JMK Research & Analytics

FINANCING TRENDS

IN THE C&I RE MARKET IN INDIA

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JMK Research & Analytics is a specialist consultancy firm that provides research and advisory services to Indian and International clients in Renewables, Electric mobility, and the Battery storage markets.

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SED Fund is a philanthropic initiative to support the Sustainable Development Goals (SDGs) of clean air, access to energy, clean water, climate action and equity, by backing efforts of governments and civil society on clean energy transition, according to principles of sustainability, diversity and equity. We amplify impact by consolidating philanthropic resources, strengthening country level institutions and civil society groups and supporting initiatives that will have the most impact in support of these goals.

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Executive Summary

Corporations worldwide are on a solid path towards decarbonization. Replacing their conventional energy usage with renewables is a crucial pillar to achieving this goal. As renewable energy (RE) is a relatively newer technology, securing adequate financing to install RE capacities is vital and a significant challenge for commercial and industrial (C&I) entities. RE solutions can either be self-deployed by C&I consumers (known as the capital expenditure (CAPEX) model) or by a developer (known as the operational expenditure (OPEX) model).

C&I financing in India can be understood in detail through the two sectoral prisms of rooftop and open access. Rooftop or on-site projects are set up within the C&I consumer premises. On the other hand, open access or off-site projects can be set up anywhere, with their power output wheeled to C&I consumers through the state grid infrastructure.

Open access, in comparison to rooftop, have considerably matured. The potential to establish larger project sizes for C&I consumers at almost a similar effort to set up on-site rooftop has made the open-access business model appealing to investors, developers, and consumers. This has led to major market players easily securing financing for open-access projects, instilling confidence in the sector. At the same time, open access developers are able to tap into newer avenues such as green bonds market to raise capital.

The situation is more precarious for rooftop solar as it still faces challenges such as a dearth of high-credit consumers and regulatory inconsistencies across states. Investors are still cautious about the rooftop solar market. Several of the rooftop-focused developers have either realigned their focus towards open access or exited the market altogether.

Concessional finance, through credit lines by multilateral development banks (MDBs), has aimed to provide a technology demonstration effect and actuate widespread acceptance of the rooftop solar business model by investors. The first concessional credit line for C&I rooftop solar was issued in 2016 by the World Bank. It led other FIs and MDBs, such as the Asian Development Bank (ADB) and the Green Climate Fund (GCF), to introduce their concessional credit lines.

Of the three concessional credit lines for C&I rooftop solar, two, namely World Bank-SBI and TCCL-GCF, have disbursed over 75% of their allocated amount to end consumers by the end of 2023. These credit lines have directly contributed to the development of more than 1.2 GW capacity of C&I solar rooftop projects. The success of these concessional credit lines has significantly increased the availability of institutional finance in the market for C&I consumers with a credit rating of BBB- and above. This reassures the market about the availability of finance and paves the way for targeting and improving the reach of financing institutions (FIs) towards low creditworthy consumers such as MSMEs through credit enhancement mechanisms.

MSMEs' rooftop solar potential of around 15 GW remains unrealized as FIs are wary of lending to entities with little to no credit history. Other reasons, like failure to put up collateral and concerns about the long-term uncertainty of MSMEs, also contribute to this trend. However, in the last few years, FIs have made concerted efforts to address the market demands of MSMEs. There is a substantial rise in the number of

financers for MSME rooftop solar and collateral-free loan products. In collaboration with the credit guarantee fund trust for micro and small enterprises (CGTMSE), the World Bank is working on a credit guarantee mechanism to take over the FI's lending risk.

In the future, most of the new C&I RE capacity will be set up under the open access mechanism. Emerging business solutions under open access, such as wind-solar hybrid, ISTS, energy storage, round-the-clock (RTC), and virtual PPA (VPPA), further strengthen its prospects.

For India to achieve its 2030 RE targets, all market sectors must grow in tandem. The C&I RE sector, which has encountered several challenges in the past, is now at a turning point, with indicators pointing to robust organic growth in the next decade. However, it is also crucial for the government to play its part in resolving any bottlenecks or regulatory inconsistencies and establish a favourable ecosystem for C&I RE development. This underscores the shared responsibility of all stakeholders in the sector's growth.

Table 1.1: Concessional credit lines details for C&I rooftop solar in India

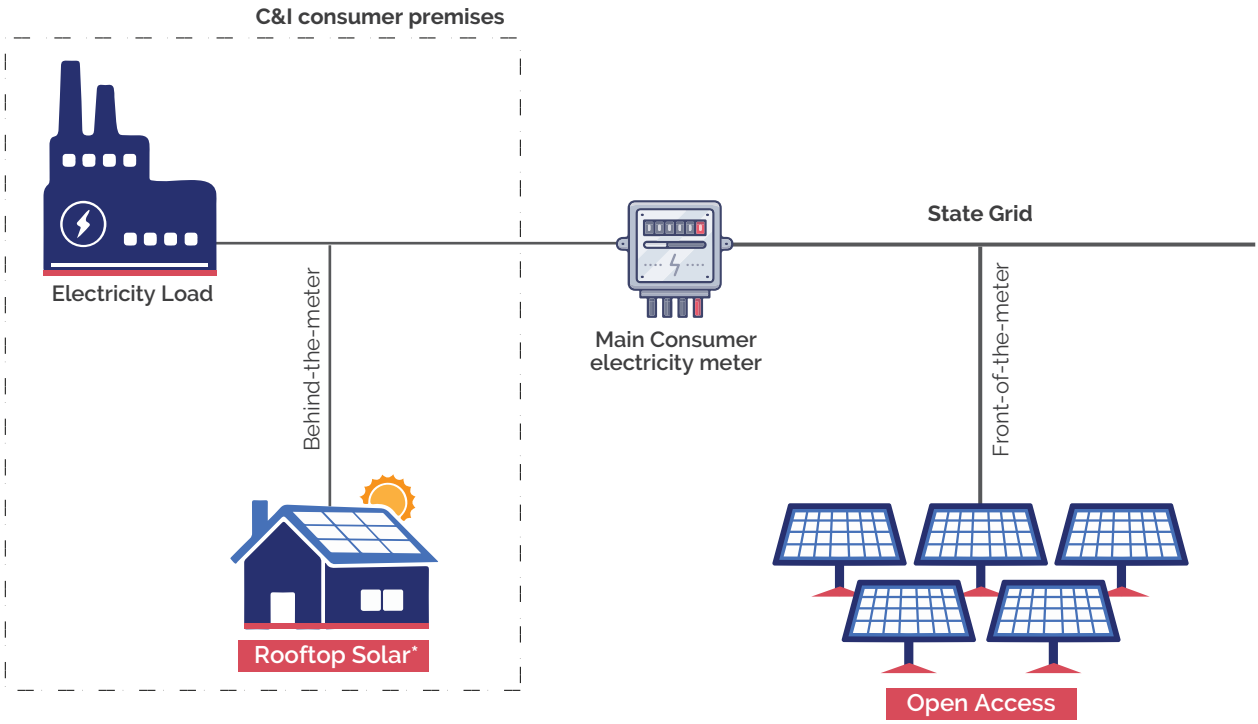
Parameter	World Bank-SBI	TCCL-GCF	ADB-PNB
Issued in...	2016	2018	2016
Expiration date	Jun-24	Mar-24	Sep-26
Lending entity	World Bank	Green Climate Fund (GCF), co-financer: Tata Cleantech Capital Limited (TCCL)	Asian Development Bank (ADB)
Loan disbursing entity	State Bank of India (SBI)	TCCL	Previous: Punjab National Bank (PNB) Current: SBI, National Bank for Agriculture and Rural Development (NABARD)
Capacity target	600 MW	250 MW	400 MW
Outlay*	US$ 648 million	US$ 200 million	US$ 500 million
Amount disbursed to end consumers	SBI to end consumers: US$ 515 million – as of February 2024	US$ 150 million – as of December 2023	US$ 9.5 million – as of June 2023

Source: World Bank, Tata Cleantech, ADB
*Note: Project outlay specified excludes the estimated equity contribution from other sources

Installation Trends

In India, open access and rooftop solar are the primary mechanisms for commercial and industrial (C&I) consumers to procure renewable energy (RE). Rooftop solar plants are set up within the C&I consumer premises and interconnected behind-the-meter (BTM). On the other hand, open access projects can be set up anywhere, with their power output wheeled to C&I consumers through the state grid infrastructure.

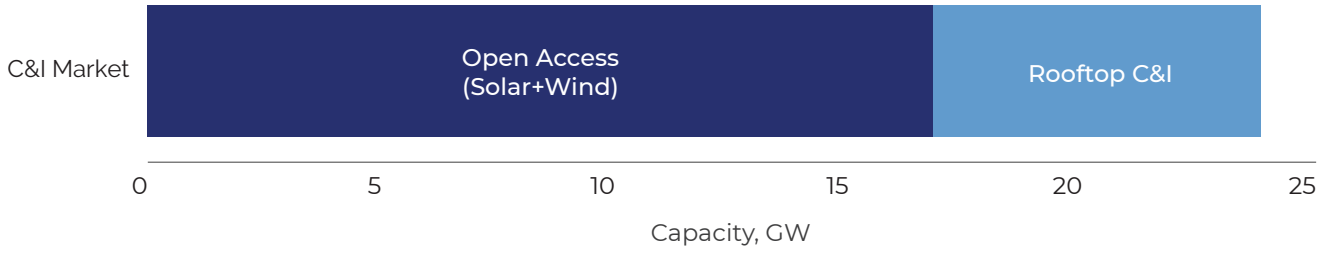
Figure 2.1: RE procurement options by C&I consumers



Source: JMK Research
*Note: Rooftop solar also includes on-premises ground mounted solar projects

As of 31st March 2024, C&I entities in India have set up RE projects of around 23.8 GW capacity. Approximately 70% of these installations are under an open access mechanism while the rest are from rooftops.

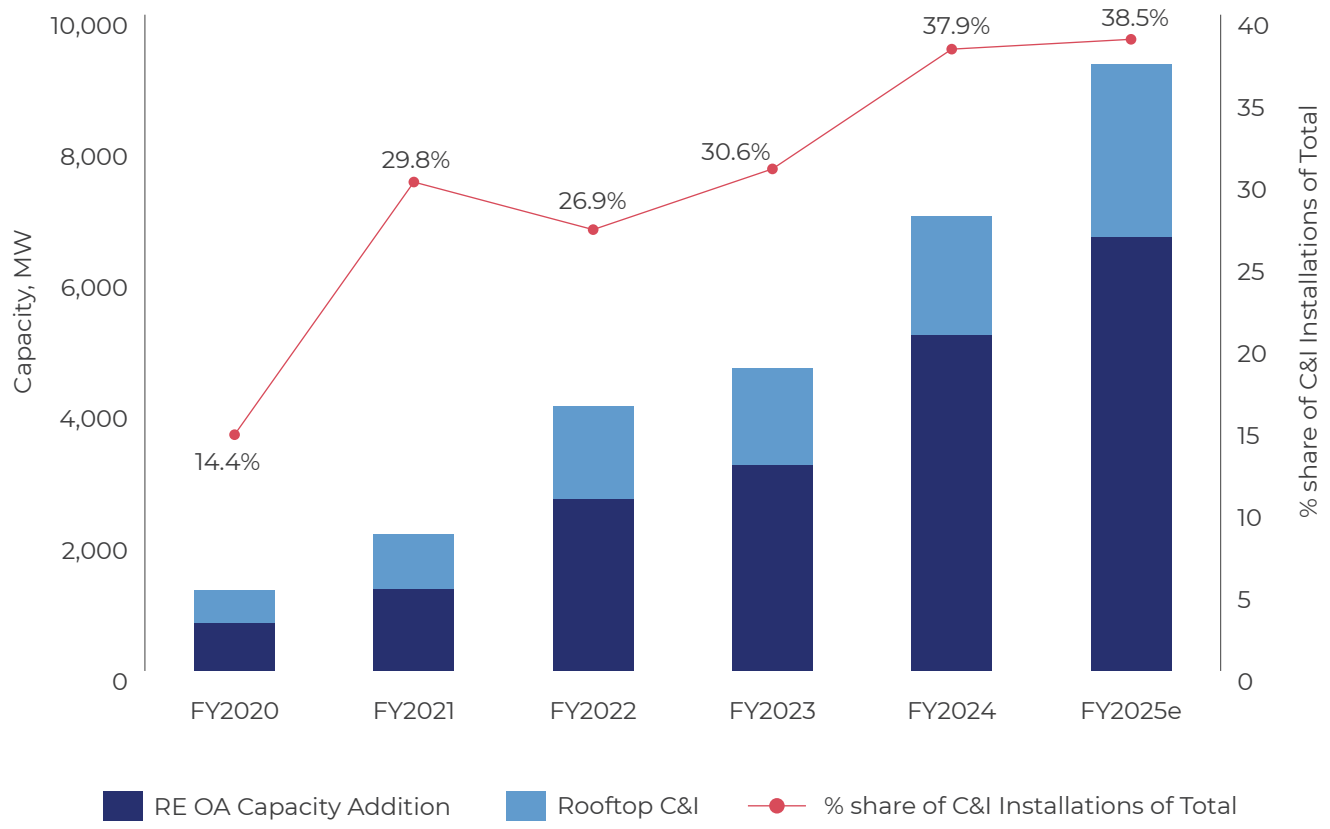
Figure 2.2: Cumulative C&I RE installations in India as of March 2024



Source: JMK Research

In the past few years, the share of C&I in overall RE installations has more than doubled from 14% in FY2020 to 37.9% in FY2024. This upsurge in RE installations in the C&I sector is majorly driven by open access. The annual installed capacity in open access has surged around five times between FY2020 and FY2024. A larger potential for portfolio growth, aided by a comparatively more favorable regulatory scenario, has enabled open access market expansion.

