

Advancing residential rooftop solar adoption in India under PM Surya Ghar Yojana

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Key findings

Before the launch of the Pradhan Mantri Surya Ghar Yojana (PMSGY) in February 2024, rooftop solar adoption was concentrated in the commercial and industrial segments, while the residential sector lagged due to high upfront costs and limited awareness. PMSGY addressed this gap by offering capital incentives and simplified procedures to make rooftop solar financially attractive for households.

Growing public interest in solar adoption under the programme has been tempered by limited awareness of financing options, complex loan procedures, technical glitches in the grievance redressal system, and fragmented supply chains.

As of July 2025, the national installation-to-application conversion ratio under PMSGY stood at just 22.7%, underscoring the challenges in translating demand into actual residential rooftop solar capacity. Gujarat and Kerala lead with high conversion ratios of above 65%, supported by a mature solar ecosystem, strong vendor base and high consumer awareness.

To accelerate residential rooftop solar deployment, several states have implemented financial incentives that either supplement the central subsidy or independently support consumers. States like Assam, Delhi, Goa, Uttar Pradesh, and Uttarakhand have introduced direct capital subsidies to offset high upfront installation costs.



Introduction

The Government of India's initiative to convert rooftops across the country into a significant solar energy resource marks a strategic move towards long-term energy security and self-reliance.

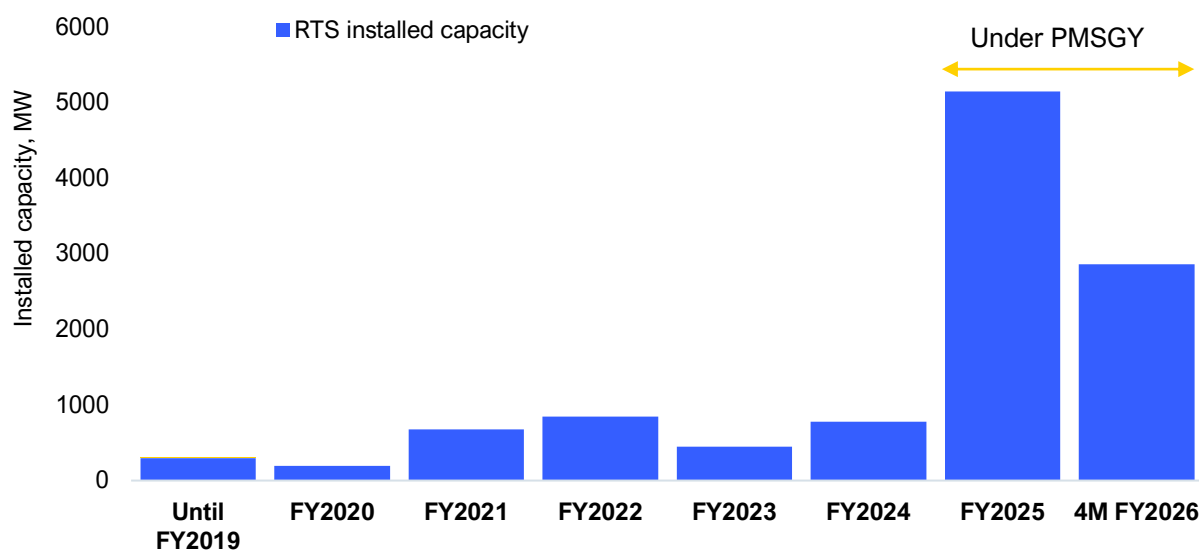
Although initial progress in the residential rooftop solar (RTS) segment was limited, the sector witnessed a considerable shift following the introduction of the Pradhan Mantri Surya Ghar Yojana (PMSGY) last year.

The government launched PMSGY to make rooftop solar more accessible for households by reducing upfront costs and strengthening decentralised clean energy adoption across India. Before its launch, rooftop solar adoption remained concentrated in the commercial and industrial segments, while the residential sector lagged due to high upfront costs and limited awareness. PMSGY targeted this gap by offering capital incentives and simplified procedures to make rooftop solar financially attractive for households and to promote self-sustained, clean energy use at the household level. It has already drawn national attention to the residential segment and laid the foundation for a more inclusive rooftop solar market within India's clean energy transition agenda.

Table 1: Scheme details

Parameters	Details
Scheme name	Pradhan Mantri Surya Ghar: Muft Bijli Yojana
Launch date	February 2024
Financial outlay	INR 75,021 crore (USD 8.53 billion)
Target	30 GW of residential rooftop solar capacity
Households covered	1 crore (10 million)
Target year	FY2027
Current status (July 2025)	4.9 GW of installed RTS capacity across approximately 1.6 million households

As of July 2025, India had collectively installed about 11 GW of residential rooftop solar capacity, of which about 4.9 GW has been added under the PMSGY. This accounts for approximately 44.5% of the country's total residential rooftop capacity, achieved in just over a year of the scheme's launch.

Figure 1: Annual residential rooftop solar installation trend

Source: Ministry of New and Renewable Energy (MNRE), PMSGY National Portal, JMK Research

An October 2024 report¹ by IEEFA and JMK Research discussed residential rooftop solar potential and the role of PMSGY to support its development in detail. This report focuses on the status of development in India's residential rooftop solar landscape under PMSGY.

Current status

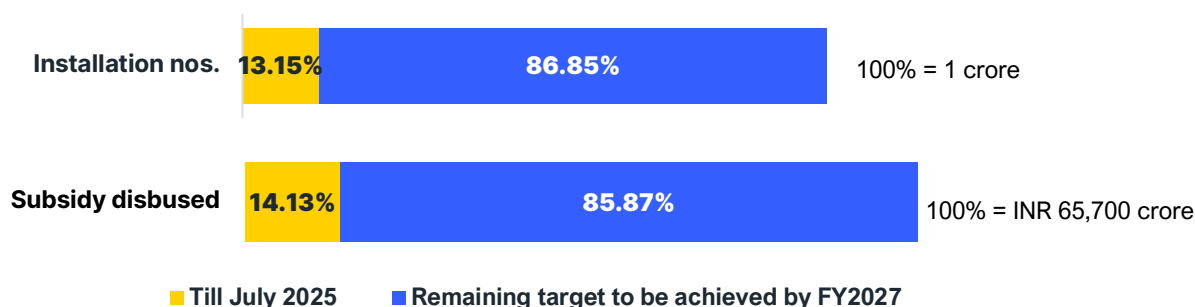
As of July 2025, PMSGY has witnessed significant traction, with over 57.9 lakh applications for residential rooftop solar installations. The scheme has facilitated the installation of 4,946 MW of rooftop solar capacity till July 2025 across various states and Union territories, indicating robust on-ground execution. Subsidy disbursements have crossed INR 9,281 crore (USD 1.05 billion) benefiting over 16 lakh households, reflecting strong financial support and household-level participation. These figures underscore growing public interest in solar adoption and the effectiveness of central incentives in accelerating clean energy uptake.

