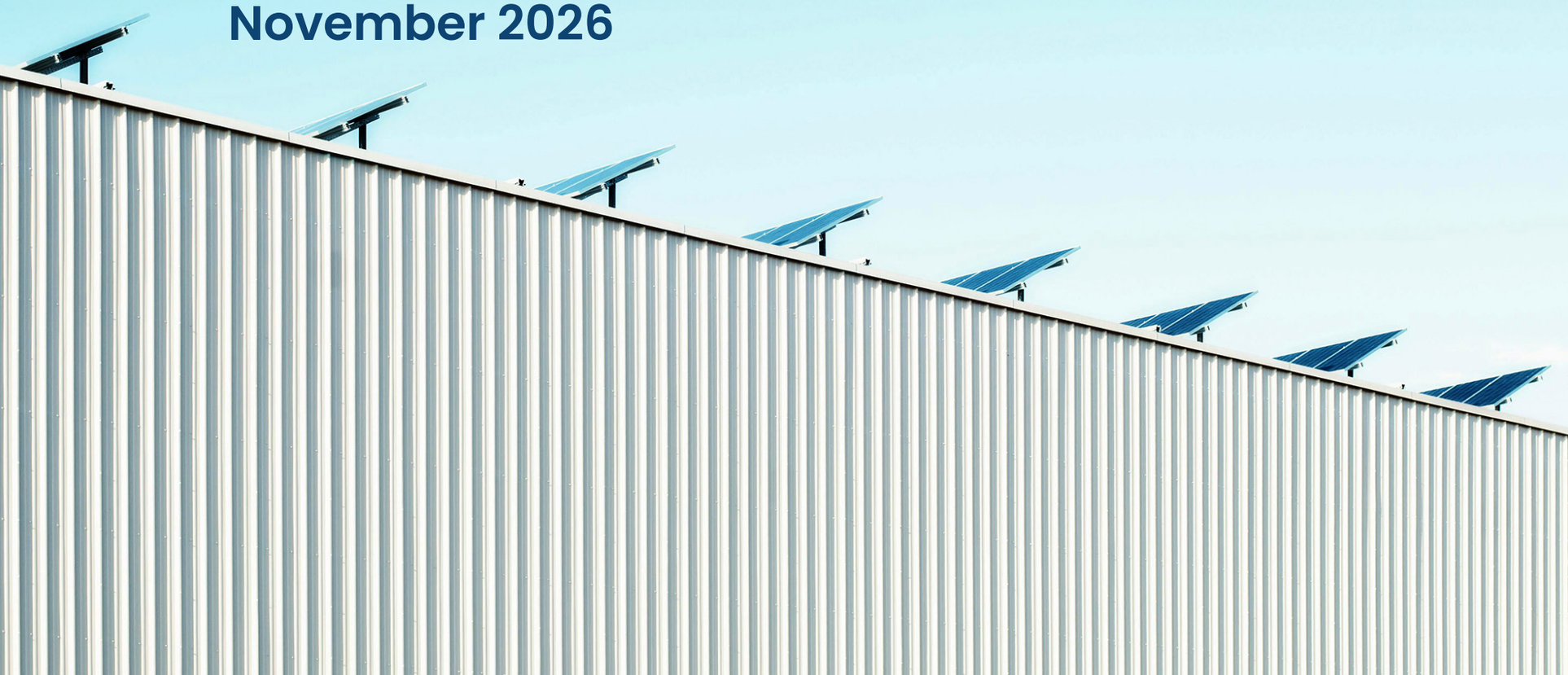
Auroville Consulting

ROOFTOP SOLAR READINESS OF TAMIL NADU'S MSME SECTOR

November 2026



ROOFTOP SOLAR READINESS OF TAMIL NADU'S MSME SECTOR

Key Insights

1



Rooftop Solar is a Cost-Effective Solution for MSMEs

Energy cost savings are the most significant factor driving rooftop solar adoption among MSMEs in Tamil Nadu, presenting a strong business case for solar investments and highlighting high awareness of its long-term economic benefits.

2



Major Barriers: Finance, Technical Knowledge, Policy Clarity, and Permitting

Access to finance remains the greatest restrictive factor for MSMEs, alongside the complexity of application and permitting processes, lack of technical knowledge on rooftop solar and challenges in policy understanding. Many MSMEs have trouble securing loans, lack clear guidance, and face cumbersome regulatory procedures, which deter investments in rooftop solar.

3



Space Constraints Limit Adoption

Many MSMEs face limited access to suitable rooftop space—especially when operating from rented premises. Innovative measures such as virtual net metering, community solar can help overcome these barriers by expanding access and supporting informed solar adoption.

4



Strategic Policy and Financial Interventions Needed

Recommendations include streamlining application processes, expanding financing options (interest-free loans, loan guarantees, blended finance), updating policy for shared solar facilities, enhancing technical support, and incentivising battery energy storage to improve reliability. Global best practices from Malaysia, Mexico, the U.S., and Europe illustrate successful models that Tamil Nadu could adapt.

Solar Energy for MSMEs: Powering Tamil Nadu's Trillion-Dollar Transformation

Tamil Nadu, one of India's most industrialised states, is home to over five million Micro, Small, and Medium Enterprises (MSMEs), which contribute significantly to the state's employment, exports, and GDP. As the state sets its sights on becoming a $1 trillion economy by 2030, it has also articulated a bold vision to emerge as a global hub for green manufacturing. At the heart of this ambition lies the energy transition—a shift from fossil fuels to clean, renewable energy that is essential not only for sustainable development but also for maintaining industrial competitiveness.

Energy accounts for 77% of Tamil Nadu's carbon emissions (TNGCC 2024), with electricity generation—largely coal-based—being the single largest contributor. With the industrial sector consuming around 34% of the state's electricity (Energy Department 2023), decarbonising this sector is both a challenge and an opportunity. Rooftop solar, in particular, stands out as a decentralised, cost-effective, and scalable solution for MSMEs to reduce energy costs and carbon footprints simultaneously.

International regulatory frameworks, such as the European Union's Carbon Border Adjustment Mechanism (CBAM), are making low-carbon production a prerequisite for global trade. Domestically, India's commitments under the Paris Agreement and its updated Nationally Determined Contributions (NDCs) are driving policies that mandate an increasing share of renewables and reduced emissions intensity. Together, these pressures demand swift and strategic action from industry, especially export-oriented MSMEs.

Tamil Nadu's untapped solar potential, combined with falling technology costs and emerging regulatory support frameworks like solar net metering, presents a compelling case for rooftop solar adoption.

This report outlines a rooftop solar readiness assessment of Tamil Nadu's MSME sector. This assessment is based on primary data collection. The report further develops a set of recommendations that are based on the insights gained from the rooftop solar readiness assessment, policy landscaping, and best national and international practices.



Rooftop solar allows Tamil Nadu's MSMEs to boost competitiveness and support net-zero goals, but tackling financing and policy barriers is essential.

Barriers and Boosters: Rooftop Solar Assessment for MSMEs

The Rooftop Solar (RTS) Readiness Assessments aim to identify the key barriers and enablers influencing rooftop solar energy systems adoption by Micro, Small, and Medium Enterprises (MSMEs) in Tamil Nadu. The findings are intended to inform policy formulation and program design by relevant departments in the MSME and power sectors, enabling more targeted and effective support for solar adoption.

This chapter presents insights drawn from extensive, in-person engagements conducted over a period of ten months, from February to November 2025, with MSME representatives—including business owners and management teams—across the state. The readiness assessment was carried out as part of a broader initiative comprising 20 district-level training and awareness programs focused on climate risk preparedness and rooftop solar readiness.

