energy Service Company (RESCO) Model

Under this model, a RESCO developer finances, installs, operates and maintains the rooftop solar power plant. The developer signs an agreement with the rooftop owner. The rooftop owners may consume the electricity generated, for which they have to pay a pre-decided tariff to RESCO developer on a monthly basis for the tenure of the agreement. Based on the consumption choice and requirement, the model is further divided into two types – Rooftop Leasing and Power Purchase Agreement (PPA).

*50 kWp, Govt. College of Commerce & Business Administration, Chandigarh*



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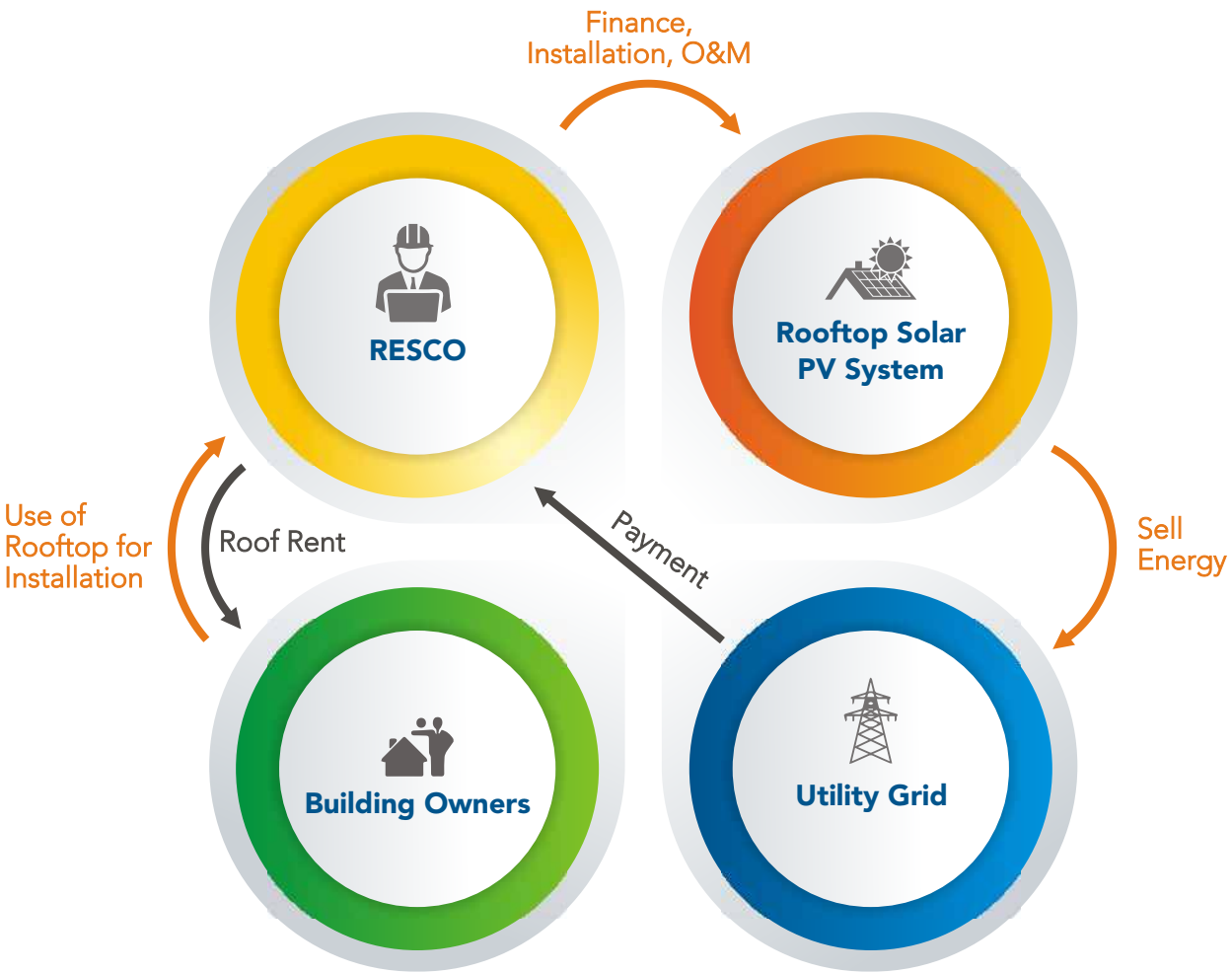
### 5.2.1 Rooftop Leasing (Under Gross Metering)

Under this arrangement, the RESCO developer leases the rooftop and pays a fixed lease/rental to the building owner over the time of the lease period for installing the solar panels of the rooftop. The RESCO developer exports the solar energy to the utility at a predetermined feed-in-tariff (FiT) approved by the regulator.

