

## Rooftop Solar: General Information, CFA and Procedure to Apply

### Grid Connected Rooftop Solar (RTS) Plant

Solar photovoltaic (PV) panels can be placed on the top of building roofs to generate electricity. Such a system is called a rooftop solar system. Electricity generated from the rooftop solar system can be used to meet the buildings' energy demand, charge batteries for later use, or can be exported to the electricity grid.

Apart from the solar PV panels, a rooftop solar system also has other components such as an inverter, module mounting structure, wires and cables, monitoring and safety equipment, and meters, etc.

### Net metering

In the case of grid-connected electricity consumers using rooftop solar systems, “net metering” is a mechanism that allow them to first consume the electricity generated from the rooftop system and then export surplus energy, if any, into the grid. Thus, the intake of electricity from the grid reduces. At the time of electricity bill generation, the consumers are billed only for the net electricity they have consumed i.e., the difference between the electricity they have consumed from the grid and the surplus electricity they have exported to the grid (from the rooftop solar system).

A conceptual diagram is given in Figure 1. Please also check the frequently asked questions via below link:

[https://solarrooftop.gov.in/pdf/faq\\_new.pdf](https://solarrooftop.gov.in/pdf/faq_new.pdf)

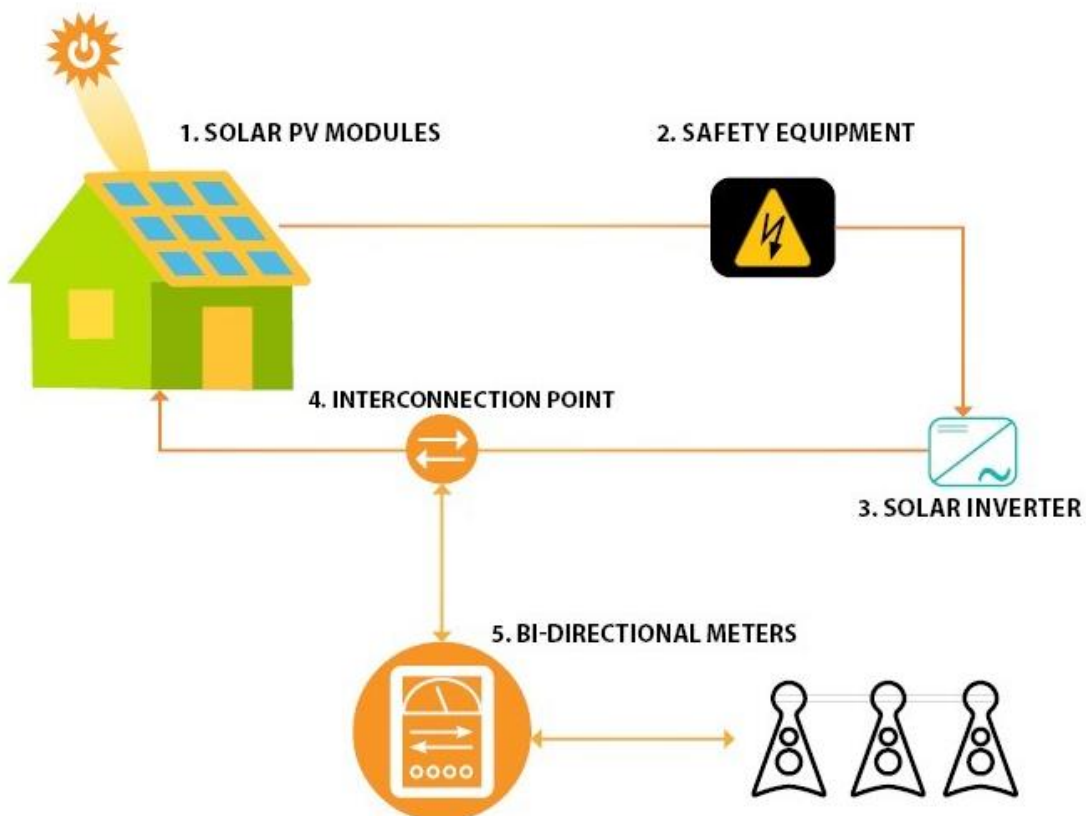


Figure 1 - Rooftop solar system components

Let us illustrate the reduction in electricity bill through solar rooftop connected via net metering through an example:

Suppose a consumer has installed 1 kWp rooftop solar system on its premises. Let us further assume that average residential grid tariff is Rs. 5 per kWh or unit and daily solar power generation is 4 kWh or units per day per kWp. Then, two cases arise:

**Case-1: Monthly consumption is more than solar generation**

Suppose the monthly consumption of consumer is 150 kWh (energy cost 150 X Rs. 5 = Rs. 750/-) and monthly generation from solar would be 30 days x 4 kWh= 120 kWh. Then the net units consumed for a month = 150 kWh – 120 kWh = 30 kWh. Accordingly, under Net metering policy, the consumer will be charged for 30 units only i.e. 30 x Rs. 5 = Rs. 150 (Total saving is Rs. 600/- per month in electricity bill).

**Case-2: Monthly consumption is less than solar generation**

Suppose the monthly consumption of consumer is 100 kWh and monthly generation from solar would be 30 days x 4 kWh= 120 kWh. Then, net units consumed = 0 and net units exported to the grid = 20 units. Therefore, consumer will not be charged for any units. Further, the DSICOM may or may not pay him for 20 units exported to the grid based on state regulations. However, the consumer will always have to bear the fixed charges, irrespective of any import/export of units.

**In case of Electricity cuts**

Please note that a grid connected RTS system will not provide electricity in case of electricity cut. Therefore, it is advisable to go for grid connected rooftop solar systems if there are no or very few power outages. For areas having frequent electricity cuts, grid connected rooftop solar systems with battery backup is more suitable. However, it will be more expensive.

**Business Models**

The Solar rooftop PV systems can be set up under two business models: CAPEX and RESCO:

- 1. CAPEX model:** In the CAPEX model, the entire investment comes from the power consumer. The consumer hires a solar engineering, procurement, and construction (EPC) company, which provides turnkey installation of the entire solar power system and hands over the assets to the consumer. The company may also take care of annual plant operation and maintenance (O&M) for a limited period depending on mutually agreed cost and terms.
- 2. RESCO model:** In RESCO model, an investor or project developer as a renewable energy service company (RESCO) invests in CAPEX and the consumer pays for the energy consumed from the dedicated solar power set up. Both consumer and developer sign a long-term power purchase agreement (PPA) for an agreed tenure and tariff.

Features of both the models are given below:

Parameter	CAPEX (EPC)	RESCO
Ownership	Consumer owns the asset	Developer owns the asset
Investment	100% investment borne by consumer	No upfront investment by the customer
Management approval	Typically requires long lead time for	Quickly replicable and scalable as

timelines	approvals at senior management level	additional projects don't need internal CAPEX approvals
O&M	Consumer pays separately for O&M	Turnkey solution, so developer bears O&M cost
Technical know how	Dedicated team needed at customer's end to evaluate system design, installation, and operation	Developer handles all technical matters
Performance risk	Customer bears all the performance risk and must manage equipment & downtime losses	Developer bears all the performance risk and is incentivized to maximize generation because revenues are linked entirely to generation
Regulatory risks and approvals	Owner's prerogative	Developer's prerogative

**RESCO Model is better suited for Large Rooftop Solar Capacities to be installed on Government Buildings, Private offices, Industries etc.** as most of the organizations do not have the technical know-how of the solar plant installation, its operation and maintenance or a dedicated team to look after them. Further, some of the major or minor decisions required for rooftop solar plants may take longer approval time in government departments. Whereas, if a RESCO is doing the installation, such issues will not arise. These are some of the advantages of the RESCO model over CAPEX model in government buildings. Further, it is advisable to go for tender and discover prices and vendors, as Ministry does not empanel any vendor as such.

#### Capacity of Rooftop Solar Required:

To get an estimate about Rooftop Solar capacity, Cost and area required, one can use the rooftop solar calculator available on the Ministry's website and may be accessed via below link:

[https://solarrooftop.gov.in/rooftop\\_calculator](https://solarrooftop.gov.in/rooftop_calculator)

Please note that the above calculator is only to get an approximate. The actual calculations will depend on physical site survey.