A total of 364 responses were collected, which we consider to be a representative sample of the larger MSME sector in Tamil Nadu. The assessment was designed to:

- Understand the current capacity of MSMEs to install and benefit from rooftop solar;
- Identify technical, financial, regulatory, and informational gaps;
- Guide policy interventions, financing mechanisms, and awareness campaigns to accelerate rooftop solar adoption among MSMEs.

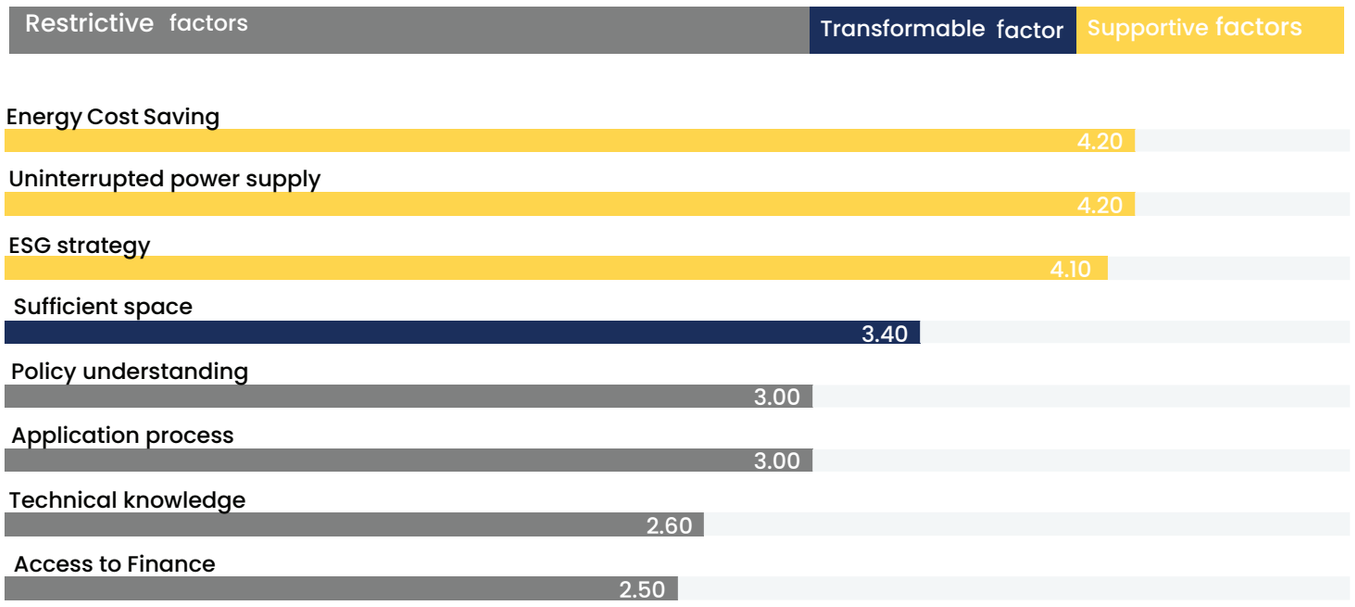
To systematically evaluate readiness, key parameters were rated on a three-tier scale:

Supportive Factors
Elements that actively enable or promote adoption.

Transformable Factor
Elements that are not yet enabling but have the potential to become supportive with targeted interventions.

Restrictive Factors
Elements that currently hinder or block adoption and require structural changes or significant effort to address.

Figure 1 : Restrictive, transformable and supportive factors



Supportive Factors:

- **Energy cost savings emerged as the strongest supportive factor driving rooftop solar adoption among MSMEs in Tamil Nadu. This indicates a high level of awareness among MSMEs regarding the economic benefits and long-term cost-effectiveness of rooftop solar systems.**

- **Uninterrupted power supply:** The need for a reliable and uninterrupted power supply is another key motivator for rooftop solar uptake. This reflects the operational importance of energy reliability for MSMEs and suggests a potential opportunity to integrate rooftop solar systems with battery energy storage solutions to enhance energy security.

- **Environmental, Social, and Governance (ESG)** compliance and aspirations, along with growing national and international pressure to meet climate targets and emissions standards, are also significant drivers. MSMEs in Tamil Nadu demonstrate strong awareness of the increasing importance of ESG requirements, particularly as these are being cascaded through both domestic and global supply chains.



Transformable Factors

- **Availability of Space:** The lack of appropriate and sufficient rooftop space has been identified as a key limitation for MSMEs considering rooftop solar. Many enterprises operate in rented or shared facilities with limited roof ownership or structural suitability. However, this constraint can be addressed through policy alternatives, such as enabling MSMEs to access affordable clean energy through third-party ownership models, utility-provided solar, or rooftop leasing arrangements from other entities. These interventions hold significant potential to transform this barrier into an enabler for wider rooftop solar adoption.

Restrictive Factors



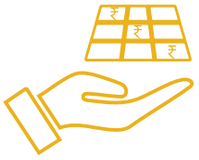
- **Policy Understanding and Clarity:** Many MSMEs perceive the existing rooftop solar policy framework as overly complex and difficult to navigate. This includes confusion around eligibility, subsidies, and net metering regulations. There is a clear need for capacity building, such as targeted training programs, simplified policy documentation, and advisory support. Enhancing policy transparency and user-friendliness would significantly improve MSMEs' ability to make informed decisions.



- **Application and Permitting Processes:** The complexity and time-consuming nature of the application and permitting process—particularly involving the Distribution Companies (DISCOMs) and the Chief Electrical Inspectorate (CEIG)—remains a significant obstacle. These procedural hurdles often lead to delays and discourage MSMEs from proceeding with installations. Streamlining and digitizing these processes could substantially reduce friction, potentially converting this restrictive factor into a supportive factor.



- **Technical Knowledge and Advisory Support:** Making a rooftop solar investment requires MSMEs to evaluate both technical and financial aspects, such as system sizing, vendor selection, maintenance, and return on investment. Currently, many MSMEs lack the in-house expertise to assess these factors accurately. Providing independent technical guidance, quality assurance mechanisms, and standardised tools could empower MSMEs to make informed and confident purchasing decisions.



- **Access to Finance:** The most significant restrictive factor identified in the assessment is access to finance. Despite the availability of dedicated rooftop solar loan products from institutions such as SIDBI and SBI, and the generally attractive payback periods of under five years, many MSMEs still struggle to secure financing. Common challenges include insufficient credit histories, collateral requirements, and a lack of awareness of available schemes. Expanding tailored financial instruments, de-risking mechanisms, and credit facilitation services is essential to overcoming this barrier.

Sector Results

This chapter analyses the rooftop solar readiness of various MSME sectors in Tamil Nadu, highlighting both the leading sectors and the lagging sectors in terms of their rooftop solar readiness. It is important to note that not all sectors were covered in this assessment, so the findings may not represent every MSME activity in the state. The assessment uses a multi-parameter approach to reveal where energy cost savings, ESG strategies, available space, policy understanding, and access to financing differ widely between sectors, guiding targeted interventions for increased solar adoption.

Figure 2 : Leading and lagging sectors



Research and Development, Textile and Apparel, FMCG, Agro & Food Processing, and Drugs, Pharmaceutical s and Nutraceuticals have been identified as the **leading sectors** in terms of rooftop solar readiness.



Pollution control equipment, IT & Communication, Plastics & Rubbers, and Electrical & Electronics have been identified as the **least ready sectors** for rooftop solar adoption.