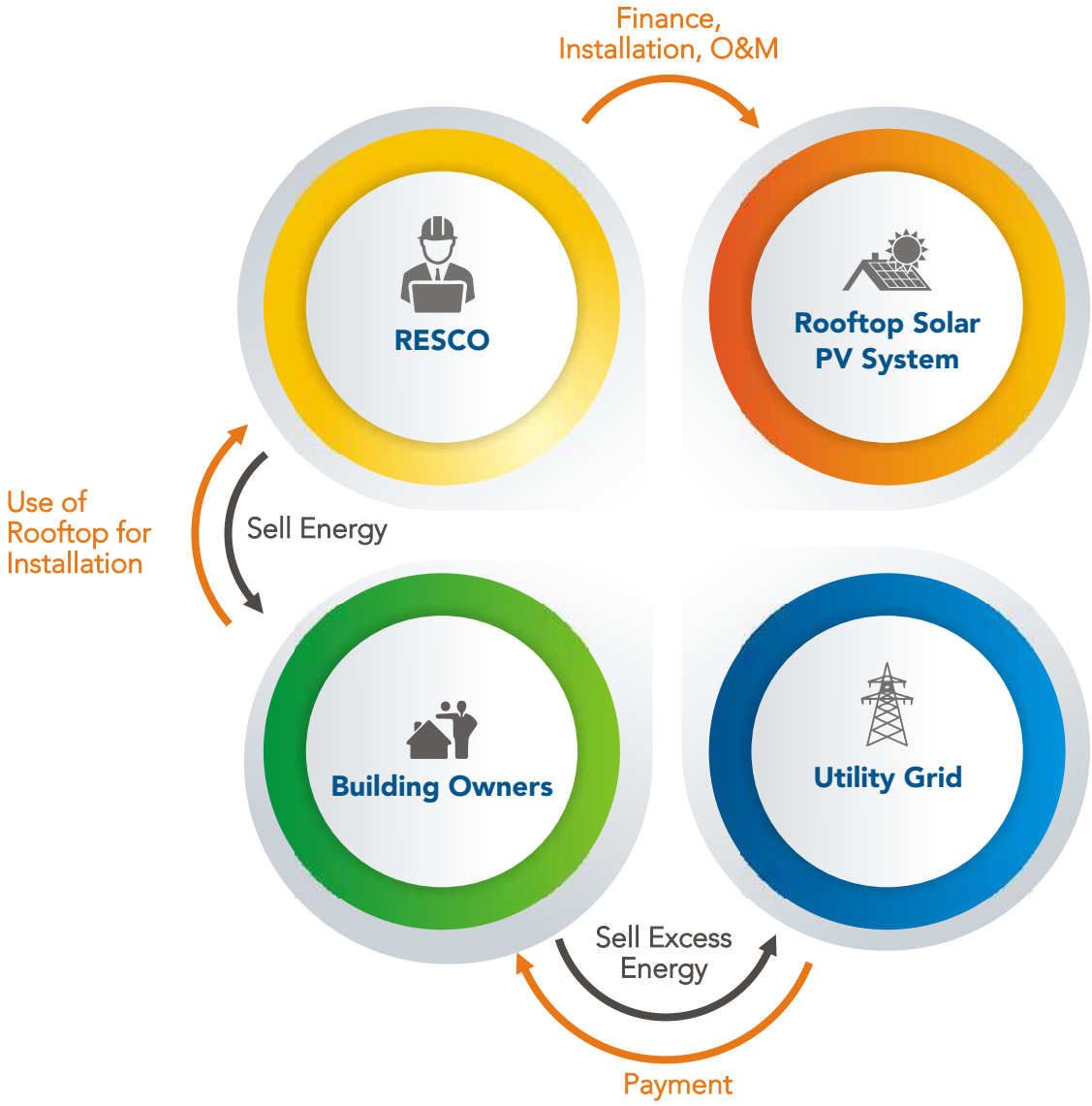
**Rooftop Leasing (Under Gross Metering)**

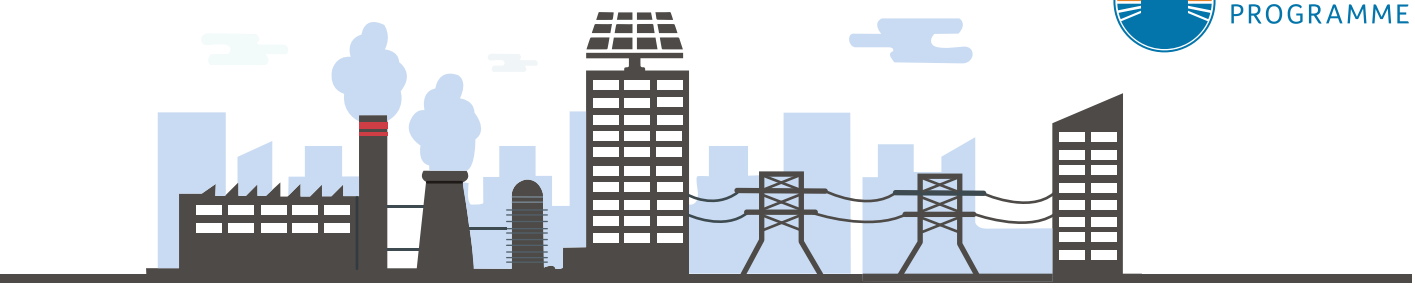


### 5.2.2 Power Purchase Agreement (Under Net Metering)

Here the RESCO developer invests in solar rooftop asset, and sells the generated power to the building owner in favor of a lower solar power tariff. The excess power could be sold by the building owner to the utility through net metering system.

