

Subsidies alone won't fix India's sluggish rooftop solar adoption



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While the Indian government's new scheme to boost rooftop solar adoption focuses on lowering the upfront costs for households, experts say DISCOM participation and better financing will be key to ensuring the scheme succeeds where its predecessors failed.

Key Takeaways

- The central government's new rooftop solar scheme aims to facilitate installation of solar systems across 10 million households
- With Rs 75,000 crore earmarked for it, the scheme offers both a subsidy boost as well as 300 units of free electricity a month to encourage mass adoption of solar
- This will go some way to speeding up India's sluggish rooftop solar adoption, which has struggled to take off due to high upfront costs
- While increased subsidies will lower the entry barrier, experts say improved financing options and getting DISCOMs on board are crucial for the scheme's success

On February 13, Indian Prime Minister Narendra Modi announced the launch of a rooftop solar scheme that aims to power 10 million households across India.

Rooftop solar systems are essentially small-scale systems meant to provide electricity for individual houses and commercial or industrial buildings for their own use, effectively reducing or nullifying their electricity bills. Typically in the range of 1 kW to 10 kW for households, these can be connected to the power grid and supply any excess electricity generated back to the grid.

The new scheme, PM Surya Ghar: Muft Bijli Yojana, is hardly the government's first stab at promoting rooftop solar installations in the country. In fact, the government is hoping that it will be third time lucky as it attempts to revitalise a nationwide grid-connected rooftop solar programme that was launched in 2014. The initial aim was to install 20 GW of capacity by 2022, a target that was revised to 40 GW by March 2026.

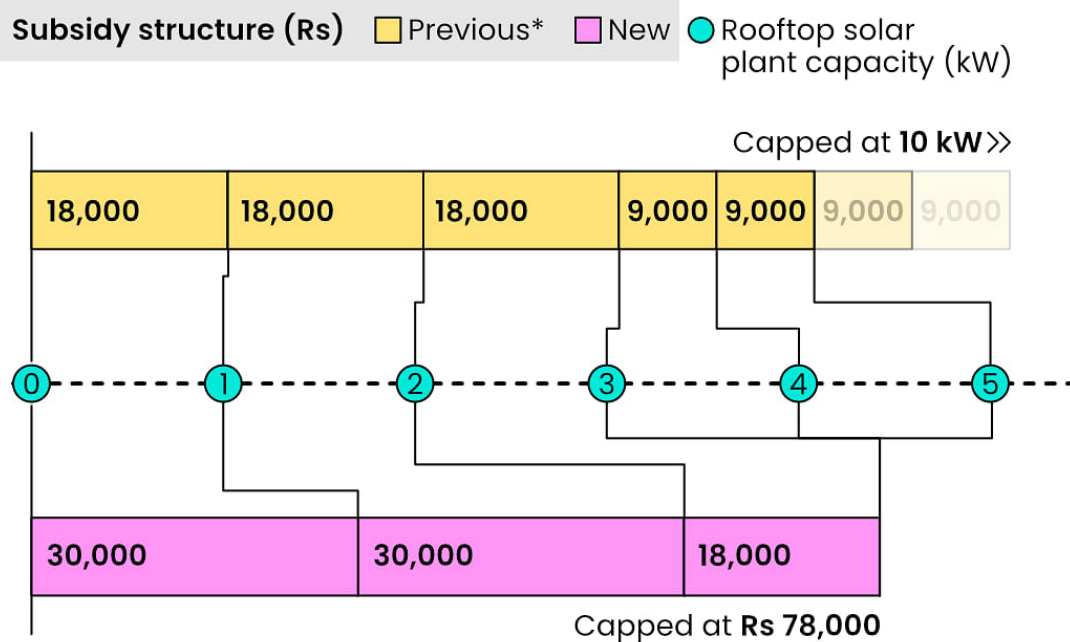
Despite this, India is yet to meet the original target of 20 GW. The latest scheme by the government, which has some Rs 75,000 crore in funding behind it, comes as India's cumulative rooftop solar capacity still stands at a paltry 11 GW, with the targeted 2026 deadline now just over two years away.