¹ IEEFA and JMK. [Unleashing the Residential Rooftop Solar Potential](#). October 2024.

Figure 2: PMSGY progress (as of July 2025)

Source: PMSGY National Portal, JMK Research

However, despite a near fourfold increase in applications between March 2024 and July 2025, only 13.1% of the target 1 crore (10 million) installations had been completed, and just 14.1% of the allocated INR 65,700 crore (USD 7.5 billion) in subsidies released till July 2025. In this scenario, the FY2027 target continues to be viewed as a considerable challenge.

Figure 3: Installation numbers & subsidy disbursement: PMSGY July 2025 vs FY2027 target

Note: Out of a total financial outlay of INR 75,021 crore, INR 65,700 crores (87.6%) are assigned as direct CFA to residential consumers under the scheme

Source: MNRE, JMK Research

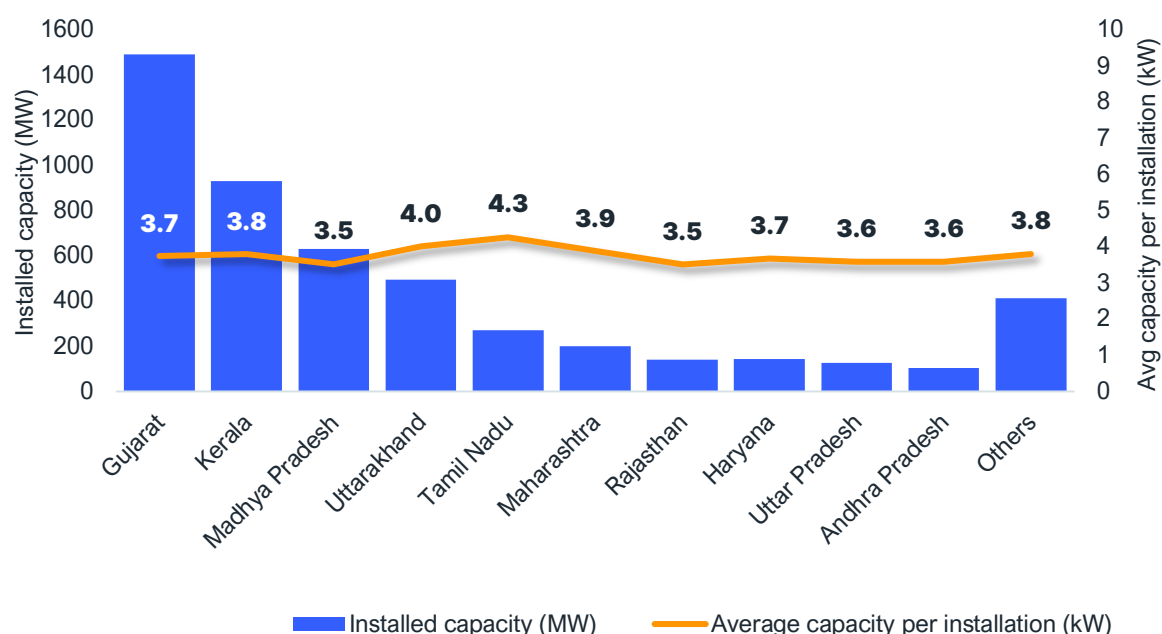
State-wise RTS installed capacity under PMSGY

Under the PM Surya Ghar: Muft Bijli Yojana, Gujarat leads all states with the highest installed residential rooftop solar capacity of 1,491MW, followed by Maharashtra, Uttar Pradesh, Kerala, and Rajasthan. These states in the top five together account for approximately 77.2% of the total installed

capacity (4,946 MW) under the scheme till July 2025. This concentration reflects stronger policy push, awareness, and adoption in these states compared to others.

However, these states report an average rooftop solar capacity of 3.86 kW per installed system, which is only slightly above the national average of 3.82 kW per RTS. Goa leads significantly with 8.7 kW per installation, followed by Delhi at 5.1 kW and Punjab at 4.7 kW per RTS. In the case of Goa and Delhi, higher capacities are attributed to the favourable policy incentives and higher residential electricity demand. In contrast, Meghalaya remains the only state with an average of below 2 kW per system, pointing to limited demand or weaker market penetration.

Figure 4: Installed capacity by state & UT under PMSGY (as of July 2025)



Source: PMSGY National Portal, JMK Research

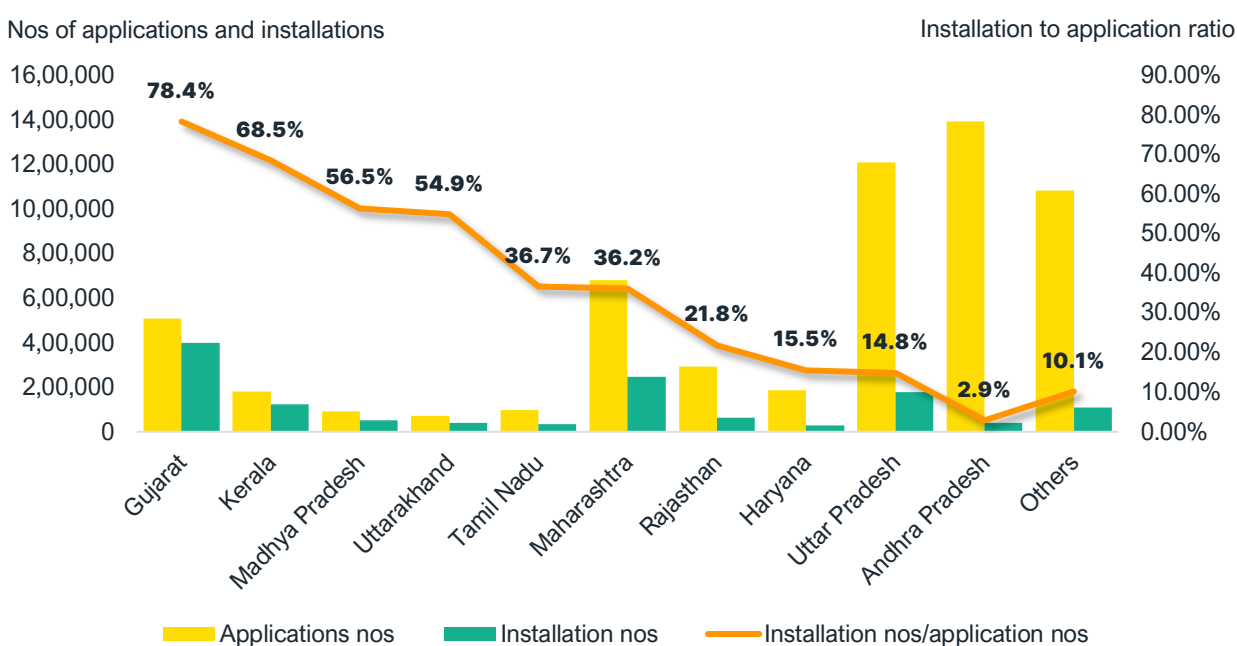
Notably, Arunachal Pradesh remains the only state with no rooftop solar installations in the residential sector under the scheme.

