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Impact of Green Energy Open Access Rules, 2022

Twenty-eight states have adopted the rules, either by implementing or drafting the regulations

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Key Findings

The Green Energy Open Access (GEOA) Rules, 2022 brought in clarity on critical aspects like consumer eligibility, electricity banking and the various charges associated with open access, such as banking and standby charges.

The GEOA Rules have gained significant momentum, with almost all states in India having adopted them.

Poor coordination between state nodal agencies and DISCOMs hinders the functioning of the Green Open Access Registry portal.

Since the release of the GEOA Rules, the Commercial and Industrial (C&I) renewable energy open-access market in India has witnessed remarkable growth. The C&I open access market's annual installed capacity grew by 90.4% between FY2023 and FY2024.

Executive Summary

The Green Energy Open Access (GEOA) Rules have widened renewable energy access by bringing in regulatory clarity and a favourable business environment. This has led to record open access installations in the fiscal year (FY)2023 and FY2024, with cumulative capacity reaching 18.7 gigawatts (GW) by the end of FY2024. Several key opportunities, however, remain underexplored – from enabling micro, small and medium enterprises to embrace green energy solutions to harnessing the potential of the Inter-State Transmission System. It is also imperative that after adopting these rules, states focus on translating them into actual project development.

The Green Energy Open Access (GEOA) Rules, implemented by the Ministry of Power in June 2022, introduced reforms to enhance access to renewable energy for India's commercial and industrial (C&I) consumers. These rules clarified various aspects like the eligibility criteria, banking provisions and associated charges while providing exemptions from surcharges. The eligibility limit for open access was reduced from 1 megawatt (MW) to 100 kilowatts (kW), expanding access to smaller consumers.

Subsequently, the Ministry of Power issued two amendments in 2023 to strengthen the GEOA framework. These amendments enabled demand aggregation through multiple connections while also clearing the ambiguity surrounding banking charges and settlement periods.

As of November 2024, 28 out of 29 Indian states and Union Territories have adopted the GEOA initiative, either by implementing or drafting regulations. Kerala remains the only state without GEOA provisions, leaving a gap in the otherwise comprehensive rollout.

The GEOA market has attracted new developers such as Kalpa Power, JSW Energy and Ampyr Energy, in addition to established companies like ReNew Power and Avaada Energy. The regulatory support provided by GEOA has spurred rapid growth in the C&I open access market, achieving a compound annual growth rate of 46% from the fiscal year (FY) 2022 to FY2024, with cumulative capacity reaching 18.7 gigawatts (GW) by the end of FY2024. Gujarat and Rajasthan have been at the forefront of this growth, accounting for more than 70% of recent installations.

The GEOA Rules have made significant strides in expanding renewable energy access for C&I consumers in India. Yet, several challenges persist. State deviations from central GEOA Rules have created inconsistencies, particularly around the eligibility criteria, approval timelines and charges. While most states align with the central 100kW threshold for eligibility, states like Tamil Nadu, Karnataka and Uttar Pradesh do not adhere to this. Approval processes vary widely across regions

due to procedural bottlenecks and the reluctance of electricity distribution companies (DISCOMs) to extend timelines beyond the specified 15-day approval period. Additional state-imposed charges, such as Karnataka's facilitation fee and Rajasthan's Renewable Energy Development Fund, further increase project costs.

The Green Open Access Registry (GOAR) portal, created as a single-window platform for open-access registration and applications, faces significant limitations that hinder its effectiveness. There is no synchronisation between State Load Dispatch Centers (SLDCs) and DISCOMs, leading to delays. Furthermore, the portal occasionally struggles to recognise group captive models.

Despite these challenges, the GEOA market offers opportunities in potentially untapped areas. In particular, micro, small and medium enterprises (MSMEs) are a potential market, given that GEOA's revised eligibility threshold has opened the door for smaller enterprises. While interest from MSMEs is rising, adoption remains limited as the relatively small project sizes have attracted limited attention from developers.

To fully unlock GEOA's potential, immediate recommendations include enhancing the GOAR portal by improving DISCOMs and SLDCs integration. Temporarily lifting the Approved List of Models and Manufacturers mandate would also reduce module costs and speed up project execution. In the near term, creating a more stable regulatory environment is crucial. This can be achieved by standardising policies on banking charges and settlement periods, and extending Inter-State Transmission System (ISTS) support for better connectivity. For long-term impact, expanding the energy exchange market through policy incentives can encourage participation, while innovative financing structures like infrastructure investment trusts (InvITs) and bonds can address funding gaps.

Additionally, the underutilised ISTS could help C&I consumers access affordable power in states with limited renewable energy options. Extending the ISTS waiver beyond 2025 would ensure that transmission costs remain competitive and attract new investments.

While the GEOA Rules have widened renewable energy access, overcoming challenges and seizing untapped opportunities are crucial for sustaining and accelerating growth. By implementing strategic recommendations and fostering a supportive regulatory and financial environment, GEOA can be pivotal in advancing India's renewable energy goals and ensuring a greener, more sustainable future for businesses.

