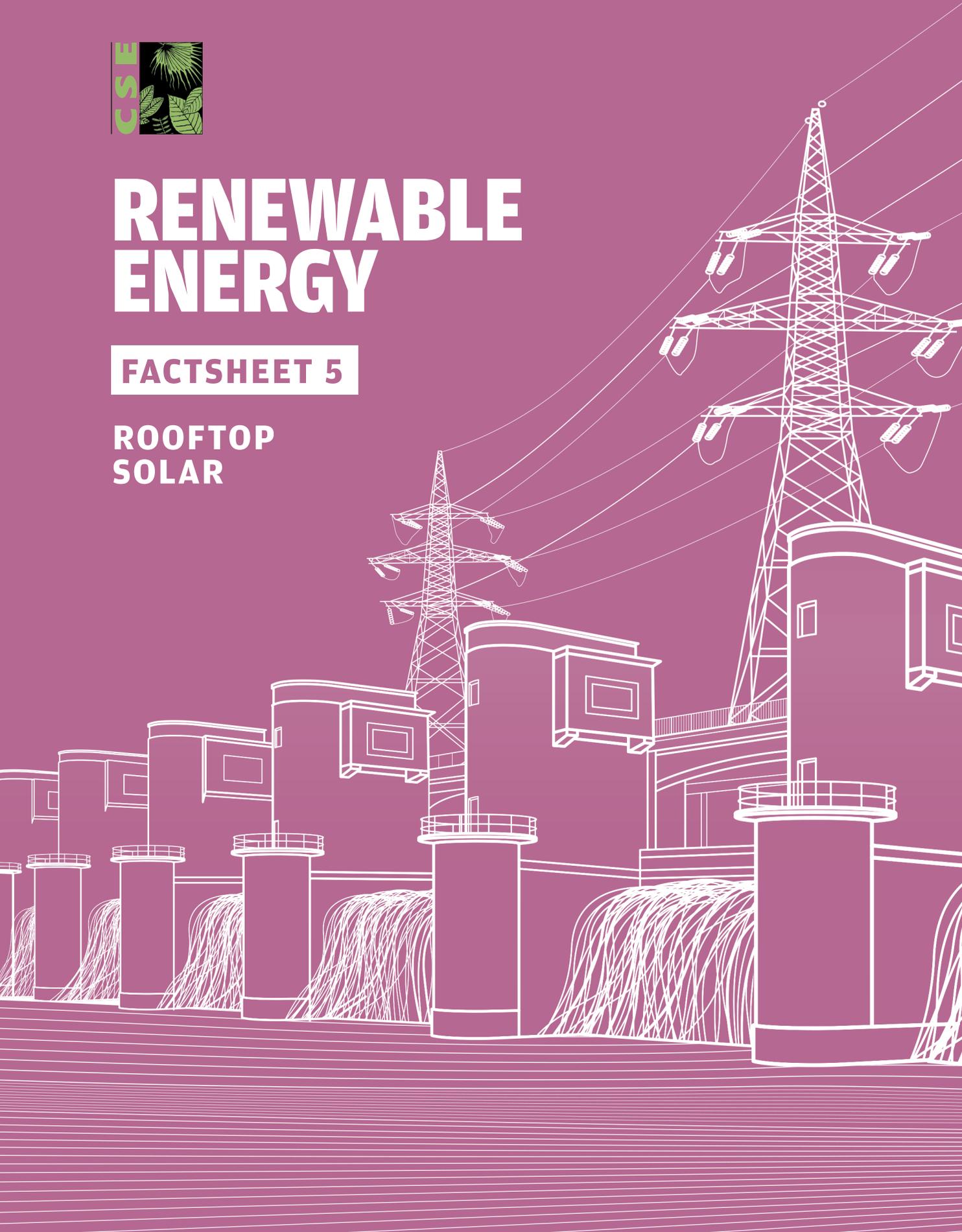




# RENEWABLE ENERGY

## FACTSHEET 5

### ROOFTOP SOLAR





# ROOFTOP SOLAR

The solar rooftop (SRT) sector in India has received ample encouragement and support officially, but its progress forward has been hampered by a lack of enthusiasm from discoms, which fear more losses if their high tariff-paying customers – the commercial and institutional sectors – choose to opt for SRT