**Power Purchase Agreement (Under Net Metering)**

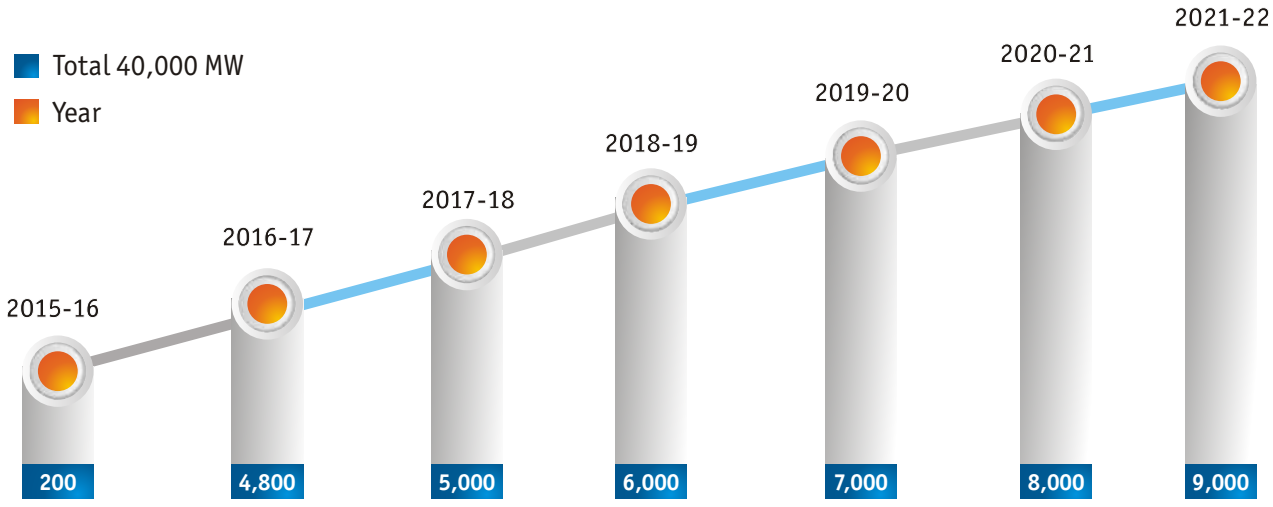




# 6 ROOFTOP SOLAR PROGRAMME BY GOVERNMENT OF INDIA

Government of India has taken an ambitious targets of 100,000 MW of solar power by 2022 out of which 40,000 MW is to be achieved through Rooftop Solar (RTS) power plants as per the clean climate commitments.

## Year – wise target (MW)




Realizing our immense RTS potential and the ambitious targets, MNRE had launched Grid Connected Rooftop and Small Solar Power Plant Programme with increased budget of ₹5,000 Crore (₹50,000 million) for rooftop solar photovoltaic (RTS) projects up to 2019-20.

Under this programme, RTS capacity in the commercial and industrial sectors to be developed without any subsidy support. RTS plants on rooftops and vacant area of buildings in residential/ social/ institutional/ Government/ PSU sectors would be developed based on subsidy/ incentive as follows:

a. For rooftops and vacant areas of buildings in residential/ social/ institutional sectors, capital subsidy at the rate of upto 30% of project cost or benchmark cost whichever is lower for General Category States and upto 70% of project cost or bench mark cost whichever is lower for Special Category States/Islands.

b. For rooftops and vacant areas of buildings in Government/ PSU sectors, financial incentive at the following rates:

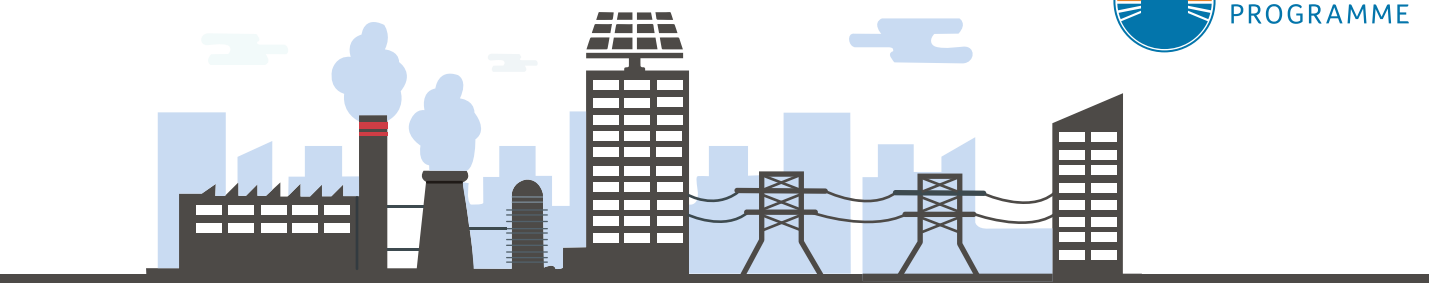
| Achievement vis-a-vis Target Allocation | Incentives for General Category States | Incentives for Special Category States/UTs |
|---|---|---|
| 80% and above within sanctioned period | ₹18,750/- per kW | ₹45,000/- per kW |
| Below 80% and upto 50% within sanctioned period | ₹11,250/- per kW | ₹27,000/- per kW |
| Below 50% delayed commissioning up 6 months beyond sanctioned period | ₹ 7,500/- per kW | ₹18,000/- per kW |

- **Special Category States/Islands:** North Eastern States including Sikkim, Uttarakhand, Himachal Pradesh, Jammu & Kashmir and Lakshadweep, Andaman & Nicobar Islands.
- **General Category States:** All other States/UTs not covered under special states.
- **Residential buildings:** All types of residential buildings, including group housing.
- **Social sector buildings:** Community centers, welfare homes, old age homes, orphanages, common service centers, common workshop for artisans or craftsman, facilities used for the community. Trusts/NGO/Voluntary organizations/ training institutes, any other establishments for common public use, etc.
- **Institutional buildings:** Schools, health institutes including medical colleges & hospitals, universities, educational institutes, etc.
- **Benchmark price:** For rooftop solar PV systems without battery backup support, benchmark price is Rs. 75 per Wp at present.

## 6.1. Achievement Linked Awards for the best performing stakeholders

In order to promote the grid connected RTS systems in the country, cash awards, along with certificates, shall be provided under this scheme to all Ministries/ Departments and State/UT Government involved in implementation.