Figure 3 RTS readiness by sector

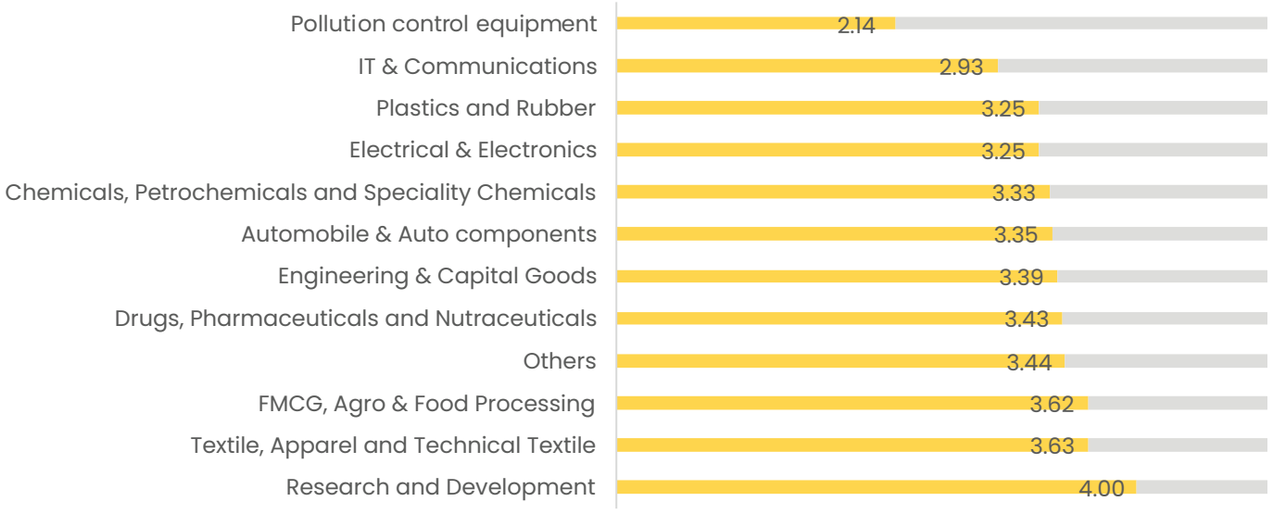


Table 1: RTS readiness by sector and parameter

#	Sector	Energy cost savings	Need for uninterrupted power	ESG strategy	Sufficient space available	Application process	Policy understanding	Access to financing
1	Automobile & Auto components	3.93	4.07	3.86	3.14	2.71	2.71	3.00
2	Chemicals, Petrochemicals & Specialty Chemicals	4.00	3.67	3.67	4.00	2.67	2.33	3.00
3	FMCG, Agro & Food Processing	4.27	4.30	4.33	3.61	2.97	3.21	2.67
4	Others	4.01	4.06	3.97	3.28	3.10	3.07	2.62
5	Textile, Apparel and Technical Textile	4.33	4.33	4.30	3.71	3.13	3.01	2.57
6	Engineering & Capital Goods	4.23	4.05	4.20	3.08	2.63	3.05	2.50
7	Electrical & Electronics	4.50	4.13	4.13	2.88	2.38	2.50	2.25
8	Research and Development	5.00	5.00	5.00	4.00	4.00	3.00	2.00
9	IT & Communications	4.50	4.00	4.00	2.50	1.50	2.00	2.00
10	Pollution control equipment	3.00	2.00	3.00	1.00	2.00	2.00	2.00
11	Plastics and Rubber	4.42	4.17	4.17	2.92	2.67	2.75	1.67
12	Drugs, Pharmaceuticals & Nutraceuticals	5.00	5.00	5.00	4.00	2.00	2.00	1.00

For the following districts, there were five or fewer survey responses, so their results should be interpreted with caution: Karur, Thoothukudi, Erode, Kanyakumari and Ranipet.

District Results

This chapter presents district-wise rooftop solar readiness, showing districts that are well-prepared to seize solar opportunities and districts that may lag due to barriers like limited policy awareness and financing. It should be noted that not all districts were covered in this assessment, and some findings may not fully reflect conditions in every region. The results enable policymakers to focus support and resources on less-prepared districts, facilitating a more balanced and accelerated transition to rooftop solar across Tamil Nadu's MSME community.

Figure 4 Leading and lagging districts



Ariyalur, Karur, Tiruppur, and Kanchipuram have emerged as the **most prepared districts,** demonstrating high rooftop solar readiness.



Coimbatore, Thoothukudi, Madurai and Theni have emerged as the **least prepared districts** in terms of rooftop solar readiness

