

DISCUSSION PAPER

ENABLING RENEWABLE ENERGY GROWTH IN ASSAM



March 2024

DISCUSSION PAPER

**ENABLING
RENEWABLE
ENERGY GROWTH
IN ASSAM**

Authors: Mandvi Singh

Research Support: Abhishek Patil and Sureet Singh

Design and Layout: Raj Kumar Singh



© 2024 International Forum for Environment, Sustainability and Technology

March 2024

Material from this publication can be used, but with acknowledgement.

Citation: International Forum for Environment, Sustainability and Technology (iFOREST). (2024). Enabling Renewable Energy Growth in Assam. New Delhi. India.

Printed at: Print Edge Inc.

Contents

Chapter 1: Introduction	6
Chapter 2: State of RE sector	7
2.1 Installed capacity	8
2.2 Policy landscape	9
2.3 Recent developments	12
2.4 Key concerns	14
2.5 Conclusion	15
Chapter 3: New imperatives for RE growth	16
3.1 Expanding electricity demand	17
3.2 New RPO trajectory	18
3.3 Economics of procurement	19
3.4 Conclusion	20
Chapter 4: Refining policy pathway	21
4.1 Framework evaluation	22
4.2 Impact evaluation	24
4.3 Conclusion	24
Chapter 5: Institutional strengthening	25
5.1 Role of APDCL	26
5.2 Role of AEDA	27
5.3 Conclusion	28
Chapter 6: Summary	29
Annexure	32
References	33

CHAPTER 1

Introduction

Assam's energy mix is currently dominated by thermal power generation, with 69% of the 2,037 MW of installed capacity being gas- and coal-based and the remaining 31% from hydro and other renewable energy (RE) sources. The additional 529 MW of captive power generation capacity installed in the state is almost entirely thermal. This reliance on thermal power underscores the need for increased penetration of RE resources.

The Government of Assam, recognizing the imperative of increasing RE penetration, introduced the Assam Renewable Energy Policy, 2022 (AREP, 2022) in November 2022. With its ambitious target of expanding the state's installed RE capacity to 1,200 MW by 2027, this policy aims to create a conducive environment for businesses and developers to attract new investments across various models of RE generation. The policy also offers a comprehensive framework for project development, particularly for solar-based projects, and includes several exemptions on duties, charges, and surcharges as incentives.

Since the announcement of the AREP 2022, there has been substantial momentum in the large-RE segment driven by state intervention, with nearly 2,000 MW of solar capacity in the pipeline. While consistent efforts towards RE expansion are visible, structural challenges limiting sector growth persist, and the state's potential in large and distributed RE deployments remains underutilized.

In the large RE segment, the challenges of perceived limited potential, high material costs, high grid integration costs, and land identification/acquisition/lease persist, posing significant barriers to growth. In the distributed RE segment, despite the existence of many successful deployment models and technology innovations, scaling up remains a challenge due to the lack of institutional strength, interdepartmental coordination, and a robust vendor ecosystem. These challenges underscore the need for strategic interventions to overcome them and accelerate RE growth in the state.

While AREP 2022 was a timely step taken by the state government to boost RE investments and decarbonize the state's electricity sector, as the policy completes over one year of its implementation, it is important to take stock of its effectiveness against stated objectives, to identify implementation priorities that can help fast-track RE growth in the state.

Further, fast-tracking RE growth requires enhanced efforts from all stakeholders, including policymakers, regulators, investors, funders, and implementors. State nodal agencies for RE, Assam Power Distribution Company Limited (APDCL) and Assam Energy Development Agency (AEDA) must play a crucial role in stimulating and facilitating the required investments. In several instances, strong policies have failed to deliver the outcomes due to the lack of the nodal agencies' capacity and capability.

In this discussion paper, iFOREST analyses the state of RE sector in Assam and the new imperatives for RE growth. It then analyzes the existing policy and institutional framework to present recommendations for future growth.

CHAPTER 2

State of RE sector

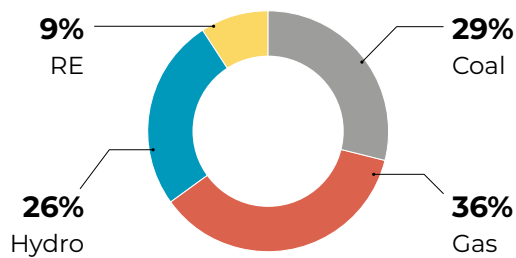


Assam's power generation sector is heavily reliant on thermal sources; however, the government has been steadily making efforts to increase the penetration of renewable energy (RE) capacity in the state. The Assam Renewable Energy Policy, 2022, sets a target to add 1,200 MW of RE capacity by 2027, while additional schemes have been launched to build further capacity. Over the past year, driven by the effort of state-owned and central-owned public sector undertakings (PSUs), the tendering and project development activities concerning large RE projects have increased. However, the pace of implementation of distributed RE (DRE) deployments continues to remain slow.