### Achievement Linked Awards



The provision of the awards would be as follows:

**Achievement / Installation of grid connected RTS by Central/ State/ Local Government**

1 Highest capacity installation by SNAs of Renewable Energy in States

2 Highest capacity installation by Central Government Departments/ Ministries on their buildings

3 Highest capacity installation by State Government Departments/ Ministries on their buildings

4 Highest capacity Installation by Government (both Central and State) Educational Institutions on their buildings

5 Highest capacity Installation by Government (both Central and State) Hospitals on their buildings

6 Highest capacity Installation by Urban Local Bodies/Local Governments

7 Largest capacity installation on a single roof by any above organization

*100 kWp, Model Central Jail, Chandigarh*

# 7 OBJECTIVES OF THE PROGRAMME

**Promote** the grid connected SPV rooftop and small SPV power generating plants among the residential, community, institutional, industrial and commercial establishments;

**Mitigate the dependence** on fossil fuel-based electricity generation and encourage environment friendly Solar electricity generation;

**Create enabling environment for investment** in solar energy sector by private sector, state government and the individuals;

**Create enabling environment for supply** of solar power from rooftop and small plants to the grid;

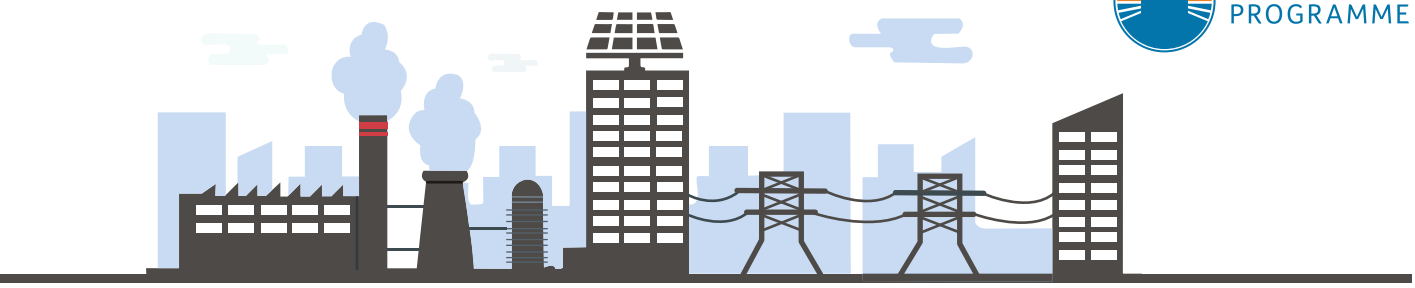
**Encourage innovation** in addressing market needs and promoting sustainable business models and ensure employment opportunities;

Provide **support to channel partners** and potential beneficiaries, within the framework of boundary conditions and in a flexible demand driven mode.;

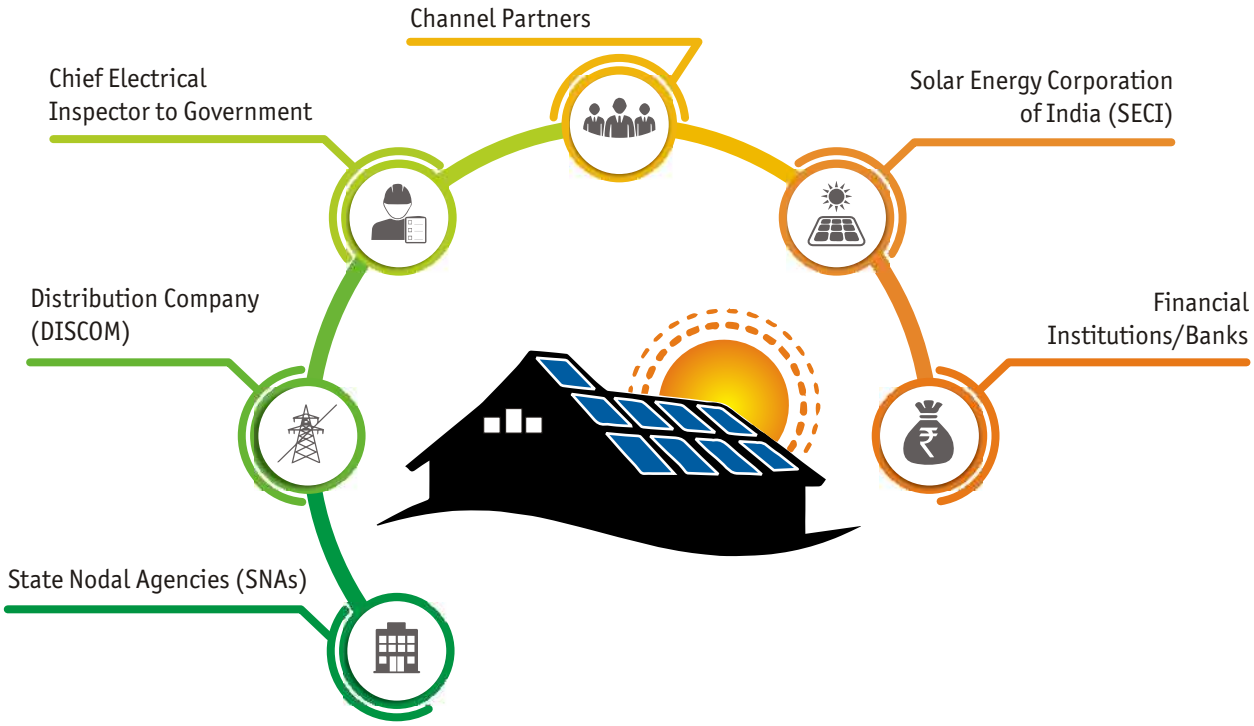
**Create a paradigm shift** needed for commoditization of grid connected SPV rooftop applications;

Encourage **replacement of diesel**, wherever possible.