Introduction

The Electricity Act, 2003 introduced open access in the electricity sector to improve reliability, promote competition among stakeholders and enhance power supply quality by giving buyers and suppliers a choice. Under the Act, consumers with a connected load of 1 megawatt (MW) or more could purchase electricity directly from generators or the open market.[1]

The Act brought in the non-discriminatory use of transmission lines, distribution systems or associated facilities by any licensee or consumer as per the regulations of the appropriate commission. It has helped commercial and industrial (C&I) consumers reduce their electricity costs by sourcing cheaper power. There are no restrictions on the type of power source used in open-access purchases.

In August 2022, India revised its Nationally Determined Contributions (NDCs), pledging to achieve net-zero emissions by 2070. It aims to meet half of its total installed capacity from non-fossil fuel energy sources by 2030 and reduce its emissions intensity by 45% relative to its gross domestic product (GDP) by 2030, compared with 2005 levels.[2] In the build-up to the NDCs announcement and to promote clean electricity generation, purchase and consumption, the Ministry of Power introduced the Green Energy Open Access (GEOA) Rules in June 2022.[3]

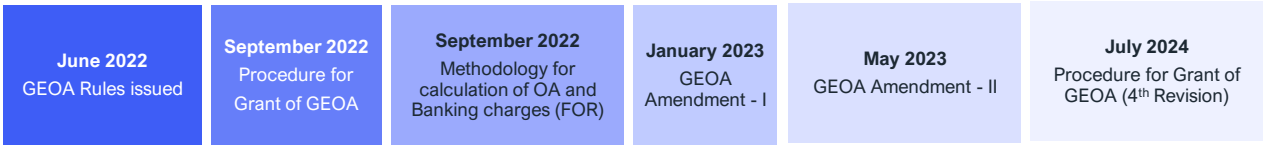
The rules address the challenges under the open access framework established by the Electricity Act, 2003, offering a streamlined pathway for renewable energy procurement. The earlier system lacked a structure to facilitate C&I consumer access to renewable energy, resulting in continued reliance on fossil fuel-based grid power. This dependence not only limited consumers' energy choices but also exposed them to price volatility and supply disruptions. Inconsistent state-level policies and regulatory uncertainties further exacerbated these issues.

Green Energy Open Access Rules, 2022

The GEOA Rules introduced key reforms to simplify renewable energy access for C&I consumers. These rules clarified critical aspects like consumer eligibility, electricity banking and the various charges associated with open access, such as banking and standby charges. It introduced exemptions on additional surcharges to boost investment in green energy, benefiting offshore wind and green hydrogen projects. The rules created a user-friendly and investor-friendly framework by streamlining processes and reducing costs, driving momentum in India's renewable energy sector. For an in-depth analysis of the original GEOA Rules, refer to our previous report, "India's Renewable Energy Open Access Market: Trends and Outlook".

[1] Central Electricity Authority (CEA). Electricity Act 2003. 2003.
[2] Press Information Bureau (PIB). Commitments made under CoP 26. December 2022.
[3] Green Energy Open Access. GOAR Rules & Amendments. June 2022.

Figure 1: Timeline of GEOA Regulations



Source: Green Open Access Registry portal

The Ministry of Power amended the GEOA Rules in January 2023[4] and May 2023[5], bringing in several key changes.

- One of the most significant changes was allowing **aggregation of the minimum contract** demand for eligibility. This allowed the grouping of smaller connections, promoting the growth of smaller-scale renewable energy projects and fostering a decentralised energy generation landscape.
- **Offshore wind** projects commissioned by December 2032 were exempt from additional surcharges.
- The amended rules also raised **standby charges** from 10% to 25% of the respective state's energy charges to ensure grid stability and improve demand management.
- The amendments improved the clarity of energy banking provisions by **defining the banking cycle**, empowering states to offer banking with a settlement period of more than one month.

Table 1: Salient Features of GEOA Rules (after amendments)

Parameters	GEOA Rules (after amendments)
Eligibility	• Any consumer (with single or multiple connections) ***having aggregated contract demand/sanctioned*** load ≥ 100 kilowatt (kW) • No capacity limit for captive consumers
Nodal Agency	• Central Transmission Utility (CTU) - for inter-state General Network Access (GNA) • State Transmission Utility (STU) - for intra-state LTOA and MTOA • Regional Load Dispatch Centre (RLDC) - for inter-state temporary GNA • State Load Dispatch Centre (SLDC) - for intra-state STOA
Open Access Charges	• After adding two charges, six kinds of open access charges have been specified: • Transmission charges • Standby charges • Wheeling charges • Cross Subsidy Surcharge (CSS) • Banking charges • ***Other fees and charges*** such as load dispatch centre fees and scheduling charges, deviation settlement charges as per the relevant regulations of the commission • Additional Surcharge (AS) is not applicable if electricity is produced from ***offshore wind projects commissioned up to December 2032*** and supplied to the Open Access Consumer.

[4] Gazette of India. Electricity (Promoting Renewable Energy Through Green Energy Open Access) Amendment Rules, 2023. 27 January 2023.
[5] Gazette of India. Electricity (Promoting Renewable Energy Through Green Energy Open Access)(Second Amendment) Rules, 2023. 23 May 2023.