#### Procedure to apply for Rooftop Solar under MNRE Subsidy Scheme (Residential Sector):

**There are two mechanisms:**

##### **I. Apply from the DISCOM Website from the Vendors empaneled after Tender done by the State:**

1. DISCOMs/Electricity Departments are the implementing agencies for RTS Ph-II Scheme.
2. For application of solar rooftop installation, you need to apply on your respective DISCOM/Electricity Department online portal. In case, the Portal is under development, you need to visit local DISCOM Office and apply offline there.
3. For the DISCOM Portal link of your concerned DISCOM/Electricity Department please visit following link:

[https://solarrooftop.gov.in/grid\\_others/discomPortalLink](https://solarrooftop.gov.in/grid_others/discomPortalLink)

4. Central Financial Assistance/Subsidy available under Rooftop Solar Ph-II Programme of Ministry of New and Renewable Energy:

The central financial assistance (or Subsidy) is available only for grid-connected solar rooftop projects **in the residential sector installed through empaneled vendors only**. Central Financial Assistance (CFA) for the Residential sector is given below:

1. CFA @ 40% of benchmark cost or @40 % of tendered rates (whichever is lower) for capacity up to 3 kW
  2. CFA @ 20% of benchmark cost or 20 % of tendered rates (whichever is lower) for capacity beyond three kWp and up to 10 kW
  3. CFA @ 20% of benchmark cost or @ 20% of tendered rates (whichever is lower) for GHS/RWA capacity up to 500 kW (limited to 10 kW per house and total up to 500 kWp)
5. To avail subsidy you need to get the systems installed only through the empanelled vendors (by DISCOMs, the Ministry doesn't empanel any Vendor). List of empanelled vendors and discovered rates are also available on the DISCOM/ED website.
6. Please note that you need to pay only the balance amount (after deducting the subsidy amount from the discovered rates) to the vendor. The subsidy will be given directly to the vendor.
7. Please revert back in case of any difficulty.

## **II. New Simplified Procedure**

**The entire Procedure to apply for Roof Top Solar along with subsidy structure under the new simplified procedure is available on the Ministry's website: "solarrooftop.gov.in" (under the tab "Simplification Procedure").**

Procedure for the **consumers** to install Rooftop Solar-

1. Register at National Portal [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in) and submit application. At the time of application, beneficiary will be informed about the complete process and subsidy amount that can be availed for installation of rooftop solar plant.
2. The application will be forwarded online to the concerned DISCOM for issuance of technical feasibility. The DISCOM will issue technical feasibility within next 15 days.
3. After issuance of technical feasibility, the beneficiary can install the rooftop solar plant through any of the registered vendors. List of registered vendors will be displayed on the portal.
4. After installation of rooftop solar plant, the beneficiary will submit plant details on the portal and apply for net-metering. The application for net-metering will be forwarded online to the concerned DISCOM.
5. Upon installation of the net-meter and successful inspection of the plant, commissioning certificate would be generated online by DISCOM.
6. Once the commissioning certificate has been received, the beneficiary will submit bank account details on the portal along with copy of cancelled cheque. Central government subsidy will be credited directly into the bank account of the beneficiary within 30 working days of receipt of the bank account details.

### **Vendor registration process for National Portal**

1. The vendors willing to execute the projects through National Portal can get registered with respective DISCOM by submitting an application along with a declaration in the format given at [www.solarrooftop.gov.in](http://www.solarrooftop.gov.in) and depositing a PBG of Rs. 2,50,000/- valid for at least five years.
2. Vendors can submit the application at the Division/Circle level and their name will be included in the list of empanelled vendors within a period of one month from the date of submission of the application. The DISCOM will update the list every month.
3. The DISCOM will upload the details of the registered vendors on the National Portal and the vendors will receive a registration mail. The vendors can now login into the National Portal with PAN No. and mobile number (used by DISCOM for registration) and enter the product rates and contact details. The details entered by the vendor will be visible to the consumer submitting application to the concerned DISCOM for rooftop solar.

*Note: In case of any misleading information or if conditions mentioned in the declaration are not met, the DISCOM will take action against the registered/empanelled vendor.*

#### **Procedure to apply for Rooftop Solar for Non-Subsidy Cases (other than Residential Sector):**

Please check local DISCOM website or visit their Office for more information.

#### **Panels to be used:**

1. from ALMM list, which is available at the Ministry's website:  
"https://solarrooftop.gov.in/pdf/ALMM\_list\_np.pdf"
2. Manufacturer has to certify that the Panel is DCR and the same has to be submitted by the Vendor.

#### **Some common instances when Subsidy under RTS Ph-II programme is not applicable:**

1. If RTS plants are installed by the such Vendors who are not empaneled by the DISCOMs.
2. If RTS plants have been installed before the launching of the scheme.
3. If RTS plants are installed in any consumer category other than Residential.