Armed with benefits such as 300 units of free electricity and increased subsidy support of up to Rs 30,000 per kW (for 2 kW systems), the

government believes that its new scheme can finally spark the sluggish adoption of rooftop solar systems into life.

Subsidy boost

Bumped up as recently as January, financial assistance for residential rooftop solar installations was further boosted by the latest scheme.



1 kW of capacity is adequate for a house consuming ~100 units of electricity a month.

Avg monthly household consumption in India was **86 units** in FY22, although it varies to a great extent from more than 250 units in Goa and Delhi to as low as 48.5 in Assam, per data from Prayas.

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**for general category states.
Source: MNRE*

While high upfront costs of these systems have been a key deterrent to mass adoption of the programme, however, industry experts believe the additional subsidies will not be a silver bullet. Instead, they point to two other issues—public awareness of the scheme and the role of distribution companies, or DISCOMs.

While increasing awareness among consumers may not be as big of a challenge, getting DISCOMs onside will be less straightforward. The [tail-end](#) of the electricity supply chain, DISCOMs have thus far served as the implementation agencies for the rooftop solar programme in their respective regions. However, their own anxieties about potential revenue losses as more consumers adopt solar have led to divided loyalties and lackadaisical implementation of the scheme, say experts.

Moreover, DISCOMs lack the resources to effectively oversee the implementation of the programme, with a mismatch between the solar policies of states and the Centre only complicating matters, say experts and industry players who spoke with The CapTable.

A massive shortfall

The Indian government had hoped that 40 GW of decentralised solar power generation through rooftop projects would help in the stabilisation of grids by providing local generation close to consumption points as well as reduce investments in power transport infrastructure.

However, while India has thus far managed a total installed solar energy capacity of 74.3 GW (~40% of India's total installed renewables capacity), rooftop solar is still only a small contributor to India's solar surge. Instead, ground-mounted large- and medium-scale plants contributed nearly 58 GW of capacity (almost meeting the government's 60 GW target) as against just 11 GW from rooftop projects.

With the country still a long way from its 40 GW target, it is unclear whether the announcement of the new scheme will see the government push back its targeted deadline for rooftop solar installations once more.

"If both the targets (rooftop and ground-mounted) shared the same timeline, there must be some fundamental questions about why rooftop went wrong, [and] what went wrong," Binit Das tells The CapTable. Das is the programme manager of the renewable energy unit at the Centre for Science and Environment (CSE), a New Delhi-based think tank.

The country's failure to meet its rooftop solar targets hasn't been helped by the general apathy from the country's residential sector. Of the installed rooftop solar capacity, the residential sector accounted for just over 2.7 GW as of June 2023, [according](#) to CRISIL's renewable energy consultancy unit Bridge To India. Per CSE's Das, no more than a million households have installed rooftop solar systems since 2014.

“The biggest challenge that we have realised is the high upfront costs even after huge subsidies provided by the central government and add-on subsidies from some state governments,” says Jaideep Saraswat, associate director of power, electric mobility, and emerging technology at not-for-profit policy research institution Vasudha Foundation. Saraswat says the problem is more acute for consumers in tier-2 and -3 cities, where the upfront cost of about Rs 50,000 for every kW of rooftop solar capacity is out of reach for the average household.

Fixing rooftop solar financing

While costs pose a problem, getting financing is a bigger challenge, Neshwin Rodrigues of global energy think tank Ember argues. “A middle-income household might not have Rs 1.5 lakh [for a 3 kW system] to spare, but over time, it is something that they can pay like how they pay for electricity every month,” says Rodrigues, who serves as Ember's India electricity policy analyst.