## A. WHERE DO WE STAND TODAY

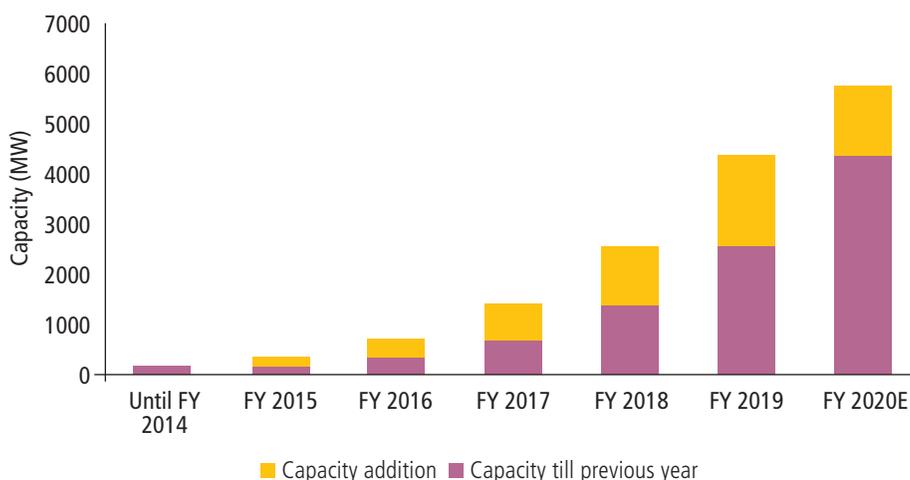
**A 1** Installing solar on rooftops is the most attractive of all propositions – it does not need new land; it is built in a modular fashion; it provides electricity to the consumer directly; it can be done quickly and is scalable; and the areas of the rooftops can add up to build a new energy grid.

**A 2** India has set itself a relatively ambitious goal for what it refers to as “subsidised grid-connected solar rooftop” – 40 GW by 2022.

**A 3** As per the MNRE, the reported figure of rooftop solar in the country was just 2.6 GW in March 2020. But as a large part of what is installed by people on their individual homes and institutions is not captured by the ministry, it is difficult to estimate how much has been actually installed across the country.

**A 4** Bridge to India, a private renewable energy consultancy, puts the number at 5.44 GW till December 2019. According to this assessment, India added some 1.8 GW in FY2019 – a higher growth than the previous year’s. But this is seen to be petering out in FY20, with a further expected addition of only 1.4 GW (see Graph 1).