	• CSS and AS do not apply if power is produced from Waste-to-Energy plants. • Standby charges <= ***25%*** of energy charges
Banking	• Minimum banking settlement period: Monthly (at least) • Minimum banking allowed (as % of energy consumption): 30% • Credit for the banked energy cannot be carried forward to the subsequent ***banking cycles*** and unutilised surplus banked energy shall be considered lapsed at the end of each ***banking cycle***
Open Access Grant Procedure	• All open access applications are to be submitted on the centralised open access portal • Approval window of open access applications by concerned nodal agency: 15 days • Open access applications priority: LTOA • Open access applications priority in the same category: First in, first out

Source: Ministry of Power, JMK Research
Note: Blue text denotes the amendments to the original GEOA Rules

Apart from the amendments, the Ministry of Power has directed the Forum of Regulators (FOR) and the National Load Dispatch Centre (NLDC) to formulate enabling provisions for open access, as stipulated in the GEOA.[6]

- In September 2022, the FOR released a report on **Developing Model Regulations on Methodology for Calculation of Open Access and Banking Charges** under the GEOA Rules.[7] This report established a transparent methodology for determining open access charges, ensuring they are reasonable and reflect the actual cost incurred by distribution licensees.
- In September 2022, the NLDC issued a comprehensive report on the **Procedure for Grant of Green Energy Open Access**, detailing processes for approvals, revisions, curtailments and obtaining standing clearance.[8] The NLDC has revised the document four times to incorporate feedback from the FOR and GEOA amendments, standardising the process and streamlining open access to renewable energy.

State-wise Adoption Status

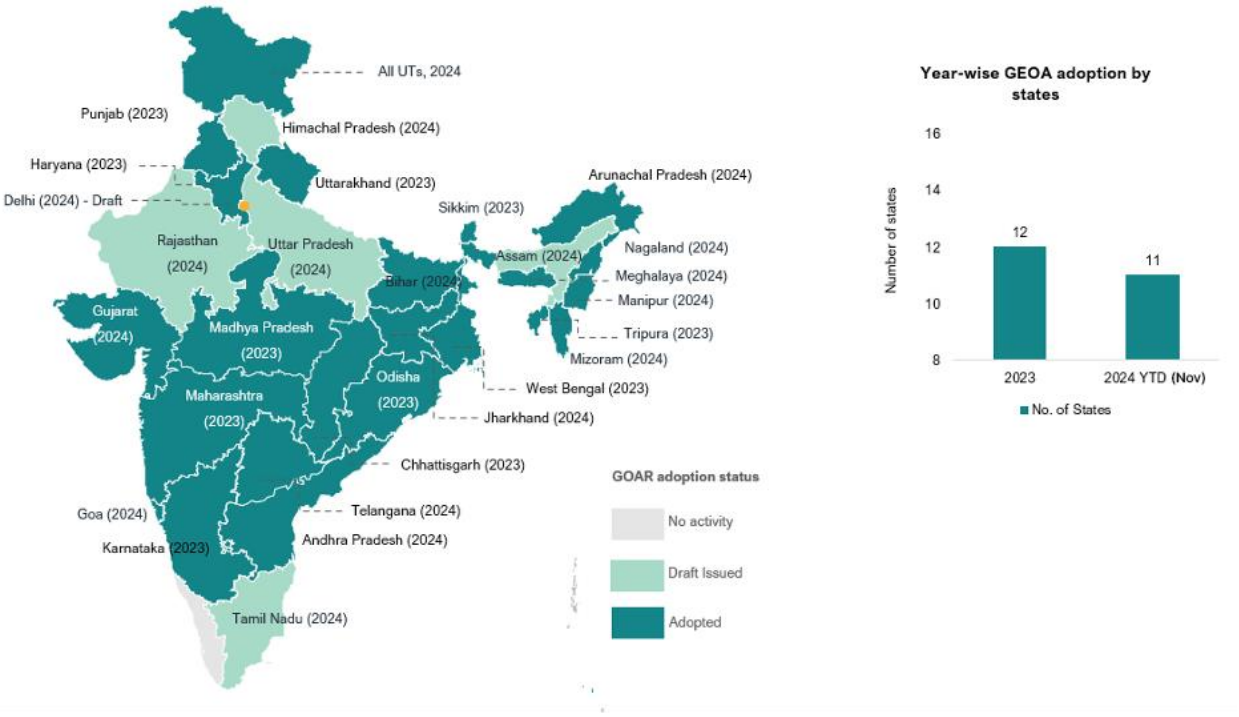
As of November 2024, the GEOA initiative has gained significant momentum, with 23 out of 29 Indian states and Union Territories formally adopting GEOA regulations to facilitate open access to renewable energy. In 2023, 12 states took swift action to adopt the GEOA regulations.[9]

The pace continued to pick up in 2024, with 11 more states adopting the GEOA framework. However, Uttar Pradesh, Himachal Pradesh, Tamil Nadu, Rajasthan, Delhi and Assam have only

[6] Green Energy Open Access. GOAR Rules & Amendments. June 2022.
[7] Forum of Regulators (FOR). Developing Model Regulations on Methodology for Calculation of Open Access Charges and Banking Charges. September 2022.
[8] National Load Despatch Center. Procedure for Grant of Green Energy Open Access. July 2024.
[9] GOAR Portal. GOAR – State Regulations.

drafted regulations. Kerala is the only state without any GEOA provisions in an otherwise nearly comprehensive rollout of the GEOA initiative.