2.1 Installed capacity

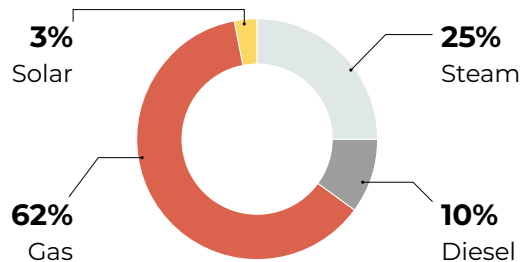
Assam has an installed capacity of 2,037 MW, which includes 36% from gas-based projects, 29% from coal-based projects, 26% from hydro projects and the remaining 9% from other RE projects (as of February 2024)¹. This represents nearly 40% of the total installed capacity in India's north-eastern region. In addition to the installed utility capacity, 529 MW of captive power generation capacity is installed in Assam across 69 industrial units.² Of the installed captive capacity, 62% is gas based, 24% is coal, 10% is diesel and remaining 3% is RE projects (as of March 2022) .

Graph 2.1: Installed utility capacity in Assam



Note: As of February 2024
Source: CEA

Graph 2.2: Installed non-utility/captive capacity in Assam

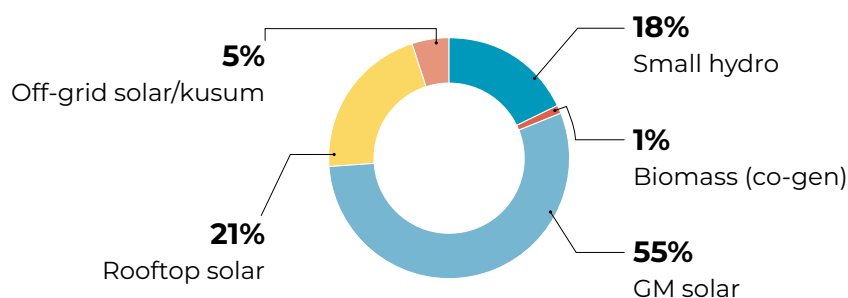


Note: As of March 2022; Includes CPPs in industries with demand of 0.5 MW and above
Source: CEA

As of February 2024, only 192 MW of RE (non-hydro) capacity has been installed in Assam, as against 136,570 MW of RE capacity installed across the country.³ Among the northeastern states, the installed capacity is the highest, accounting for nearly one-third of the regional installed capacity. Source-wise, 55% of the state's RE capacity is ground-mounted solar, 21% is rooftop solar, 18% is small hydro, 5% is off-grid, and 1% is in the form of non-bagasse cogeneration projects.

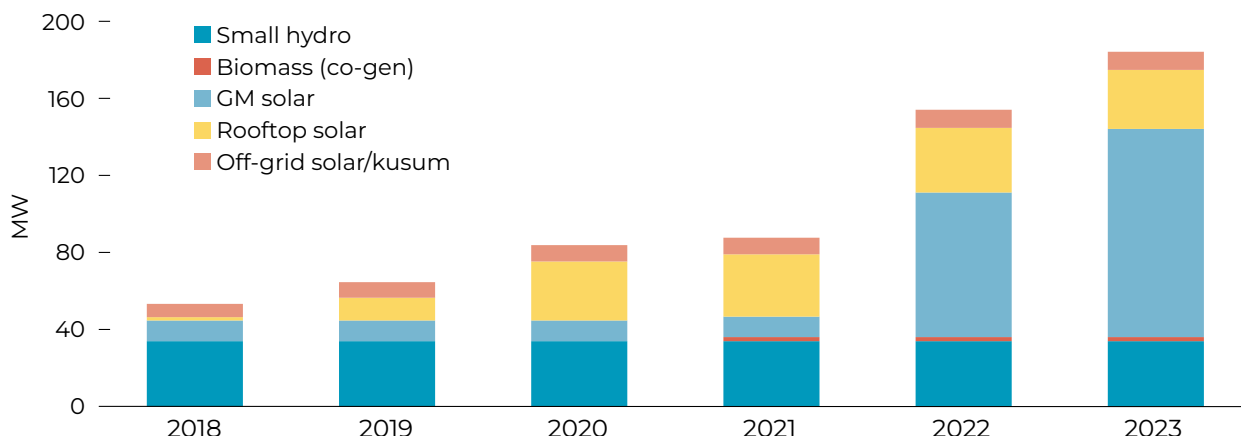
In the past five years, the installed RE capacity has increased nearly four times, from 53 MW in 2018. This has been primarily on account of the growth in the solar ground-mounted and rooftop capacities, while small hydro capacity has remained nearly stagnant.

Graph 2.3: Installed RE capacity in Assam



Note: As of February 2024
Source: MNRE

Graph 2.4: Growth in installed RE capacity in recent years



Source: MNRE

2.2 Policy landscape

To expand the share of RE in the state's energy mix, the Government of Assam, for the first time, introduced an RE policy in October 2022. The Assam Renewable Energy Policy 2022 (AREP, 2022) aims to increase the RE capacity in the state by 1,200 MW by March 2027 by facilitating investments across various deployment technologies.⁴ The key features of the AREP, 2022 are as follows:

Objectives & target

AREP, 2022 aims to create an enabling environment for businesses and developers to mobilize new investments across various models of RE generation. This includes the development of solar parks on vacant government lands. It also encourages multiple consumer categories to adopt on-grid and off-grid deployments by the residential, commercial, industrial, governmental consumers, and agriculture sectors. Further, it calls for establishing favourable municipal bylaws to facilitate the adoption of rooftop solar.