*1 MWp, Punjab Engineering College (PEC), Chandigarh*



# 8 MAIN PV ROOFTOP PROGRAMME ACTORS




## 8.1 State Nodal Agencies (SNAs)

SNAs are the Government Agencies at State level that work for the promotion and development of renewable energy programmes/projects in their respective states. They keep/maintain all applications and records with requisite brief about the beneficiaries/projects duly conducted and certified by them. These records are to be made available for the audit purpose or to the inspecting team/MNRE officials etc.

## 8.2 Distribution Company (DISCOM)

DISCOM interprets and implements the provisions of the policy and regulations, thereby allowing customers to interconnect their RTS system to the grid. In the process, the DISCOM ensures overall safety, adherence to the overall technical guidelines, and follow commercial processes.

## 8.3 Chief Electrical Inspector to Government

The Chief Electrical Inspector (CEIG) ensures safety compliance and operations of RTS system as per the provisions laid out in the Electricity Act, 2003 and Indian Electricity Rules, 1956. The CEIG's involvement with respect to the process is on two counts: firstly, approval of drawings and design documents, secondly, pre-commissioning inspection of the installed RTS plant for issue of 'Charging Certificate'.

## 8.4 Channel Partners

Channel Partners are the agencies empaneled by MNRE that facilitate individuals and small groups of clients to access the provisions/ benefits available under this programme. The empanelment with MNRE is based on certificate from a rating agency in the country for technical and financial strength. The rating agencies would check the net worth/ turnover of the participating entity, its technical capability of supplying, installing and providing after sales service, track record and tie-ups with the equipment suppliers.

The Channel Partners/Implementing agencies could include the following:-

- Renewable Energy Service Providing Companies (RESCOs)
- System Integrators
- Manufactures of any component of the Solar Plants
- Project developers
- Vendors/ suppliers of solar equipment
- Reputed and relevant NGOs of National level.
- Solar Ambassadors

*200 kW, Mats University, Raipur*

MNRE has also published the guidelines for channel partners under the grid connected rooftop and small solar power plant programme.

For respective States/ UTs, SNAs and DISCOMs have to undertake competitive bidding for selection of developers for installing RTS plants and only such empaneled developers will be allowed to claim CFA/ subsidy.

## 8.5 Solar Energy Corporation of India (SECI)

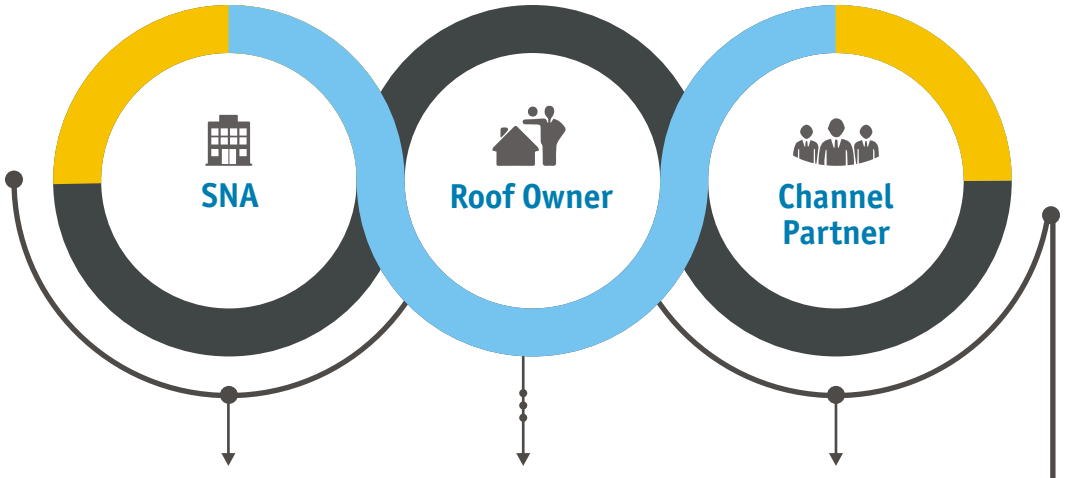
Solar Energy Corporation of India Ltd. (SECI) is a CPSU under the administrative control of the Ministry of New and Renewable Energy (MNRE), set up to facilitate the implementation plans of the targets set therein. It is the only CPSU dedicated to the solar energy sector. SECI will setup the allotted capacity following the competitive bidding process.

## 8.6 Financial Institutions/Banks

The financial Institutions and financial Integrators i.e., NABARD, National Housing Banks, other Banks, IREDA, etc. are also eligible for implementing the programme. They may source funds from MNRE, their own resources or any other sources i.e., carbon credits, National Clean Energy Fund, funds from States, beneficiary contribution, CSR sources etc.

Other Govt. Departments/Agencies i.e., Railways, Defense/Para Military Forces, Local Government Bodies including Municipal Corporations/Municipalities, State Departments, etc. interested in directly implementing the programme are also encouraged.