Figure 2: Adoption of GEOA Rules across States (status as of November 2024)



Source: SERCs, JMK Research

Impact of GEOA Rules

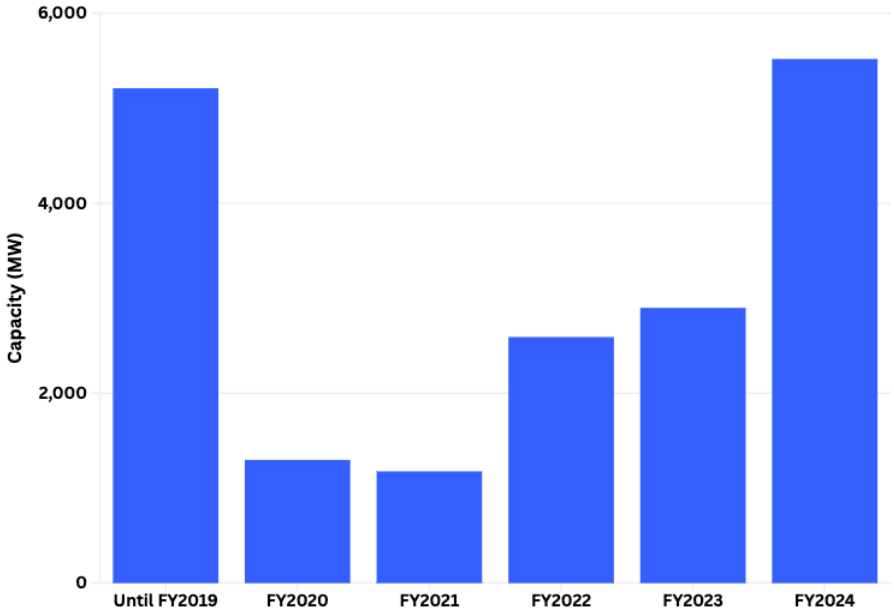
The introduction of the GEOA Rules has reshaped the renewable energy landscape in India, setting the stage for significant advancements in accessibility and market participation. Over the last two years, the sector has witnessed an upsurge in installed capacity and new market entrants. Consolidating regulations at both the central and state levels has created a more cohesive regulatory framework, fostering transparency and ease of operations.

GEOA Market Growth

Since the release of the GEOA Rules in June 2022, India's C&I renewable energy open-access market has witnessed remarkable growth. According to JMK Research, the market recorded a compound annual growth rate of 46% between the fiscal year (FY) 2022 and FY2024, expanding from 10.2 gigawatts (GW) in 2022 to an impressive cumulative of 18.7GW in FY2024. The impact of GEOA Rules is particularly evident between FY2023 and FY2024, with a remarkable 90.4% increase in annual installed capacity.

- Over 70% of the total capacity additions were in Gujarat, Tamil Nadu, Karnataka, Maharashtra and Rajasthan, which benefited from green energy policies. Gujarat and Rajasthan led the surge, adding 1.43GW and 0.98GW in FY2024, respectively.
- JMK Research estimates that open access annual installations could exceed 6GW in FY2025.

Figure 3: GEOA Annual Installed Capacity Trend



Source: Industry sources, JMK Research. Note: Capacity includes both solar and wind

New Market Entrants

After the GEOA Rules came into effect, developers like Kalpa Power, JSW Energy and Ampyr Energy shifted their attention to the green energy open access market. Other companies like ReNew Power, Avaada Energy, Azure Power, O2 Power, Sembcorp and Statkraft, which entered the open access business in the past four years, have also established a substantial project portfolio. These developers can leverage favourable state regulations and diversify their revenue streams by tapping into the demand from C&I consumers seeking sustainable energy solutions.