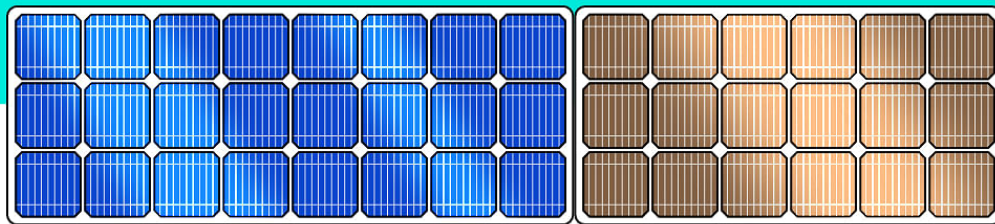
[Reports](#) from earlier in the month suggest that while subsidies through central financial assistance (CFA) could cover about 60% of costs, the remaining 40% could be serviced by loans from special purpose vehicles established by public sector units. The excess units generated from rooftop solar systems could be used to pay off these loans.

However, industry experts say that no clear guidelines from the government have been released since, leading to confusion, even for REC (formerly the Rural Electrification Corporation), which was designated as the programme's implementation agency. A recent [report](#) from Mercom India indicated that PSUs which were tasked with taking up the scheme in their respective states had expressed concerns about the implementation of the scheme to the Ministry of New and Renewable Energy (MNRE). They suggested the scheme be limited to just offering subsidies rather than facilitating financing as well.

The scheme's current portal, PM - Surya Ghar, lists financing options for consumers, including from public sector banks and private players. Products from private banks mostly include personal loans, while a scheme from the State Bank of India offers rooftop solar financing loans with interest rates in the range of 9.65-10.65%.

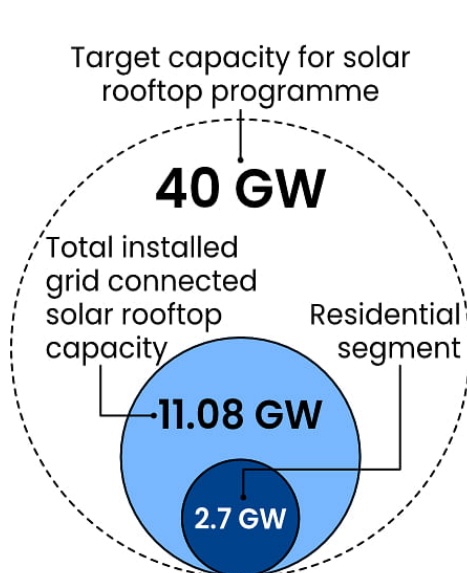
False dawn

While India's solar residential rooftop potential is massive, the country has failed to achieve even its original 20 GW target.

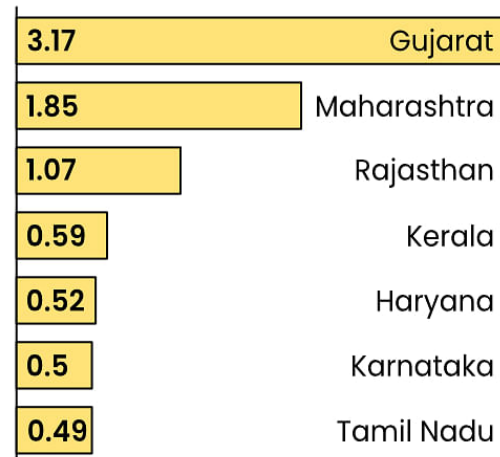


Rural areas' solar potential
363 GW

Urban areas' solar potential
274 GW



Top states with cumulative installed capacity under the programme* (GW)



**as of November 30, 2023*

While this certainly eases the path to solar adoption, Ember's Rodrigues says that the application processes for solar financing need to be smoothened. "If I have to go to a bank and spend around six days to apply for this loan, it doesn't make sense. This makes things like single-window clearances important," he suggests.