Figure 2.3: Share of C&I installations of total RE installations in India



Source: JMK Research

Around 300 GW capacity still needs to be installed if India needs to attain its solar and wind target of 420 GW by 2030.[1] Assuming a 40% share of the C&I segment in subsequent annual solar and wind installations, approximately an additional 120 GW of C&I RE capacity is required to be set up by 2030. This translates to US$89 billion worth of investments flow into the sector between 2024 and 2030. Subsequently, it will result in an annual carbon abatement of around “177 million tonnes” after 2030. Subsequently, a 70:30 "debt to equity" ratio translates into around US$62 billion of debt capital requirements in the same period. Hence, debt capital from multilateral entities, banks, NBFCs, etc., will be critical for mobilizing adequate financing at favorable financing terms.

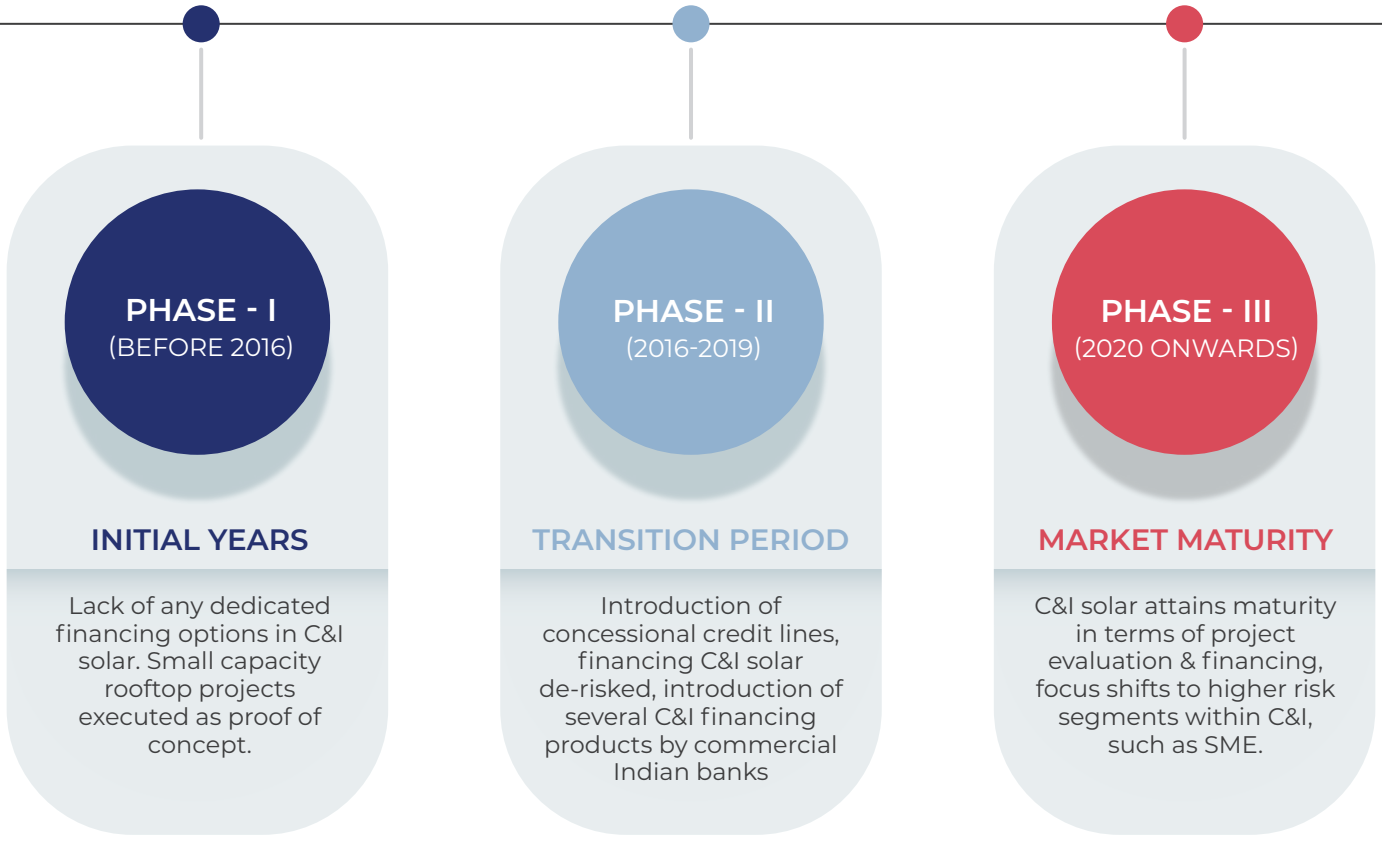
[1] Times of India. **India gets closer to meeting 2030 renewable energy targets with new transmission plan.** April 2023

Evolving Financing Trends in the C&I RE Market

Rooftop Solar

In its early years, financial institutions (FIs) perceived rooftop solar as a risky investment. Hence, commercial banks, which are usually the primary lenders in India, were absent from rooftop solar financing. The introduction of a concessional credit line in 2016 by the World Bank (WB), with the State Bank of India (SBI) as its disbursing entity, was the point of inflection for financing in C&I rooftop solar. The success of the World Bank-SBI concessional credit line led other FIs and multilateral development banks (MDBs), such as the Asian Development Bank (ADB) and the Green Climate Fund (GCF), to introduce their own concessional credit lines. After 2018, the financing market for C&I rooftop solar has gradually attained maturity, with several commercial banks in India beginning to offer rooftop solar-based financing products.

Figure 3.1: Evolution of C&I rooftop solar financing in India



Business Model Shift In C&I Rooftop Solar

Despite CAPEX accounting for the highest share of solar rooftop installations, institutional lenders always prefer the RESCO OPEX model. The key reason for this is the higher asset security offered by RESCO entities. Also, the asset cash flow under the OPEX model is much easier to model and track. Therefore, in the C&I solar market institutional financing, the OPEX model is the dominant business model. However, in the past 2-3 years, OPEX has been ceding space to CAPEX, even in the large-scale C&I consumer market segment. The primary contributing factors to this trend are:

- **Maturity in solar technology:** Over the past decade, C&I consumers have also developed an understanding of various facets of solar technology. While they hesitated to invest their capital around 8-10 years ago in emerging solar technology, they are much better placed now to assess any potential risks. The investments are further secured with appropriate performance guarantees from developers and backed by those from module manufacturers.

- **More significant quantum of cost savings:** The CAPEX model lacks an intermediary entity like RESCO, and the C&I entity owns the solar project. Thus, under CAPEX, the electricity cost savings for the end consumer increase significantly vis-à-vis OPEX.

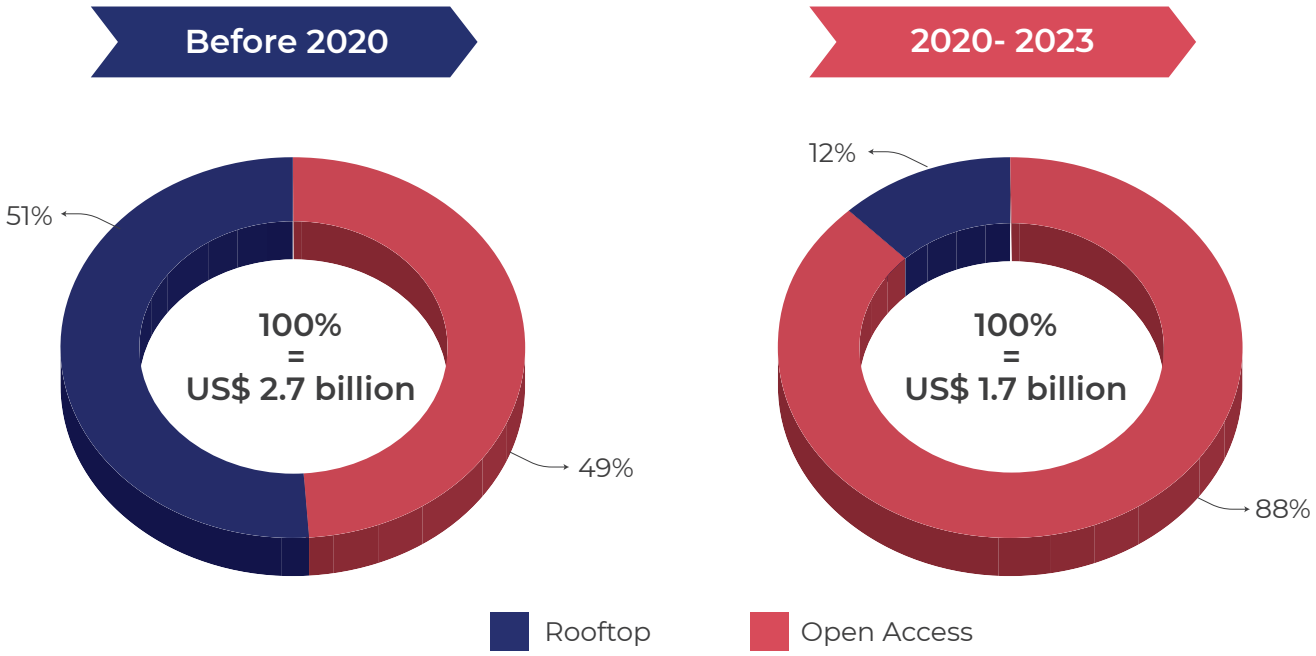
- **Lack of “A” grade RESCO companies:** Several C&I RESCO companies, such as Azure and ReNew, have either pivoted to OA from rooftop or left rooftop altogether. Thus, there is a dearth of grade "A" RESCO developers, with several small-scale "engineering procurement and construction (EPC)" developers present in the market, prompting the C&I entities to execute these projects internally.

- **Acceptance of CAPEX model by FIs:** Even though lenders still prefer RESCO, due to factors mentioned above, FIs have assessed the risk and got increasingly comfortable with companies going with the CAPEX model.

Open Access (OA) Market

OA is non-discriminatory transmission and distribution (T&D) infrastructure access to any energy consumer/generator. OA empowers C&I consumers to set up and source RE from off-site utility-scale projects. This allows the consumer to install much larger installations than having the solar project within its own premises. The RE OA business model has matured considerably in the past five years. This trend is primarily driven by larger ticket size and associated portfolio growth in the case of OA projects. In addition, the central government's launch of Green Open Access Rules (GOAR) in June 2022 has established concrete regulatory backing for OA projects, thereby significantly lessening their risk profiles to institutional lenders.[2] Based on these advantages of the OA business model, there is a shift in focus of institutional financing in the C&I corporate PPA market from rooftop to OA.

Figure 3.2: Share of sector type in C&I RE investments, before 2020 vs 2020-2023



Source: JMK Research
Note: Some open access investments may include a minority unspecified portion directed toward rooftop

As OA is already an established business model, there is no concessional financing scheme for OA projects in India. Developers generally employ their capital to execute these projects. This capital is raised either at the project or portfolio level from private equity firms, NBFCs, development finance institutions (DFIs), commercial banks, bond issuance, etc. For captive/group-captive OA projects, the end consumer invest a minimum of 26% project equity in line with the "Electricity rules, 2005."[3].

[2] Ministry of Power. **Green Open Access Rules.** June 2022
[3] Ministry of Power. **Electricity Rules 2005.** June 2005

Green Bond Issuance Picking Pace In C&I RE Market

In the past decade, several utility-scale developers and governments have issued bonds in RE space, colloquially termed "green bonds". Until May 2024, Indian RE developers have cumulatively issued more than US$ 13 billion of green bonds[4]. However, the majority of this issuance is linked to the development of utility-scale DISCOM PPA projects.

Green bond issuance is gradually making inroads in C&I RE financing.

Continuum Green Energy, a leading C&I RE developer, issued green bonds worth US$ 350 million in July 2022. Backed by Morgan Stanley, the bonds were offered only to international investors, priced at a six-month secured overnight financing rate (SOFR) of 2.6%. The proceeds from the bond issuance were used to refinance current assets and further its portfolio expansion.

ReNew Power is another active player in the C&I space, having issued several tranches of green bonds.