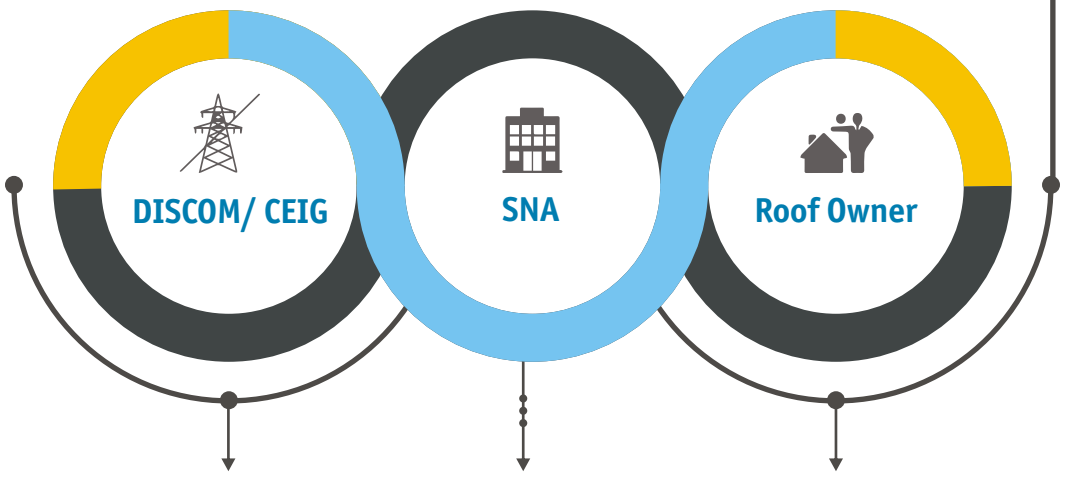
# 9. PROCESS FLOW




- Prepares targets based on capacity sanction by MNRE
- Select installers/ channel partners through tendering and fixes rate contracts
- Display of the selected installers/ channel partners and rate contracts in public domain

- Submits installation requests to the SNA
- Independently selects installer for getting proposal from the list finalised by SNA

- Channel Partners submits proposal to the rooftop owner as per site assessment
- After selection/receiving work order, signs the EPC Agreement/PPA with roof owner
- Submits request for RTS installation and subsidy to the SNA
- Applies Net metering to the concern DISCOM on behalf of roof owner




- Technical feasibility analysis of distribution transformer
- Technical evaluation of plant design and installation parameters
- Plant inspection and installation of bidirectional meters
- Chief Electrical Inspector to Government conducts inspection for the plant

- Reviews the application and documents submitted by installer
- Monitors the installation work and progress
- Conducts inspection after project completion/ commissioning

- Receives subsidy after complete due diligence from SNA and starts benefiting from Net metering.

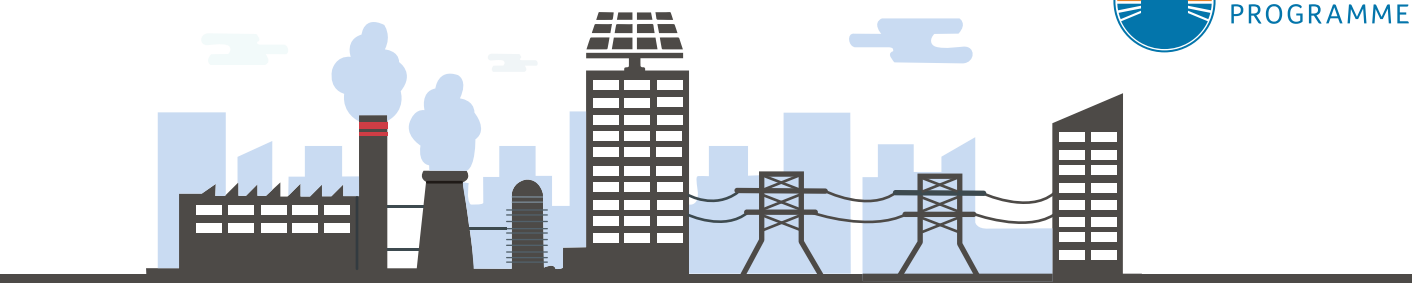
# 10 STATE INITIATIVES & SCHEMES

To achieve a sustainable development route that provides advancement in economic as well as environmental objectives, MNRE is closely working with the Central/State/UT Government and Central/State Electricity Regulatory Commissions on various schemes:

- 20 States have developed Solar Policies supporting Grid Connected Solar Rooftop Systems, and
- State Electricity Regulatory Commissions of 34 States/UTs have notified regulations for net-metering/gross-metering as on 06.01.2017.
- Some State Governments also provide capital subsidy in addition to CFA provided by MNRE. Thus under the Chief Minister's Solar Rooftop Capital Incentive Scheme, Tamil Nadu Government provides a capital subsidy of Rs. 20,000 per kilowatt for grid-connected residential solar PV systems in addition to the 30% subsidy scheme of MNRE. Similar incentive is also being provided by the State Governments of Gujarat & Chhattisgarh.

Summary of the above mentioned State Solar Policies and Net-metering regulations can be accessed at PV Rooftop cell webpage: http://pvrooftop.in/states/index_states.htm

*200 kW, Royal Heritage Mall, Pune, Maharashtra*



# 11 MAJOR INITIATIVES

## 11.1 Concessional Loans for RTS Developers

As no Central financial subsidy is now available for commercial and industrial sectors, MNRE initiated the proposal for multilateral concessional loans from the World Bank (WB), Asian Development Bank (ADB) and New Development Bank (NDB) to support RTS project developers. All the three multilateral banks have approved proposal for$1370 million concessional loans to State Bank of India (SBI), Punjab National Bank (PNB) and Canara Bank respectively. Ministry of Finance has approved special guarantee fee for supporting RTS sector. These loans will be available to project developers in Rooftop Solar sector through the above scheduled banks on concessional rates.[1]

## 11.2 Online Portal for Rooftop Solar 'SPIN'

MNRE for monitoring and management of Grid Connected PV Rooftop Projects in India, launched an online application called SPIN (Solar Power in India). The application is developed by the NIC and is available for use of all stakeholders at www.solarrooftop.gov.in

The main objectives of this online platform is to make all process involved in the installation of Grid Connected Rooftop Systems transparent. Some of the major tasks conducted on SPIN portal include:

- Empanelment of channel partners/ agencies and their management;
- Managing proposals, sanctions, targets of empaneled agencies;
- Monitoring of installation of RTS systems;
- Disbursement of subsidy (Under proposed discussions);
- Awareness creation for RTS & installation interest form for general public;
- Creation of Geo-referenced database of all RTS projects.