The policy targets a capacity addition of 1,200 MW, including 620 MW from grid-connected solar projects, 300 MW from grid-connected rooftop projects, 80 MW from off-grid solar, and 200 MW from other RE sources, including small hydro, pump storage, biomass and solid waste. This target is in addition to the 1,000 MW of RE capacity proposed to be set up under the Mukhya Mantri Souro Shakti Prokolpo project announced in the 2022-23 project. (Refer to Annexure 1 for sub-component-wise targets set under AREP, 2022)

Technology specific measures – large RE

The policy provides detailed technology-specific measures of project development, particularly focusing on solar-related technologies.

Table 2.1: Technology-specific measures in AREP, 2022

Technology	Target	Specific measures & mode of implementation
Solar parks	100 MW, including 50 MW through floating solar	<ul style="list-style-type: none"> • Minimum capacity of each park set at 25 MW • APDCL, acting as solar power park developer (SPPD), is responsible for development & management of park infrastructure, and for formulating business modalities aligned with MNRE guidelines. • Developers will be selected by APDCL through competitive bidding, and the discom will procure 100% power from the parks. • Pooling stations within the park will be developed by SPPD.

Table 2.1 continued

Technology	Target	Specific measures & mode of implementation
Grid-connected solar rooftop	300 MW	<ul style="list-style-type: none"> For government buildings, third-party Renewable Energy Service Company (RESCO) model is encouraged under EXIM metering, with payment security (through budgetary provision). Sale of surplus power at 100% of average power purchase cost. For PSGs/RESCOS, gross metered installations on leased roof area encouraged for sale of power to APDCL at competitively determined tariff. For individual consumers, gross metered installations encouraged with PPAs signed with APDCL at AERC-determined tariff. For industries, installations with storage encouraged. Grid-connected rooftop deployment capacity limit set at a maximum of 1 MW, subject to being equal to the sanctioned load or contract demand of consumer, not exceeding 80% of distribution transformer capacity. Circle-level rooftop solar cells to be set up, and SoP to be notified for timely implementation.
Solar plants for sale of power to APDCL	300 MW, including 100 MW with storage, 100 MW without storage and 50 MW floating solar	<ul style="list-style-type: none"> Selection of SPGs and tariff discovery to be done through competitive bidding and 25-year PPAs. State government may provide payment security.
Solar plants for sale of power to any entity other than APDCL	50 MW	<ul style="list-style-type: none"> Minimum capacity for plants for 3rd party sale within or outside the state is 1 MW, and maximum capacity is subject to available transmission/evacuation capacity. All such projects eligible for availing of available policy incentives. Deemed approval of open access request within 21 days.
Solar power plant under REC mechanism	50 MW	<ul style="list-style-type: none"> Minimum capacity of plants under this category set at 250 kW. SLDC assigned as state nodal agency for accreditation of projects. All such projects eligible for availing of available policy incentives.
Captive solar plants	20 MW	<ul style="list-style-type: none"> Minimum capacity set at over 1 MW, and maximum based on available transmission/evacuation capacity. For captive projects selling surplus to APDCL, tariff will be 75% of APPC. For projects selling to 3rd party within the state, CSS and additional surcharge exempted for five years. For projects selling to 3rd party outside the state, all charges will be applicable.
Grid-connected solar installations in Agri sector		<ul style="list-style-type: none"> APDCL to purchase surplus power generation from grid-connected solar pumps at 100% of APPC. Minimum capacity for agro-PV projects to be 500 kW to 2 MW, to be set up on leased to self-owned land. PPAs to be executed on levelized tariff notified by AERC.

Technology specific measures – DRE

The policy calls for the promotion of several off-grid technologies through various measures. For off-grid solar water pumps, the state agriculture department is notified as the nodal agency to quantify the requirement and roll out MNRE schemes. Mini-grids for unelectrified areas are to be undertaken as per administrative guidelines of Rural Electrification Corporation Limited; street lighting is to be promoted in collaboration with local government bodies; solar home lighting through state and central budgetary support, and stand-alone plants on government land through APDCL/AEDA through state and central fiscal support. It also promotes local entrepreneurs through capacity-building programmes.

Incentives and support

To support the development of the RE sector in the state and attract new investments, the AREP provides the following incentives and exemptions:

Table 2.2: Incentives under in AREP, 2022

Category	Details
Electricity Duty and cess	• Exempted for five years from the date of project commissioning
Cross subsidy & additional charges	• Exempted for 10 years for captive/3rd party sale of electricity within the state.
Capex Incentive/state subsidy	• CAPEX subsidy of ₹1,000/kWh for grid-connected rooftop plants under EXIM metering, up to a maximum of ₹3,000/consumer for 30 MW capacity (based on a first-come, first-serve basis).
Wheeling and transmission charges	• 50% exemption for three years for captive and OA users. • 100% exemption for 10 years for RE-based EV charging stations.
Statutory and Environmental Clearance	• Solar projects exempt from obtaining statutory clearances, and other no objection clearances.
Open access	• 21-day deemed approval for 25 years (or tenure of project), whichever is lower.

Nodal agencies

Power (Electricity) Department is the nodal department for implementation of AREP, 2022. The department is responsible for overall policy guidance and oversight of the sector. Specific tasks assigned to the department under the AREP, 2022 include facilitation of state government land allotment, and arranging for any infrastructure support from other departments. Meanwhile, APDCL, the state-owned power distribution company of Assam, has been assigned the explicit role of nodal agency for implementing solar power projects under the policy. The assigned role entails registration projects, statutory clearances facilitation, and capacities bidding.