Energy sector expert Alexander Hogeveen Rutter goes a step further. He tells The CapTable that ideally a loan should be linked to the electricity bill and not the individual because most consumers are likely to move. This could be done through what is called on-bill financing—a common practice overseas that enables customers to repay loans for renewable energy upgrades directly through their utility bills.

Rutter points out that this is out of the Centre's hands. "This happens at the state level and needs the state DISCOMs to be onboard," Rutter says.

DISCOMs, though, have historically been part of the problem when it comes to solar rooftop adoption, rather than the solution.

The DISCOM disconnect

Even if one can afford a rooftop solar system, it can't be installed without the express approval of local DISCOMs. Thus far, say industry players, this has been a lengthy process owing to structural issues, such as the delays in getting technical feasibility approvals from DISCOMs, installation of net meters, and project commissioning. (A net metering system allows users to be billed based on the net total of how many units their solar system is feeding into the grid and how much they are taking from the grid.)

"Even though the issues [related to rooftop solar] are getting resolved, sometimes DISCOMs don't even let you connect. They don't give you approvals and no-objection certificates," says Rutter.

"Today, if I decide that I want to go solar, it could take me 3-4 months to get the system running even though the installation might take only one month. Getting the permits in place and getting the net metering done involves DISCOMs, and that takes time," explains Mathew Samuel, co-founder of digital solar platform SundayGrids.

RainmatterCapital-backed SundayGrids enables users to reserve solar energy from community solar projects to offset their power bills.

“Honestly, even though the willingness and interest to adopt solar is really high, the final conversion is actually less than 3%, especially in urban areas where the most amount of consumption is happening,” he says. For its part, MNRE issued directives to DISCOMs in January to make the feasibility approvals and project commissioning processes simpler by reducing documentation.

A major reason for DISCOMs dragging their feet, say experts, is the lack of resources necessary to facilitate the implementation of the rooftop solar scheme. “They have a separate line of work, which is maintaining the infrastructure that they have and ensuring close to 24/7 power supply. The implementation of solar PV (photovoltaic) system is another add-on to them,” Vasudha’s Saraswat says.

For instance, one of the challenges that vendors face at the grassroots level is that DISCOM officials are not aware of the SOPs [standard operating procedures] of what needs to be done for deploying solar systems, he notes. “What they require as of now is support. It's not that they are not interested in doing it, but they don't have the bandwidth,” says Saraswat.

Beyond just bandwidth, though, is a more pressing concern. DISCOMs see solar adoption as an existential threat to their business. Shailendra Shukla, former chairman of Chhattisgarh State Power Companies, tells The CapTable that a narrative has developed among DISCOMs that they are losing their customers due to rooftop solar systems. DISCOMs also incur expenses such as providing power during the evening as well as providing the connection to houses and metering, experts say.

“The key is to have a fair charge—find a middle ground between pure net metering and not letting you install solar systems at all,” offers Rutter. Ember’s Rodrigues, for instance, suggests that DISCOMs could apply banking charges. For instance, if consumers supply 10 units from their solar systems to the grid during daylight hours, they can take back only, say, eight units.

How DISCOMs navigate this, however, is complicated by state-specific regulations, and even those regulations can be tricky to implement. For instance, Gujarat—which boasts the highest installed rooftop solar

capacity of any state in the country—does not have banking charges for residential consumers. Instead, it only allows banking charges for demand-based consumers and MSME units on a per-unit basis.

Shukla, for his part, suggests that DISCOMs be allowed to charge Rs 0.03-0.04 per unit on solar-generated power as a trading margin. These earnings will incentivise them to promote rooftop solar systems. “This is what DISCOMs do for coal power—they buy electricity from somewhere, sell to consumers, and in return, they earn through a trading margin of 2.5 paise per unit,” he explains. With DISCOMs playing such a crucial part in the implementation of the scheme, in the end, says one senior industry source, the success of the scheme will depend as much on state governments as the Centre.