Using this portal more than **1,150 Channel Partners/New Entrepreneurs** have been empaneled to tap the solar potential available in the various sectors in the country.

## 11.3 Scheme for Urban Local Bodies (ULB)

MNRE is also focusing on upcoming buildings/new construction, so that these have RTS installation as a mandatory requirement. ULBs play a pivotal role in accelerating the RTS

[1] *http://mnre.gov.in/file-manager/ UserFiles/ Financing-of-RE-projects-by-Banks-&-FIs.pdf*

in new construction in their area by implementing Model Building Bye-laws.

To enable RTS development from planning stage, Ministry of Urban Development (MoUD) has recently amended Model Building Bye-laws for including RTS plants for major building projects.

## 11.4 Standardisation of RTS Documents

To ease and expedite the process of RTS implementation in Government sector, model bidding documents for both CAPEX and RESCO modes has been developed by MNRE; i.e. Memorandum of Understanding (MoU) for execution between Organisation/ ULB/Ministry /Departments and PSU, Engineering, Procurement and Construction (EPC) Agreement for CAPEX /Ownership model and Power Purchase Agreement for RESCO /PPA mode RTS projects. All these documents have been duly vetted by the Department of Legal Affairs, Ministry of Law and Justice and Department of Expenditure, Ministry of Finance. These model documents have been made available in public domain.[2]

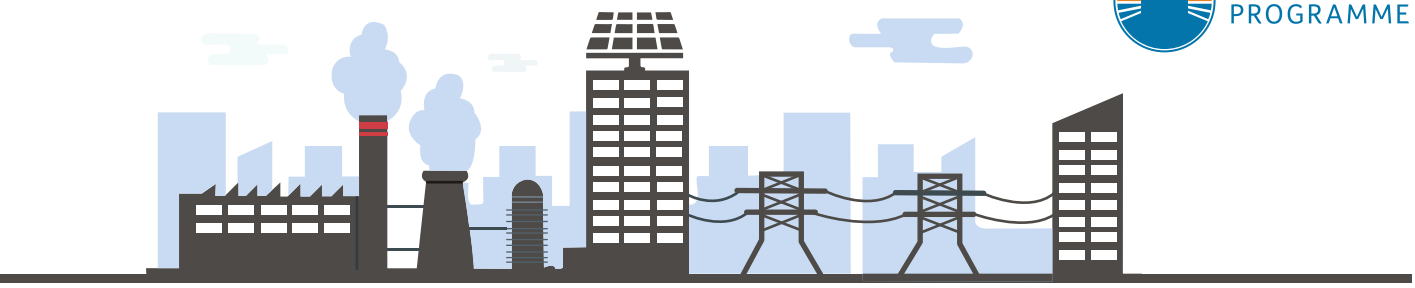
*495 kWp, Govt. College for Girls, Chandigarh*

## 11.5 Implementation of RTS on all Government Rooftops

MNRE has been collating data about RTS potential of rooftops and surplus areas of Government building premises of various Ministries/Departments. Commitment Certificates of about 3800MWp has been received from different Ministries/ Departments. To expedite the RTS installation on these in Ministerial and Departmental buildings, MNRE has shortlisted 11 Public Sector Undertakings (PSUs) to assist the Ministries/Departments through Project Management Consultancy (PMC).

Under such PMC, the scope of work of the PSUs would essentially cover, but not limited to coordination with the Ministry/Department, collection of list of sites, site visits, solar potential assessment, technical evaluation, finalisation of feasibility report, finalization of bidding documents in either CAPEX or RESCO mode, collation of State wise projects for economics of scale, submission of project

[2] *http://solarrooftop.gov.in/notification/Notification-24112016.pdf*



proposals and project completion reports (PCRs) in SPIN portal, getting sanction from MNRE, undertaking bidding process, selection of vendors, monitoring implementation, ensuring net metering as per the State/UT policies, quality control, supervision during O&M period, dispute resolution and contract management.

## 11.6 50 MW Rooftop Solar on CPWD Buildings

SECI has undertaken competitive bidding at national level for 50 MWp grid connected rooftop projects in RESCO mode on buildings of Central Public Works Department. In this scheme Power Purchase Agreements have been signed between CPWD and various developers on the basis of allotment and installation is into progress.

## 11.7 500 MWp Grid Connected Rooftop Power Plant Scheme

SECI has undertaken competitive bidding at national level for 500 MWp grid connected rooftop projects. CFA (subsidy) of 30% of the benchmark cost for residential, institutional and social sector will be provided through SECI under this scheme. A total of 122 developer/Installers have been selected for RTS installations across the country. CFA is not applicable for private commercial and industrial sector.

Interested roof owners may get the state wise list of successful developers with quoted price from http://seci.gov.in[4] and contact Solar Energy Corporation of India for further details.