Figure 5 RTS readiness by district

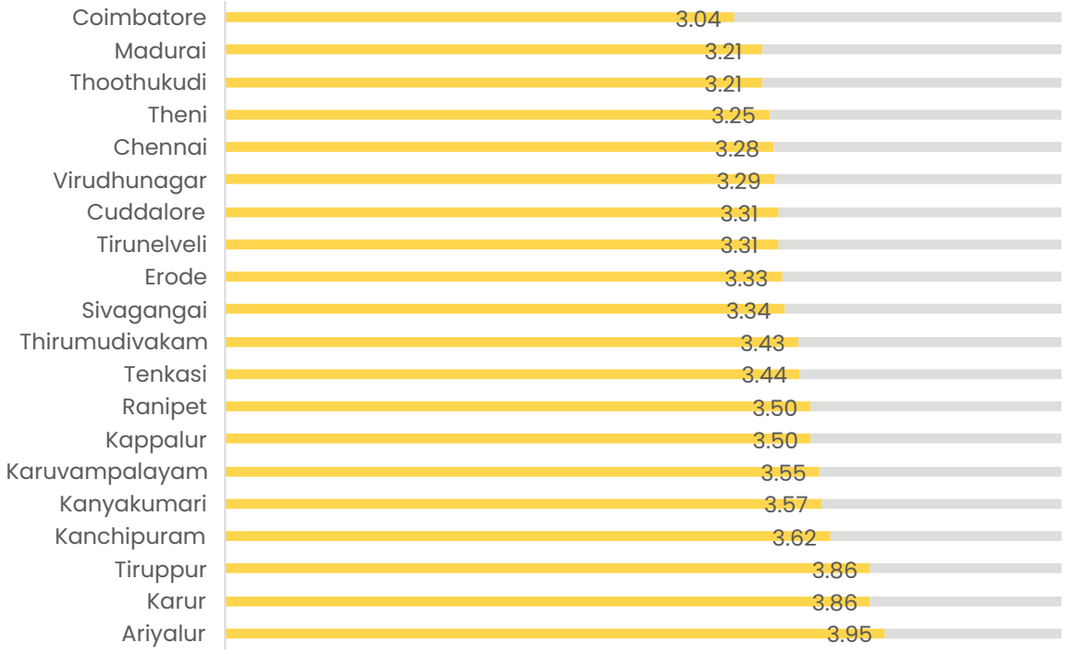


Table 2: RTS readiness by district and parameter

#	District	Energy cost savings	Need for uninter-rupted power	ESG strategy	Sufficient space available	Applica-tion proc-cess	Policy under-standing	Access to financing
1	Karur	3.00	3.00	5.00	3.00	4.00	4.50	4.50
2	Kanyakumari	3.50	3.50	3.25	2.75	4.25	4.25	3.50
3	Ariyalur	4.25	4.17	4.17	3.92	4.00	3.67	3.46
4	Kanchipuram	4.11	3.78	3.67	3.56	3.56	3.22	3.44
5	Tenkasi	3.77	3.85	3.92	3.28	3.31	3.13	2.79
6	Cuddalore	3.54	4.08	3.85	3.08	3.08	2.85	2.69
7	Tiruppur	4.68	4.26	4.61	4.23	3.55	3.10	2.58
8	Karuvampalayam	4.27	4.36	4.17	3.69	2.86	2.97	2.54
9	Thoothukudi	4.00	4.50	3.50	5.00	1.00	2.00	2.50
10	Kappalur	4.41	4.26	4.37	3.43	2.80	2.74	2.50
11	Thirumudivakam	4.17	4.30	4.26	3.17	2.65	2.96	2.48
12	Theni	3.56	3.44	3.44	3.56	3.00	3.33	2.44
13	Sivagangai	4.60	4.50	3.90	2.60	2.70	2.70	2.40
14	Chennai	4.12	4.06	4.12	3.00	2.65	2.71	2.29
15	Ranipet	3.50	4.25	4.00	4.00	3.00	3.50	2.25
16	Virudhunagar	4.44	4.33	4.22	3.11	2.11	2.56	2.22
17	Tirunelveli	3.79	4.21	4.05	2.79	2.84	3.26	2.21
18	Erode	4.67	5.00	5.00	1.67	3.00	2.00	2.00
19	Madurai	4.30	4.07	4.07	2.77	2.50	2.83	1.97
20	Coimbatore	4.29	4.00	3.57	3.00	2.14	2.57	1.71

For the following sectors, there were five or fewer survey responses, so those findings should also be treated cautiously: Pollution Control Equipment; Research and Development; Drugs, Pharmaceuticals and Nutraceuticals; IT and Communications; and Chemicals, Petrochemicals and Speciality Chemicals.

MSMEs Rooftop Solar Demand & Its Investment Opportunities

The total rooftop solar demand among the surveyed 364 MSMEs is estimated at 42MW, representing an investment potential of approximately INR 252 crore. On average, each MSME requires about 127 kW of rooftop solar capacity. In terms of system size, installations ranging from 1 kW to 4,470 kW account for the largest share of demand, with 58% of the identified capacity requirements falling below 25 kW. Power-intensive sectors such as the Automobile & Auto Components, Electrical & Electronics Sector, FMCG, Agro & Food processing and the Textile, Apparel and Technical Textile Sector indicate the highest average rooftop solar capacity needs. The survey shows that 22.71% of MSMEs covered have already installed rooftop solar systems.

This growing demand offers significant opportunities not only for sustainable energy adoption but also for local job creation across installation, manufacturing, and maintenance segments. By encouraging these investments, rooftop solar expansion can accelerate Tamil Nadu's green growth trajectory while playing a pivotal role in advancing the state's ambition to achieve a one-trillion-dollar economy through cleaner, more resilient, and future-ready industries. one-trillion-dollar economy through cleaner, more resilient, and future-ready industries.

Figure 6: Average rooftop solar capacity by industry sector

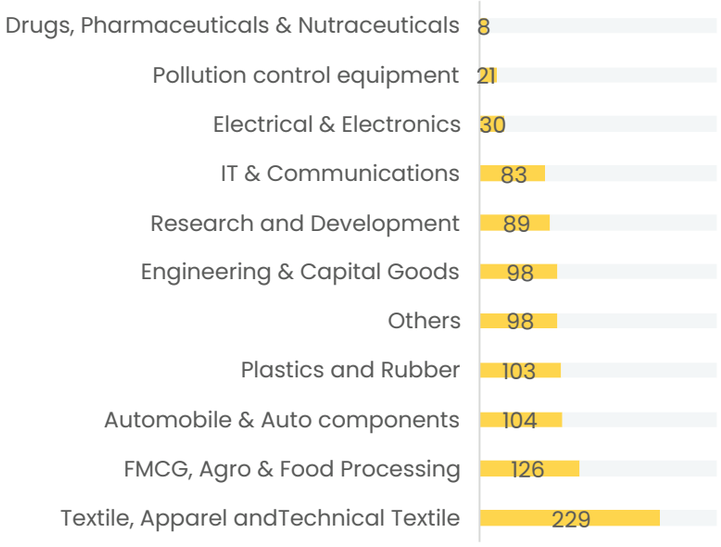
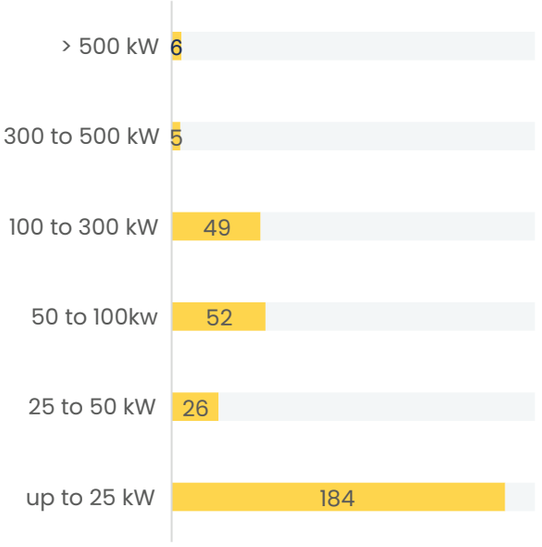


Figure 7: Frequency distribution of rooftop solar system capacities



Tamil Nadu Rooftop Solar Policy Landscape

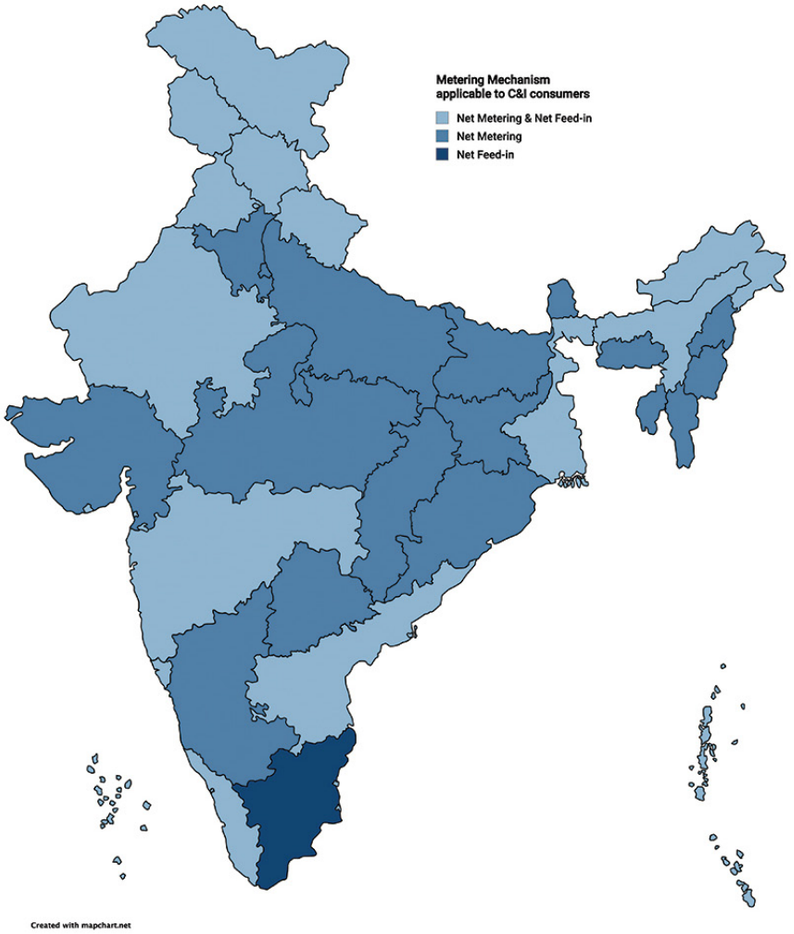
Tamil Nadu's rooftop solar policy landscape presents significant opportunities for MSMEs to reduce electricity costs, secure reliable power, and gain a competitive and green edge. Streamlining of application processes, navigating network charges, and incentives for energy storage could further unlock the rooftop solar sector for MSMES.