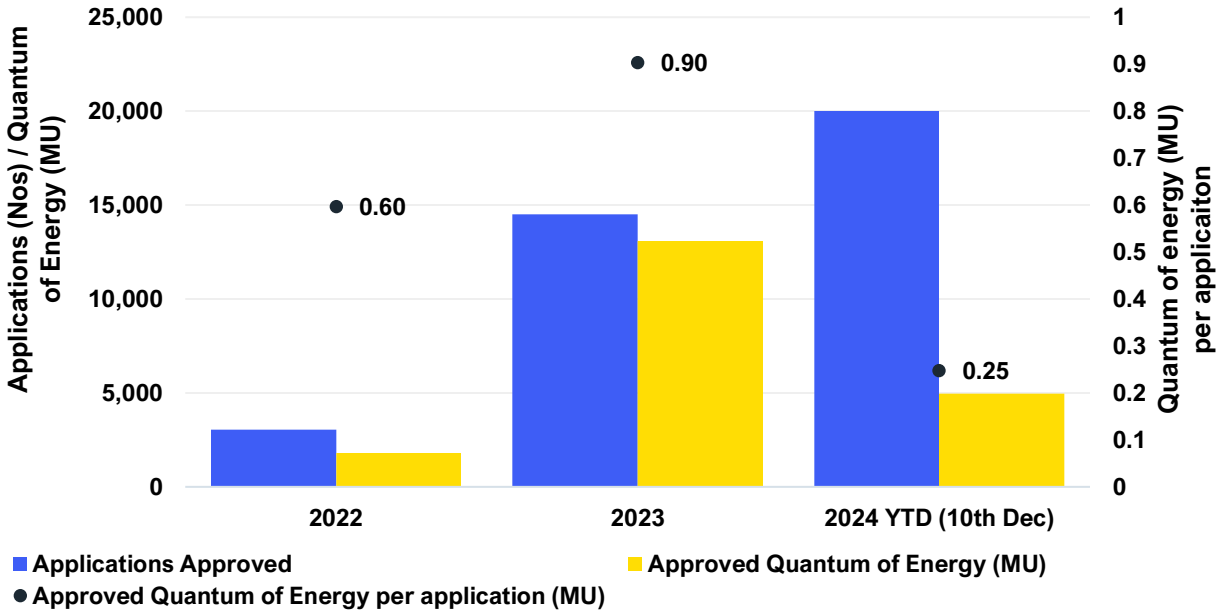
With the eligibility threshold lowered to an aggregated demand of 100kW, smaller developers and commercial consumers can participate in green energy initiatives. This has enabled them to adopt sustainable energy practices, regardless of their technical limitations and space constraints.

Growth of Green Open Access Registry Portal

The Green Open Access Registry (GOAR) portal, launched after the notification of the GEOA Rules, represents a seismic shift in green open access development in India. The national-level centralised

portal aims to streamline the application process for consumers and developers and allows stakeholders to track and assess market progress.

Figure 4: GEOA Applications and Quantum of Energy Approved on the Portal



Source: GOAR portal, JMK Research

By 10th December 2024, over 37,558 applications for GEOA had been approved, representing a cumulative 19,892 million units (MUs) of electrical energy.[10] A recent trend has been the drop in the approved quantum of energy per application between 2023 and 2024 from 0.9MU to 0.25MU. A surge in applications from consumers falling within the newly introduced 100kW to 1MW eligibility range has driven the decline, indicating broader market engagement under the revised regulations.

Standardisation of Regulations Across States

The central GEOA Rules have established a uniform framework for renewable energy procurement through open access, harmonising charges, approvals and banking provisions across states. This standardisation has significantly reduced regulatory uncertainty and minimised disparities in state-level policies, making it easier for businesses and developers to navigate the renewable energy sector. Streamlining the approval process and providing clear guidelines facilitate smoother project execution. The consistency in policies has helped boost investor confidence, enhancing the viability of renewable energy open-access projects.

[10] GOAR Portal. Green Open Access Registry.

Challenges Needing Resolution

The GEOA Rules face numerous challenges that hinder their implementation. We can classify these challenges broadly into state-wise deviations, procedural and others.

Deviations from GEOA Rules

Although states have made progress in adopting the GEOA Rules, most have deviated from the central guidelines. As electricity is a concurrent subject under the Indian Constitution, the central and state governments can both make laws on it. This has led to several states exercising discretion while formulating GEOA policies. We present a comprehensive list of state-wise deviations presented in the following table.

Table 2: State Regulations vis-à-vis Central GEOA Rules

State	Open Access Eligibility	GEOA Approval Window	Timeframes for GEOA (STOA, MTOA, LTOA)	Open Access Charges	Energy Banking	Standby Charges
Central	Single or multiple connections with aggregated contract demand ≥ 100kW No capacity limit for captive consumers	15 days	NA	Transmission, wheeling, CSS, standby, banking and other charges such as scheduling charges, DSM charges	Period = at least monthly Quantum = 30% Charges = 8%	25% of energy charges
Karnataka	Single connection with contract demand ≥ 100kW No capacity limit for captive consumers	15 days	LTOA≥ 5 years 1 year<MTOA< 5 years STOA≤1 year	Transmission, wheeling, CSS, standby, banking, grid support charges	Period = monthly Quantum = 30% Charges = 8%	NA
Maharashtra	Single or multiple connections with aggregated contract demand ≥ 100kW No capacity limit for captive consumers	30 days	7≤LTOA<12 years 3 months<MTOA≤5 years STOA≤1 month	Transmission, wheeling, CSS, standby, banking and other charges	Period = monthly Quantum = NA Charges = 8%	NA
Gujarat	Single or multiple connections with aggregated contract demand ≥ 100kW No capacity limit for captive consumers	Eight days	12≤LTOA≤25 years 3 months≤MTOA≤3 years STOA≤1 month	Transmission, wheeling, CSS, standby, banking and other charges	Period = daily for solar; monthly for wind and hybrid Quantum = 30% Charges = Rs1.5/kilowatt-hour (kWh) (US¢1.8/kWh)	10% of energy charges