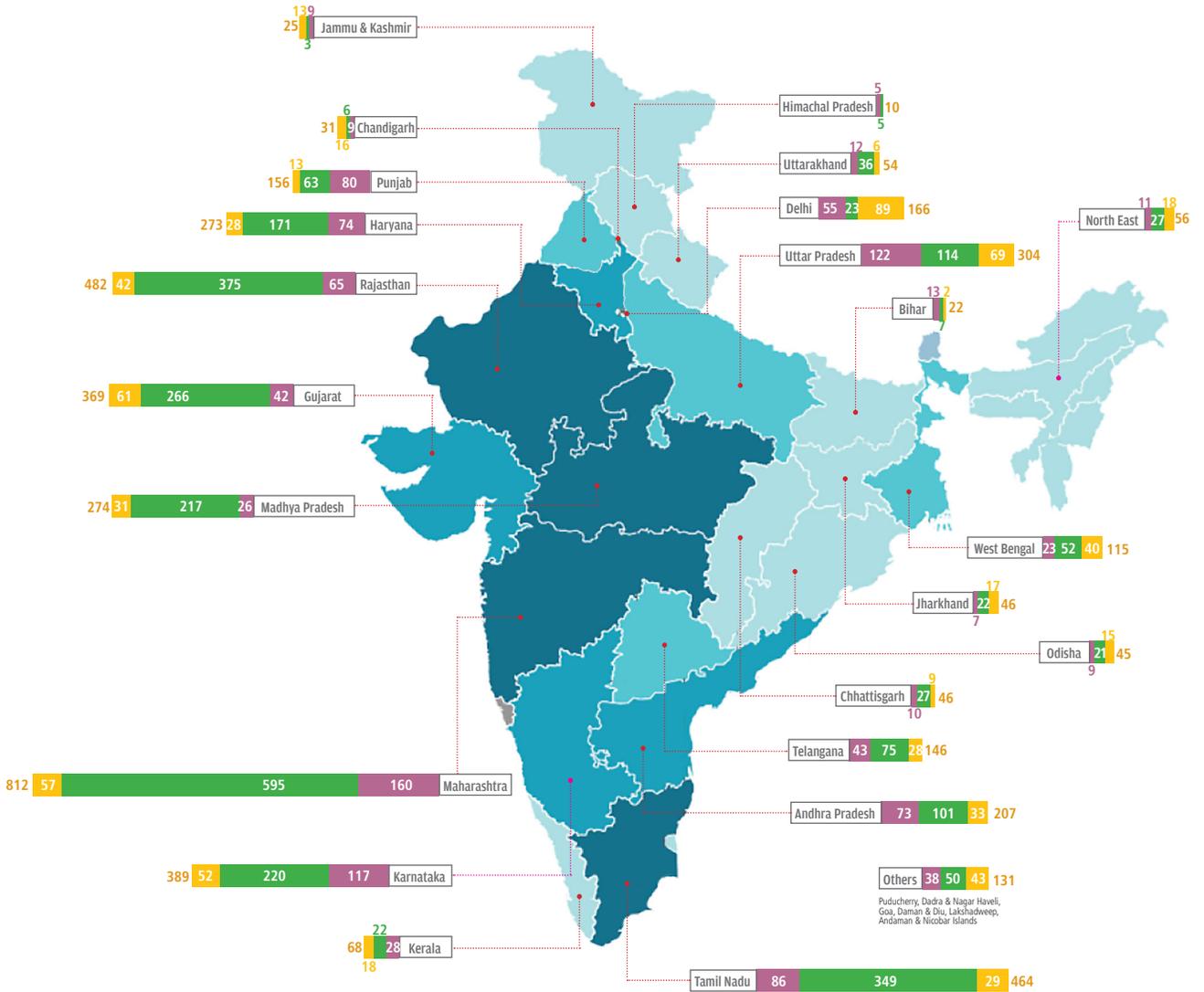
**Graph 1: Rooftop solar installations**



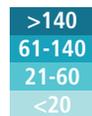
Source: Bridge to India<sup>1</sup>

**A 5** The highest installation of rooftop solar, finds CSE, has been in commercial and industrial units. The state which has the highest capacity is Maharashtra. Four states – Maharashtra, Rajasthan, Tamil Nadu and Karnataka – account for 40 per cent of the total solar rooftop installation in the country, with Madhya Pradesh showing the highest growth in 2019 (see Map).

**Map: Rooftop solar installation in India – as of December 2019**



Capacity addition in 2019, MW



Total installed capacity: 5,440 MW<sup>1,3</sup>  
as on 31 December 2019



Source: Bridge to India<sup>2</sup>

**A 6** Different states are moving ahead with policies and incentives; however, it is unclear what is working and what is not. State policies have defined caps on system sizes, types of metering and subsidy. Delhi's solar policy, for instance, provides a generation-based incentive (GBI) of Rs 2/kWh of the total solar energy generated. The more recent (2019) state policies of Rajasthan and Tamil Nadu have relaxed the system size limits so that 100 per cent of the sanctioned load can be installed.

**A 7** States are also using 'mandates' – directions – which make it compulsory to install rooftop solar. Chandigarh has made it mandatory to install solar energy in residential housing measuring over 500 square yards; Haryana has introduced a similar policy.

**A 8** States are introducing net-metering so that customers can 'sell' surplus energy back to the distribution companies. At the last count, some 36 states and UTs had introduced this and paid between Rs 2.5 upwards for the surplus power.

**A 9** So, much has been done to activate this sector. Yet, it would seem that we are not moving as fast as we can and should to install rooftop solar to feed both household and community needs. Why?

## B. WHERE DO WE STAND TODAY

**B 1** According to the MNRE, the key problem is that electricity distribution companies (discoms) do not want to install rooftop solar. They contend that while the residential and farming sectors are subsidised, it is the institutional and commercial sectors that cross-subsidise and provide the necessary finances for discoms. Solar rooftop is also more viable for commercial and institutional sectors. Their concern is that if these high electricity tariff paying sectors move to solar rooftop, it will make discoms even more financially unviable.

