

No. 318/27/2022-GCRT
Government of India
Ministry of New and Renewable Energy

Atal Akshay Urja Bhawan,
Lodhi Road, New Delhi -110003.
Dated: 03rd of October, 2022

OFFICE MEMORANDUM

Subject: Clarification on applicability of central financial assistance (CFA) available under Rooftop Solar (RTS) Programme Phase-II for solar systems installed under Virtual Net Metering (VNM) arrangement.

Ministry is implementing Rooftop Solar (RTS) Programme Phase-II and providing CFA for installation of RTS plant in residential sector by individual household or by GHS/RWA. Some of the States and UTs are having provision of Virtual Net Metering, wherein a group of consumers of a Distribution company can install a solar plant within the area of the same company and avail benefits of net metering against the solar power fed into the grid from that solar plant.

2. A clarification has been sought by different stakeholders on the applicability of CFA available under RTS Programme Phase-II for residential consumers installing solar plants under VNM arrangement.

3. In this regard, it is to clarify that the CFA applicable under RTS Programme Phase-II of MNRE will also be applicable for solar plants setup under VNM arrangement, subject to following conditions: -

- i. CFA would be available only for residential consumers of rural areas,
- ii. Considering that connected load of a residential consumer in rural areas would generally be not more than 3 kW, each participating consumer under VNM would be allowed to install capacity upto 3 kW and avail subsidy available under RTS Programme Ph-II.
- iii. Solar plant installed under VNM shall supply power to the same distribution sub-station (HT or LT side) through which the participating consumers are connected. This will ensure reliable power supply to the participating consumers and other benefits of co-locating power generation and consumption.

4. Further, to facilitate the installation of solar plants under VNM arrangement this Ministry has prepared a Concept Note (attached herewith) covering some of the possible business models including CAPEX, RESCO and Utility operated model. Please note that these models are indicative and only for guidance. The actual implementation will depend on the applicable regulations and other conditions.

Encl: As above.

Veepin Kumar
03-10-2022

(Dr. Veepin Kumar)
Deputy Director (RTS)

To,

All concerned State Implementation Agencies.

Concept Note on Virtual Net Metering

1. Need

Residential consumers, especially the households with inadequate roof area/roof strength/ roof right/ shadow free roof/inaccessible roof etc. have remained deprived of rooftop solar despite numerous efforts from the Ministry of New and Renewable Energy (MNRE) and States. It is critical to promote and facilitate new and innovative models for proliferation of rooftop solar (RTS) systems under different metering mechanisms for the eligible segment of the consumers.

2. Concept of Virtual Net Metering

“Virtual Net Metering” means an arrangement whereby entire electricity generated from a Solar Project installed at Consumer premise or any other location is injected through Solar Electricity Meter and the electricity exported is adjusted in either one or more than one electricity service connection(s) of participating Consumer(s) located within the same Distribution Licensee’s area of supply.