Tamil Nadu*	EHT and HT consumers with contracted demand ≥ 63 kilovolt-amperes (kVA) No capacity limit for captive consumers	NA	12≤LTOA≤25 years 3 months≤MTOA≤3 years STOA≤1 month	Transmission, wheeling, CSS, standby, banking and other charges	Period = monthly Quantum = NA Charges = 8%	NA
Rajasthan*	Single or multiple connections with aggregated contract demand ≥ 100 kW No capacity limit for captive consumers	NA	12≤LTOA≤25 years 3 months≤MTOA≤3 years STOA≤1 month	Transmission, wheeling, CSS, standby, banking and other charges	Period = annual Quantum = less than 30% Charges = 8%	25% of energy charges
Madhya Pradesh	Single or multiple connections with aggregated contract demand ≥ 100kW No capacity limit for captive consumers	NA	NA	Transmission, wheeling, CSS, standby, banking and other charges	Period = at least monthly Quantum = at least 30% Charges = 8%	At most, 25% of energy charges
Uttar Pradesh*	Single or multiple connections with aggregated contract demand ≥ 100kW (<= 150kW in case of multiple connections) No capacity limit for captive consumers	STOA- 15 days MTOA- 30 days	5 years<LTOA≤25 years 11 months<MTOA≤3 years STOA≤11 months	Transmission, wheeling, CSS, standby, banking and other charges	NA	= 0 (Embedded Open Access consumer) = 125% of demand and energy charge
Telangana	Single or multiple connections with aggregated contract demand ≥ 100kW No capacity limit for captive consumers	12 days	7 years<LTOA≤25 years 1 month<MTOA≤7years STOA≤1 month	Transmission, standby, wheeling, CSS, AS, banking, reactive and imbalance charges and others	Period = at least monthly Quantum = 30% Charges = 8%	NA
Chhattisgarh	Single or multiple connections with aggregated	NA	NA	Transmission, standby, wheeling, CSS, AS, banking, and others	Period = at least monthly Quantum = at least 30% Charges = 2%	=125% of energy charges

	contract demand ≥ 100kW					
Andhra Pradesh	Single or multiple connections with aggregated contract demand ≥ 100kW	NA	LTOA≥5 yrs 1<MTOA<5 yrs STOA≤1 year	Transmission, standby, wheeling, CSS, AS, banking, reactive energy charges and others	Period = monthly Quantum = 30% Charges = 8%	=125% of energy charges

Source: Respective state energy regulatory commissions
*Note: *- States with draft Green Energy Open Access Policy are marked with an asterisk*
Red highlighted provisions are deviations from central GEOA policy, while green represents information not announced in the state GEOA policies

GEOA Eligibility

Most states have aligned their eligibility criteria with central guidelines, which specify a minimum contracted demand of 100kW for both single and aggregated connections. This alignment intends to create a uniform framework that facilitates easier access to renewable energy for C&I consumers. However, some states have introduced variations in their eligibility criteria, leading to inconsistencies in access to GEOA.

- In Tamil Nadu, eligibility is determined by specific consumer categories, with a minimum demand requirement of 63kVA.
- Karnataka has established a GEOA framework that permits access only through a single connection model.
- Uttar Pradesh has set an aggregate connection threshold of 150kW for consumers to qualify for GEOA.

Approval Delays

Although the central government stipulates a 15-day approval window, states have adopted different timelines, leading to discrepancies in the approval time. The involvement of multiple central and state nodal agencies, coupled with administrative inefficiencies and procedural bottlenecks, prolongs the process. For instance, the approval process takes twice as long in Maharashtra and Uttar Pradesh. While Karnataka adheres to the central timeframe, Madhya Pradesh and Chhattisgarh have failed to specify a definitive period, potentially causing delays in granting access.

Another challenge affecting approvals is the reluctance of distribution companies (DISCOMs), especially in Uttar Pradesh, Rajasthan and Andhra Pradesh, to enable open access for C&I consumers. These consumers are crucial for the financial stability of DISCOMs because they generate a high, steady revenue. As a result, DISCOMs often resist allowing direct power procurement from renewable energy developers.

GEOA Charges

In line with the central policy and FOR guidelines, most states impose five core charges for green energy open access: transmission charges, wheeling charges, CSS, standby charges and banking charges. However, the first amendment to the GEOA Rules introduced a sixth, more ambiguous

category of "other charges", leading to significant variation in how states apply these charges. Some states have exploited this provision, adding extra charges for open-access projects. These are:

- Karnataka: The state introduced a facilitation fee of Rs25,000/MW (around $298/MW) for captive and group captive projects.[11]
- Madhya Pradesh: The state levies the Harit Urja Vikas Fee on electricity at Re0.1 (US¢0.12) per unit. This fee applies to all renewable energy projects.[12]
- Rajasthan: The state has a Renewable Energy Development Fund, which receives developer contributions in the range of Rs200,000/MW/year (around $2,381/MW/year) and Rs500,000/MW/year (around $5952/MW/year), to support the sector's growth.[13]
- Telangana: The state's CSS is among the highest in the country at Rs1.42/kWh (US¢1.7/kWh), posing a significant cost challenge for renewable energy developers.[14]

Inconsistencies in Duration of Open Access Projects

The central GEOA Rules lack defined timelines for short-term open access (STOA), medium-term open access (MTOA) and long-term open access (LTOA). While some states have adopted continuous timelines, others have strategically introduced gaps between the allowed durations of LTOA, MTOA and LTOA. For example, Gujarat permits STOA for up to one month, MTOA for three months to three years, and LTOA for 12 to 25 years. These gaps reflect a preference by certain states for LTOA over MTOA and STOA.