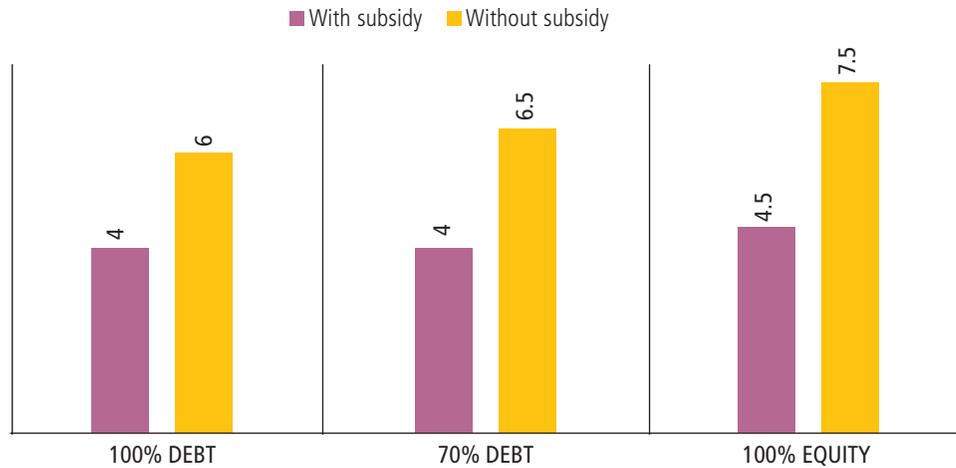
**B 2** The other problem is that the cost of electricity to the residential sector is subsidised and often even waived completely (up to 200 units); so, there is no incentive for households to install rooftop solar.

**B 3** It is also for this reason that the only growth in this segment has been in the commercial and industrial sectors, which currently pay high electricity bills: installing solar reduces their monthly power bills. The payback on the system at the current high commercial tariffs is between five-seven years. The Cochin airport installed its 40-MW system to power all its operations, and expects that it will pay back the cost in four-five years.

**B 4** Commercial institutions are more credit-worthy, which makes it easier to get loans. The Reserve Bank of India (RBI) has now notified grid-connected solar rooftop systems under priority sector lending and public sector banks are advised accordingly. To increase the economic viability of SRTs (solar rooftops), the World Bank is providing financial assistance of US \$625 million. It has also developed a product with the State Bank of India under which interest rates on debts for SRT have been slashed from 16 per cent to 8-9 per cent. The MNRE, along with the World Bank, is working on a new financing facility and business models for the residential sector.

**B 5** Centre for Science and Environment (CSE) has estimated the payback period for the installation of solar rooftop under different financial models for the residential sector in Gurugram (Haryana), where a subsidy is available on domestically manufactured solar panels. Even if the customer has to spend entirely out of her/his pocket without subsidy support, the payback of 7.5 years is lucrative for a 25-year lifetime product (see Graph 2).

**Graph 2: Payback period (in years) for SRT in a Gurugram residential sector under various financing models**

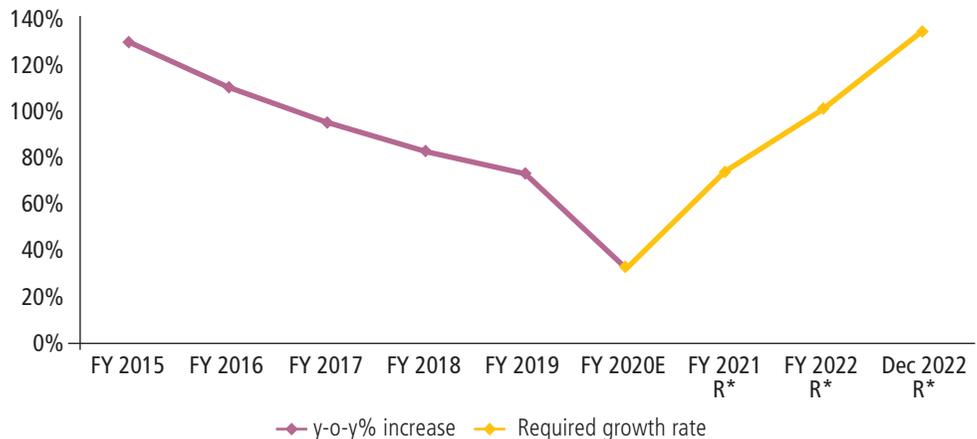


Source: Analysis by CSE based on CEA data

**C. WHAT IS BEING DONE**

**C1** These problems persist and the year-on-year growth of the segment is indicating a decreasing trend. The segment requires instant V-shaped recovery and rapid growth for achieving the target (see Graph 3).