Number of applications vs installations

As of July 2025, the national installation-to-application conversion ratio under PMSGY stood at just 22.7%, underscoring the challenges in translating demand into actual rooftop solar capacity. Gujarat, Kerala, Madhya Pradesh, Ladakh, Puducherry, Lakshadweep, and Uttarakhand had crossed the 50% mark by July 2025—a notable improvement from October 2024, when only Gujarat had crossed this benchmark.

States such as Gujarat and Kerala lead with high conversion ratios of above 65%, supported by a mature solar ecosystem, strong vendor base and high consumer awareness. Among Union territories, Ladakh, Puducherry, Lakshadweep have all crossed the 50% mark, highlighting how smaller geographies with targeted administrative focus can achieve faster rollouts. In contrast, Uttar Pradesh (14.8%) and Andhra Pradesh (2.9%) show low conversion despite the influx of applications because of low vendor availability compared to application volumes.

Figure 5: Installation to application ratio (as of July 2025)



Note: The figure highlights the top 10 states/ UTs with the highest installation numbers, further sorted by their installation-to-application conversion ratios.

Source: PMSGY National Portal, JMK Research

State attractiveness for residential rooftop solar

In terms of overall attractiveness for residential rooftop solar under PMSGY, Gujarat, Kerala, Madhya Pradesh, and Maharashtra stand out for strong consumer awareness, robust vendor ecosystems, and implementation efficiency. Delhi, Rajasthan, and Karnataka fall into a medium-performance bracket where demand exists but procedural and vendor-related bottlenecks limit progress. Uttar Pradesh, and Andhra Pradesh remain in the low-attractiveness category, constrained by weak awareness and limited vendor availability per capita, though state-level incentives for UP could improve future uptake.

Table 2: State-wise attractiveness for residential rooftop solar

State	Awareness	Vendor availability	Demand	Implementation efficiency	Additional state incentives
Gujarat	Green	Green	Green	Green	Yellow
Maharashtra	Green	Green	Green	Yellow	Yellow
Kerala	Yellow	Green	Yellow	Green	Yellow
Delhi	Green	Yellow	Yellow	Yellow	Green
Madhya Pradesh	Yellow	Green	Yellow	Green	Yellow
Rajasthan	Yellow	Yellow	Yellow	Yellow	Yellow
Karnataka	Yellow	Yellow	Yellow	Red	Yellow
Uttar Pradesh	Red	Yellow	Green	Red	Green
Goa	Yellow	Yellow	Yellow	Red	Green
Andhra Pradesh	Red	Red	Green	Red	Yellow

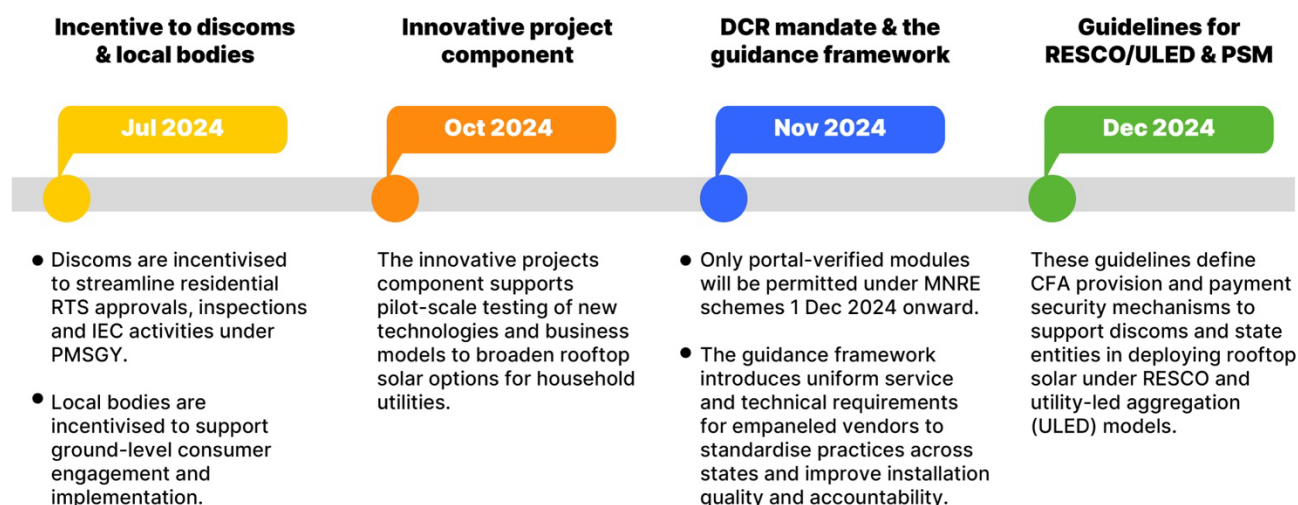
Colour code: Green for high, yellow for medium, and red for low

Source: PMSGY National Portal, Industry Sources, and JMK Research

Policy development

PMSGY also aims to strengthen adoption by simplifying the deployment process and removing procedural bottlenecks. The following are the major policy updates since its inception.

Figure 6: PMSGY policy development



Source: MNRE, JMK Research

Capacity building programme² (July 2024)

The capacity building programme under PM Surya Ghar Muft Bijli Yojana aims to develop a strong workforce capable of supporting the installation of 1 crore residential solar rooftops. The Ministry of New and Renewable Energy (MNRE) plans to train over 3 lakh individuals, including at least 1 lakh solar PV technicians, in the installation, operation, maintenance, and repair of rooftop systems. As of August 2025, the scheme has certified over 34,200 solar PV installers and over 17,300 solar helpers and assistant technicians³.

The programme also focuses on upskilling vendors, engineers, and supervisors while building capacities of distribution companies (DISCOMs), renewable energy development agency (REDAs), financial institutions, and government departments for effective coordination.

The 'Innovative Projects' component⁴ (October 2024)

The programme encourages innovation in both technology and business models by funding pilot projects and proof-of-concepts, enabling start-ups and research institutions to test and scale ideas i.e. to expand the range of rooftop solar products and services for households and utilities.