Restrictive Energy Banking Provisions

GEOA Rules stipulate that banking charges in kind should be 8% of the energy banked at the consumer's end, and the credit for banked energy must be adjusted during the same banking cycle. The minimum energy that can be banked is 30% of the monthly electricity consumption.[15] Some states, such as Madhya Pradesh and Telangana, closely adhere to these provisions. However, other states have adopted the GEOA Rules after modifying these original provisions. For instance, Rajasthan has encouraged banking by adopting a yearly banking period, whereas Gujarat has discouraged it by implementing daily banking for solar power. Without flexible energy banking mechanisms, consumers have to rely on grid power during periods of low renewable energy output, diminishing the cost-saving potential of open access.

GOAR Portal Limitation

Managed by the NLDC, the GOAR portal's functionality is limited by a lack of effective synchronisation with state nodal agencies. The absence of essential data from local DISCOMs in several states, which limits applicants' access to crucial application information, compounds this

[11] Government of Karnataka. Fee Structure for allotment of RE Projects in Karnataka.
[12] Government of Madhya Pradesh. Madhya Pradesh Renewable Energy Policy. 2022.
[13] Government of Rajasthan. Rajasthan Renewable Energy Policy. 2023.
[14] Telangana State Electricity Regulatory Commission. Order. August 2024.
[15] Green Energy Open Access. GOAR Rules & Amendments. June 2022.

disconnect. In some states, the portal may not consistently recognise group-captive models, limiting opportunities for group-captive renewable energy developers. As the portal is the sole platform for filing GEOA applications, its dependence on accurate and timely data from state nodal agencies presents a significant hurdle.

Land Acquisition Challenges

Acquiring land for renewable energy projects, especially wind, remains challenging in India. Land availability, discrepancies in land records, cumbersome documentation, bureaucratic delays and local opposition can delay projects and increase development costs. The fragmented nature of land ownership and varying state-level regulations further complicate the situation, making land acquisition a hurdle.

Untapped Opportunities

The GEOA framework offers businesses a direct route to affordable, sustainable power. Yet, due to the energy sector's evolving nature, several key opportunities remain underexplored – from enabling micro, small and medium enterprises (MSMEs) to embracing green energy solutions to harnessing the potential of the Inter-State Transmission System (ISTS).

Untapped Micro, Small and Medium Enterprises (MSMEs) Segment

The eligibility reduction from 1MW to 100kW has opened doors for smaller enterprises, particularly within the MSME segment, which accounts for roughly 25% of India's industrial sector's energy consumption.[16] Despite growing interest from smaller consumers in industrial states like Gujarat and Maharashtra, actual on-ground adoption has remained limited. This is partly because MSME consumers are looking for short-term power purchase agreements (PPAs) of three to five years over the traditional 25-year agreements, which pose financial challenges for developers due to limited project scalability and concerns regarding return on investment.

Several factors could catalyse this potential market:

- The increasing pressure from MSMEs' end consumers to enhance operational sustainability and the government concurrently imposing Renewable Purchase Obligations (RPOs) on smaller consumers will significantly promote renewable energy adoption in MSMEs.

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

- MSMEs with space and technical constraints will increasingly prefer open access to rooftop solar, driving demand for both single and aggregate connection models for GEOA among MSMEs.

Underutilised C&I ISTS Market

The ISTS is a crucial yet underutilised asset for facilitating GEOA across states, especially for C&I consumers in states with limited renewable energy potential and topographical challenges. While the existing GEOA framework does not explicitly reference ISTS, the GNA regulations introduced in India in 2022 aim to leverage the ISTS to benefit C&I consumers. Despite their potential, these projects have seen limited implementation, as most C&I consumers are connected to STU rather than CTU, which is a crucial requirement to avail ISTS power.

The ISTS waiver, which currently exempts renewable energy projects from transmission charges, is set to expire for projects commissioned after 30 June 2025. After this date, charges will resume incrementally at 25% annually.[17] Extending this waiver is imperative to accelerating the C&I ISTS market. By reducing transmission costs, the waiver helps lower the overall price of delivered green power, making renewable energy more competitive and attractive, especially to cost-sensitive C&I consumers. This continued financial relief could stimulate additional investment in interstate renewable energy projects and encourage C&I consumers in states with limited renewable potential to adopt green energy solutions, ultimately driving broader market growth.

Recommendations

A series of strategic interventions is imperative to unlock GEOA's full potential. This section delineates key recommendations to surmount existing barriers, refine policy frameworks and promote wider adoption.

[17] Ministry of Power. Waivers of inter state transmission charges. 2021.

