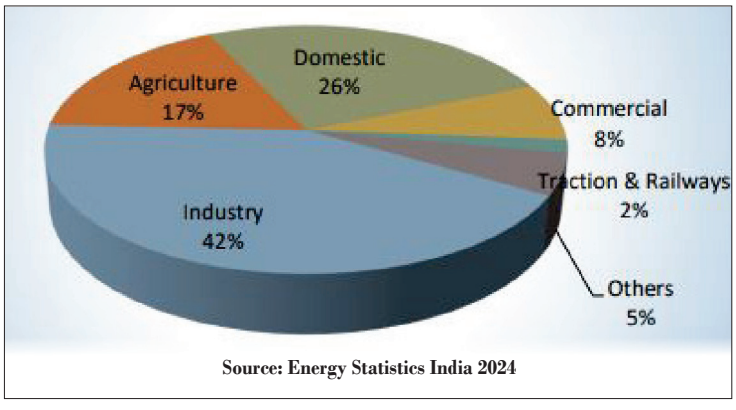
Solarising the C&I Sector:

A Catalyst to India's Green Energy Transition

The Commercial and Industrial (C&I) sector can play a pivotal role in India's transition to renewable energy. While the sector is counted as an energy guzzler with about 50 percent share in all India's energy consumption, the RE penetration is low at 6-8 percent. Energetica India talks to various stakeholders – C&I customers, NBFCs and developers, to chart a roadmap.

The Indian Commercial and Industrial (C&I) sector is not only crucial to the nation's economic growth but also to its overall energy transition. As per India Energy Statistics 2024, the C&I sector accounts for roughly about 50 percent of India's total energy consumption. The sector's energy demand is growing at a CAGR of about 10 percent.



Source: Energy Statistics India 2024

Sector-wise Electricity Consumption 2022-23

Between FY2022 and FY2024, the C&I open access market grew at a CAGR of 46 percent, with cumulative capacity reaching 18.7 GW by FY2024. Gujarat and Rajasthan have led this expansion, contributing over 70 percent of recent installations, states a report by Institute of Energy Economics and Financial Analysis (IEEFA). The cumulative installed solar open access capacity in the C&I sector stood at about 17.8 GW. As per Ministry of New and Renewable Energy (MNRE) data, as of December 31, 2024, the total installed rooftop solar capacity in India stands at about 15.76 GW. The share of the C&I sector is estimated at about 70-80 percent.

However, the share of RE in the C&I sector's total energy consumption remains significantly low at around 6-8 percent, indicating huge potential. According to ICRA Research, even assuming 20 percent of C&I sector demand is met through RE by 2030, the RE capacity requirement is estimated at 80 GW. Moreover, as India strives to become the global manufacturing hub with its 'Make in India' policy, the actual figure can go well beyond this projection.

The Economics Behind Solar Adoption

From a financial perspective, solar energy is an extremely cost-effective alternative to traditional grid power.

Shashank Sharma, Founder, Chairman, and CEO of Sunsure Energy states, "In many cases, businesses can achieve savings of up to 40 percent compared to conventional electricity costs. This significant reduction in energy expenditure is a powerful incentive for companies, particularly in industries where power has a high share in the overall operational cost."

With the captive open access model, companies can now expect to receive power within 6-8 months of signing Power Purchase Agreements (PPAs). "This quick setup and minimal upfront capital investment—where only about 26 percent of equity is needed, with no additional surcharge or cross-subsidy—have made the decision-making process for adopting solar energy far more efficient and lucrative for businesses," adds Sharma.

Combining solar plants with battery energy storage systems (BESS) can help C&I sector customers mitigate

higher peak-hour charges up to 1.2 times under the Time-of-Day tariffs starting April 2024. And, with declining solar energy and BESS costs, it makes a compelling business sense.

The C&I Sector's Shift to Solar Energy

In terms of industry adoption, we are seeing widespread participation across various sectors. "Leading the charge are industries such as Cement, Pharmaceuticals, Metals and Mining, and Data Centres. These sectors have been particularly proactive in integrating solar power into their operations due to the high energy demands and potential cost savings," shares Sharma.

Sunsure Energy installed a 17.5 MW ground-mounted captive solar project within the Kapilas Cement factory of Dalmia Cement (Bharat) premises in Odisha. Dalmia Cement also initiated a 128 MW solar procurement arrangement through open access in Tamil Nadu. Another cement company, Ambuja Cement has commissioned its 200 MW solar power project in Khavada, Gujarat. UltraTech Cement will procure 55 MW hybrid power in Karnataka. A report by ICRA Ratings estimated the green power to account for 40-42 percent of the total power mix by March 2025, compared to around 35 percent as of March 2023.