Solar metering mechanisms:

Tamil Nadu offers solar net metering, net feed-in and gross metering to its consumers. Solar net metering applies to domestic consumers only. Solar gross metering applies to consumers with a sanctioned load greater than 150 kW. The solar net feed-in mechanism is available to all consumers, including industries.

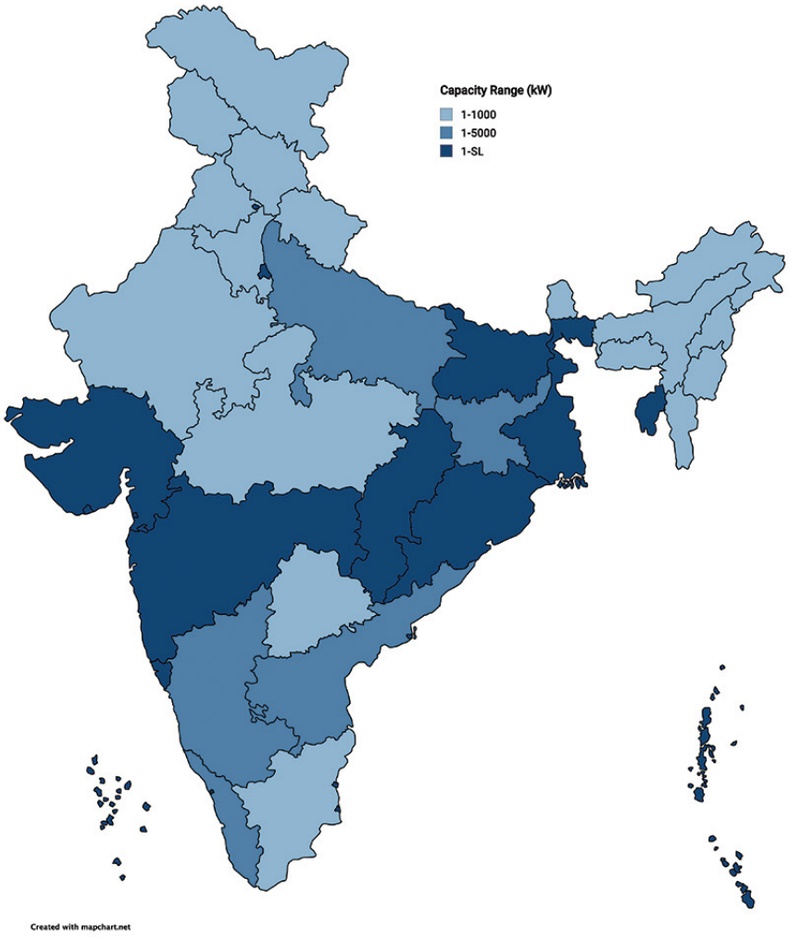
Net Feed-In (Net Billing): Similar to net metering, but with a key difference in compensation. Surplus energy exported to the grid is credited at a predetermined feed-in tariff, usually lower than the retail rate. Consumers pay the standard retail rate for electricity consumed from the grid, and the credits from exported energy reduce their overall bill.



Other states: The majority of states have introduced net metering, net feed-in and gross metering mechanisms for prosumers. A few states have further innovated and introduced group net metering, virtual net metering, community solar and peer-to-peer trading. Delhi, for example, is actively promoting virtual net metering and community solar energy for consumers who have limited roof access at their property.

Permissible capacity

The permissible rooftop solar capacity in Tamil Nadu ranges from 1 kW to 999 kW. However, the allowed rooftop solar installation must not exceed the sanctioned load of the prosumer's service connection. Additionally, the total rooftop solar capacity connected at the distribution transformer (DT) level cannot exceed 80% of the DT's rated capacity

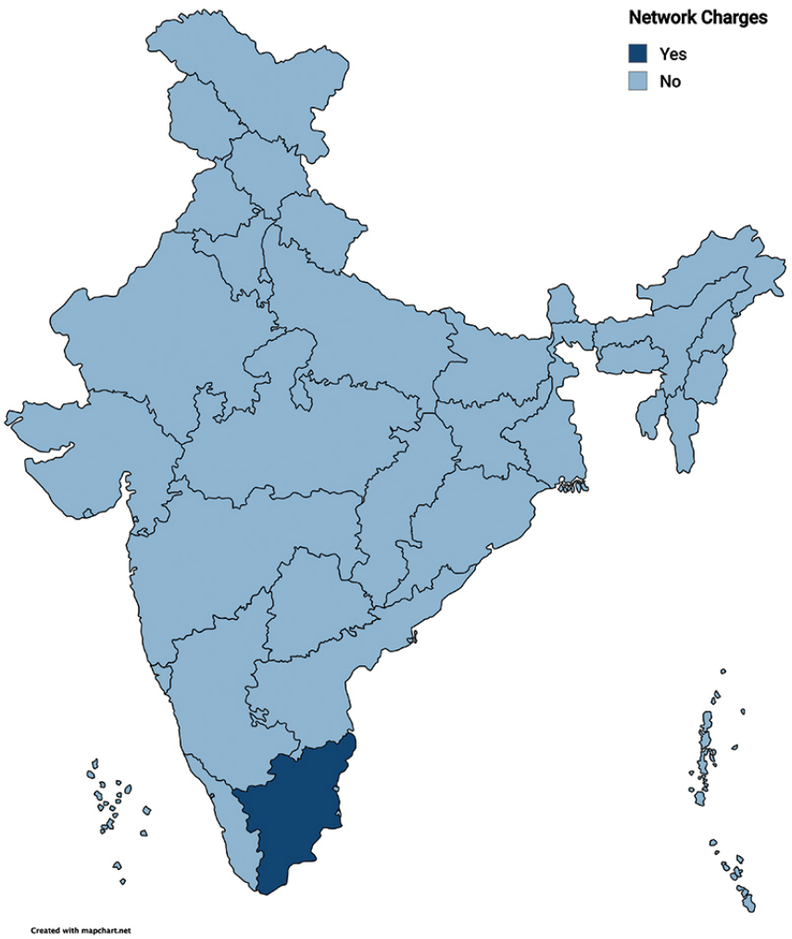


Other states: Some states, such as, have an absolute rooftop solar capacity limit greater than 1 MW. Maharashtra, for example, allows capacities up to 5 MW. The majority of states in India limit the permissible rooftop solar capacity based on the prosumers' sanctioned load. The capacity limits imposed on the aggregate rooftop solar capacity on the DT level vary significantly between states, from 15% to 100%

Solar network charges

Tamil Nadu has introduced set network charges for rooftop solar systems based on consumer category and system capacity. The network charges apply to the gross generation of the rooftop solar system under the net metering and net billing / net feed-in mechanism; this means the charges apply to all solar energy units produced.