In June 2025, MNRE had issued a Call for Proposals for the Innovative Projects component⁵ under PM Surya Ghar Yojana, giving eligible participants until 19 August 2025 to submit their proposals. This component provides funding of 60% of the project cost up to INR 30 crore (USD 3.4 million), with phased grant releases of up to 50% initially for equipment procurement, and the balance linked to progress and fund utilisation. Institutions can claim overheads of up to 8% of the project cost, or INR 15 lakh (USD 17,045), released only after successful completion and review. The MNRE oversees the scheme, while the National Institute of Solar Energy (NISE), which serves as the scheme implementation agency, monitors execution, verifies fund use, conducts progress reviews, and enforces milestone-based disbursements.

DCR mandate (November 2024)

The MNRE has mandated that all ALMM-listed manufacturers are required to register their production facilities and upload their solar PV cell and module data on the Domestic Content Requirement (DCR) verification portal⁶. All past data from 1 January 2024 onward must be submitted on the portal. From 1 December 2024, only those modules whose DCR credentials are verified through the portal will be permitted under MNRE schemes, including PMSGY, Central Public Sector

² MNRE. [Operational Guidelines for Implementation of Component 'Capacity Building' under PMSGY](#). July 2024.

³ PMSG Portal. [Trained Solar PV Installers and Helpers](#)

⁴ MNRE. [Operational Guidelines for Implementation of Component "Innovative Projects" under PMSGY](#). October 2024.

⁵ MNRE. [Innovative Projects Component under PM Surya Ghar: Muft Bijli Yojana](#). June 2025.

⁶ MNRE. [DCR Mandate](#). November 2024.

Undertaking (CPSU) Scheme Phase-II, and Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM).

Through this measure, a unified digital mechanism has been created for the authentication of DCR compliance, with which unauthorised use of non-domestic components is expected to be reduced. However, it may add an additional compliance burden on manufacturers and temporarily constrain module availability.

Solar City Programme and Model Solar Village component

The Solar City Programme⁷ under the scheme requires each state and Union territory to designate at least one city for complete solarisation through a mix of rooftop, open access, and street lighting systems. As of April 2025, 27 states/ UTs had nominated their solar cities⁸, with notable examples including Sanchi (Madhya Pradesh), Thiruvananthapuram (Kerala), Chandigarh, and Ayodhya (Uttar Pradesh). In fact, UP has gone a step further and announced its own state-level programme to develop 17 additional solar cities.⁹

Another key initiative under the scheme is the Model Solar Village component, introduced through MNRE guidelines in August 2024¹⁰. This supports the solarisation of one village per district to expand clean energy access in rural areas. A total allocation of INR 800 crore (USD 91.7 million) has been made, with INR 1 crore (USD 0.11 million) central financial assistance (CFA) earmarked for each model village. In recent months, Telangana issued a tender to install 80.69 MW of RTS across 80 villages covering 80,000 households with 2 kW systems, while Andhra Pradesh floated a tender for 1.2 GW residential RTS under PMSGY to serve about 6 lakh SC & ST households through the utility-led aggregation capex model.

In parallel, states have launched their own village solarisation drives. Jharkhand¹¹ aims to solarise 1,000 villages, while Uttarakhand has a target of 300 villages¹². Andhra Pradesh is targeting to set up five model solar villages per district in the state¹³. However, there are no completed solar cities or model solar villages as of August 2025. These initiatives remain crucial for extending sustainable energy access in off-grid and underserved regions.

⁷ PIB. [MNRE has asked each State/UT to develop at least one Solar City](#). March 2023.

⁸ MNRE. [Development Of Solar Cities](#). April 2025.

⁹ Times of India. [UP to develop 17 major cities as Solar cities](#). Feb 2024.

¹⁰ Ministry of New and Renewable Energy. [Operational Guidelines for Implementation of Component "Model Solar Village" under PM-Surya Ghar: Muft Bijli Yojana](#). August 2024.

¹¹ JREDA. [Jharkhand aims to solarize 1,000 villages](#). July 2022.

¹² UREDA. [Uttarakhand Solar Policy 2023](#). June 2023.

¹³ The Hindu. [Every district in Andhra Pradesh to have five model solar villages](#). January 2025.

Others

- Guidelines for renewable energy service company (RESCO), utility-led aggregation models and payment security mechanism under PMSGY¹⁴ (December 2024): These guidelines define the mechanism for providing CFA to residential consumers under RESCO and utility-led aggregation (ULA) models, along with a payment security system to ensure timely payments to developers. For instance, Tata Power-led Odisha discoms launched a 1 kW rooftop solar scheme¹⁵ under the ULA model of PMSGY. Consumers contribute only INR 5,000, while the Central government covers INR 30,000 and the Odisha government adds INR 25,000 as subsidies. Together, these subsidies reduce the effective cost of a system priced to a minimal one-time payment.
- Under the scheme's incentives for local bodies¹⁶ (July 2024) INR 1,000 crore is allocated to incentivise urban local bodies (ULBs) and panchayati raj institutions (PRIs) for each eligible installation, encouraging them to mobilise households, raise awareness, and coordinate with DISCOMs, banks, vendors, and communities through outreach and local initiatives.
- The Guidance Framework¹⁷ (November 2024) standardises service, technical norms, warranties, and documentation for all empanelled vendors to improve installation quality and ensure accountability across states.

Additional capital incentives across states for residential segment

To accelerate residential rooftop solar (RTS) deployment, several Indian states have implemented financial incentives that either supplement the central subsidy or independently support consumers. States like Assam, Delhi, Goa, Uttar Pradesh, and Uttarakhand have introduced direct capital subsidies to offset high upfront installation costs. These subsidies are either offered as a fixed amount (ranging between INR 10,000-20,000 or USD 115-230 per kW) or as a percentage of the total system cost (ranging from 50% to 80%).

Some states also promote RTS through tax and duty exemptions. For instance, Andhra Pradesh is reimbursing 100% SGST for residential rooftop solar installations from 2024 to 2029, Telangana is providing 100% reimbursement from 2025 to 2035, and Uttarakhand is offering 50% reimbursement from 2023 to 2028. While states like Tripura, Delhi, and Mizoram also offer SGST exemptions, they

¹⁴ MNRE. Guidelines for Implementation of PSM for RESCO/ ULA models under PMSGY. December 2024.

¹⁵ Business Standard. [Odisha power discoms launch 1 kW rooftop solar scheme for households](#). September 2025.

¹⁶ MNRE. [Operational Guidelines for Implementation of Component "Incentives to Local Bodies" under PMSGY](#). July 2024.

¹⁷ REC. Guidance Framework for Vendor Operations under PM Surya Ghar: Muft Bijli Yojna. November 2024.

have not specified the quantum or time period. Madhya Pradesh incentivises rooftop solar by offering property tax exemptions for installations.