**Graph 3: Year-on-year growth and required growth rate for rooftop solar**



CSE analysis

**C2** Speaking to the Parliamentary Standing Committee, the secretary for MNRE had assured that this problem will be sorted out: “We will promote open access and captive facilities, which will promote solar rooftop in commercial and institutional facilities. Also, as solar rooftop becomes cheaper, its spread will increase. We will be able to meet the 40,000 MW target that we have set for rooftop solar.”<sup>3</sup>

**C3** To increase the uptake of rooftop solar, the MNRE has introduced some changes in its policies. In 2019, the Cabinet approved Phase II of the Grid-Connected Rooftop Solar Programme; in this, a Central financial assistance of Rs 11,814 crore has been allocated to subsidise installations in the residential sector. Also, under it, 4-GW installations will get capital support; the level would be proportional to the size of the system. Therefore, a system of 3-kW capacity could get up to 40 per cent subsidy on the benchmark cost, while others with bigger systems, including housing societies, would get 20 per cent (see Table 1).

**C4** The Phase II policy has also identified the issue of incentives to discoms to promote rooftop solar. Therefore, another Rs 4,950 crore has been allocated to provide performance-based incentives to discoms to install grid-connected rooftop capacity.

**Table 1: Measures to promote solar rooftop<sup>5</sup>**

Central Financial Assistance (CFA) in Phase I to government sectors through state nodal agencies / Solar Energy Corporation of India (SECI)
Model Memorandum of Understanding (MoU), Power Purchase Agreement (PPA) and Capex Agreement prepared for expeditious implementation of RTS projects in the government sector.
Central Financial Assistance (CFA) in Phase II for residential sectors in urban and rural areas with discoms as implementing agencies. The total financial outlay for this phase is Rs 11,814 crore, paid through discoms. To avail the benefits of CFA, only indigenously manufactured PV modules and cells can be used.
Central Financial Assistance (CFA) will also be provided to discoms to give them incentives to promote rooftop solar. This incentive is given for the achievement of additional capacity above the baseline set.
States are notifying net / gross metering regulations – as of late 2019, 36 states and UTs have notified regulations and tariff orders.
Concessional loans from the World Bank through SBI and Asian Development Bank (ADB) through PNB for disbursal of loans to industrial and commercial sectors, where Central assistance is not given.
Many states have their own solar rooftop policies, which provide additional benefits for installation. Delhi, Rajasthan and Tamil Nadu have state policies.
Central assistance to states for development / integration of online portal and aggregation of demands related to rooftop solar projects.
Appointment of experts to support public sector undertakings in the implementation of rooftop projects in ministries and departments.

### Facilitating decentralised solar systems

Some other programmes to support decentralised solar include the following:

- Grid-connected solar PV power plants on canal banks and canal tops – with capacity between 1 MW to 10 MW – are supported with Rs 1.5 crore / MW (for canal bank projects) and Rs 3 crore / MW (for canal top projects), subject to 30 per cent of the project cost in both the cases.
- The Kisan Urja Suraksha Evam Utthan Mahabhiyan (KUSUM) aims to solarise irrigation activities in the agricultural sector. Solarisation of stand-alone and grid-connected agriculture pumps receives a CFA of 30 per cent of the benchmark cost (or tender cost, whichever is lower); special category states receive a 50 per cent CFA. Here too, discoms receive an incentive of Rs 0.40 per kWh subject to the limit of Rs 6.60 lakh per MW / year for a period of five years.
- A Solar City Programme has been instituted, which – so far – has covered 60 cities including 13 pilot and five model solar cities. In the model and pilot category cities, solar PV projects with an aggregate capacity of 9,029.166 kWp and solar water heating systems with an aggregate capacity of 7,894.5 m<sup>2</sup> collector area have been sanctioned under the programme. As of February 2018, Rs 101 crore was sanctioned and Rs 28 crore released for various activities. Solar city cells have been created in 37 solar cities and 50 cities had developed detailed master plans.

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