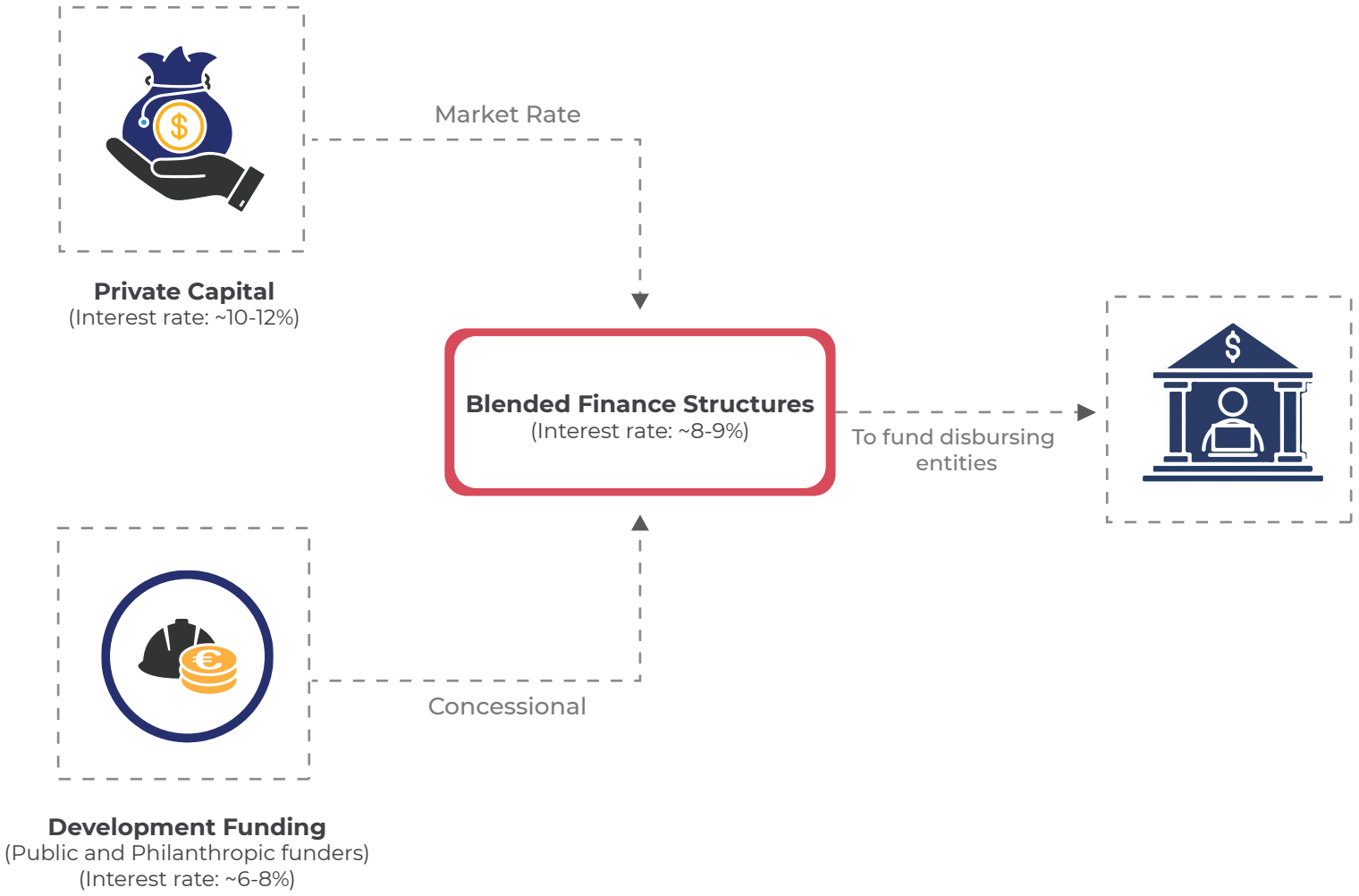
Currently, the developers prefer to list their bonds in offshore developed markets. This is done to take advantage of lower coupon rates in offshore issuance vis-à-vis domestic, ample availability of capital in a more liquid global bond market and diversification of the investor base. Going ahead, large C&I developers in India, especially the ones backed by large corporates such as JSW Energy, are likely to explore bond markets to raise capital.

[4] JMK Research

Scope and Role of Blended Finance

The previous section demonstrated the ever-changing financing landscape for the C&I RE sector. Private sector investment is imperative for the growth of any sector. However, some emerging yet critical sectors that are yet to attain maturity are deemed too risky or generate sub-par investment returns (6-9%), thereby demotivating private sector investment. Hence, in such scenarios, private capital is blended with funding from development, government, and philanthropic institutions, which have slightly lenient lending conditions. These blended finance structures can offer long-term funds to entities operating in emerging and risky sectors, such as rooftop solar and open access markets, at an attractive interest rate. Hence, blended finance operates as a market-building instrument that helps to attract commercial finance.

Figure 4.1: Simplified structure of a blended financing product



Source: JMK Research
Note: Rates provided pertain to debt financing structures only

Blended finance can also support innovations by promoting emerging business models, as with C&I rooftop solar a few years back. Bundling private sector money also improves existing grant programs' efficacy and impact. Blending private capital with government agency funds also imparts a sense of security and insurance to the financial product. Almost all the concessional credit lines in C&I rooftop solar in India, such as WB-SBI or Tata Cleantech-GCF, have incorporated the blending of public and private capital to offer concessional loans.

Table 4.1: Comparison of traditional and blended finance

Parameter	Traditional Finance	Blended Finance
Financing Stakeholders	It includes only one or two financial stakeholders in a private or public fund transaction.	Several stakeholders are involved in a blended finance intervention, including the government, philanthropies, multi-lateral development banks (MDBs), commercial banks, and private investors.
Applicability and target sectors	Generally, it targets investments in traditional matured risk-free sectors.	Blended finance targets financing in emerging and risky sectors
Interest rates (If structured as debt)	10-12%	8-9%
Expected Internal rate of return (IRR)	12-14%	6-9%
Turnaround time	Generally, lesser turnaround time is required in funds disbursal	It takes more turnaround time as it involves multiple stakeholders and careful examination of risky projects
Example	C&I rooftop solar loans offered by some banks such as “Indian Bank”,	WB-SBI's Concessional credit line for C&I rooftop solar blends concessional funds from the Clean Technology Fund (CTF) with funds from the International Bank for Reconstruction and Development (IBRD).

Source: JMK Research

Applications For India

For a developing economy like India, an inflow of private capital will be essential, along with public funding, especially for the emerging sectors.

- **De-risking of market segments:** Going ahead, blended finance structures will continue to support energy transition in India in riskier segments, such as MSME and residential. Blended finance will aid the creation of favorable lending products for such segments, including long-tenured collateral-free loans at attractive interest rates, credit guarantee funds, first-loss cover, and technical assistance funds.
- **Support RE development in sensitive regions:** An added application of blended finance is providing funds for projects that make commercial sense but are hampered by location or political constraints. Blended financing can be explored to set up C&I RE projects in socio-sensitive regions of India, such as the Northeast and the states of Jharkhand, Chhattisgarh, etc. The private capital in

those projects can be combined and strengthened with the underlying security of respective public entities, such as state governments, to facilitate project financing.

In India, blended finance is still wrought with some regulatory challenges that are impeding its large-scale acceptance. India's regulatory framework clearly demarcates funds deployed for not-for-profit versus for-profit activities. Thus, commercial entities face challenges with taxation and accounting when investing in not-for-profit or environmentally beneficial activities. An enhanced clarity is also required in terms of a blended finance framework for implementing taxation on blended finance entities with different tax regimes. After overcoming some of these challenges, first blended finance loan deal in over a decade (and one of the first in renewables) was committed in India in 2023, to finance 170 MWp of renewable assets of Fourth Partner Energy Ltd. (FPEL).[5]

Table 4.2: Snapshot of blended finance deal in India to finance 170 MWp of renewable assets

Parameter	Details
Beneficiary	Fourth Partner Energy Ltd.
Portfolio financed	170 MWp (75 MWp offsite + 95 MWp onsite)
Project type	Offsite solar park and onsite rooftop solar projects
Senior debt	US$ 52 million - IFC
Subordinated debt	US$ 17 million – IFC
Concessional finance	US$ 25 million – Blended Climate Finance program of IFC-Finland and IFC-Canada

Source: IFC

Financing Products Available

Access to ample financing options for consumers and C&I solar developers is critical for the growth of the C&I RE sector. Over the years, several financers have emerged, underlining the maturity of C&I RE sector financing. Every solar project or portfolio is usually financed through a combination of equity and debt. Some primary financing methods or products in the C&I RE market are discussed below.

[5] IFC. Blended Finance for Climate Investment in India. 20232

Table 5.1: Financing products for the C&I RE market, by key lenders/players

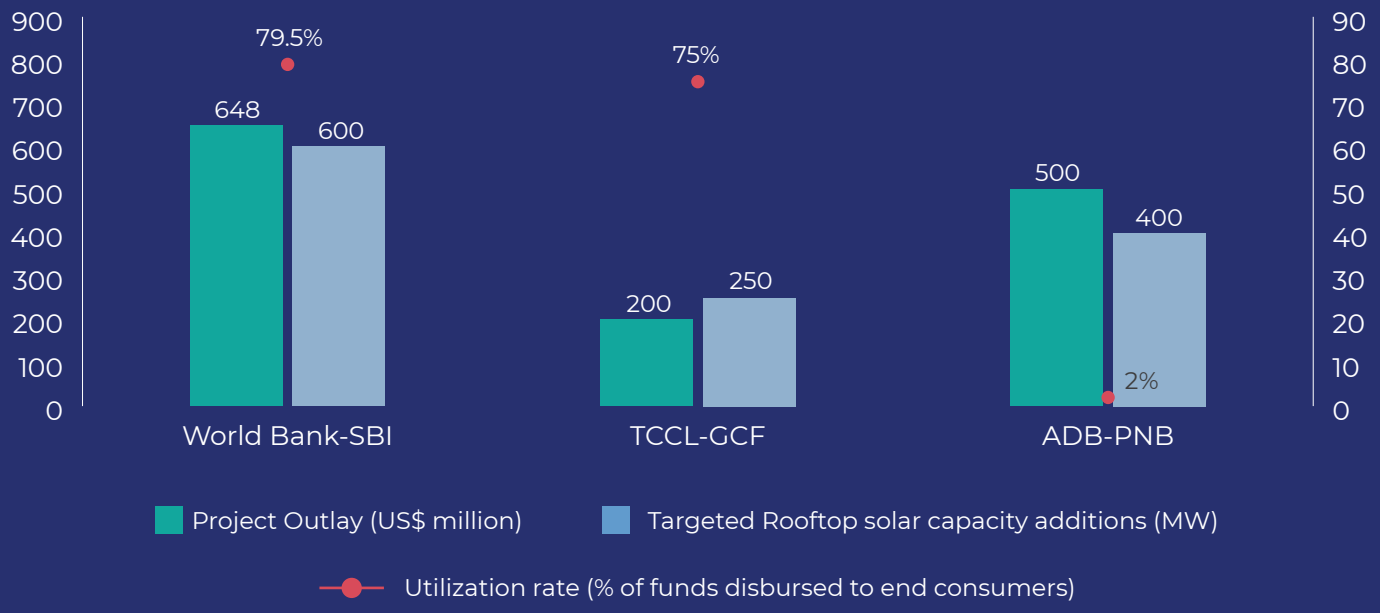
Financing Product	Key Lenders/players	Example/Description
Term loan	SBI, Indian Bank, Bank of Baroda, sidbi, YES BANK, Union Bank of India	A term loan is a debt financial instrument consisting of a specified repayment schedule and a fixed or floating interest rate. **SBI Surya Shakti** CIBIL score of borrower > 649 • Minimum debt service coverage ratio (DSCR): 1.2 • Loan amount: Up to Rs40 million (US$0.48 million) • Project size: Up to 1MW • Repayment period: Up to 10 years • Collateral: Not required • Rate: Linked to 6 months MCLR, around ~10-11% **SIDBI MSME loans for Solar PV Projects** • Loan amount: Up to Rs.500 million (US$6 million) • Project size: 25 kW-10 MW • Repayment period: Up to ten years • Up to 100% financing. • Rate: 8%-10% • Loan turnaround time: 2-7 days
Working capital loans/bridge loans	SBI, Union Bank of India	Working capital loans are generally short-term high-interest loans taken to finance theday-to-day operations of an entity or project.
Line of credit	THE WORLD BANK, GREEN CLIMATE FUND, ADB	LoC is an arrangement between the FI and the financial off-taker that mandates a preset borrowing limit that can be drawn until exhaustion within a fixed period. **Tata Capital-GCF concessional credit line (disbursed by TCCL)** • Project investment: Up to 80% of the project cost • Minimum credit rating: BBB- • Minimum DSCR: 1.15 • Rate: evaluated on a case-to-case basis, around 9-11%
Green Bonds	CONTINUUM Continuum Green Energy, ReNew POWER	Bond issuance is a viable alternative for large, established RE corporations to raise low-cost capital. **Continuum green energy bonds** • Outlay: US$ 350 million • Rate: Floating six-month SOFR of 2.6% + markup. • Issuance: July 2022. • Maturity: 3.5 years.
Fractional investments	SUSTVEST	Crowdfunding to meet a portion of financing needs has emerged as another unique way to source capital for solar projects in the C&I space. **CISF rooftop solar project (funded through SustVest)** • Project Size: 572 kW • Total funding amount: Rs 2.94 crore(US$ 0.35 million) • Minimum investment: Rs. 25000 • Approximate post-tax IRR for investors: 11%

Source: JMK Research

Concessional Credit Lines

Several global multilateral banks such as the World Bank, GCF, and ADB announced concessional credit lines from 2016 onwards to address the shortage of debt financing and improve investor confidence in the segment. These programs aimed to provide a demonstration effect, showcase various business models, instill market confidence, and provide evidence and a track record of rooftop solar performance. These measures were expected to unlock a large quantum of domestic debt and equity investment and increase rooftop solar installation in India.