Table 3: Additional capital incentives across states for residential rooftop solar

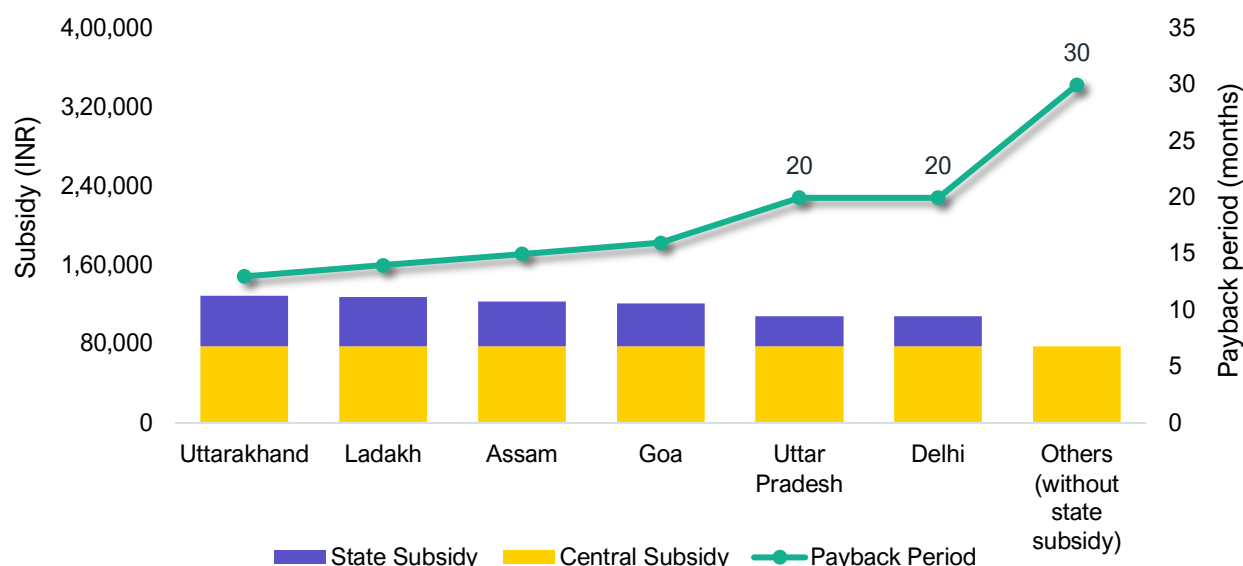
States	State subsidy	Total subsidy for 3 kW (state + central)
Ladakh	INR 20,000 (USD 227.3)/kW up to 2 kW, INR 50,000 (USD 568.2) for 3 kW	INR 1,28,000 (USD 1454.5)
Uttarakhand	INR 17,000 (USD 196)/kW up to 3 kW	INR 1,29,000 (USD 1465.9)
Delhi	INR 10,000 (USD 113.6)/ kW up to 3kW	INR 1,08,000 (USD 1227.3)
Uttar Pradesh	INR 15,000 (USD 170.5)/ kW up to 2kW	INR 1,08,000 (USD 1227.3)
Assam*	INR 15,000 (USD 170.5)/ kW up to 3kW	INR 1,23,000 (USD 1397.7)
Goa	30% of benchmark cost up to 3kW	INR 1,21,500 (USD 1380.7)

Note: *Applicable for first 1 lakh residential consumers only

Source: State policies, JMK Research

The subsidies provided under PMSGY for rooftop solar installations have significantly reduced the payback period to 30 months for 3 kW rooftop solar systems, in contrast to approximately 54 months in the absence of any subsidy support. Where additional state-level subsidies have been introduced, the payback period has been further reduced, as reflected in the figure below. The additional subsidies provided by states are intended to boost rooftop adoption within their respective jurisdictions.

Figure 7: Residential RTS payback period across different states (for 3 kW)



Assumptions: Overall cost = INR 1.7 lakh (USD 1,955) for 3kW; Benchmark cost = INR 1.45 lakh (USD 1,668) for 3kW; Electricity charge = INR 7/ unit (US ¢ 8.1)

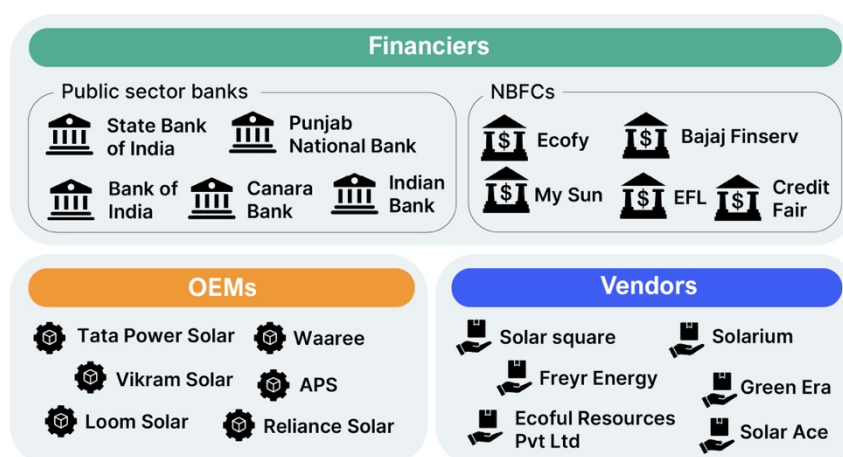
Source: State policies, JMK Research

Apart from the capital subsidy, in states such as Delhi and Kerala, performance-based incentives are used to encourage adoption and sustained use of RTS systems. Delhi's solar policy includes a generation-based incentive (GBI) that provides payouts for five years, with higher rates for lower-consuming residential users. Kerala is restructuring its capital subsidy into a GBI model for off-grid systems, aiming to ensure that installed systems are well-maintained and continue to function effectively over time.

Key stakeholders under PMSGY

With the Government of India emphasising residential rooftop solar and launching the ambitious PMSGY, regulators, investors, financiers, developers, and consumers have sharply increased their focus on this market.

Figure 8: Key stakeholders



Source: PMSGY Portal, JMK Research

Original equipment manufacturers (OEMs)

With the rooftop solar market reaching technological maturity, commoditisation has advanced significantly. Several OEMs offer standardised residential rooftop solar kits designed for faster project execution, while also engaging in installations either directly or through vendor partnerships.