Table 3: Recommendations for GEOA Market Growth

Issue	Recommendation
Immediate	
Relaxation in GEOA Eligibility	Removing or expanding the condition that consumers must be within the same electricity division of a distribution licensee could boost participation from C&I consumers in the 100kW to 1MW range within the GEOA segment.
Improvements in GOAR Portal	The GOAR portal is a single-window platform for GEOA registration and applications. However, its usability can be improved by incorporating additional features to enhance user accessibility. • Publicising detailed information about state substation capacity data to allow potential developers to assess the feasibility of their projects effectively. • Integration with DISCOMs needs an improvement to facilitate better coordination between central and state nodal agencies.
ALMM should be Dropped for Open Access	With ALMM having been reimplemented, developers can buy solar modules only from listed local manufacturers who prefer larger order sizes from DISCOM PPA projects. This supply crunch leads to higher procurement and project costs. Removing ALMM (at least for two more years) would enable faster, cheaper procurement of PV modules, thereby supporting the growth of the open-access market.
Near-term	
Avoiding Arbitrary Policy Changes	Regulatory irregularities and policy uncertainties in the open access market deter investors from making investments. Central and state governments must coordinate to bring uniformity through the following means: • Implement a five-year lock-in period for key national policies. • Standardise banking charges and settlement periods across states. • Ensure compliance of state GEOA provisions with central GEOA provisions.
Aid ISTS Market Development	To overcome connectivity barriers in the GEOA market, providing infrastructure support for C&I consumers, who face high costs in building transmission lines to connect with distant CTU substations, is essential. • The central government should extend the 100% exemption in ISTS charges until 2030.

	• The CTU should extend dedicated feeder lines to support mid- and large-scale industrial clusters, improving connectivity for ISTS power across more than 350 clusters in India.
Long-term	
Improving Market Penetration of the Power Exchange Market	The following strategic recommendations can address the challenges facing the underutilised power exchange market in India, including low transaction volumes and limited price visibility: • Rationalise price ceiling to enhance supplier participation in Day-Ahead Markets. • The Ministry of Power should support merchant-based market development through subsidies, tax breaks and setting clear regulatory guidelines. • Market coupling of power exchanges for better price discovery and renewable energy integration. • Ministry of Power should launch a pilot Contracts for Difference (CfD) project for small renewable capacities for demonstration.
Providing Financial Support to Developers	The following measures can promote sector growth and address the financing challenges in the open access market, where high interest rates and limited funds hinder C&I developers: • Government financial institutions like Power Finance Corporation (PFC), Renewable Energy Corporation (REC) and Indian Renewable Energy Development Agency (IREDA) should boost debt exposure for renewable energy open access projects. • Infrastructure investment trusts (InvITs) or aggregated bond financing structures can help unlock developer capital.

Source: JMK Research. Note –Color depicts the urgency of the recommendation – Dark green: Immediate; Green: Near-term; Light green: Long-term

Conclusion

The issuance of GEOA Rules by the Ministry of Power was a turning point for India's green open access market. The regulatory clarity and supportive environment established by these rules have led to record annual installations in FY2023 and FY2024. Even with minimal waiver support, the open-access market in India is experiencing organic growth. Open-access developers can effectively raise capital through debt, equity and bonds.

Almost all states in India have either adopted the GEOA Rules or are in the process of implementing them. However, deviations from the central GEOA Rules in certain states could hinder the prospects of the open access market. After adopting these rules, states must focus on translating them into actual project development. State authorities, including regulators, DISCOMs and SLDCs, must collaborate to address intermediary challenges like approval delays and scheduling issues.

Some states with high renewable energy potential, such as Andhra Pradesh, are beginning to recognise the benefits of GEOA. The Andhra Pradesh Integrated Clean Energy Policy (2024) has introduced a much-needed regulatory framework for green open-access projects. Other states with untapped open access potential could likewise boost green open access adoption by implementing comprehensive policies.

As the landscape of renewable energy technologies evolves, the central GEOA Rules and their associated frameworks will also likely evolve. The first amendment to the GEOA Rules included bringing offshore wind projects within the open access charges framework. Future additions to the GEOA Rules are likely to incorporate provisions for emerging technologies like ISTS open access and power exchange-based projects. These amendments are vital to shaping the overall development of the green open-access market.

Despite the overall growth of the green open access market, its adoption among one of the targeted consumer bases, MSMEs and small-scale C&I entities with less than 1MW peak contract demand has been disappointing. The GEOA Rules will not fully succeed unless green open access penetration among smaller consumers improves. Aggregating demand from smaller consumers with limited rooftop space and stringent environmental requirements is the most viable approach for enhancing green open-access adoption in this segment.

Augmenting grid infrastructure, particularly in terms of substation capacity and circuit length, will be crucial for efficiently integrating the power output from intra-state and inter-state green open access projects. Improved grid infrastructure will facilitate better project connectivity, expedite execution, and reduce congestion and transmission costs.

The expansion of the green open access market represents a transformative shift in India’s energy sector, aligning with the ambitious decarbonisation and net-zero goals of C&I entities. Market stakeholders, including regulators, financiers and developers, must work together to eliminate obstacles that impede widespread green open access adoption, ultimately helping India achieve its 2030 renewable energy target.

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The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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