Figure 6.1: Key concessional credit lines in India for C&I rooftop solar



Source: JMK Research
Note: Project outlay is specified, excluding the estimated equity component

The concessional credit lines from the World Bank, GCF, and ADB aim to facilitate the direct development of 1.25 GW of rooftop solar capacity in India. As of February 2023, the World Bank has already surpassed its target of 600 MW, with around 870 MW of rooftop project orders already signed. However, SBI will disburse the project funds based on project milestones such as erection, charging, and commissioning. The current utilization rate (% of funds disbursed to end consumers) of both the World Bank and GCF lines is more than 75%.

Table 6.1: Comparison of traditional and blended finance

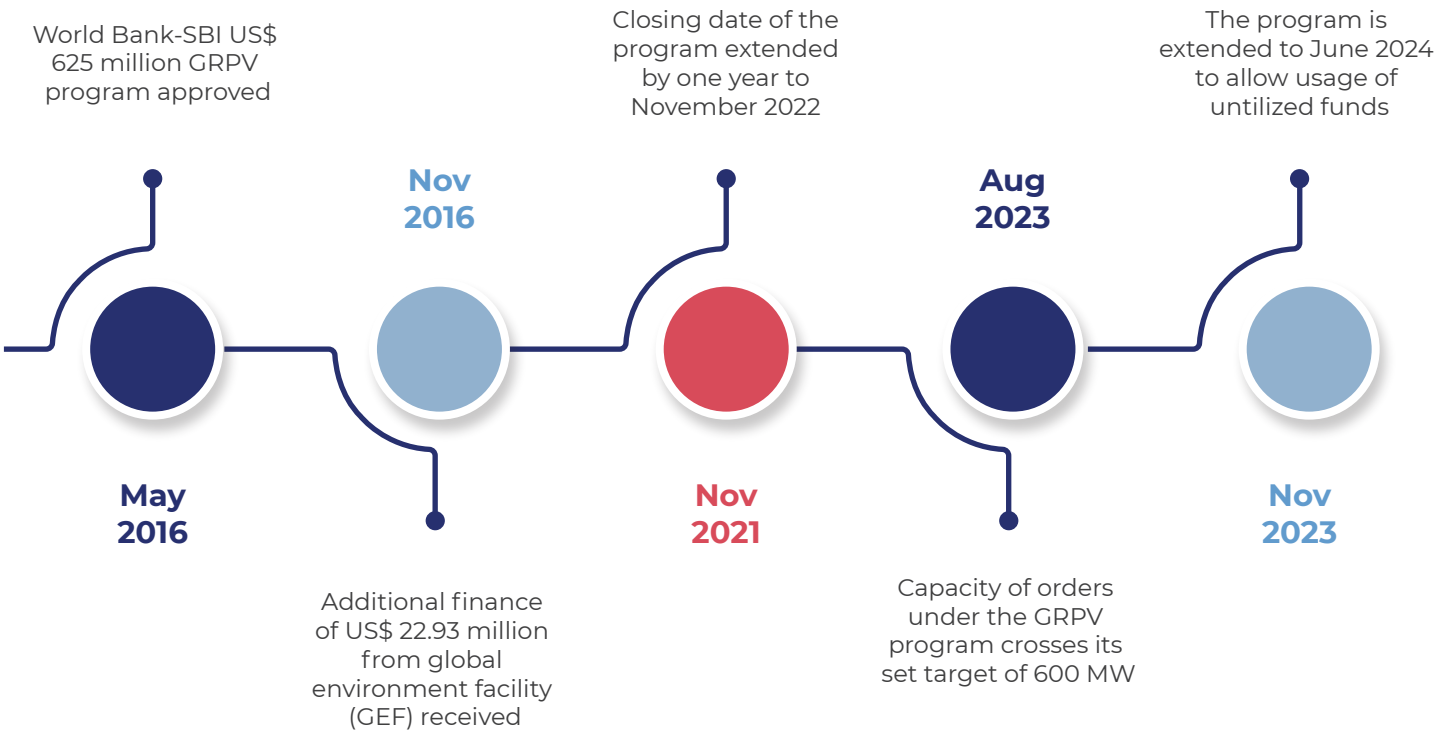
Parameter	World Bank-SBI	TCCL-GCF	ADB-PNB
Lending entity	World Bank	Green Climate Fund (GCF), co-financer: Tata Cleantech Capital Limit - ed (TCCL)	Asian Development Bank (ADB)
Loan disbursing entity	State Bank of India (SBI)	TCCL	Previous: Punjab National Bank (PNB) Current: SBI, National Bank for Agriculture and Rural Development (NABARD)
Outlay*	US$ 648 million	US$ 200 million	US$ 500 million
Duration	2016-2021 (currently ex - tended to June 2024)	2018-2024	2016-2023 (disbursing entities reassigned and duration extended to 30th September 2026)
Capacity target	600 MW	250 MW	400 MW
Sectors targeted	C&I entities, public institutions	C&I, public institutions, residential	C&I, residential
Eligibility conditions	Debt service coverage ratio: >=1.20x Credit risk assessment (CRA) rating: at least SB-10	Debt service coverage ratio: >=1.15x Credit rating: at least BBB-	Annual fixed asset cover age ratio: >=1.25
Financing terms	Rate of interest: 8-8.5% Tenure: up to 15 years	Rate of interest: 9-11% Tenure: up to 15 to 20 years	Rate of interest: >8.35% Tenure: up to 15 years
Amount disbursed	World Bank to SBI: US$ 624 million; SBI to end consumers: US$ 515 million – as of February 2024	US$ 150 million – as of December 2023	US$ 9.5 million – as of June 2023

Source: JMK Research
*Note: Project outlay specified excludes the estimated equity contribution from other sources

The World Bank-State Bank of India (SBI) Concessional Credit Line

In May 2016, the World Bank collaborated with SBI to promote the installation of Solar PV Rooftops in India's Commercial and Industrial (C&I) sector. The World Bank approved a Grid-Connected Rooftop Solar PV (GRPV) program of USD 625 million (USD 500 million from IBRD, USD 125 million from CTF) to provide concessional financing to grid-connected rooftop solar developers and C&I consumers through SBI. In November 2016, the World Bank approved an additional USD 22.93 million (grant from the Global Environmental Facility (GEF)) for the GRPV program. The closing date of the GRPV program was revised to 31st October 2023 from 30th November 2021, and then finally to June 2024 to ensure the funds are allocated effectively.

Figure 6.2: World Bank-SBI concessional credit line timeline

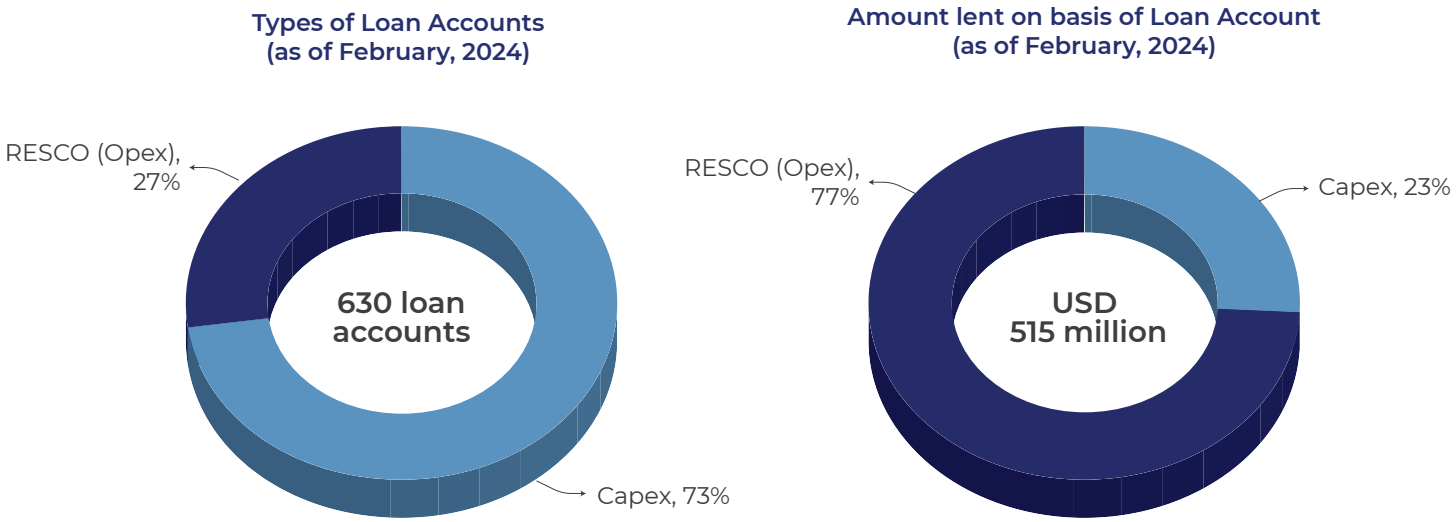


Source: JMK Research

Implementation Status

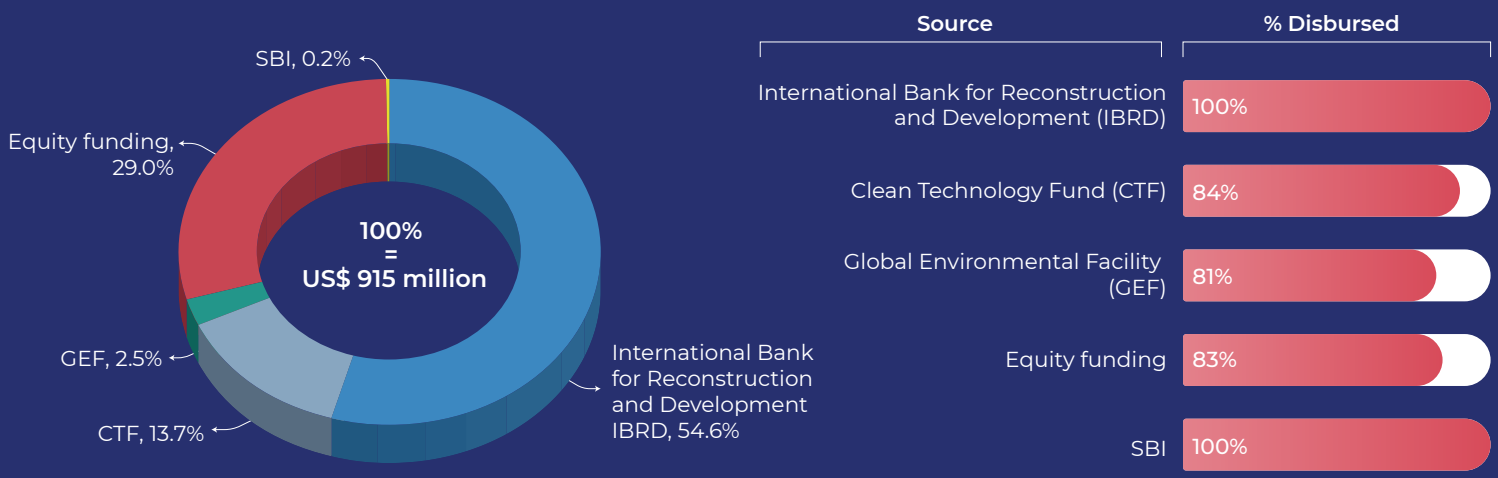
As of 27 February 2024, SBI had sanctioned USD 515 million to more than 630 loan accounts, mobilized USD 219 million of equity from private sources, and signed 870 MW of GRPV orders. The figures below depict the types of borrowers SBI has lent to and the amount disbursed to them.

Figure 6.3: World Bank-SBI concessional credit line disbursement split



SBI lent to more than 630 loan accounts until February 2024, of which the majority were Capex accounts, contributing 73% of the loan accounts, and the remaining were RESCO loan accounts (Opex). However, regarding the loan amount, RESCO loan accounts represented 77% (USD 396.55 million) of the amount, and Capex loan accounts represented the remaining 23% (USD 118.45 million).