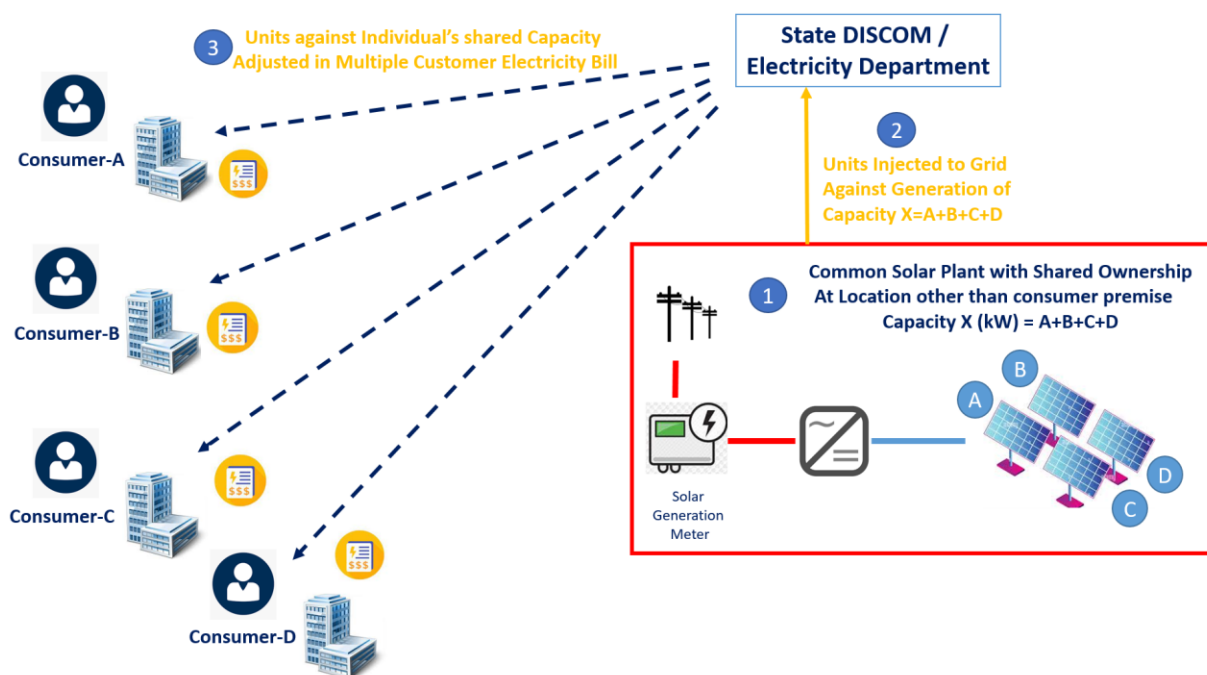


Fig.1 Virtual Net Metering Concept

Since the power flow is virtual, parties need not set up the system on consumer premises rather it can be anywhere within the Distribution Licensee area. This gives the opportunity for the system to serve more than one consumer. For example, suppose a group of 4 consumers, within the same distribution license area, decide to install a single large solar plant on a single roof or multiple roofs or a mix of roof(s) and ground(s) or ground(s) only, within the same distribution license area. They decide to share the solar plant capacity in the proportion of A:B:C:D and notify the

same to the DISCOM. The units generated from the solar plant will be injected into the grid and their units will be measured by a solar meter. The units, so generated, will be allocated to the 4 consumers in the same ratio of A:B:C:D which is adjusted against the consumption of units from grid by individual consumers (See Fig. 1). The solar plant capacity proportions for each consumer is completely at the discretion of group of consumers. However, the allocation shall still be as per the state regulations for solar energy.

Instead of small solar plants on individual roofs a common solar plant of higher capacity will have advantage of economies of scale, higher efficiencies and lower maintenance cost, thus solar power can be generated at lower per unit cost.

3. Current Status

Virtual net-metering is increasingly gaining traction among different States of the country. In such cases, the solar plants can be set up on any adjoining land or rooftops as per Virtual Net Metering regulations by a group of households (either in CAPEX or RESCO mode). Following States and Union Territories (UTs) already have provisions for Virtual Net Metering:

1. Goa
2. Delhi
3. Jammu and Kashmir
4. Ladakh
5. Odisha
6. Puducherry
7. Andaman & Nicobar
8. Lakshadweep
9. Chandigarh
10. Dadra & Nagar Haveli and Daman & Diu

The Ministry is pursuing with Regulators of other States and UTs also to allow virtual net metering.

Process flow of Virtual Net Metering is given below:

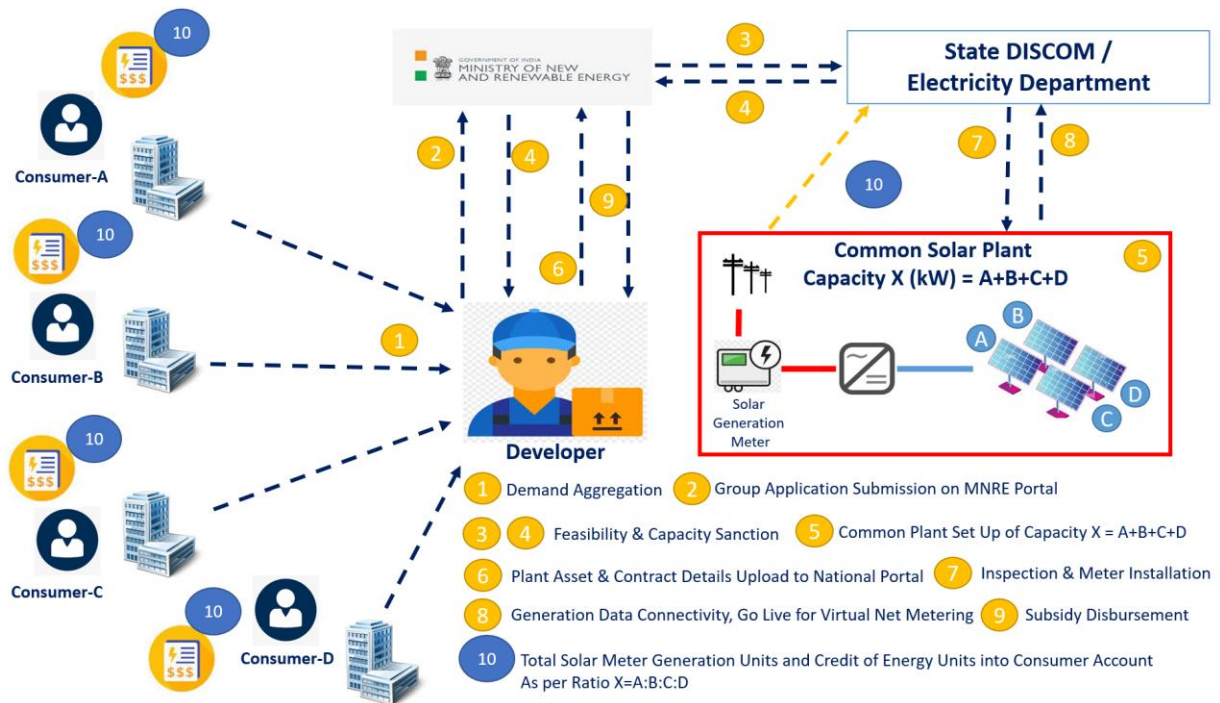


Fig.2 VNM Implementation Process

4. VNM Financial Models:

4.1. Model-1: Capital Investment (CAPEX) Model

In this model, a group of residential consumers will identify a piece of land/roof/mix of land & roof to set up a solar plant under VNM arrangement. The cost of plant (excluding MNRE subsidy) and land is borne by the consumers. The EPC developer/vendor will install the plant and maintain as per agreed terms. The electricity generated from the solar power plant is distributed to all the 4 participating consumers in the same ratios as the share of cost of plant (including land) among them. The DISCOM or Electricity department will adjust generated units in consumer's electricity bill.

Capital Investment:

MNRE	Consumer
Rs. 14,558/- per kW	Balance cost

Plant Ownership: Shared Consumer ownership

Illustration:

Suppose a group of four residential consumers set up a 10kW Solar plant, under VNM arrangements, as given in figure below:

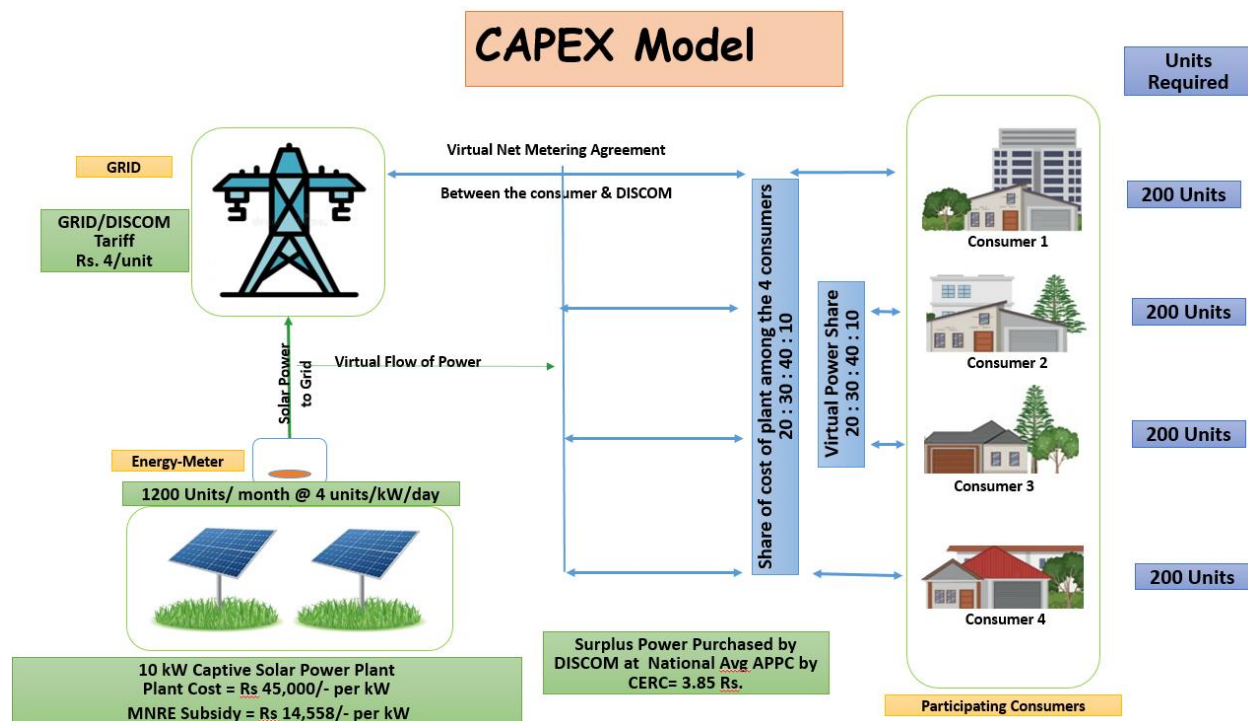


Fig. 3: VNM in CAPEX Model

Following assumption are made:

1. Cost of plant = Rs. 45,000/- per kW
2. Ratio of share of cost and virtual power among the 4 consumers = 20:30:40:10
3. MNRE subsidy = Rs. 14,558/- per kW
4. Rate at which surplus power is purchased by the DISCOM = APPC, in the illustration National Average APPC of Rs. 3.85/unit has been considered.
5. DISCOM Grid tariff = Rs 4/unit.

The electricity generated from the solar power plant is distributed to all the 4 participating consumers in the same ratios as the share of cost of plant among them. The DISCOM or Electricity department will adjust generated units in consumer's electricity bill. This will lead to either reduction in the electricity bill in case (import of electricity is more than export of electricity to the grid) or payment to the consumer by the DISCOM (in case) export of electricity is more than the import of electricity to the grid. Therefore, there will be monthly savings for the 4 consumers. It has been

calculated that payback price will be 6 years and thereafter they will be earning for next 20 years. The calculated financial details are given in the table below.

Consumer	Consumption (kWh)	Cost sharing of RTS plant (%)	Monthly Units Share from RTS plant (kWh)	Monthly Import from Grid [(-) for export (kWh)]	Monthly Electricity bill before VNM (RS.)	Monthly Electricity bill after VNM (Rs.)	Annual saving (Rs.)	Share in cost of RTS plant (Rs.)	Payback (in Years)
1	200	20%	240	-40	800	-154	11448	68884	6.02
2	200	30%	360	-160	800	-616	16992	103326	6.08
3	200	40%	480	-280	800	-1078	22536	137768	6.11
4	200	10%	120	80	800	320	5760	34442	5.98

4.2. MODEL- II: The RESCO Model

A RESCO developer will design, build, fund and operate the entire solar power plant (roof or ground-mounted). Consumer shall pay to the developer against assured monthly unit generation per kW. DISCOM will adjust generated units in consumer's electricity bill.

Capital Investment:

Consumer	MNRE	Developer
0%	Rs. 14,558/- per kW	Balance cost (30% - Equity, 70% - Bank Loan @ 9% IR and 10 Yrs tenure)

Plant Ownership: RESCO

Illustration:

Suppose a RESCO sets up a VNM plant of 10 kWp on a piece of land under VNM arrangement on behalf of four consumers, as shown in Fig below:

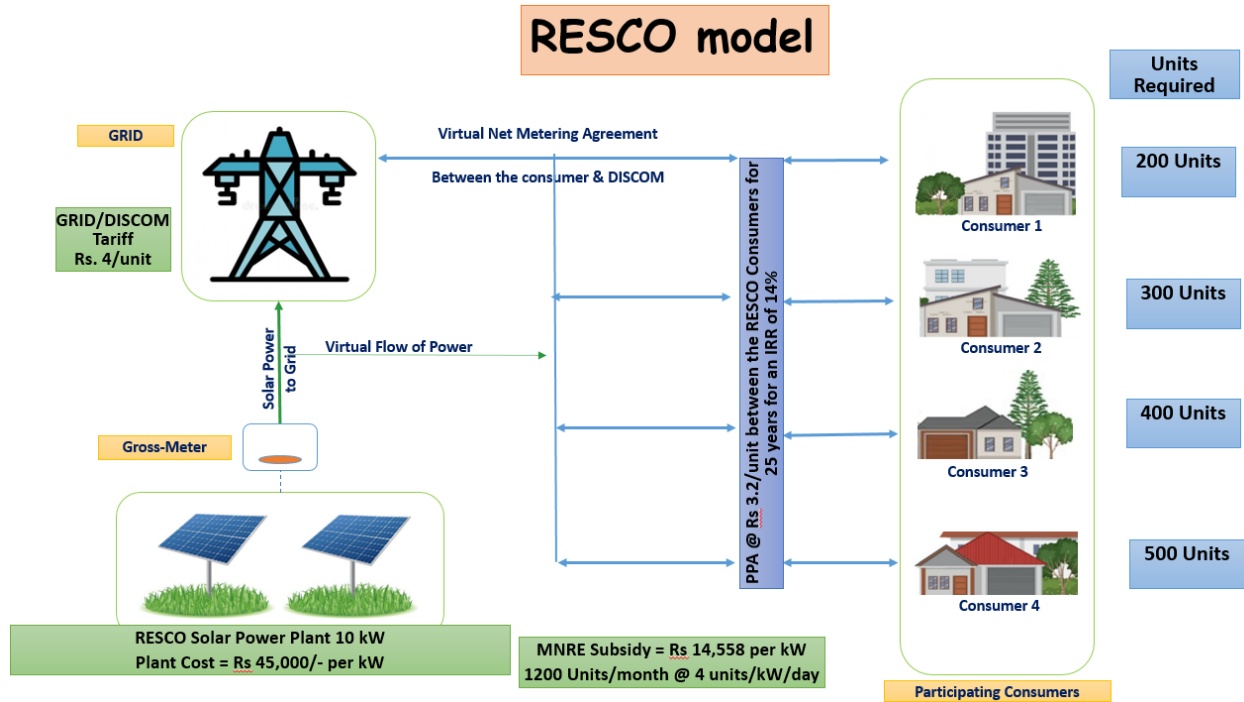


Fig. 4: VNM in RESCO Model

Following assumptions are made:

1. Cost of plant = Rs. 45,000/- per kW
2. MNRE subsidy = Rs. 14,558/- per kW
3. Rate at which surplus power is purchased by the DISCOM = APPC, in the illustration National Average APPC of Rs. 3.85/unit has been considered.
4. DISCOM Grid tariff = Rs 4/unit.
5. Electricity demand (in units) for four consumers per month is 200, 300,400 and 500 respectively.
6. The 1200 units generated per month will be supplied to the consumers as 200, 300,350 and 350 respectively.
7. The responsibility or providing vacant land to the RESCO and bearing cost, thereof, lies with the group of consumers.

The RESCO sells the electricity generated to the participating consumers to offset their consumption. It has been calculated that to get an IRR of 14% the RESCO needs a PPA of Rs 3.2 per unit for 25 years with the consumers. DISCOM will adjust generated units in consumer's electricity bill. This will lead to reduction of electricity bill and thereby, resulting in monthly savings for the four consumers. The financial details are given in table below: -

Consumer	Consumption (kWh)	RESCO solar supply to consumers (kWh)	Import from Grid (kWh)	Electricity bill before VNM (RS.)	Payment to RESCO (Rs.)	Electricity bill after VNM (Rs.)	Annual savings to consumers (Rs.)
1	200	200	0	800	640	640	1920
2	300	300	0	1200	960	960	2880
3	400	350	50	1600	1120	1320	3360
4	500	350	150	2000	1120	1720	3360

4.3. Model III: Utility Model – Special case of RESCO Model:

In rural areas, the electricity is generally subsidized, and realization of electricity bills is very less. Both the factors lead to loss of revenue to the utilities. The utilities can reduce this loss by setting up solar plants in rural areas. With VNM arrangement and subsidy available from central government, the cost of solar power generated from such solar plants would be around Rs 3.2 per unit as shown in Model-II above.

Generally, the APPC for the State/UTs is more than Rs 3.2 per unit. Moreover, there are around 20% technical losses till the LT side of the end beneficiary, thereby increasing the actual cost of power for the utility. The solar plant setup at tail end under VNM arrangement will not have such technical losses.

Let us take an example of a rural area in the state of Andhra Pradesh. The APPC (2020-21) for the state is Rs. 4.71/- per kWh. Considering around 20% technical losses till the LT side of the end beneficiary, the actual cost of power would be around Rs. 5.88 per kWh. With VNM and subsidy from Central Government, a solar plant can be installed in rural areas by the Utility. The cost of solar power generated from such plant would be around Rs. 3.2 per kWh. Thus, utility would save approx. around Rs. 2.68 per kWh.

Therefore, it is very advantageous for the DISCOMs to promote solar plants through virtual net metering arrangement in the rural areas.

Such local generation of power would ensure that the villagers receive reliable daytime power, improving their income through economic activities. This will lead to increase in the number of commercial/industrial consumers for the utility. Further the expenditure on network augmentation and its operation and maintenance will also reduce. It will also help the DISCOM to achieve their RPO target.