## 11.8 1000 MWp Grid Connected Rooftop Power Plant Scheme

SECI has issued tender for development of 1000 MWp of rooftop solar power project(s) on pre identified government owned buildings. Out of the entire tendered capacity, 700 MWp is to be implemented under the RESCO route where the project shall be owned, developed & maintained by the developer (3rd party). Balance 300 MWp shall be implemented under the CAPEX mode.[5]

## 11.9 Technical Assistance / Cooperation

MNRE has liaised with World Bank, Asian Development Bank, GIZ, European Union and USAID to provide technical assistance and support for RTS programme. Thus the PV Rooftop Cell has been established at MNRE under the technical cooperation with the European Union in order to expedite Rooftop Solar implementation and to support stakeholders.

MNRE has also collaborated with USAID, ADB, WB and GIZ for technical support to DISCOMs and SNA for faster deployment of grid connected rooftop solar. The support from

[3] *http://solarrooftop.gov.in/notification/Notification-01122016.pdf*
[4] *http://seci.gov.in/upload/files/what_new/news/5867363c5b168ListofsuccessfulbiddersRooftop500MW.pdf*
[5] *http://www.seci.gov.in/upload/ uploadfiles/files/Final%20Tender%20Documents%20for%201000MW%20RT%20Solar%20PV%20Tender.pdf*

these multilateral/ bilateral institutions to the allocated DISCOMs/SNAs will, inter alia, cover

**At State, DISCOMs & SNA Level**

a) Gap analysis & action plans;

b) Establishing solar cell & technical committees: National/ State & Utility levels by providing technical experts;

c) Handholding of Selected utility /DISCOM/ state electrical inspectors by deploying expert staffs;

d) Review and Streamlining of process and developing timelines;

e) Development of unified web portal at the Nation/ State levels;

f) Development of customer support centre for rooftop solar for the State/UT levels;

g) Streamlining of forms and formats for interconnection application, approval and site verification;

h) Transaction advisory service for ensuring time-bound processing of net-metering/grid-connectivity/subsidy /loan applications;

i) Training & Capacity Building programmes for SNA/SERC/Electrical Inspectors/DISCOMs/Bank Staffs.

**Awareness / Media Campaign**

a) Designing & developing Media Campaign in local language for rooftop solar;

b) Issuing advertisement in print and electronic media (also in local languages) at national and state level;

c) Development of Massive open online courses for ULB, Households, Developers, Installers;

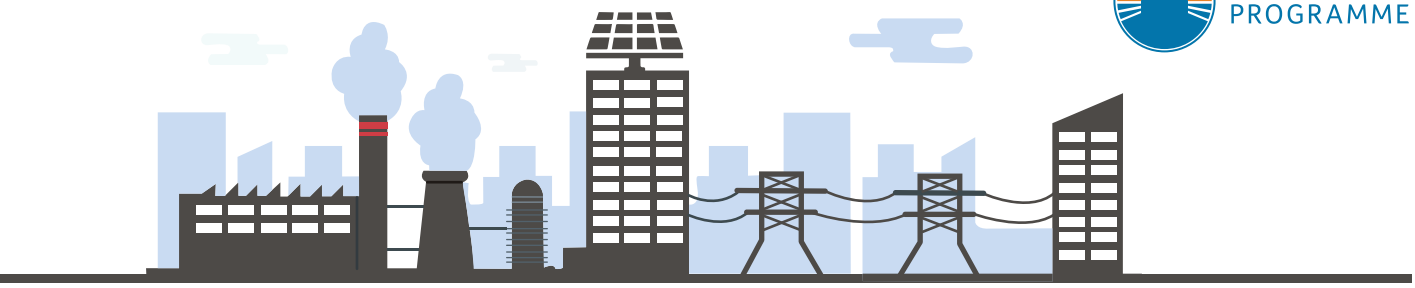
d) Designing and issuing brochures on Solar Rooftop Programme;

e) National Training Portal Design Training of officers of Utility/ DISCOM/ Electrical Inspectors from all States/UTs;

f) Development of National Monitoring Centre;

g) Developing and printing model tender documents, Power Purchase Agreements for RESCO projects & RPC agreement for CAPEX projects.

*600 kW, Lal Bahadur Shastri Airport, Varanasi*



**Capacity Building**

a) Selection, financing and monitoring of Training partner institutions;

b) Development of training modules for learners and trainers;

c) Training of Entrepreneurs /Installers /Corporates /DISCOM-SNA-Banks-SERC-CRI staffs/officers;

d) National Knowledge exchange programs and study tours;

e) National training web portal integrated with NISE/MNRE websites;

f) Workshops for ULBs, real estate developers and other stakeholders;

g) Coordination with Green Skill Jobs Council;

h) Legal Advisory on different kind of agreements grants under multilateral/Bilateral funds;

i) Training of Bank Staffs both at head quarter and regional level.

**Literature Development**

a) Documentations, Case Studies and Discrimination;

b) Developing Model tender, PPA documents for States, SNAs and DISCOMs;

c) Training of utility engineers;

d) National guidelines for Urban Local Bodies (ULBs).

## 11.10 Other Major Initiatives

- Closely working with DGS&D for developing standardized rate contract for Rooftop Solar implementation;

- In order to facilitate the installation of solar rooftop systems, increase customer awareness & participation, MNRE launched a mobile application. This will be made available to all SNAs/ DISCOMs for adaption in local languages.

# Contact

This booklet covers key administrative processes, schemes and initiatives associated with a solar rooftop PV programme of the MNRE. Since the commencement of the rooftop solar programme, the administrative processes have evolved based on monitoring of the processes and feedbacks of stakeholder.

**For all matters related to RTS installations, clarification and accreditation related queries you may contact:**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