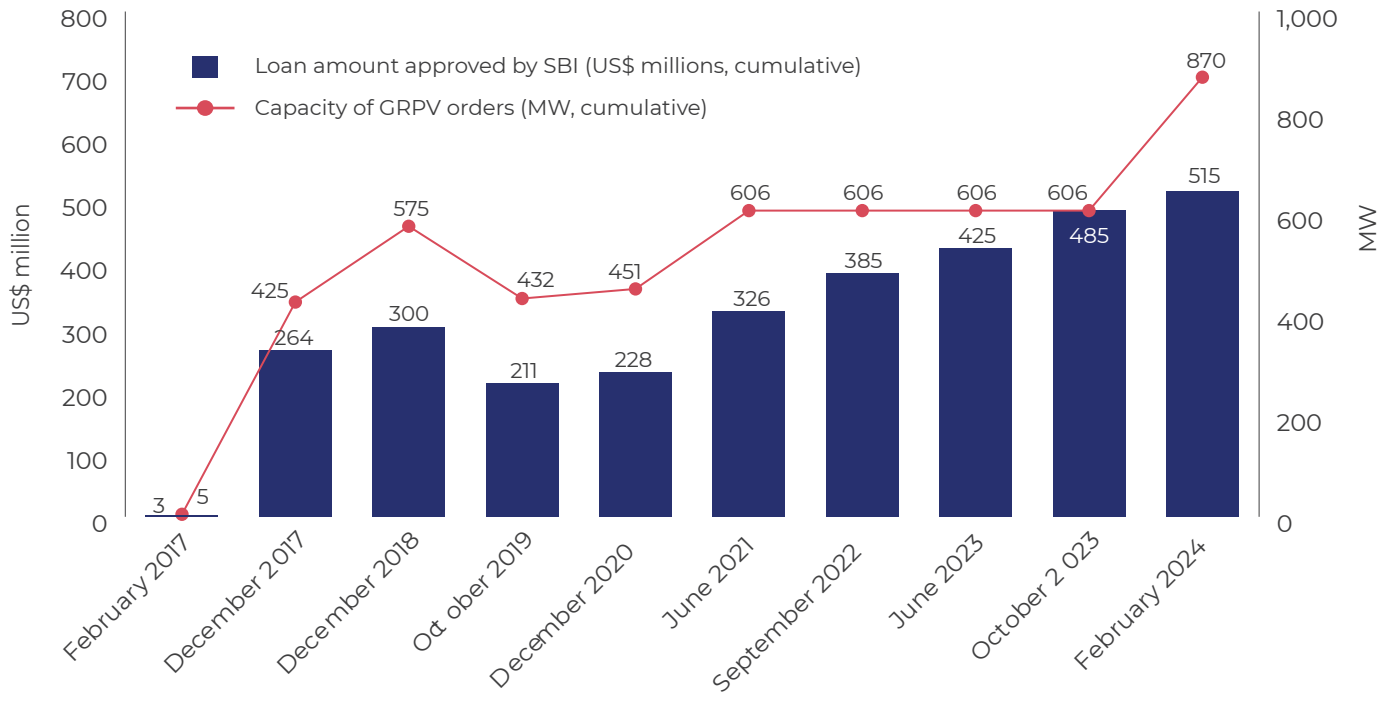
Figure 6.4: World Bank-SBI concessional credit line disbursement status, by source of funds



Source: World Bank
Note: The equity component of the program cost is not financed by the World Bank or its accredited funding agency, such as SBI

There are still funds left to be disbursed under the GRPV program and the closing date was 31st October 2023. Therefore, SBI has proposed the World Bank to extend the project closing date by 18 months until 30th April 2025 so that SBI could utilize the funds allotted to it in the first place (USD 625 million) effectively; otherwise, it will have to return the remaining funds to the World Bank. Although the World Bank has approved the extension in its latest update until June 2024, it may be extended further upon reassessment.

Figure 6.5: Implementation status timeline of World Bank-SBI concessional credit line



Source: World Bank

Challenges and outlook

Despite the widespread success of this program, some market stakeholders have pointed out issues in specific provisions, which have partly contributed to the fund failing to meet its disbursement deadlines.

- The primary concern was SBI's preference of lending only to high-credit blue-chip borrowers, thereby hindering a large consumer base, such as MSMEs, from accessing affordable rooftop solar finance.
- This trend towards extra caution in selecting loan borrowing entities was exacerbated in 2018 by the liquidity crisis of NBFCs in India.[6]
- Also, the program renders any project that avails any form of government subsidy and behind-the-meter (BTM) projects ineligible for financing.

The experience and lessons from these concessional credit lines will be crucial for future developments in this sector. Several bank officials in India now understand the nuances of rooftop solar. Going ahead, the World Bank, in collaboration with SBI, is working on finalizing a concessional line for the residential segment and setting up a credit guarantee fund for rooftop solar in MSMEs.

[6]Business Today. **NBFC crisis and its domino effect on Indian economy.** January 2020

C&I Financing Case Study: Ashapura Engineering Pvt Ltd, Aurangabad

Background

Ashapura Engineering Pvt Ltd (AEPL) is an SME unit involved in manufacturing of automobile components and is situated in Waluj industrial area of Aurangabad. Total plant connected load is 75 kW and major load consists of thread forming, rolling and cutting machines.

Motivation to adopt solar

Industrial tariff rate in Maharashtra is among the highest in the country. Hence, electricity cost savings was the primary reason for shifting to rooftop solar. Accelerated depreciation (AD) benefit of 80% was another key reason to adopt solar during conceptualisation stage. However, by the time net metering was signed, finance ministry had slashed the AD benefit to 40%.

Project Financing

SBI funded the project through its ongoing world bank concessional credit line. SBI disbursed Rs 23.6 lakhs (US$ 28,294) for the project, which is approximately 74% of the entire project cost. AEPL was able to avail funding from this concessional credit line as SBI had been a regular financer for the entity for its core operations and had a good past relationship and repayment history with the bank. According to the AEPL owner, major hurdle in financing was cumbersome paperwork process. SBI helped in this by hiring a third party for handling paperwork.

Parameter	Details
Project capacity	40 kWp
Project equipment	Solar module – REC 335 Wp, Solar inverter – Growatt 40 kW 3 phase
Financer	SBI
Debt-equity ratio	75%:25%
Repayment period	7 years
Moratorium period	1 year
Interest rate	8.35%
Commissioning date	Mar-17

Benefits

The levelized cost of electricity from the solar plant is Rs. 4.14 kWh, against local DISCOM tariff of Rs 7.5-9. With 72% reduction in annual electricity bill, the project achieves payback in around 6 years. Considering all the benefits, the IRR of the project was evaluated to be 12.9%.

Source: Indo-German Energy Forum.[7]

[7] Indo-German Energy Forum. **Solar Rooftop PV Installations by MSMEs with Bank Financing.** August 2019

Tata Cleantech Capital Limited (TCCL)-Green Climate Fund (GCF) Line of Credit

Background

In 2018, The Green Climate Fund (GCF) approved the funding proposal submitted by NABARD (National Bank for Agriculture and Rural Development) to support the solar rooftop segment in India. The program is called "Line of Credit for solar rooftop segment for Commercial, industrial, and residential housing sectors." It aims to support the development of the solar rooftop segment in the country by providing concessional loan assistance. The program will be executed by Tata Cleantech Capital Limited (TCCL).

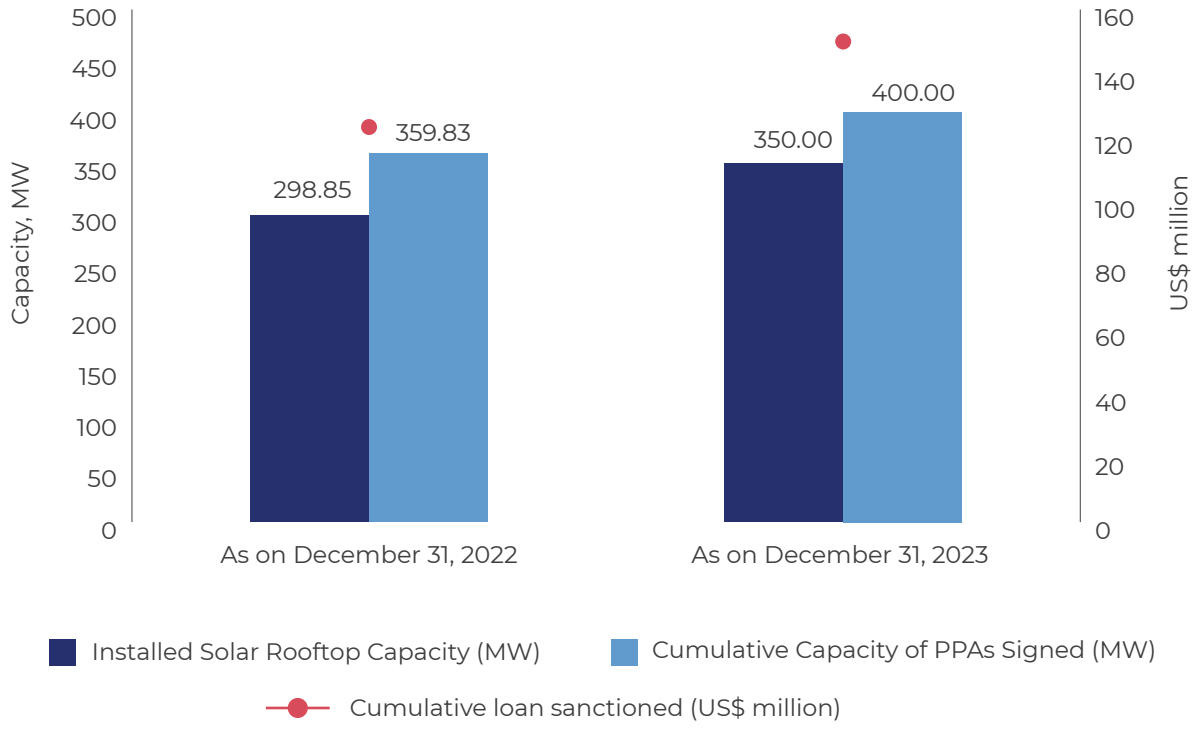
The program is a USD 250 million aid, with GCF providing USD 100 million in loan assistance, TCCL contributing USD 100 million, and private equity investors contributing USD 50 million. In its initial phase, from 2018 to 2022, the program aimed to add 250 MW of rooftop solar capacity.

Implementation Status

As of 31 December 2022, TCCL had sanctioned a cumulative loan of USD 123.31 million for rooftop solar projects under the program, and it is expected to reach USD 150 million by 31 December 2023.

As of 31 December 2022, TCCL had disbursed USD 100 million to the project developers, including USD 50 million from the GCF loan. In February 2023, GCF disbursed USD 10 million to NABARD, and it is expected that GCF will disburse another USD 15 million by 31 December 2023.

Figure 6.6: Implementation status of TCCL-GCF concessional credit line



Source: TCCL, GCF

As of 31 December 2022, TCCL has sanctioned a cumulative solar rooftop capacity of 411.27 MW, and Power Purchase Agreements (PPAs) for a cumulative capacity of 359.83 MW have been signed. The cumulative signing of PPAs is expected to be more than 400 MW by 31 December 2023. As of 31 December 2022, the operational capacity of rooftop solar power plants is 298.85 MW, and it is expected to reach 350 MW by 31 December 2023.

Table 6.2: Comparison of World Bank-SBI and TCCL-GCF concessional credit lines

Outlay	Powered by the world's largest development bank (World Bank) and largest bank in India (SBI), the World Bank-SBI concessional credit line has garnered prominent interest in the C&I Indian rooftop solar financing landscape. The outlay of the program at US$ 625 million+ is the largest among all its peers and offers the least interest rate of 8-8.5%.
Sectors Targeted	In contrast to C&I rooftop solar, the TCCL-GCF concessional credit line also targets residential and public/institutional sectors. Out of the total outlay, TCCL-GCF has set aside US$50 million and US$20 million for the public/institutional and residential sectors, respectively. In addition, given an exciting and viable project scenario, there is also a provision to fund off-grid projects under the TCCL-GCF program. However, recently in December 2023, the World Bank added a separate vertical for residential rooftop under its concessional credit line with an outlay of US$ 165 million.
Selection Flexibility	Another key difference is the enhanced flexibility in selecting eligible entities for rooftop solar loans. For example, the World Bank-SBI line mandates funding entities with at least 1-year of experience/past track record in the power sector and with strict credit rating requirements. However, the TCCL-GCF program evaluates each borrower or project proposal on a case-to-case basis with no such rigid parameters. Similar flexibility in conditions is also present in loan tenure and its quantum as a percentage of project cost.
Key Beneficiaries	World Bank-SBI: JSW Energy, Azure Power, CleanMax, Cleantech Solar, Amplus Solar TCCL-GCF: Home Scape by Amplus Solar, Fourth Partner Energy, Mysun

Source: World Bank, TCCL, GCF, JMK Research

Going ahead, concessional credit lines will be flexible and evaluate lending parameters such as loan tenures and interest rates on a case-to-case basis. As the C&I rooftop solar market has matured, the focus on upcoming concessional programs will be equally distributed among all rooftop solar segments, such as residential, MSMEs, etc.

Asian Development Bank (ADB) Concessional Credit Line

In 2016, ADB approved USD 505 million under the sovereign-guaranteed Solar Rooftop Investment Program (SRIP) to help the Government of India establish a solar rooftop financing facility in the country. Punjab National Bank (PNB) was selected as the borrower and executing agency for implementing the program at the request of the government of India.