2.3 Recent developments

Large RE projects have gained significant momentum in Assam over the last couple of years, primarily driven by the efforts of state nodal agencies and PSUs. Two major solar plants were commissioned in the state in 2022, including a 90 MW plant by Azure Power and a 70 MW Amguri Solar Power Park by Jackson Power. Since then, several projects have been announced and awarded, likely to be commissioned by 2025-2027.

iFOREST research indicates that this includes about 15 projects aggregating 1,985 MW of capacity. This mainly comprises ground-mounted projects – eight projects aggregating 1,625 MW of capacity. In addition, three agri-PV projects (250 MW) and two floating solar projects (110 MW) are under development. While most of these projects are in various stages of approval and development, construction has been recently initiated on a 50 MW Dhekiajuli Solar Power Project of SJVN Green Energy Limited (SGEL). The project was awarded to SGEL in August 2023 at ₹3.92/kWh. Construction is expected to cost \$35.17 million and be completed by March 2025.

In addition to these projects, some other installations are also being explored. For instance, in October 2022, SJVN Green Energy signed an MoU with the APDCL to develop 1,000 MW of floating solar projects in the state. Assam Gas Company (AGCL) has also invited bids to conduct a feasibility study for a proposed agri-voltaic solar power project at Sadiya in the Tinsukia district.



Table 2.3: Key RE projects in Assam

Sl. no	Solar Power Plant/ Location	Capacity (MW)	Developer	Status
1	Across four districts – Udalguri, Boko, Naaogoan, Cachar	90	Azure Power	Commissioned in June 2022
2	Amguri solar power park	70	APGCL (SPPD); Jackson Power (SPG)	Commissioned in May 2022
3	Namrup solar power plant	25	APGCL and OIL	Bids for EPC vendor invited in February 2024
4	Majuli solar power plant	20	APGCL	Under Construction
5	Sonbeel floating solar project	70	APGCL	Cabinet approval in March 2023; Bid invited for project management consultancy for 20 MW capacity in August 2023.
6	Tezpur agri-voltaic projects	100	-	Cabinet approval in March 2023
7	Golaghat floating solar project	40	APGCL	Cabinet approval in March 2023
8	Margherita solar project	200	-	Cabinet approval in March 2023
9	Lower Kopali agri-voltaic project	50	-	Cabinet approval in March 2023
10	Chandrapur solar project	60	-	Cabinet approval in March 2023
11	Batadrava agri-voltaic project	100	-	Cabinet approval in March 2023
12	Dhubri solar project	70	SJVN Green Energy Limited	Awarded to SGEL in August 2023 at ₹3.92/kWh; Tender for EPC tender floated in October 2023.
13	Dhekiajuli solar power project	50	SJVN Green Energy Limited	Awarded to SGEL in August 2023 at ₹3.92/kWh; Construction initiated in March 2024, Expected commissioning by March 2025.
14	Not identified	200	SJVN Green Energy Limited	Awarded to SGEL in August 2023 at ₹3.90/kWh; Bids to purchase/ lease up to 1,000 acres of land for 28 years floated in December 2023.
15	Karbi Anglong district under 'Mukhya Mantri Sauro Shakti Prokolpo'	1,000	To be tendered by APDCL	DPR preparation awarded to Fichtner Consulting Engineers in June 2023; Bids invited for project management consultant in January 2024
	Total	2,145		

Source: iFOREST research

2.4 Key concerns

While efforts for RE expansion are steadily underway, there are a number of concerns to be addressed for RE scale-up in Assam:

- **Low perceived potential for RE projects:** Assam's ambition to develop its RE resources is restricted by the existing potential assessment by central agencies. The state's RE generation potential needs to be closely reassessed based on updated data and information, considering the latest generation technologies and deployment models.
- **Project development challenges:** Several project development-level challenges persist and restrict investor interest in the state. Land acquisition/mobilization-related hurdles pose a significant obstacle, as even land ownership data remains fragmented and incomplete. Meanwhile, the existing infrastructure support in the form of existing power grid networks and roads remains limited.
- **Higher cost of generation:** The cost of solar power generation remains relatively high for Assam due to higher project development costs (higher equipment costs) and relatively lower capacity utilisation of solar installations. At present, power generated within the state cannot compete with the cost of procurement for imports from 'RE-rich' states due to the current ISTS charges waiver. Adequate policy tools are needed to cover the procurement cost differential.
- **Lack of interest from RE developers:** Despite a new RE policy and a strong state commitment to RE growth, private RE developers continue to elude Assam. While a few projects were initially awarded and delivered by private sector developers, investor interest has since been anchored in state and central PSUs.
- **Lack of policy attention to other RE segments:** Policy attention is primarily centred on mid-scale solar plant deployments. While this is commendable, other major RE segments with significant potential remain untouched, including small hydro and biomass.
- **DRE scale-up challenges remain unaddressed:** There is an obvious case of large-scale DRE implementation in Assam that addresses energy access issues, catalyse rural development, and supports disaster relief. However, the deployments remain underwhelming even under centrally sponsored schemes. There are several issues hindering scale-up, including policy stagnation, lack of an institutional anchor, limited vendor ecosystem and limited consumer demand. Meanwhile, the sustainability of assets remains a significant concern due to a lack of standards and guidelines for implementation and a missing after-sales market. An ecosystem approach for addressing these concerns is presently lacking.