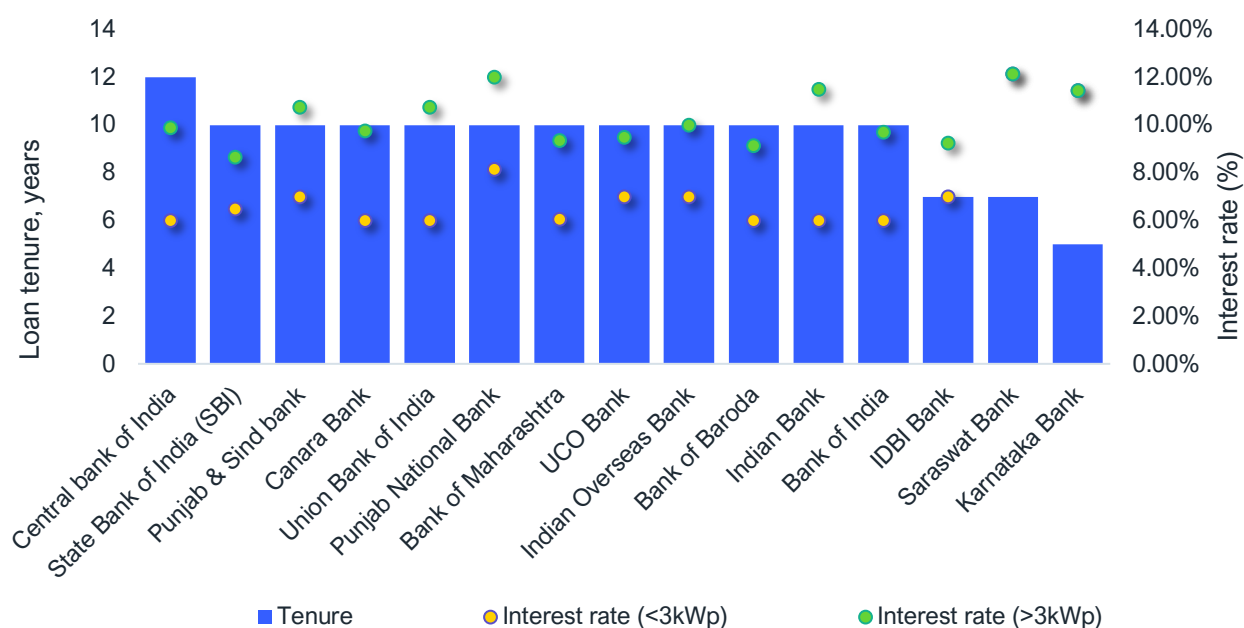
For instance, Tata Power Solar has established a nationwide presence through 604 channel partners operating across more than 400 cities, supported by 240 authorised service partners in over 560

cities. This network has enabled the installation of more than 1.8 lakh (0.18 million) residential rooftops under its system¹⁸.

Financiers

Leading public and private sector banks such as the State Bank of India (SBI), Punjab National Bank, Canara Bank, Bank of Baroda, HDFC Bank, and IDBI Bank offer dedicated loan products for residential rooftop solar systems. Alongside banks, non-banking financial companies (NBFCs) and fintech firms including Ecofy, Bajaj Finserv, Credit Fair, My Sun, Electronica Finance Limited and others have also entered the rooftop solar financing space. However, their products typically carry slightly higher interest rates and shorter loan tenures compared to those offered by banks.

Figure 9: Interest rate and tenure comparison of residential RTS financing schemes by banks



Note: 1. Interest rate upper limit is shown as specified by the financing entity; 2. Apart from these private sector banks, NBFCs and fintechs also provide financing services

Source: NPRS, JMK Research

The graph highlights leading public sector and few other banks offering residential rooftop solar financing. These loan products are structured either as standalone loans (dedicated to solar installations) or composite loans (integrated with home loans for new constructions). Interest rates in these schemes generally start at 6% and can go up to 12.15% for tenures of up to 10 years. In

¹⁸ Tata Power. [Media Release](#). July 2025.

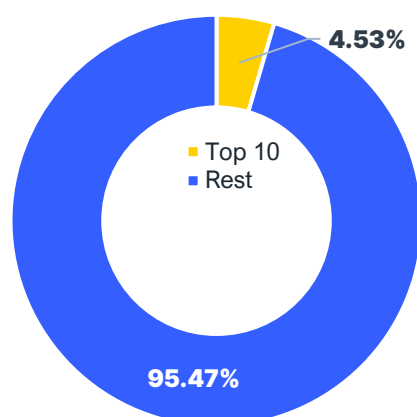
addition, private sector banks, NBFCs, and fintech players also provide financing for residential rooftop solar, with rates ranging from 9.5% to 15% for shorter tenures of 2-5 years.

Vendors

Under PMSGY, vendors serve as the primary delivery partners responsible for supplying, installing, and maintaining rooftop solar systems. They enroll via the National Portal, get empaneled by DISCOMs, and act as the main interface with households, driving on-ground execution.

The number of empaneled vendors under PMSGY has surged from 6,552 in July 2024¹⁹ to over 40,000 by July 2025, marking a six-fold rise. Uttar Pradesh, Maharashtra, and Gujarat together account for more than 9,000 vendors, highlighting the growing interest of regional players, even if the number of vendors relative to application numbers remains low. This expansion has been driven by higher consumer awareness and greater visibility of the residential rooftop market. At the national level, firms like Solar Square Energy (80 MW), Solarium Green (25 MW), and Ecofull Resources (17 MW) have played a major role.

Figure 10: Installed capacity of top 10 PMSGY vendors



Source: PMSGY Portal, JMK Research

While some vendors have been engaged as official partners of approved module manufacturers and directly procure rooftop kits, most vendors source solar modules from different manufacturers to meet local demand.

¹⁹ PIB. PMSGY - [Redefining Solar Power and Energy Access](#). August 2024.

Challenges of PMSGY

Consumer-side barriers

Low awareness

Despite the growing government push for residential rooftop solar adoption under PMSGY, limited consumer awareness continues to be a significant barrier, as seen in the following areas:

1. Low consumer awareness about the financial benefits, subsidy structure, and long-term savings from rooftop solar.
2. Concerns about high upfront costs, complex application procedure and heavy maintenance under PMSGY, which are largely misconceptions. Subsidies and low-interest loans reduce costs, the National Rooftop Portal simplifies approvals, and vendors provide multi-year maintenance.
3. Limited grassroots outreach with inadequate regional-language marketing and a lack of enough demonstration projects in rural/semi-urban areas.
4. Customers' heavy dependence on installers' guidance, which stems from low awareness, price-driven choices, a surge in installers, and shortages of DCR modules. Added paperwork for DISCOM approvals and subsidy claims further pushes most households to let installers manage the entire process.

This knowledge gap has slowed down the project uptake, leaving the scheme dependent on more proactive or informed consumers while large sections of eligible beneficiaries remain untapped.