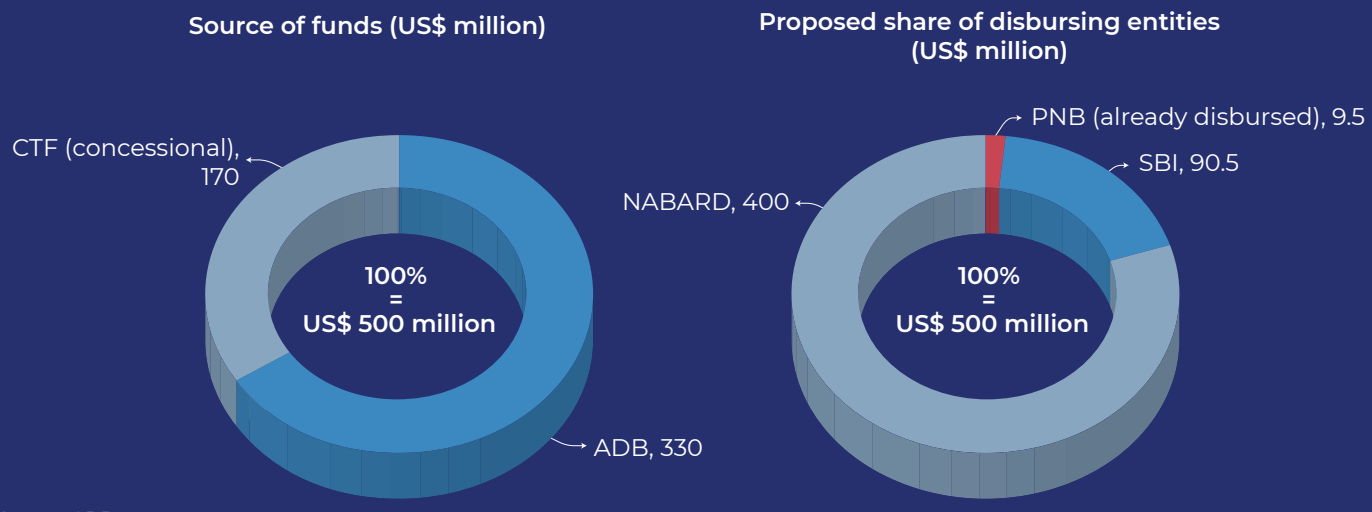
The program was expected to be financed under three MFF tranches until 30th June 2023. Under the 1st tranche, ADB provided a loan of USD 100 million to PNB. But unfortunately, PNB could not utilize the funds effectively. Only USD 9.5 million out of USD 100 million were disbursed, and because of the unsatisfactory performance, ADB suspended the balance of tranche 1 (USD 90.5 million) on 6th July 2020 and canceled on 16th July 2021. The loan was closed on 11th November 2022. Some inherent reasons for the failure of PNB to utilize and disburse the loans effectively were:

Delay or lack of a systematic approach: According to ADB, it took PNB a long time to adopt the specific institutional policy and guidelines for solar rooftop financing. As a result, PNB did not implement a systematic approach at an early stage of program implementation.

Internal management changes: After 2018, PNB underwent some internal management changes. The new management's focus shifted to restructuring and stabilizing its core banking operations and tightening its investment appraisal systems rather than prioritizing loan disbursement to an emerging rooftop solar sector.

Strict collateral requirements: ADB envisioned to create lenient collateral conditions for C&I entities borrowing under this program. However, PNB sought to follow its strict collateral requirements under its typical lending requirement for small private investors, which several solar rooftop developers had difficulty pledging.

Figure 6.7: Updated financing plan for ADB rooftop solar concessional credit line, June 2023



Source: ADB

The State Bank of India (SBI) and the National Bank for Agriculture and Rural Development (NABARD) have been proposed as additional borrowers under the MFF. They will receive USD 490.5 million to implement the program.[8] Once ADB's Board of Directors approves the changes, the President of ADB will process the program for approval.

[8] ADB. **Solar rooftop investment program: major change in facility**. June 2023

SIDBI Term Loan Assistance for Solar PV Plants

SIDBI, Small Industries Development Bank of India, is India's primary financial institution which caters to the financial needs and development of the micro, small, and medium enterprises (MSME) sector. SIDBI encourages MSMEs to invest in Solar PV projects through its "Mission Renewable Energy". ***SIDBI has financed more than Rs.2200 crore (US$ 263 million) leading to more than 500 MW solar capacity additions under its Mission RE in the last two financial years.***

SIDBI key lending schemes are: (i) End to End Energy Efficiency (4E Financing) Scheme including its Express variant and (ii) Green Finance Scheme to extant finance to the Solar PV Projects. Under these schemes, SIDBI provides 100% funding to MSMEs to set up rooftop solar plants for their captive use with at least 25% interest bearing FD as cash collateral. SIDBI provides term loans to the Solar PV project starting from Rs.10 lakh (US$ 11,967) to Rs.50 crore (US$ 5.98 million), i.e. project capacity of 25 kW to 10 MW, with a repayment tenure of up to 10 years including a moratorium up to 12 months.

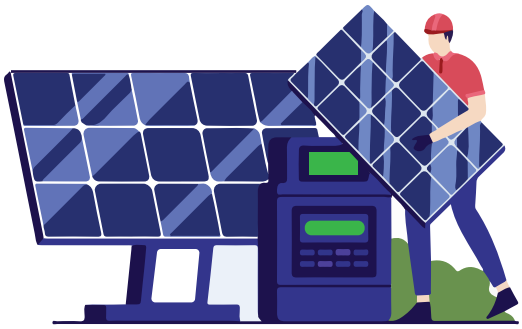
During the FY 2024, SIDBI has launched a new financing product, the Promoting Adoption of Clean Energy (PACE) scheme. The scheme is specifically designed to streamline and expedite the installation of solar rooftop systems at residential premises through financial assistance to MSMEs, i.e. RESCOs, ESCOs, EPC contractors, vendors, etc. The assistance is in the form of "Term Loan / Revolving limit as Term Loan" with a maximum limit of Rs.5 crore against 20% interest bearing FD as cash collateral.

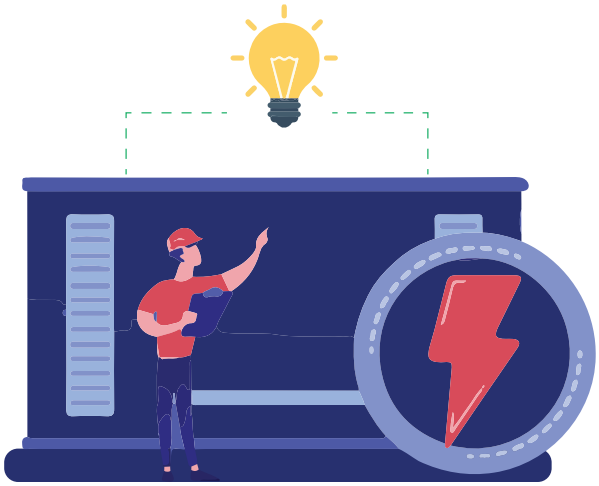
Rs. 2,200 crore (US$ 263 million)

Amount disbursed by SIDBI for solar PV plants under "Mission RE"

500 MW+

Solar PV capacity set up





SIDBI's Partnership with Solar OEMs and Suppliers

SIDBI has entered into referral arrangements with solar Suppliers and OEMs in the solar PV market. These arrangements are aimed at maximizing SIDBI's outreach in the solar industry and to leverage the technical and project execution expertise of some of these firms. Tata Power Solar, Havells India, Jakson Engineers, ORB Energy, Ornate Solar, Panasonic Life Solutions, Fujiyama Power Systems, Goldi Solar, Luminous Power, Kirloskar Solar, EmmVee Solar, Husk Power Systems etc are SIDBI's major referral partners.

Refinancing – An Innovative Mechanism To Mobilize Private Capital

Refinancing is essential for C&I entities and RESCOs to enhance their project returns and provide a cushion against any downside risk. During the refinancing process, the stakeholders involved in the project, including commercial and industrial entities (C&I) and Renewable Energy Service Companies (RESCOs), seek to enhance their existing financing terms by capitalizing on the continued successful operation of the solar project. In the C&I RE market, refinancing can be categorized on the basis of three use cases, as explained in the table below.

Table 7.1: Refinancing use cases in the C&I RE market and its impact

Use-case/Benefit	Description	Impact
Better financing terms	The risk factor of the solar project is significantly reduced after its successful commissioning. After the project has been in operation for 2-3 years, the project stakeholders can apply to refinance with better terms.	Although the project tenure will remain unchanged after refinancing, the interest rates are favorably improved by around 150-200 basis points. Owing to lesser interest, additional freed-up capital can either be converted to dividends for project shareholders or invested back into the project by increasing the debt component by up to 5%.
Enable access of institutional finance to lower credit rating consumers	Consumers with lower credit ratings, such as MSMEs, need help accessing institutional finance. Hence, during project execution, they generally employ self-equity. After the project is executed and has been successful for a couple of years, they can approach an institutional lender to evaluate and extend long-term debt capital to the project.	The financing terms after refinancing are comparable to those of high credit rating consumers for a well-maintained project. Availing long-term debt enables the end consumer to reinvest the additional capital into its core operations or its future decarbonization efforts.
Refinancing after bridge financing	Owing to project commissioning timeline constraints, RESCOs generally employ short-term bridge loans during project execution. After project commissioning, the specific project or an entire portfolio of projects is refinanced, preferably through concessional financing.	Availing debt capital is a document-heavy and time-consuming process. This method of bridge loans and refinancing enables speedy and unhindered project execution. Additionally, while refinancing, developers can combine several already commissioned projects into a single portfolio.

Source: JMK Research

MSME Challenges and Potential Solutions

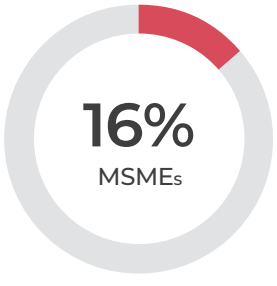
The Micro, Small and Medium Enterprises (MSME) plays a vital role in the Indian economy. It comprises 64 million entities both in the manufacturing and services sectors. It contributes 30 percent of the country's gross domestic product (GDP) and employs nearly 111 million people. It is also one of the country's major power consumers. The industrial sector consumes 56% of India's total energy demand, and the MSME sector consumes around 25% of the energy demand of the industrial sector.[10]

As significant energy consumers, MSMEs must switch to eco-friendly technologies like rooftop solar, which will help them produce efficiently and achieve a sustainable environment. Additionally, a greener energy portfolio leads to lesser greenhouse gas (GHG) emissions in MSME factory output, which is an attractive proposition to their end clients – usually large corporates with ambitious emissions reduction targets. The rooftop solar potential in MSMEs is estimated to be around 15GW, around 37% of India's rooftop solar target of 40GW.[11]

Challenges Faced

Despite MSMEs' growing desire to switch to alternative energy sources like rooftop solar, inadequate financing has been a significant roadblock, as installing rooftop solar requires a substantial upfront investment.

- **Lack of creditworthy MSMEs:** The lack of historical financial data and payment track records, coupled with cases of defaults, make lending institutions apprehensive of giving MSMEs loans.
- **Failure to put up collateral:** For significant investments, banks generally demand collateral to reduce lending risks, which MSMEs usually fail to provide. Notably, their existing assets are already collateralized in several cases, making it difficult for them to obtain loans.
- **Long-term uncertainty about MSMEs:** At times, it is hard to ascertain the future and longevity of the business viability of an MSME, leading to increased reluctance from banks to lend to this segment.
- **Difficult access to Institutional Finance:** Only 16 percent of MSMEs are financed by the formal banking system in India. International Climate Financing organizations like GCF follow stringent application standards and regulations, which are complex for MSMEs.



16% of MSMEs are financed by formal banking system in India

However, in the past couple of years, the rooftop solar financing situation for the MSME segment has improved. This progress is partly due to increasing awareness of MSMEs towards renewable energy adoption and by lending institutions realizing the potential of the untapped market for solar lending in the MSME segment.

[9] ADB. **Solar rooftop investment program: major change in facility.** June 2023

[10] Economic Times. **Why India must focus on MSMEs for meaningful energy transition.** September 2023

[11] Financial Express. **Why MSMEs are hesitant in embracing non-conventional energy sources like rooftop solar.** April 2022

Financing Trends For Rooftop Solar In The MSME Segment

The number of lenders for the MSME segment for rooftop solar has increased substantially – from around three entities in mid-2021 to more than eleven as of March 2024. Of these eleven lenders, nine (except State Bank of India (SBI) and Indian Bank) have issued schemes catering to only the MSME segment. The loan disbursing entities range from public and private sector banks such as SBI, Union Bank, Yes Bank, etc., to non-banking financial companies (NBFCs), such as SIDBI, Electronica Finance Limited, Clime Finance, and others.

Some international investment firms, such as the United States Agency for International Development (USAID), British International Investment (BII) and others, are also vying to provide financing options to MSMEs interested in rooftop solar projects. USAID has appointed EFL and cKers finance as its fund disbursing entities in India.