STATE OF IMPLEMENTATION OF CENTRAL GOVERNMENT DRE SCHEMES

The implementation of rooftop solar, a key focus of the central government, in Assam is lagging. Despite an allocation of 3.50 MW under Phase-II of MNRE's Grid Connected Rooftop Solar Programme, only 0.20 MW have been installed, representing a mere 6% of the total allocation. The slow vendor empanelment process and limited consumer outreach activities are contributing to this low implementation rate.

The implementation of the central government's Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) in Assam is yet to see any progress. Despite the sanction of 10 MW capacity under Component A, 4,000 off-grid solar pumps under Component B, and 1,000 pumps under Component C, no capacity has been so far.

Similarly, the Central Government's scheme for biogas in Assam has not met the intended targets. Despite a target of 1,200 units for 2022-23, no capacity was installed in the state during the year, highlighting the need for a more effective approach.

2.5 Conclusion



RE currently comprises a minor share in Assam's ENERGY mix. However, the government has shown a clear commitment towards a clean energy growth pathway, by setting the goal of expanding the existing RE capacity of 192 MW by another 1,200 MW by 2027. Recent developments indicate that there is a clear momentum towards development of new solar ground mounted, floating and agri-PV projects. While the new RE policy aims to catalyze new investments, several structural challenges towards large and distributed RE scale-up remain unaddressed. This is crucial as there are new demands on large scale RE scale up emerging.

CHAPTER 3

New imperatives for RE growth

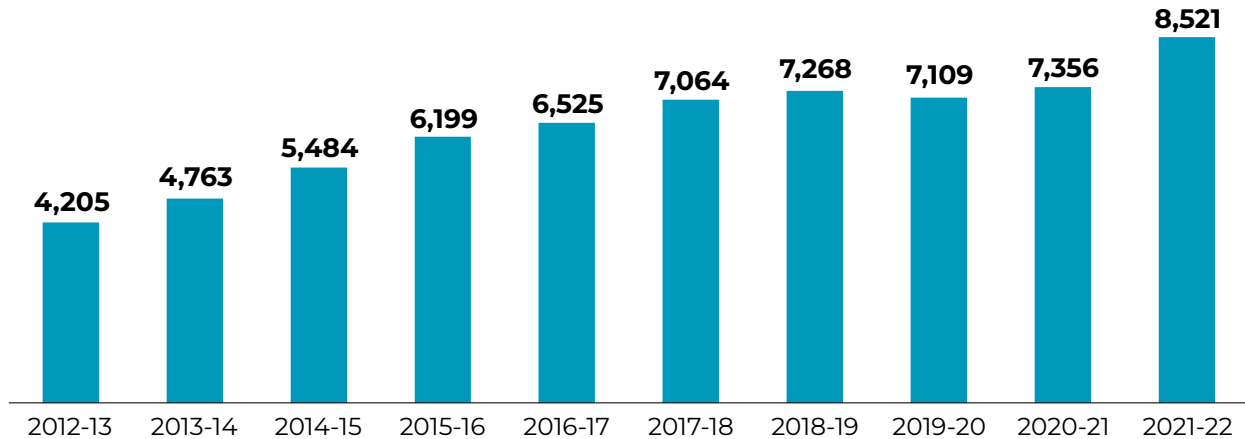


Assam has targeted increasing the installed renewable energy (RE) capacity by 1,200 MW by March 2027 under the new Assam Renewable Energy Policy, 2022. There are vital push factors necessitating large-scale renewable energy scale-up in the state. While power demand is fast expanding in the state, RE sources (primarily solar) provide one of the cheapest sources for power procurement. Further, strong regulatory requirements from the central government mandate that the future electricity procurement pathway be heavily dependent on green energy sources. Further, there is a case of local procurement of RE sources to build the local economy and support green economic growth.

3.1 Expanding electricity demand

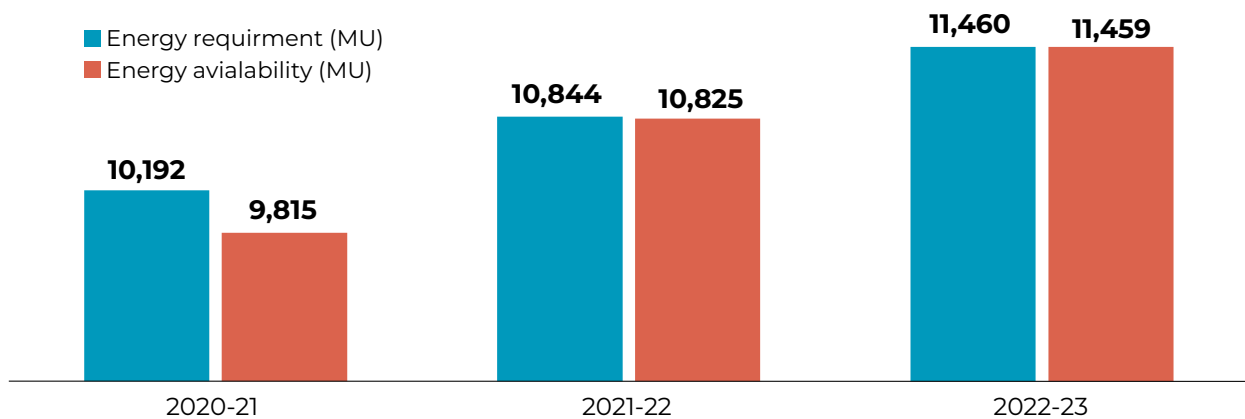
Assam's demand for electricity has been steadily increasing due to expanding electrification and economic growth. In the decade ending 2021-22, Assam's electricity consumption (utility) has doubled. Already, the electricity availability in the state is struggling to keep pace with the expanding demand, with the peak shortage in 2022-23 amounting to 2.84%.⁵