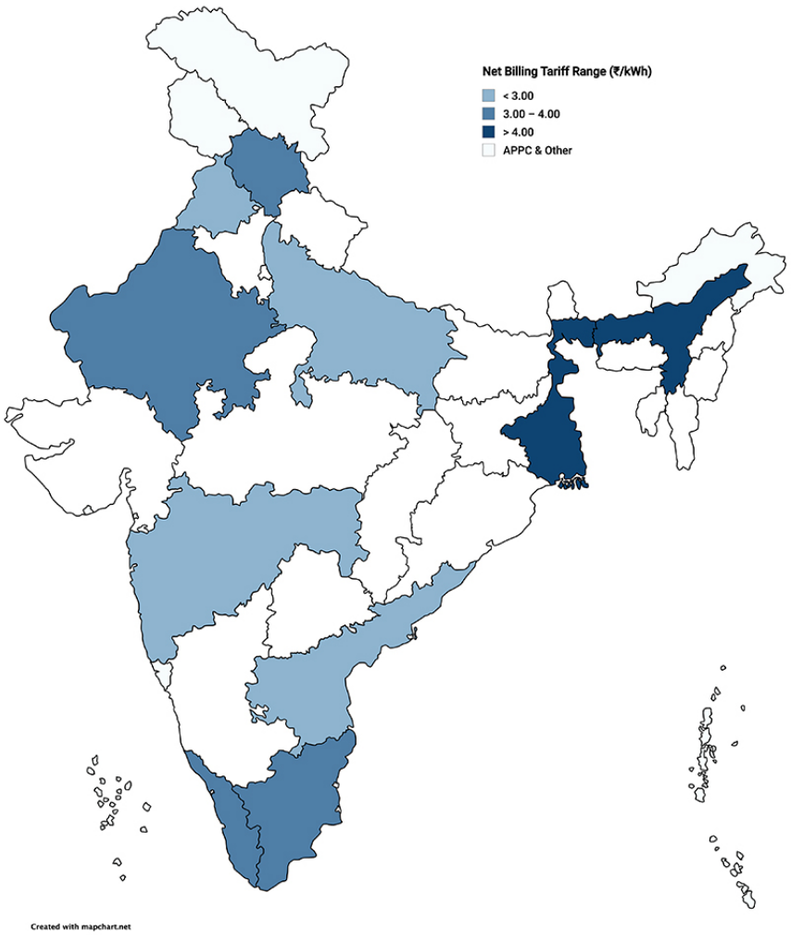
Consumer category	Network charges (INR/kWh)
High Tension (HT) Consumers	1.04
Commercial & Industrial (LT CT)	1.59
Domestic Consumers Up to 10 kW	0.32
Domestic Consumers Above 10 kW	1.19



Other states: As of August 2025, no other state in India has introduced network charges.

Solar feed-in tariffs

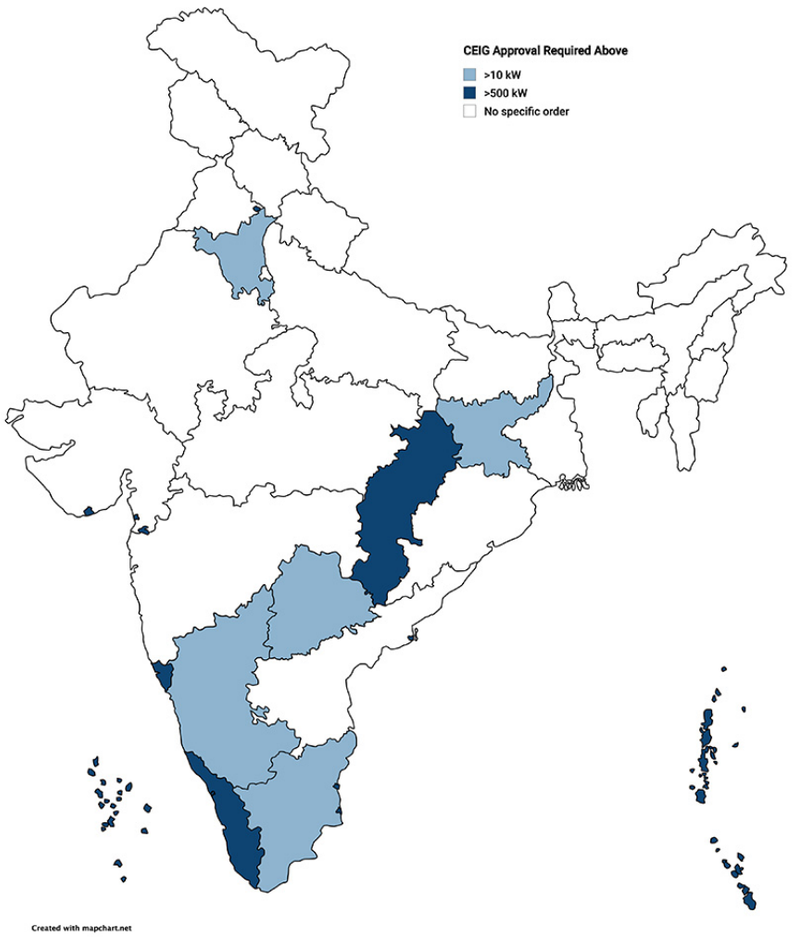
The Tamil Nadu Electricity Regulatory Commission (TNERC), has introduced rooftop solar feed-in tariffs based on system capacity. The feed-in tariffs are 3.61 INR/ kWh for systems up to 10 kW, 3.37 INR/kWh for 11–150 kW, and 3.10 INR/ kWh for 151–999 kW systems. To further incentivise exports during peak demand, TNERC is also considering a 20% premium on Time-of-Use (ToU) tariffs, encouraging solar generation when the grid needs it most.



Other states: 13 states and all 7 UTs have adopted net feed-in / net billing. Across Indian states, notified net feed-in tariffs range widely- in Himachal Pradesh, the tariff for solar projects up to 1 MW is fixed at ₹ 3.50 /kWh for installations located in industrial and urban areas, and ₹ 3.45 /kWh for those situated elsewhere. West Bengal follows a voltage-based structure, with tariffs of ₹ 4.37 /kWh for low- and medium-voltage, ₹ 3.89 /kWh for high-voltage, and ₹ 3.73 /kWh for extra-high-voltage consumers. In other states, tariffs are set at ₹ 2.09 /kWh in Andhra Pradesh, ₹ 2.82 /kWh in Maharashtra, ₹ 2.97 /kWh in Punjab, ₹ 2.98 /kWh in Uttar Pradesh, ₹ 3.07 /kWh in Kerala, and ₹ 3.65 /kWh in Rajasthan.

Application and permitting process

Rooftop solar applications in Tamil Nadu are managed through the Tamil Nadu Power Distribution Corporation Ltd (TNPDCL) and the Tamil Nadu Electrical Inspectorate (TNEI). Applicants register on the Unified Solar Rooftop Portal (USRP) for both subsidised and non-subsidised systems. For systems up to 10 kW, the Tamil Nadu Green Energy Corporation has waived the technical feasibility requirement, streamlining approvals.After installation, TNPDCL conducts a safety inspection followed by the installation of a bi-directional net meter. For systems above 10 kW, a safety certificate from the Chief Electrical Inspectorate (CEI) is mandatory.



Other states: Rooftop solar systems up to 10 kW do not require a technical-feasibility report. The 2019 MNRE Phase-II RTS Guidelines recommended that no CEI inspection be required for systems up to 500 kVA to shorten commissioning timelines. Chhattisgarh requires CEI inspection only above 500 kW; Jharkhand above 100 kW ; Haryana above 20 kW, with self-inspection permitted below these limits. Telangana allows self-certification up to 75 kW, with a CEIG-required system more than 75 kW. In Kerala, CEIG approval is required for systems above 500 kW. While Karnataka applies a tiered system- AEE approval up to 10 kW, additional Chief Electrical Inspector for 10–100 kW, and CEIG above 100 kW.

Facilitating Rooftop Solar – Global Good Practices Examples

Countries around the world are accelerating rooftop solar adoption by pairing innovative finance, streamlined permitting, and community-driven models, demonstrating how MSMEs can benefit from affordable, reliable, clean energy and strong policy support. These global good practices highlight replicable strategies that make solar accessible, scalable, and transformative for businesses of all sizes.