Financing barriers

A significant portion of Indian households remains excluded from rooftop solar adoption due to limited access to affordable financing. Inadequate credit scores and the absence of consistent state-level subsidies in many regions increase the upfront cost burden, particularly for lower- and middle-income segments. Loan approval processes offered by public sector banks are often slow and complex, and low consumer awareness further reduces approval rates despite lower interest charges (7-8%). NBFCs, on the other hand, achieve higher approval rates through proactive marketing, consumer outreach, and simplified procedures, but their significantly higher interest rates (10-14%) create a trade-off between accessibility and cost. This persistent financing gap is a critical barrier that must be addressed to accelerate household-level adoption and achieve the ambitious targets of PMSGY.

Delayed approvals and subsidy disbursements

Under the PMSGY framework, the government has set a target of completing rooftop solar approvals and commissioning within 30 days, 15 days for technical feasibility assessment and another 15 days for system commissioning and net-metering. This streamlined timeline is intended to make the adoption process easier for households and ensure faster disbursement of subsidies.

However, despite this mandate, implementation on the ground has been far slower than planned, with many DISCOMs struggling to meet these deadlines. In practice, approval processes for rooftop solar systems are stretching anywhere from 45 to 120 days. These delays stem mainly from meter shortages, lack of coordination between consumers, installers, and DISCOMs, and procedural inefficiencies at the utility level.

DCR-related issues

The introduction of the Approved List of Cell Manufacturers (ALCM) in July 2025 marks an important step towards strengthening domestic solar manufacturing, with nine registered companies together holding a combined annual cell production capacity of 25GW+. However, this remains far below the domestic module production capacity of 100GW+, creating a significant supply gap that poses a major risk to the execution of PMSGY. Once demand from utility-scale, commercial and industrial projects is factored in, access to ALCM-compliant cells could become severely constrained, leading to supply bottlenecks and installation delays even when sufficient module manufacturing capacity is available.

Table 4: DCR vs non-DCR modules market readiness

Parameter	DCR	Non-DCR
Availability	1-2 months	Readily available
Price	INR 23-26 (US ¢ 26-30) per watt	INR 13-15 (US ¢ 15-17) per watt
Manufacturing capacity	25 GW+	100 GW+

Source: Industry sources, JMK Research

As of July 2025, DCR-compliant modules already carry premiums of up to INR 12 (US¢14) per watt over non-DCR variants. These higher prices are making larger residential installations less economically attractive and, in some cases, eroding the effective benefit of the INR 78,000 (USD 897.1) subsidy.

At the same time, domestic DCR module supply remains fragmented and limited, resulting in delivery delays of up to two months. These delays are prompting many consumers to opt for non-DCR systems and forgo the subsidy in favour of faster installations. Without stronger measures to prioritise domestic supply for PMSGY over exports and address anti-dumping-related cost pressures on key

inputs such as solar glass²⁰, the affordability and timely rollout of residential rooftop projects are likely to remain at risk.

Technical and logistical hurdles

PMSGY grievance redressal system

PM Surya Ghar Yojana has put in place a grievance redressal system, but its effectiveness, particularly in resolving subsidy-related cases, remains limited. Vendors and consumers continue to encounter persistent portal glitches, incorrect auto-filled information, and data-entry errors, which prolong application approvals and delay subsidy disbursements. Installers report encountering recurring technical errors while uploading documents, while the portal itself lacks a visible complaint-tracking dashboard and clear escalation pathways. These issues prevent timely resolution of cases, create growing subsidy backlogs and affects stakeholders' trust in the delivery mechanism.

Vendor ecosystem challenges

Fragmented supply chains for key rooftop solar components, such as panels, inverters, and mounting structures, are causing delays in PMSGY implementation, with many approved vendors concentrated in only a few states. This concentration increases delivery times and raises logistical costs for projects in remote or rural regions. At the same time, installers are producing inconsistent quality and varying system standards as installations scale up, resulting in lower system performance and shorter asset lifespans. Although MNRE has issued authorised training centres, certified installer lists and technical guidelines, interviews with industry sources reveal that these measures have not fully closed the gaps. Without stronger enforcement of standards and regular audits, these inconsistencies could undermine the long-term effectiveness of the programme and reduce consumer trust.

Given the rapid expansion in the number of empanelled PMSGY vendors over the past year, the residential rooftop solar vendor market is expected to move towards gradual consolidation over the medium term. Only a limited set of larger companies providing engineering, procurement, and construction (EPC) services is likely to remain competitive over time, as stricter empanelment requirements and mandatory performance obligations are being introduced under the renewable energy certificate (REC)/MNRE vendor guidance framework. As installation volumes increase and service expectations rise, smaller vendors may find it difficult to maintain quality, sustain cashflows until subsidy reimbursement, or meet evolving standards on DCR compliance and digital reporting. As a result, the vendor landscape under PMSGY is expected to become more concentrated, with experienced national and regional EPCs retaining a larger share of installations.

²⁰ The Hindu. [India imposes anti-dumping duty on solar glass from China and Vietnam for 5 years](#). May 2025.

Recommendations

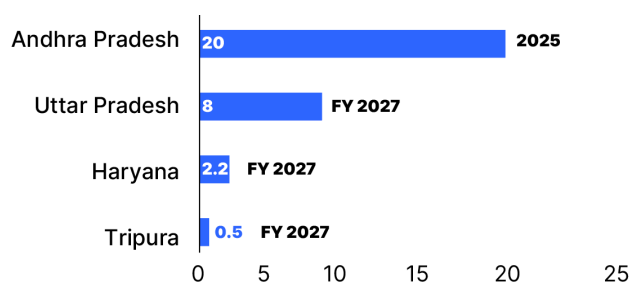
The recommendations for strengthening the PM Surya Ghar Muft Bijli Yojana are based on a blend of stakeholder consultations and market research, combining insights from policymakers, vendors, DISCOMs, financial institutions, and consumer feedback with data-driven analysis of adoption trends.

Policy and regulatory reforms

Defining a time-bound roadmap for state rooftop solar adoption

Establishing clear, time-bound rooftop solar capacity targets at the state level is essential for effective policy execution. States should base these targets on technical potential assessments across consumer segments, setting measurable and phased milestones to track deployment trajectories. States such as Uttar Pradesh, Andhra Pradesh, Haryana, and Tripura have already outlined specific RTS targets, and other states/ UTs must also adopt a similar approach.

Figure 11: State-wise residential rooftop installation targets (in lakhs)



Source: State policies, JMK Research

Domestic supply prioritisation policy for DCR modules

A dedicated domestic supply allocation policy should be introduced, reserving a minimum of 20% of DCR module production for PMSGY-related residential rooftop projects. The accelerated demand for DCR modules has been placing pressure on the domestic supply chain, causing longer lead times and fluctuating prices for DCR-compliant modules. With domestic module and cell manufacturing capacity mismatch, intermittent shortages are likely to persist over the next 12-18 months. By earmarking a fixed share of output for domestic schemes, authorities can improve supply stability and ensure installation schedules, thereby sustaining the overall momentum of the programme.