Figure 8.1: Key lenders active in rooftop solar MSME space

Source: JMK Research

Another major trend is the rise of collateral-free loans for rooftop solar installations for the MSME segment—of the eleven lenders, six provide loans without collateral. However, these loans may include extra eligibility conditions and financial benchmarks, such as a minimum DSCR ratio or CIBIL score. Some schemes, such as SBI Surya Shakti and the scheme from Union Bank, specify an eligibility condition that the electricity savings from the rooftop solar plant should at least cover the monthly repayment obligation towards the loan.

Potential Solutions

Role of SIDBI and other NBFCs

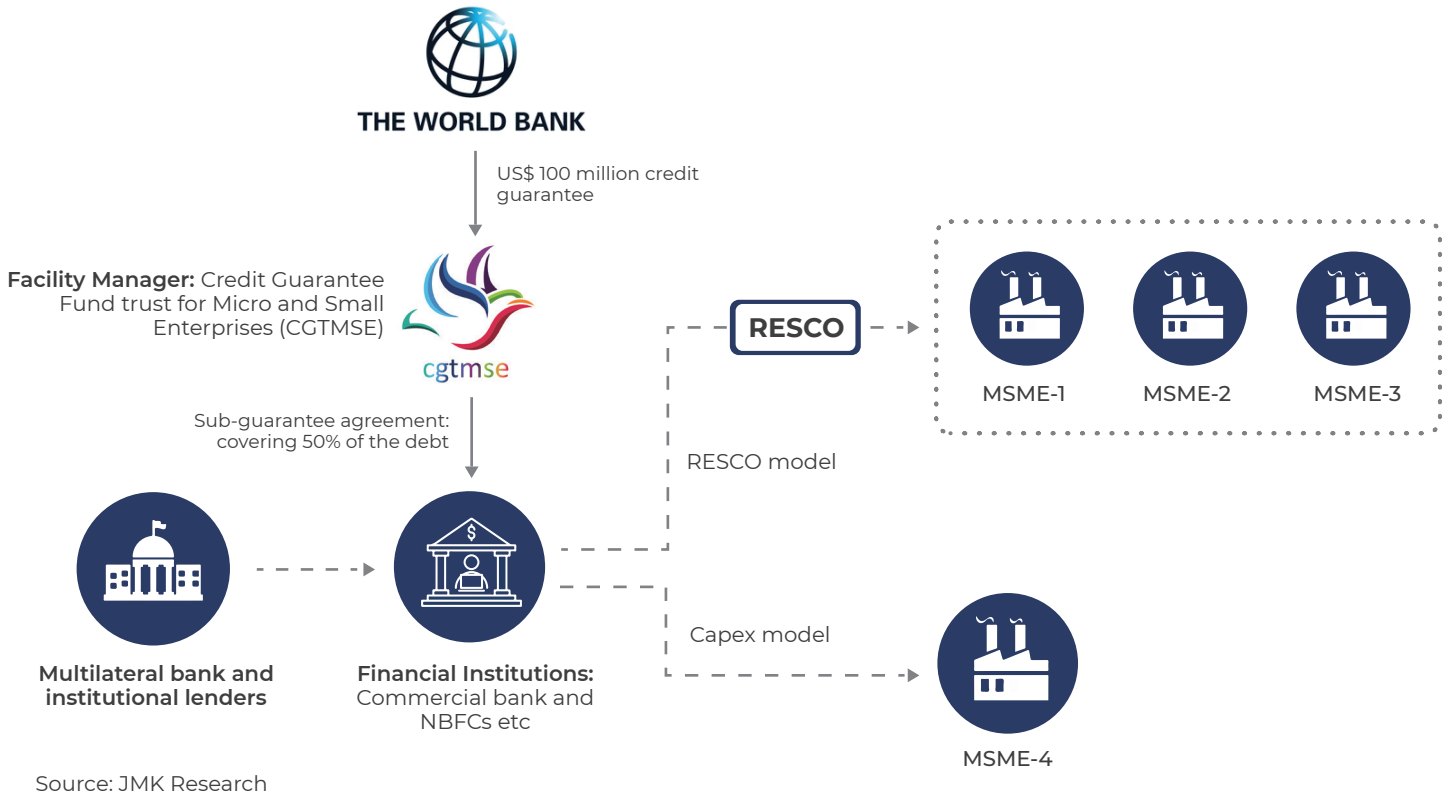
Small Industries Development Bank of India (SIDBI) is the primary financial institution set up by the Indian government to promote, finance, and develop the MSME sector. Going ahead, SIDBI must spearhead an efficient collaborative effort to integrate and streamline the efforts of the other associated NBFCs such as credit guarantee fund trust for micro and small enterprises (CGTMSE - for credit guarantee), commercial banks and power developers to offer a standardized rooftop product to MSMEs.

SIDBI can work with local DISCOMs and regulatory agencies to aggregate the power demand of MSMEs within an industrial cluster. This can be an effective tool for enhancing financing attractiveness to avail solar loans from commercial banks and other lenders. Another way SIDBI can aid MSMEs is by helping them reduce the hassle of paperwork (cited by MSMEs as a significant challenge) involved in solar financing and later in availing net metering provision.

Introduction of novel financing instruments

Averting MSMEs' apparent risk profile will require ingenious interventions in traditional OPEX and CAPEX business models. The evolution of financial instruments and frameworks, such as credit guarantee schemes to cover first-loss or partial-loss in case of payment default, will be critical to increasing rooftop solar uptake by MSMEs. Mezzanine funding structures can also be utilized, wherein the lender can convert the debt into equity in case of non-payment or default. However, mezzanine loans generally incur relatively higher interest rates of more than 12%.

Figure 8.2: Proposed structure and capital flow in the upcoming World Bank credit guarantee mechanism (CGM) scheme



Source: JMK Research

Under the current World Bank-SBI concessional credit line, US$10 million was set aside for investment in risky and innovative business models. Subsequently, the World Bank is working on a credit guarantee mechanism (CGM) scheme. The scheme will involve a US$100 million payment guarantee fund covering up to 50% of the debt financing amount from participating financial institutions to a grid-connected rooftop solar project. The World Bank is likely to approve and announce the scheme this year.

Exploring new fundraising avenues

Until solar financing matures in MSMEs, they will need to look beyond the traditional avenues of funds, such as commercial banks and NBFCs. Raising funds to cover at least a part of the project cost from innovative and newer financial avenues, such as venture capital funds, green or infrastructure bonds, crowdfunding, etc., should be equally explored.

Another innovative financial framework is an end-to-end solution, such as the one offered by ORB Energy, wherein everything from financing, supply, design, construction, and maintenance is covered under one package. An added advantage of such a one-stop solution is the standardization and clarity it brings to the stakeholders of the entire ecosystem, from FIs to developers to MSME consumers.

Table 8.1: Financing parameters of credit to MSMEs offered by ORB Energy

Parameter	Description
Collateral	No collateral requirement
Turnaround duration for loan disbursal	7-10 days
Down payment	0-25%
Interest Rate	12%
Tenure	2-5 years

Source: Orb Energy

As of March 2024, Orb has cumulative installations of more than 280 MW of rooftop solar systems, of which more than 65 MW has used Orb's in-house financing. MSMEs and SMEs together account for more than 64% of the cumulative installations by March 2024.

Like ORB Energy, Aerem Solutions Pvt Ltd. (a private NBFC backed by Blume Ventures and Avaana Capital) is also creating a full stack solution for rooftop solar. For this, Aerem Solutions acquired Spinkraft Ventures (a leading distributor of solar equipment) in May 2024.[12] They plan to offer single point access to customers and EPCs to their solar tech software tools, customized financing solutions, and quality solar procurement.

Government incentives and waivers for MSMEs

To unlock the potential of rooftop solar in MSMEs, the government must offer handholding support until the market matures. This support may be in the form of subsidies, tax credits, waivers on energy charges, or credit guarantee covers.

- Tamil Nadu has waived 50% of networking charges for MSMEs installing solar rooftops.[13]
- In Uttarakhand, the state solar policy has specified that interest (up to 10%, max. Rs. 8 lakhs) and capital subsidy (up to 40%, max. 40 lakhs) will be imparted to MSME consumers investing in solar rooftops.
- In Gujarat, the government provides waivers and incentives on energy charges in addition to interest subsidies. The surplus injection rate for MSME consumers is Rs 2.25/kWh, around 28% higher than other C&I consumers. Also, the banking charges for MSME consumers are set lower at Rs 1.1/kWh vis-à-vis Rs 1.5/kWh for other C&I consumers.

[12] Aerem. **Aerem announces strategic acquisition of Spinkraft Ventures.** May 2024

[13] Economic Times. **Why India must focus on MSMEs for meaningful energy transition.** September 2023

Financing Challenges In The RE C&I Solar Market

The dearth of institutional finance, especially in the rooftop segment, is a significant impediment to the uptake of solar in the C&I market. The contributing factors to this trend and the affected market stakeholders are demarcated in the table below.

Table 9.1: Financing Challenges in C&I RE solar, by affected market stakeholders

Description	Large C&I Consumers	MSMEs	Developers/ Installers	Financing institutions (FIs)
Unfavorable borrowing conditions • High rate of interest • Strict collateral requirements • Short tenure • Stringent creditworthiness check	✓	✓		
Underdeveloped financial ecosystem. • Difficult access to institutional finance • Dearth of innovative financial instruments • Unmatured securities market, including credit guarantee funds, insurance products		✓	✓	
Disadvantageous market dynamics • Lack of credit-worthy (BBB+) consumers • Divestment of capital from C&I rooftop to open access and utility markets			✓	✓
Lack of government support • The government will likely not approve C&I rooftop concessional credit lines anymore. • Lack of standard impactful clear rooftop guidelines for states, similar to “Green Open Access Rules.”	✓	✓	✓	✓
Perceived operational challenges/risks. • Business insolvency of consumer • Loss of generation (caused by degradation of modules, substandard operational main tenance)			✓	✓

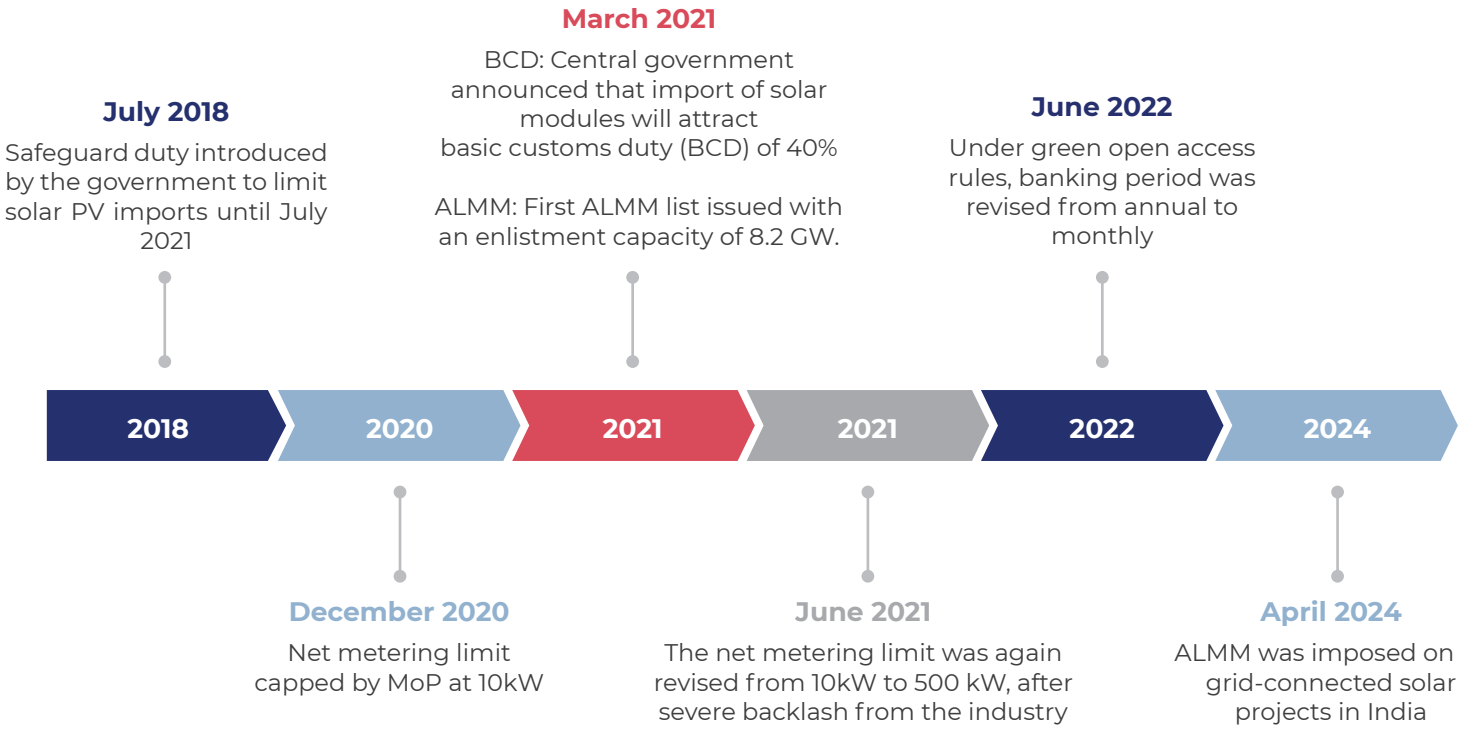
Regulatory Flip-Flops Impacting C&I Sector Financing

The C&I solar market in India faces uncertainty and ambiguity regarding several associated market regulations. The regulatory challenges specific to the C&I market primarily arise from the discontent of state DISCOMs unwilling to part revenue from its high-paying C&I consumers shifting to renewable energy sources. In addition, some other overarching RE central regulations, such as the approved list of models and manufacturers (ALMM) and basic customs duty (BCD), also contribute to this ambiguity.