Graph 3.1: Growth in total electricity consumption (utility) (MUs)



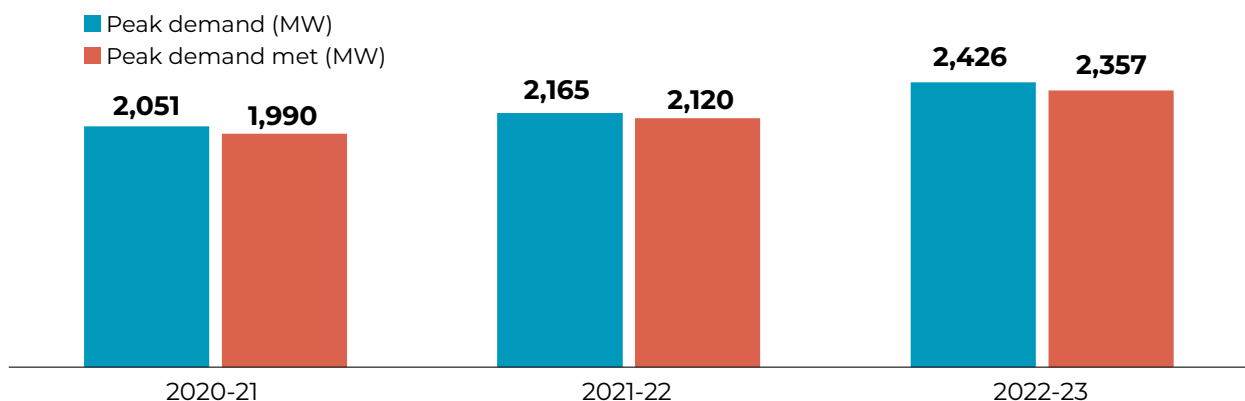
Source: General Review 2023, CEA

Graph 3.2: Energy demand availability scenario in Assam



Source: Assam Economic Survey, 2023

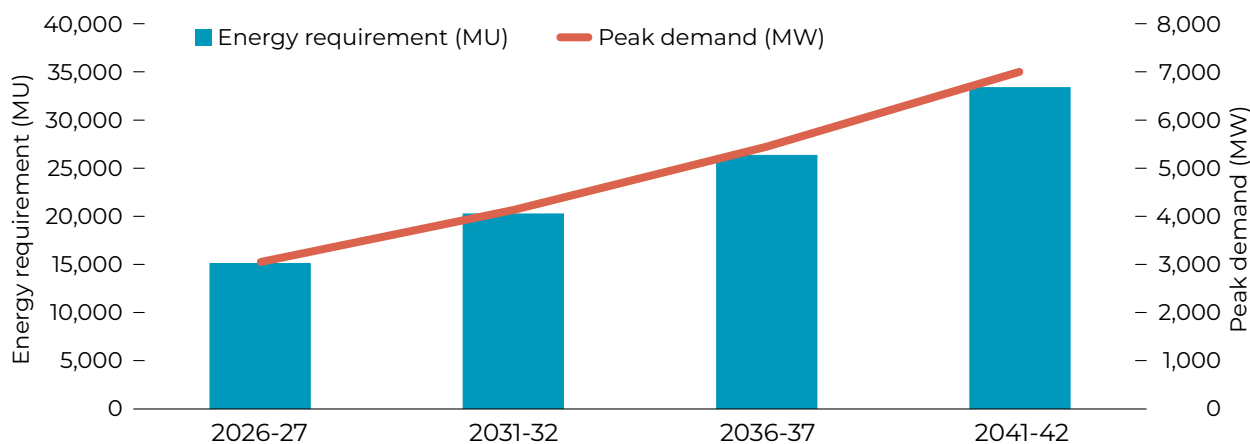
Graph 3.3: Peak demand availability scenario in Assam



Source: Assam Economic Survey, 2023

The power availability scenario in the state could significantly worsen if supply-side measures are not prioritised. Assam presently has one of the lowest per capita electricity consumption among states (about 350 kWh in 2021-22), at one-third of the national per capita consumption (1,255 kWh). The low levels of growth reflect stagnant historical growth and lower industrialisation levels. However, as the state aims for fast economic growth in the coming decade, the electricity requirement is projected to grow at an unprecedented pace. The Central Electricity Authority (CEA) projects that the state's energy requirement and peak demand (utility) will double by 2031-32.⁶

Graph 3.4: Projected power demand in Assam (utility)



Source: 20th Electric Power Survey of India, CEA

In addition to the utility consumption, about 1,478 GWh of power is being generated in the state by captive power plants to meet the industrial electricity demand in the state. This demand is also likely to grow in the coming years, in line with the state economic growth.