In the pharma sector, Lupin has signed a PPA with Sunsure Energy for 21 MW of solar power through open access. JB Pharma said it sourced 12.1 percent of its energy needs from renewable sources in 2023-24. Concord Biotech and Strides Pharma have also increased RE intake.

Automobile manufacturer Skoda Auto Volkswagen India has installed an 18.5 MWp rooftop solar plant in its manufacturing facility in Chakan, Pune. **Piyush Arora, MD and CEO, Skoda Auto Volkswagen India** said, "We have made solar energy a cornerstone of our sustainability strategy, with our Chhatrapati Sambhajinagar facility operating on 100 percent green energy. Our Chakan (Pune) facility houses one of the largest rooftop solar plants which is a testament to our commitment to decarbonisation. The 18.5 MWp rooftop solar installations at the Chakan facility have contributed to 30 percent of total energy needs, significantly reducing our overall dependence on fossil fuel-driven energy. We offset almost 28 percent of CO2 emissions from our production taking us closer to our 'Go to Zero' goal in line with our Group's global target."

From the laminates manufacturing industry, Greenlam Industries installed a 900 kW rooftop solar plant in its facility in Behror, Rajasthan. **Saurabh Mittal, MD and CEO, Greenlam Industries** states, "The solar installation has significantly reduced Greenlam's dependence on grid electricity, leading to lower carbon emissions. In the fiscal year 2023-24, the plant generated approximately 790,519 kWh of solar power. If this electricity had been sourced from the grid, it would have resulted in around 1,281 metric tons of CO_2 emissions. This represents a substantial reduction in Scope 2 emissions, advancing Greenlam's commitment to sustainability."

Gujarat-based BigBloc Construction installed a 450 kW rooftop solar plant at the Umbergaon facility. It has added an 800 kW solar project at its subsidiary Starbigbloc Building Material and plans a 1,350 kW installation at its joint venture, Siam Cement Bigbloc. **Mohit Narayan Saboo, Director and CFO, BigBloc Construction** shares, "BigBloc Constructions generates carbon credits by using flyash in AAC Blocks and walls and furthers sustainability by installing rooftop solar panels, reducing CO2 emissions, costs, and reliance on fossil fuels while fostering a greener ecosystem."

Operational Challenges

However, widespread adoption faces multi-faceted challenges. In the Capex model, the C&I customer faces the challenge of maintaining solar plants. "High dust levels in the area present an ongoing challenge for maintaining optimal solar panel performance. To address this, Greenlam has secured an Annual Maintenance Contract (AMC) to ensure regular cleaning and maintenance," shares Mittal.

Sharma agrees, "Earlier, in self-owned Capex models, customers had the burden of not just the huge upfront capital expenditure, but also the maintenance and management of the

project. Now, with the open access models, they are relieved of the upfront investment and can focus on their core business functionalities, leaving maintenance to the experts."

Overcoming the Capex Challenge

The need for more creditworthiness, limited financing options, substantial initial capital requirements, and collateral requirements pose a challenge for solar adoption.

Amar Rajpurohit, Chief Business Officer (MSME Loans) at Capri Loans remarks, "Businesses can typically recover the upfront cost of purchasing solar equipment within 3-4 years. MSMEs can enjoy uninterrupted power during peak seasons, supported by inverters that ensure consistent energy back-up. By reducing dependency on costly diesel generators and avoiding increasing per-unit electricity charges, businesses can achieve higher production efficiency."

Capri Loans offer loans where the solar panels themselves serve as collateral, eliminating the need for additional security. Further, these loans can be classified as secured term loans on the MSME's balance sheet. "Our repayment structure is aligned with standard term loans, making it easier for businesses to manage cash flows while also availing tax benefits on interest payments. Customers can claim up to 40 percent depreciation in the first year and additional benefits in subsequent years, significantly improving the return on investment," divulges Rajpurohit.

Pratik Mandvia, Solar Business Head for Mufin Green remarks, "We offer the solar asset under a PPA model, or a pay-as-you-use model. This eliminates the need for upfront capital investment. Instead, they pay for the power generated by the solar units over a 5-10-year period. After this time, the asset is transferred to them at a nominal cost, making it an affordable and sustainable option for businesses looking to reduce their energy costs. Additionally, the company also offers collateral-free loans to make it easier for MSMEs to access financing without the need for significant upfront security."

Kailash Rathi, Head of Partnerships and Co-Lending, Ecofy states, "For our top-tier customers, we offer a 100 percent Loan-to-Value (LTV) on the product, which allows customers to install solar systems without any initial cash outflow. This model is designed to make the transition to clean energy as seamless as possible, eliminating the financial barrier that often prevents SMEs from making this crucial shift. In addition to this, we also offer flexible leasing solutions that enable customers to adopt solar technology without any upfront capital investment."