PMSGY procedural reforms

Strengthening grievance redressal mechanism

PMSGY should establish a district-level escalation matrix with clearly assigned officials and contact points so that unresolved post-installation issues such as subsidy disbursement delays, incorrect data entries or portal malfunctions can be routed beyond the initial DISCOM or portal level. A year-round grievance hotline should allow vendors and consumers to report issues in real time and receive status updates. These steps will provide multiple resolution pathways for cases that arise after installations are completed, ensuring accountability and faster complaint resolution.

Enhancing facilitation (pre-installation stage)

To ensure more applications result in actual installations, state- and district-level facilitation cells should coordinate between households, vendors and DISCOMs, providing end-to-end support from application to installation. These facilitation teams should help households file applications, claim subsidies and manage coordination during the physical installation stage. Technology-enabled solutions such as mobile apps and messaging platforms, combined with partnerships with local NGOs, self-help groups and panchayats, can improve real-time query resolution and progress tracking, particularly in rural and semi-urban regions where the pre-installation support ecosystem remains weak.

Others

Consumer awareness

Given that rooftop solar remains a relatively new concept for most Indian households, central and state governments should actively invest in structured awareness campaigns. A specialised agency should be appointed to act as a bridge between consumers and DISCOMs, conducting targeted outreach and providing technical guidance. Additionally, short-format, regionally tailored bootcamps (2-3 days) can be organised to cover the full solar adoption lifecycle:

1. *Pre-installation*: Scheme awareness, subsidy details, technology basics, 25-year electricity savings, and contribution to climate goals.
2. *Mid-installation*: Vendor selection, contract terms, and quality verification.
3. *Post-installation*: Maintenance best practices, panel cleaning methods, solar generation monitoring, and early fault detection.

Financing option

A dedicated taskforce can be created to monitor and coordinate financing activities across public sector banks and NBFCs. Awareness can be spread among households regarding affordable loan options, lower interest rate schemes can be promoted, and complex loan procedures can be simplified. Targeted marketing campaigns and consumer outreach initiatives can be implemented to educate potential adopters and increase loan uptake. By streamlining financing processes and improving accessibility, household participation can be significantly enhanced.

Enhancing monitoring mechanisms

Currently, PMSGY relies primarily on a centralised digital platform that aggregates installation and subsidy data reported by states and vendors, with limited real-time ground-level validation. To enhance programme transparency, quality assurance, and responsiveness, the state and district-level agencies should be empowered with formal authority and tools to conduct periodic inspections, audits, and real-time performance monitoring of rooftop solar installations. This decentralised monitoring should be supported by capacity building, digital tools (including mobile inspection apps and Internet of Things [IoT] integration), and clear escalation protocols to promptly address delays, quality issues, or subsidy disbursement bottlenecks.

Such a framework will enable faster problem resolution, improve data accuracy, increase accountability among stakeholders, and allow tailored interventions based on local needs, ultimately improving the conversion rate from applications to installations and supporting the long-term sustainability of PMSGY.

Commoditisation of rooftop solar kits

The Indian rooftop solar market continues to face fragmented quality and weak end-to-end guarantees, challenges that standardised plug-and-play solutions could resolve. Promoting the commoditisation of rooftop solar kits, with modules, inverters, mounting structures, and cables supplied as standardised and pre-assembled packages, can simplify installation, cut project delays, and reduce errors from mismatched components. This approach could significantly accelerate adoption across both urban and rural households by making rooftop solar more accessible, efficient, and trustworthy.

Conclusion

The PM Surya Ghar Muft Bijli Yojana (PMSGY) represents one of the most ambitious policy to accelerate adoption within the residential segment, which had previously expanded at a relatively modest pace. Installed capacity in the segment is projected to expand rapidly, from 17GW in FY2025

to nearly 30GW by FY2027, with much of this growth expected to be driven by households that previously lacked financial or technical access to solar²¹.

Residential rooftop solar is expected to see wider adoption through emerging consumer-centric financing models such as pay-as-you-save (PAYS), community solar, hybrid RESCO, and peer-to-peer (P2P) trading gain traction. These models can expand access to low-income and credit-constrained households, broadening the scheme's impact and promote more inclusive participation.

To unlock its full potential, PMSGY must address challenges around subsidy disbursements, digital processes, consumer awareness, and domestic supply chain readiness. Streamlining approvals, upgrading digital platforms, and building stronger awareness campaigns will be essential to ensure smoother conversion of applications into installations. At the same time, domestic content requirements should evolve into an opportunity for scaling up local manufacturing while minimising supply-side bottlenecks. If these measures are prioritised, the scheme can create a more predictable investment environment and establish India as a competitive hub for rooftop solar solutions.

The next phase requires deliberate market-building reforms. Standardising rooftop solar kits as plug-and-play solutions can ensure consistent quality, simplify installations, and make adoption easier across rural and semi-urban households. Establishing state-level facilitation cells within DISCOMs to coordinate approvals, vendor engagement, and grievance redressal can further enhance consumer trust and reduce delays. Over time, these steps can catalyse a more self-sustaining ecosystem in which rooftop solar adoption expands organically.

Policy adjustments already underway point toward a more resilient implementation pathway. By strengthening verification mechanisms, embedding secure and timely payment structures, and piloting new deployment models, the government can improve vendor confidence and enhance financial viability for large-scale rollouts. If these interventions mature into stable processes, they will lay the groundwork for faster replication across states and a gradual shift from subsidy dependence toward market-led adoption.

The introduction of the India Energy Stack (IES)²² in July 2025 marks a pivotal step toward modernising the energy ecosystem. For rooftop solar, IES can automate application approvals, net metering, and subsidies, while giving households real-time access to generation, billing, and carbon savings. Over time, its integration of smart metres, unique IDs, and AI-driven dashboards could serve as the backbone for a digital clean energy marketplace, fostering innovation and consumer-centric services.

Looking forward, the long-term success of PMSGY will hinge not only on the provision of subsidies but also on its ability to institutionalise streamlined digital processes, standardised product solutions, and consumer-centric support systems. If these gaps are addressed, the scheme could transition

²¹ Care Ratings. [India's Rooftop Solar Market to reach 25-30 GW by FY27](#). April 2025.

²² PIB. [MoP conceives an 'India Energy Stack' to build the Digital Backbone for India's Power Sector](#). June 2025.

from being subsidy-driven to a sustainable, market-trusted programme. In doing so, PMSGY has the potential to transform India's residential rooftop segment into a scalable and inclusive pillar of the country's clean energy transition.

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