3.2 New RPO trajectory

As the electricity demand increases, there is a clear and strong regulatory mandate for Assam to expand procurements from RE sources. The Ministry of Power in October 2023 issued an updated trajectory for renewable purchase obligations (RPOs) for designated consumers, including discoms, open access consumers and captive producers⁷. This entails a gradual expansion of RPO requirement from 29.91% in 2024-25 to 43.3% in 2029-30, with technology specific requirements introduced for new wind, hydro and DRE capacity.

Table 3.1: New RPO trajectory for Assam

Year	Wind	Hydro	DRE	Other	Total
2024-25	0.67%	0.38%	0.75%	28.10%	29.91%
2025-26	1.45%	1.22%	1.05%	29.29%	33.01%
2026-27	1.97%	1.34%	1.35%	31.29%	35.95%
2027-28	2.45%	1.42%	1.65%	33.29%	38.81%
2028-29	2.95%	1.42%	1.95%	35.05%	41.37%
2029-30	3.48%	1.33%	2.25%	36.27%	43.33%

Note: Table reflects the RPO specific to Himalayan states, which includes a lower DRE and higher other RE component
Source: MoP

Given the new RPO trajectory and the projected electricity demand, the RE-based electricity requirement of Assam will expand significantly in coming years. For instance, the new RPO trajectory will lead to a need for 114 MW of wind and 203 MW of hydro capacity by 2026-27, which would increase to at least 706 MW and 270 MW respectively by 2031-32. The increase will be maximum in the other

RE category, at 2,706 MW by 2026-27 and 4,199 MW by 2031-32, which is likely to be met largely by solar. Further, new requirement of DRE RPO has also been introduced, which will increase the DRE procurement requirement to at least 357 MW by 2031-32.

In absence of rapid domestic expansion of the state-based RE capacity, Assam would be faced to import majority of this, significantly impacting the state's energy security.

Table 3.2: Projected RE capacity requirement in Assam to meet new RPO trajectory (utility)

	Year	Wind	Hydro	DRE	Other RE
Energy requirement (MU)	2026-27	298	203	205	4,741
	2031-32	706	270	456	7,357
Capacity requirement (MW)	2026-27	114	39	160	2,706
	2031-32	269	51	357	4,199

Note: For 2031-32, the same level of RPO as 2029-30 is considered.
Source: iFROEST estimates

3.3 Economics of procurement

At present, Assam is highly dependent on thermal sources for meeting its electricity requirement. Nearly 40% of APDCL's energy procurement is from gas-based sources. Gas prices are highly volatile and linked to domestic and foreign supply chains, with prices being regulated by Ministry of Petroleum and Natural Gas despite being produced in Assam. There has been sudden and significant increase in prices of gas in 2022-23, making gas based power highly expensive.⁸

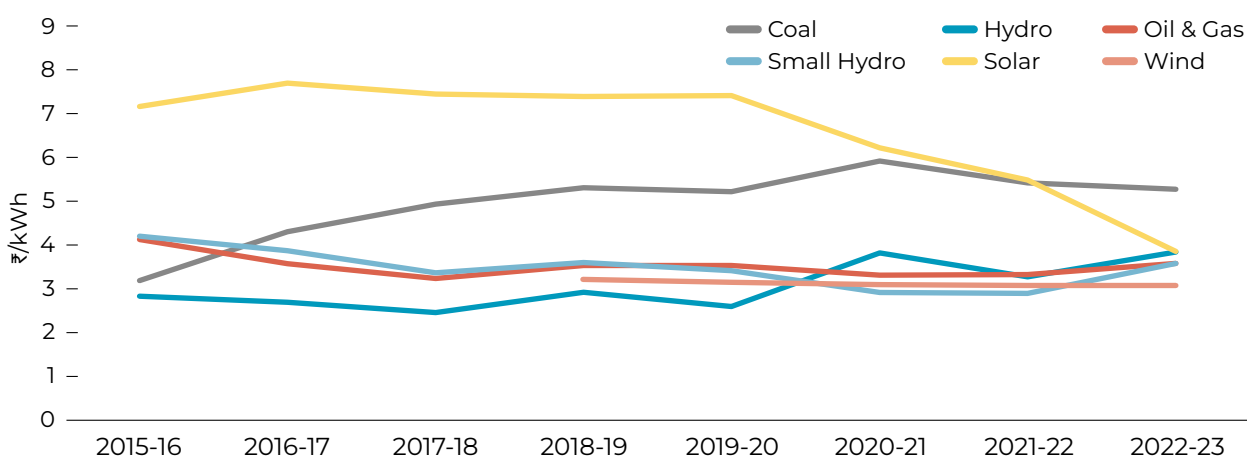
Table 3.3: Recent trends in gas-prices

Year	April-September	October-March
2019-20	3.69	3.23
2020-21	2.39	1.79
2021-22	1.79	2.9
2022-23	6.1	8.57

Source: AERC, APDCL Tariff Order 2022

Procurement prices for coal have also been increasing steadily. According to NITI Aayog database, APDCL cost of procurement of coal-based power has increased nearly 40% since 2015-16 to reach ₹5.27/kWh in 2022-23. Meanwhile, the cost of solar procurement, has decreased 86% during this period to reach ₹3.85/kWh in 2022-23.