Access to finance I Green Technology Financing Scheme I Malaysia

Malaysia's Green Technology Financing Scheme (GTFS) is a strong example of how government-backed low-interest loans can scale rooftop solar adoption among MSMEs. Launched in 2010, GTFS supports green technology investments by offering a 60% government loan guarantee and a 2% interest rebate through participating financial institutions. This structure reduces risk for lenders while making rooftop solar more accessible and affordable for small businesses. For MSMEs, especially in energy-intensive sectors like manufacturing, rooftop solar offers immediate cost savings and improved energy reliability. The modular nature of solar systems makes them easy to scale based on a business's energy needs and roof space. The GTFS model has proven effective in accelerating adoption across Malaysia by aligning public incentives with private capital and simplifying access to clean energy financing. The success of GTFS lies in its replicability—integrating national policy with localised banking support, and making decentralised energy solutions like rooftop solar financially viable for MSMEs.



Access to finance I Distributed Solar Energy Program I Mexico

Mexico's Federal Electricity Commission (CFE) has implemented a distributed solar energy program aimed at supporting small and medium-sized enterprises (SMEs) in adopting rooftop solar solutions. The program offers zero-interest financing and guaranteed return mechanisms, with the government-backed CFE working alongside banks and private investors to provide credit enhancement and payment guarantees. This reduces the financial risks typically associated with rooftop solar investments. The program has had a significant impact on solar adoption among SMEs in Mexico, particularly in the industrial sector, by making solar energy more accessible and financially viable. SMEs, which previously struggled with the high costs of grid electricity, can now transition to more sustainable and cost-effective energy sources. By de-risking investments and offering tailored financing solutions, the CFE has helped reduce energy costs for small businesses while supporting Mexico's broader renewable energy goals.

The initiative has proven effective in boosting renewable energy uptake, contributing to a reduction in Mexico's dependence on high-cost fossil fuels and aligning with national sustainability objectives. Through government-backed risk mitigation measures, the program is helping to drive solar adoption at the SME level, facilitating the transition to clean, affordable energy. This model highlights how innovative financing and risk-sharing mechanisms can make solar solutions financially accessible to businesses, driving both economic and environmental benefits.



Technical knowledge I Advancing Small Business Solar Equity (ASBSE) Project I USA

The Advancing Small Business Solar Equity (ASBSE) project, led by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL), aims to increase solar adoption among small businesses by addressing common barriers such as high upfront costs and a lack of technical knowledge. The initiative introduced the Solar Hub Network model, which provides solar technical assistance and resources directly to small businesses through trusted community-based organizations (CBOs). These organizations serve as intermediaries to deliver tailored support, making solar more accessible for small enterprises. The ASBSE project offers a comprehensive suite of services to SMEs, including energy audits, financial modelling, and expert guidance on system design and installation. The program also helps small businesses navigate the complexities of solar incentives and financing options, ensuring they are well-equipped to make informed decisions about adopting solar energy. By lowering the barriers to entry, the ASBSE project empowers small businesses to reduce their energy costs, lower their carbon footprint, and contribute to the broader clean energy transition. costs, lower their carbon footprint, and contribute to the broader clean energy transition.



Sufficient space I Virtual Net Metering I New York, USA

New York's Virtual Net Metering (VNM) framework is a key policy that expands access to solar energy for customers who cannot install systems on-site. It allows multiple electricity consumers, including small businesses, to share the benefits of a single solar installation through community solar programs. This enables participants to subscribe to a portion of an off-site solar project and receive energy credits on their utility bills based on their share of the electricity generated. For small businesses, especially those operating in rented spaces or buildings without adequate rooftop space, this model offers a practical way to reduce electricity costs and participate in clean energy without investing in their own systems. The solar energy generated is fed into the grid, and the utility allocates credits proportionally to each subscriber, lowering their monthly bills as if the panels were installed on their own premises. Overall, New York's VNM policy supports both small businesses and residential consumers in accessing solar energy, contributing to the state's clean energy goals while promoting greater equity and participation in the renewable energy economy.



Sufficient space I Community Solar I France

In 2023, France enacted a national policy requiring large parking lots to be covered with solar panels, transforming these underutilised spaces into energy-generating assets. The regulation targets parking areas over 1,500 square meters and mandates that at least half of their surface area be equipped with photovoltaic panels. This initiative is part of France's efforts to accelerate renewable energy adoption and meet climate goals. A regional supermarket chain in southern France implemented this policy by installing solar canopies over its large parking lots. The canopies generate electricity while providing shade for customers' vehicles, reducing heat buildup. The electricity is fed into the grid, with a portion allocated to nearby businesses and residents through a community solar model. Local cafes and small offices subscribed to the energy credits, lowering their electricity bills without needing to install their own solar systems. This policy not only boosts solar capacity but also allows local businesses and residents to benefit from clean, affordable energy. By utilizing underused parking spaces, the policy provides a practical solution to expand renewable energy access. France's approach is already inspiring other European countries to explore similar strategies to increase solar capacity while supporting local economies and communities.



Application and Permitting process I SolarAPP+ I Unites States of America

SolarAPP+ (Solar Automated Permit Processing Plus) is an innovative online platform developed by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) to streamline and automate the permitting process for residential rooftop solar installations. The platform performs instant compliance checks against national building, electrical, and fire codes, allowing eligible solar projects to receive immediate permit approval. This significantly reduces installation timelines, lowers administrative burdens, and cuts permitting costs, which can otherwise add thousands of dollars to the price of a residential solar system. By simplifying and standardizing permitting procedures, SolarAPP+ supports faster and more consistent rooftop solar adoption across local jurisdictions. Importantly, the platform is offered at no cost to local governments, promoting widespread use and contributing to the broader growth of the solar energy sector.



Application and Permitting Process I Safety Certification I Germany

Germany has undertaken a series of regulatory reforms to accelerate the adoption of rooftop solar, particularly benefiting residential users and small businesses. The German government introduced further simplifications through the “Solar Package 1.” Under this reform, the threshold for simplified grid connection procedures was increased from 10.8 kW to 30 kW. If a grid operator does not respond to a connection request within one month, the system can proceed to connect without further delay. This change is designed to expedite the integration of rooftop solar into the electricity grid and reduce project timelines. Together, these regulatory adjustments have significantly improved the feasibility and attractiveness of rooftop solar for small businesses and households. By streamlining safety and grid connection procedures, Germany has created a more supportive environment for distributed solar energy, aligning with its broader clean energy transition goals and encouraging scalable adoption across sectors.



Policy understanding I Renewable Energy Market Transformation I South Africa

TThe Renewable Energy Market Transformation (REMT) project in South Africa, supported by the World Bank and the Global Environment Facility, aimed to accelerate the adoption of renewable energy technologies, including rooftop solar, with a strong emphasis on building awareness around policy and regulatory frameworks. One of the key components of the project was to bridge the gap between policy intent and implementation by making regulatory processes more accessible and understandable, particularly for small and medium-sized enterprises (SMEs). The initiative provided targeted training and technical assistance to help SMEs navigate complex policy landscapes and make informed decisions about investing in rooftop solar. Through workshops, stakeholder consultations, and the dissemination of simplified policy information, the REMT helped demystify existing regulations, clarify eligibility criteria for incentives, and improve engagement between enterprises and energy authorities. This focus on regulatory literacy empowered MSMEs to better leverage national solar programs and contributed to increased uptake of rooftop solar solutions across the sector.