Overcoming the Regulatory Bottlenecks

The adoption of open access solar power is dependent on the open access regulations in the state, and several times there have been instances of flip-flops in the past. The cases of Haryana and Andhra Pradesh are particularly well-known.

"The commercial viability of an open access project, including commercial factors like tariffs and internal rates of return (IRRs), is heavily dependent on state-specific regulations," asserts Sharma.

Although the implementation of Green Energy Open Access (GEOA) Rules 2022 has streamlined a lot of these processes, electricity being a state subject, there are still deviations.

Variation in Green Energy Open Access Rules Across States

Category	Central Guidelines	State Variations
Eligibility Criteria	Minimum contracted demand of 100 kW (single or aggregated)	**Tamil Nadu:** 63 kVA (specific consumer categories) **Uttar Pradesh:** 150 kW in case of multiple connections
Approval Window	15 days	**Maharashtra:** 30 days **Gujarat:** 8 days
Banking Rules	**Banking charges:** 8% **Period:** at least monthly **Quantum:** 30%	**Rajasthan:** Yearly **Gujarat:** Daily, charge: INR 1.5/kWh
Standby Charges	25% of energy charges	**Gujarat:** 10% of energy charges
Additional Charges	Allows a sixth 'other charges' in addition to the 5 core charges	**Karnataka:** Facilitation Fee (INR 25,000/MW) for captive/group captive; **Madhya Pradesh:** Harit Urja Vikas Fee (INR 0.1/unit) **Rajasthan:** REDFC of INR 50,000/Hectare/Year or 7% of power generated

While deviation per se is not a bad thing! Many states have also gone beyond the central diktat to promote RE adoption. For example, Rajasthan's yearly banking is a favourable step. While Gujarat follows a daily banking policy, but offers faster approvals and lower standby charges. However, additional charges and a lower banking period can be a dampener.

Moreover, even after the GEOA rules, there are stand-offs among RE developers, DISCOMs and regulatory bodies requiring court intervention. Recently, the Karnataka High Court struck down Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022, and related KERC regulations, stating the Union government exceeded its authority under the Electricity Act. Following this, KERC has come up with a new draft for the open access regulation. A month before, the Madras High Court quashed the imposition of INR 50 lakh/MW 'Resource Charges' by the Tamil Nadu Green Energy Corporation Ltd.

There clearly is a need for better alignment among central and state-level policies. Developers suggest simplifying approvals, adopting a cluster-based metering approach, and providing consistent banking facilities to streamline processes and reduce costs.

Rooftop Solar vs Open Access

While an IEEFA report pegs the market potential of 15 GW for rooftop solar in MSMEs, it remains largely untapped. However, some state governments have come forward to actively support solar adoption. For example, Tamil Nadu offers a 50 percent waiver on networking charges for MSMEs installing solar rooftops.

Uttarakhand's solar policy includes an interest subsidy of up to 10 percent (capped at INR 8 lakh) and a capital subsidy of up to 40 percent (capped at INR 40 lakh) for MSMEs adopting solar rooftops. Similarly, Gujarat provides energy charge waivers, incentives, and interest subsidies to promote solar investments.

Further, regulators are exploring innovative models like virtual net metering and peer-to-peer trading to further give fillips to the rooftop solar segment.

However, in some states, the implementation of GEOA Rules 2022 shifted the market attention for solar development from rooftop solar to open access (OA), leading to state regulators prioritising OA approvals over rooftop solar.

Sharma asserts that when comparing rooftop solar to the open access model, it totally depends on the size of the units. C&I customers with large-scale operations have huge power demands, and the rooftop solar model has its scale limitations.

"The preference for open access is largely due to its lower capital requirements, higher offset, significantly larger savings, and reduced risk exposure for clients. It also guards the customers against various project risks, such as changes in law or policy, making it a worthwhile-looking option for many. The adoption of Green Open Access Rules (GOAR) across India has further opened new avenues for customers with a contract demand exceeding 100 kW," reasons Sharma.

While the popularity of the rooftop vs open access model can vary by industry and the size of the unit, open access generally offers greater flexibility and scalability. "For example, electricity guzzlers like data centres prefer open access due to their substantial energy needs, limited rooftop space, and the desire for cost-effective solutions. However, smaller businesses might still find rooftop solar suitable if they have limited space and lower energy demands," remarks Sharma.

The Way Ahead

The C&I sector's move towards solar and other renewable energy will be crucial for India's overall energy transition and a step towards achieving net zero. To further bolster the RE integration in the C&I sector and counter the intermittent nature of solar energy, it can be combined with wind energy and BESS or pumped hydro storage to make round-the-clock energy available. This will further enhance the reliability of RE power which is crucial for the C&I segment.

Overall, as India progresses toward sustainable development, the synergy between the C&I sector and RE sector stakeholders will be crucial in building a resilient, competitive, and green economy. While the path is complex and filled with challenges, the prospects are significant.