Although the regulatory challenges in the C&I open access market were partly addressed by the "Green open access rules" issued by the government in June 2022, the flip-flops in policy design continue to persist in C&I rooftop sector.

Policy uncertainties undermine the country's overall RE ambitions and demotivate financers and lenders to invest in C&I RE. Frequently changing regulations and the imposition of new charges create uncertainty among investors about the long-term profitability of these projects.

Figure 10.1: Timeline of major regulatory flip-flops that impacted the C&I solar market



Source: JMK Research

An attractive net metering policy is considered vital to the growth of C&I rooftop solar. On the contrary, several states have either reduced the net metering limits or replaced them altogether in favor of financially

unattractive provisions, such as gross metering or net billing. Fluctuations in net metering provisions are clearly demonstrated by the central government's mandated revision to 10kW in December 2022 and then finally to 500kW in June 2021.

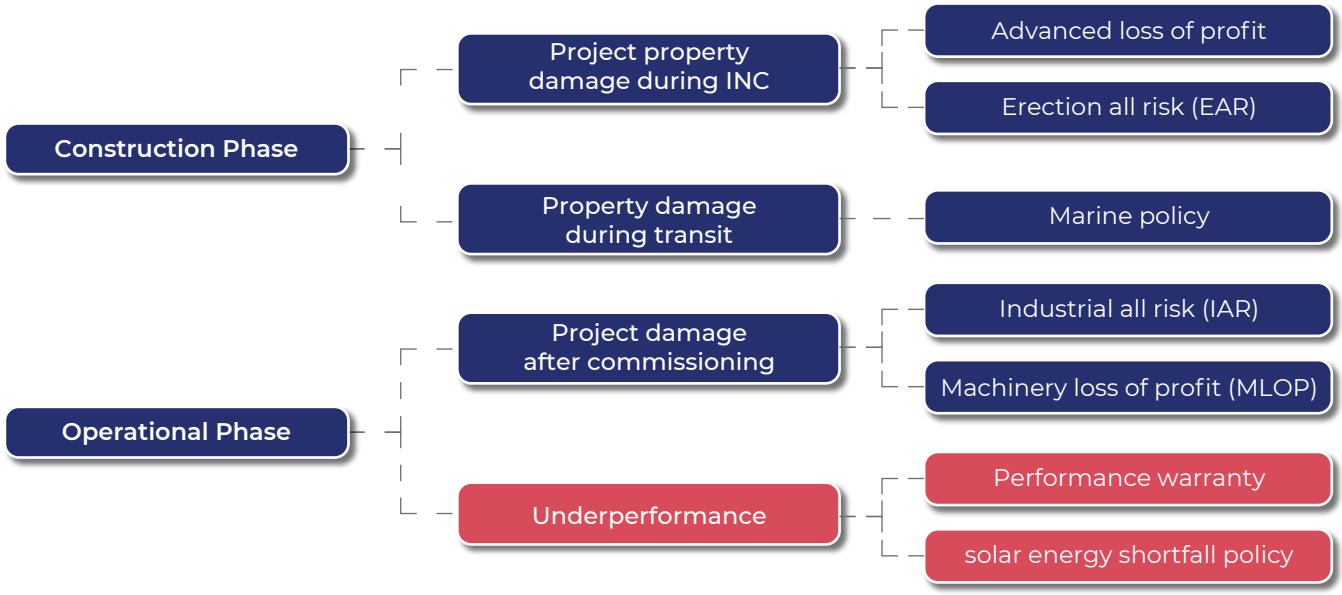
Initially, the ALMM was to be implemented from April 2022. Since then, it has been deferred multiple times to October 2022, April 2023, and lastly to April 2024. On 9th February 2024, MNRE notified that ALMM will be applicable from April 2024, except for captive open access projects.[14] However, just a few days later, on 15th February, MNRE rescinded this order and kept it under abeyance until further notice, further increasing uncertainty and keeping market stakeholders in limbo.[15] Finally, on 28th March 2024, MNRE declared that ALMM will be applicable for all grid-connected solar projects in India from April 2024.

Multilateral banks, who typically fund the C&I rooftop solar through concessional credit lines, do not prefer domestic content requirement (DCR) based modules in their projects. These multilateral banks perceive ALMM as an extension of the DCR program. In addition, the imposition of heavy duties of 40% on imported modules through BCD has further complicated matters, especially for the developers aiming to avail concessional financing for their projects.

Role of Insurance Providers

A suitable insurance cover can alleviate the risks associated with solar, thereby driving investments into the sector. Several project risks are common across the energy sector and industry, including property damage during installation and commissioning (INC), transit, fires, natural calamities, etc. Hence, the insurers have designed broad industry-level blanket policies for these risks. These include erection all risk (EAR), industrial all risk (IAR), marine policy etc.

Figure 11.1: Demarcation of solar risks and associated insurance covers type



Source: JMK Research
Note: Cells with red background are used to highlight specificity to the solar sector

[14] MNRE. Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order, 2019 – reg. February 2024

[15] MNRE. Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order, 2019 – reg. February 2024

However, solar (along with wind) presents an added risk regarding its invariability and unpredictability driven by associated weather conditions. Specially designed insurance covers avert the "underperformance" risk of solar assets due to unpredictable weather scenarios, fluctuations in policy design, faulty solar modules, etc. PV is a relatively newer asset type, so insurance companies are revisiting rates and offerings as more actual performance data becomes available in the market.

Several leading Indian insurers offer solar-specific insurance covers, such as HDFC ERGO, ICICI Lombard, IFFCO Tokio, Tata AIG, etc. The covers provide coverage against degradation or damage to PV modules, such as module performance warranty, shortfall in energy production, and damage to the overall solar plant or its components. Insured entities, which can be module manufacturers, RESCO, or end consumers, can request to structure insurance products for a specific project or an entire portfolio.

Figure 11.2: Key insurers in the solar sector in India, based on specific risks covered

Insurer	Module performance warranty	Energy shortfall policy	Property damage insurance (including solar plant)
HDFC ERGO	✓	✓	
ICICI Lombard	✓		✓
IFFCO Tokio	✓		✓
Tata AIG	✓		
New India Assurance	✓		
SBI General Insurance			✓
Cholamandalam MS General Insurance		✓	✓
Marsh India	✓	✓	

Source: JMK Research

Access to insurance is necessary to limit exposure to various risk factors. ***According to market stakeholders, annual insurance expense for solar projects is 0.5-1% of capital invested in the project, resulting in an impact on PPA tariffs of around 0.2-0.3 per kWh.*** The structural uniqueness of solar rooftops leads to risks specific to this market segment, such as increased fire risk due to combustible roof loading, limitations of sufficient area, etc. Hence, there is a need for solar rooftop focused insurance products in the market.

Way Forward

The shift of concessional financing towards non-C&I market segments in rooftop solar

When concessional financing for C&I rooftop solar in India was introduced almost a decade ago, this market segment was still in its infancy. Over the years, the C&I rooftop market stakeholders, including developers, consumers, and lenders (commercial banks, NBFCs, etc.), have significantly matured in the nuances and intricacies of project selection, business models, identification of risk factors, and challenges of any given scenario.

Thus, in the years ahead, concessional financing will shift to riskier and still largely unexplored segments within "solar rooftop," such as MSMEs and residential solar. The recently launched Pradhan Mantri Suryodaya Yojana, under which one crore households are targeted for solar installations, is an indirect active call and the official mark of government support to lenders to mobilize investments in this space[16].

Number of households targeted under PM Suryoday Yojana

Emerging business solutions in C&I open access to drive sector investments

Open access is experiencing organic growth driven by larger project sizes, an improving regulatory landscape, and corporates' ever-increasing focus on decarbonization. All major renewable energy OA players have a healthy pipeline of projects with strong financial backing from investors.

Emerging business solutions under open access, such as wind-solar hybrid, ISTS, energy storage, round-the-clock (RTC), virtual PPA (VPPA), etc., further showcase the vibrancy of this market segment. Thus, going ahead, most of the investment inflow in the C&I RE market will be under the open access mechanism.

The development of Green Hydrogen in C&I sector energy needs will lead to a further influx of investments

Under the aegis of the "National Green Hydrogen Mission (NGHS)," the government aims to establish a green hydrogen production capacity of 5 million metric tonnes per annum (MMTPA) in India and facilitate investments of Rs. 8 lakh crores (US$96.4 billion) by 2030.[17]

Proliferation of green hydrogen consumption in industrial entities' core operations will lead to an indirect upsurge in RE installations. Most of this new RE capacity will be set up under the C&I open access mechanism, expediting additional capital influx.

[16]NarendraModi.in. **1 crore households to get rooftop solar under Pradhan Mantri Suryodaya Yojana**. January 2024

[17]PIB. **Cabinet approves National Green Hydrogen Mission.** January 2023

More financers to offer one-stop solutions for small-scale installations

Orb energy offers a one stop solution for C&I consumers aiming to install rooftop solar, which includes financing, supply, design, construction, and maintenance under a single package. Aerem solutions (with Spinkraft) and Tata power (with Ecofy) have recently declared to offer similar financing products. Ecofy also partnered with Waaree to finance and install over 10,000 rooftop projects specifically for residential and MSMEs, mobilizing more than Rs 100 crores of capital in the process.

Going ahead, this trend will pick up as companies which have presence in multiple solar verticals will try to offer an integrated product. This will significantly reduce the hassle and turnaround time of the whole process for small-scale consumers.

Conclusion

The RE C&I market has matured considerably compared to 10 years ago. The maturity is evident in market stakeholders' awareness of the selection of RE technology employed, financing instruments available, and RE developer's diversified solution offerings.

Concessional credit lines, first introduced for C&I rooftop solar in 2016, have successfully catalyzed the C&I rooftop solar market. Although the direct rooftop solar target under these concessional credit schemes was cumulatively around 1.2 GW (miniscule compared to the overall rooftop solar target of India, i.e., 40 GW), they have achieved their prime objective, viz. instilling investor confidence in the market. However, the credit lines are almost over, and concessional finance will likely not be available anymore for the C&I rooftop. Simultaneously, some market stakeholders claim that concessional credit schemes will no longer be necessary, and organic growth driven by solid market mechanisms will be more suitable for all-round development.

While the OA market is soaring, the C&I rooftop still faces several headwinds in its growth. There is a dearth of high-credit C&I consumers. The government support, especially at the state level, is considerably less for

C&I rooftop vis-à-vis OA. Although the situation has improved significantly, institutional lenders such as commercial banks still perceive rooftop solar as risky. Hence, to alleviate these challenges, there is a huge scope of innovative finance mechanisms to support market development, such as blended finance, credit guarantee mechanisms, etc.

Even though the market potential of rooftop solar in MSMEs is 15 GW, it is still largely untapped. The lack of access to affordable institutional finance is a significant impediment in MSMEs vying to go solar, with traditional lenders vary of investing in this distributed and risky market segment. Similar to residential, government support can be crucial in unleashing the potential of MSMEs. To kickstart development, the government can offer subsidies to MSMEs setting up captive RE projects under rooftop and open access mechanisms. Local DISCOMs can act as demand aggregators as well as developers for setting up these projects. This underlying support from a state government agency will enable MSMEs to avail RE project financing at much more suitable terms and significantly reduce the associated loan paperwork hassle. A credit guarantee scheme, an innovative financial instrument, is currently being developed by the World Bank to mitigate the risks of FIs lending to MSME rooftop solar in India. However, its pricing (currently perceived as high by market stakeholders) and on-ground implementation will ultimately define its effectiveness.

Refinancing (often coupled with bridge financing) and blended finance will be other effective ways to reduce the cost of capital in C&I RE market, especially for emerging market segment of MSMEs. Blended finance should address market failure and enable crowding in rather than crowding out by not creating any unfair advantages to a specific market player. In addition, when blended finance eventually goes away, the targeted sector should be commercially viable.

Going ahead, the insurance market is set to play a vital role in the C&I RE sector, especially considering the increasing complexities and scale of C&I RE projects. With the rising importance of power quality, future C&I RE projects will be highly integrated and will include and combine several RE technologies and projects spread across different locations, all controlled by complex control systems guiding the project operations. These include wind-solar hybrid, energy storage, RTC, ISTS-based C&I RE projects, etc.

Financing support will be a crucial factor in the decarbonization journey of Indian C&I entities. It will be the responsibility of Financing Institutions such as commercial banks and NBFCs to offer enough liquidity in the market and the government to set up a favorable ecosystem for C&I RE development.

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