Uninterrupted Power Supply I Solar-Plus-Storage Incentive Program for Small Enterprises I California, USA

California's shift toward integrating solar and battery storage systems for small businesses has gained momentum following changes to the state's energy policies in 2023. These changes, particularly the reduction in compensation for surplus solar energy fed back into the grid under the Net Energy Metering (NEM) 3.0 policy, have encouraged businesses to adopt solar-plus-storage solutions. The state's Self-Generation Incentive Program (SGIP) plays a crucial role by offering rebates for the installation of battery storage systems, making this option financially viable for small enterprises.

With the SGIP, small businesses can store excess solar energy generated during the day and use it during peak demand periods, typically in the evening when electricity prices are higher. This approach helps businesses lower their energy costs and enhance energy reliability, as it reduces their reliance on grid power during expensive time-of-use (TOU) periods. The Time-of-Use (TOU) pricing structure further incentivizes businesses to adopt storage systems. With TOU rates, electricity prices vary based on the time of day, making solar-plus-storage even more beneficial for businesses that want to maximize energy savings by consuming stored energy during peak times. This policy shift reflects California's broader clean energy goals and recognizes the value of solar-plus-storage in enhancing energy resilience and reducing costs for small businesses.



Recommendations

1. Simplify and Streamline Application Processes
2. Enhance Technical Knowledge and Support
3. Improve Policy Awareness and Understanding
4. Address Rooftop Space Constraints
5. Expand Access to Finance
6. Ensure Reliable and Cost-Effective Power Supply





Simplify and Streamline Application Processes

To accelerate rooftop solar adoption among MSMEs in Tamil Nadu, the threshold for mandatory safety certification by the Chief Electrical Inspector (CEI) may be revised upward. Inspection and approval by the local DISCOM could be deemed sufficient for rooftop solar systems up to 500 kW capacity, while only installations above this threshold would require certification from the Chief Electrical Inspectorate. Streamlining these procedures would reduce potential delays in the permitting process and make it easier for micro, small, and medium enterprises to adopt solar power and contribute to Tamil Nadu's clean energy and industrial growth goals.



Enhance Technical Knowledge and Support

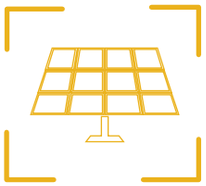
Many MSMEs lack the technical expertise required to make informed decisions on solar energy adoption. Providing structured support, including technical assistance and capacity building, will bridge this gap. Tamil Nadu can leverage existing programs such as the Promotion of Energy Audit and Conservation of Energy (PEACE) scheme offered by FaMeTN to include solar energy assessments and guidance. The MSME Department can also play a pivotal role by offering rooftop solar energy demand aggregation services, enabling collective procurement and better bargaining power for small enterprises. These measures will ensure that MSMEs can access reliable information and support, facilitating smarter and more confident investment in rooftop solar.



Improve Policy Awareness and Understanding

Awareness about rooftop solar policies, incentives, and regulatory provisions is often low among MSMEs. To address this, dedicated regional workshops and information campaigns tailored to industrial clusters can be implemented on a regular and recurring basis. These initiatives will demystify complex regulatory language, increase participation, and encourage MSMEs to take advantage of available clean energy opportunities..

Address Rooftop Space Constraints



Many MSMEs, particularly those in congested industrial zones, lack adequate rooftop space remains a significant barrier to solar adoption. To overcome this, Tamil Nadu should update its renewable energy policy to support virtual net metering and community solar systems. These approaches allow multiple MSMEs to share a single solar installation located off-site, while still benefiting from credits on their electricity bills. This would make solar accessible even to businesses operating in space-constrained facilities.. In 2020, the Electricity (Rights of Consumers) Rules, introduced by the Ministry of Power, included provisions for virtual net metering; however, as of date, virtual net metering has not been adopted in Tamil Nadu.

Expand Access to Finance



Financing remains a critical challenge for rooftop solar adoption. MSMEs often face difficulties in accessing affordable loans or navigating complex financing options. Tamil Nadu can address this by working with financial institutions to introduce blended finance models, offering interest-free loans, and providing state-backed loan guarantees. Additionally, the Tamil Nadu Green Climate Fund can be repurposed or expanded to specifically support solar projects for MSMEs, thereby lowering the upfront cost barrier and improving financial viability.

Ensure Reliable and Cost-Effective Power Supply



To further incentivise rooftop solar adoption and ensure consistent power availability, Tamil Nadu may promote battery energy storage systems (BESS) for MSMEs. Storage solutions would allow businesses to manage intermittent solar generation and reduce reliance on the grid during peak hours or outages. In parallel, the introduction of time-of-use (ToU) feed-in tariffs would reward enterprises for exporting power during high-demand periods, improving the financial returns of solar investments and supporting broader grid stability.

References

AFFIN. 2024. Green Tech Financing Scheme 4.0. Available at: https://www.affinalways.com/en/greentech-financing (accessed on 22nd April 2025)

California Public Utility Commission.2024 Self Generation Incentive Program. Available t: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/self-generation-incentive-program (accessed on 22nd April 2025)

Energy Sage. 2022. Virtual net metering: What is it? How does it work? Available at https://www.energysage.com/community-solar/virtual-net-metering-what-is-it-how-does-it-work/?utm_source=chatgpt.com (accessed on 20th April 2025)

Energy Department of Tamil Nadu (2023). Demand No.14, Policy Note 2022-23. Available at: http://cms.tn.gov. in/sites/default/files/documents/energy_e_pn_2022_23_0.pdf (accessed on 22nd April 2025)

MNRE. 2019. Case Study on Virtual Net Metering. Available at: https://solarrooftop.pmsuryaghar.gov.in/knowledge/file-14.pdf?utm_source=chatgpt.com (accessed on 20th April 2025).

MGTC. 2023. Budget 2023: More funds, incentives for green tech to meet net zero target and sustainability agenda. Available at: https://www.mgtc.gov.my/2023/02/budget-2023-more-funds-incentives-for-green-tech-to-meet-net-zero-target-and-sustainability-agenda/?utm_source=chatgpt.com (accessed on 22nd April 2004)

NREL. 2023a. SolarAPP+ Performance Review. Available at: https://www.nrel.gov/docs/fy24osti/89618.pdf (accessed on 18th April 2025)

NREL. 2024. Advancing Small Business Solar Equity (ASBSE) Project. Available at: https://www.nrel.gov/docs/fy24osti/89510.pdf?utm_source=chatgpt.com (accessed on 22nd April 2025)

PV-Magazine. 2024. France publishes new provisions making solar mandatory on parking areas. Avaialble at: https://www.pv-magazine.com/2024/11/18/france-publishes-new-provisions-making-solar-mandatory-on-parking-areas/?utm_source=chatgpt.com (accessed on 20th April 2025)

PV-Magazine. 2025. Mexico deploys 1 GW of distributed solar in 2024. Available at: https://www.pv-magazine.com/2025/02/04/mexico-deploys-1-gw-of-distributed-solar-in-2024/?utm_source=chatgpt.com (accessed on 22nd April 2025)

TNGCC. 2024. Tamil Nadu's Greenhouse Gas Inventory and Pathways for Net-Zero Transition. Available at: https://www.ceew.in/sites/default/files/tamil-nadu-greenhouse-gas-inventory-report-net-zero-transition-and-climate-change-report.pdf (accessed on 22nd April 2025)

World Bank. 2014. South Africa - Renewable Energy Market Transformation Project (English). Available at: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/940861468305679775 (Accessed on 18th April 2025)

World Bank. 2024. Rooftop Solar Guarantee Facility for MSMEs. Available at: https://projects.worldbank.org/en/projects-operations/project-detail/P172261?utm_source=chatgpt.com (accessed on 22nd April 2025)