Graph 3.5: Source-wise average cost of procurement of APDCL



Source: NITI Aayog, India's Climate and Energy Dashboard

Further, there is a strong case of setting up RE capacities within Assam despite relatively higher tariffs. At present, the central government provides a waiver of inter-state transmission system (ISTS) charges for RE projects to support 'low-RE' states in meeting their RPO requirement through procurements from 'RE-rich' states.⁹ iFOREST research indicates that these charges amount to about ₹0.60/kWh for Assam. This is a significant differential, given that the CUF differential between Assam and leading RE states (such as Rajasthan) is about 5%, leading to a generation tariff differential of over ₹0.40/unit. The ISTS waiver for solar and wind projects is scheduled to be phased out by July 2028.

Table 5: Estimated ISTS charges and losses (₹/ kWh)

Months in 2023	Assam
April	0.63
May	0.61
June	0.57
July	0.46
August	0.47
September	0.48
October	0.61
November	0.75
December	0.74
Average per unit charge	0.59
Average per unit charge with 3.5% losses	0.61

Note: For calculating per unit cost, the state-wise ISTS charges without waiver are considered
Source: POSOCO; ERLDC, WRLDC, NERLDC

However, there is a strong case of Assam to provide adequate incentives for RE procurements within the state. At a macro level, the lopsided pattern of RE growth is highly inefficient, leading to higher transmission investments, charges, and losses. Further, this pattern of growth has strong implications for the energy security of Assam, given the increased RPO requirements.

3.4 Conclusion

As Assam plans to expand electricity generation and procurement to meet the fast expanding demand, there are crucial concerns of regulatory requirements and economics to consider. There is a clear case for RE capacity expansion for ensuring energy security in the state. This would further lay the foundation for developing green economy in the state, through vendor ecosystem development, fostering investments in solar manufacturing sector, preparing for new green jobs, not only to meet local demand but also to meet the fast growing demand in the rest of the country.

CHAPTER 4

Refining policy pathway



The Assam Renewable Energy Policy (AREP) was introduced in November 2022 to usher new investments into Assam’s renewable energy (RE) sector and add 1,200 MW of new capacity by March 2027 across various technologies. The policy introduces several technology-specific measures and incentives to promote project development. While AREP 2022 is still in the early implementation stage, it is crucial to take stock of the progress concerning initial implementation stages to ensure timely progress.

To support this, a framework evaluation is undertaken across key focus areas of growth target, scope of policy, implementation mechanism, incentives, and infrastructure support. A review of existing policy analysis and indexing frameworks identifies a few broad criteria for a policy evaluation – robustness of framework, comprehensiveness of approach, robustness of incentives, implementation environment and investment impact. This section uses the reference framework developed to assess the overall robustness and comprehensiveness of AREP, 2022, followed by an impact evaluation.

4.1 Framework evaluation

Growth targets

Clearly defined targets are fundamental to growth-oriented policies (across sectors), as they reflect the government's strong intent and confidence in backing sectoral growth. The AREP 2022 clearly defines its vision and objectives and commits to a very detailed framework of technology-specific targets.

The policy has significantly increased its ambition (to an RE capacity growth of 1,200 MW over five years, including 1,000 MW from solar) compared to its previous version (which aimed at adding 590 MW of solar capacity over a three-year period). Further, it also reflects significant capacity addition over existing installed capacity—five times for solar ground-mounted, six times for rooftop, and seven times for off-grid solar.

While the expanded growth vision is commendable, it still reflects a conservative stance compared to the requirements of the state's expected electricity consumption growth and the new renewable purchase obligation (RPO) trajectory mandated by the central government. As discussed in the previous section, Assam will require an RE capacity of over 3,000 MW by 2027 and nearly 5,000 MW capacity by 2030 to service its RPO requirement. To address energy security concerns, the policy must align capacity growth ambitions with the RPO requirements.

Scope of policy

The scope of RE policies typically varies significantly across states depending on their perceived strengths and focus areas. The AREP 2022 aims to be an all-encompassing RE policy in its scope, covering grid-connected solar power, grid-connected rooftop solar, off-grid solar, small hydro, pump storage, biomass and solid waste. However, the policy provides detailed elaborations of the implementation mechanisms for solar-related technologies, but it fails to provide adequate clarity on the approach towards developing other segments effectively.

While AREP 2022 provides a broad/often generic framework for growth for all RE technologies, it is appropriate that technology-specific detailed policies be devised for focus (non-generic), high-potential segments such as water resource-based RE projects (large hydro, pump storage hydro, floating solar, small hydro), urban and rural DRE, and biomass and biofuels.

Implementation mechanism

APDCL has been made the nodal agency responsible for AREP's 2022 implementation. The state-owned utility is new to the RE sector, as its primary role continues power distribution. The utility has been steadily building its internal capacity to address the new requirement; however, this needs to be further strengthened in terms of both quantity and quality of manpower.

Further, the discom requires explicit support from other state agencies to roll out the comprehensive set of responsibilities identified in the policy. While APDCL continues to remain responsible for the overarching role of ensuring AREP 2022 implementation, specific duties for key RE segments can be assigned to specialised organisations/agencies.

For instance, Assam Energy Development Agency (AEDA) can be explicitly assigned the role of developing and implementing DRE projects in the state, while Assam Power Generation Corporation Limited (APGCL) can be assigned the role of promoting large, small and pump hydro projects. Capability of these agencies can be built to act as state-level renewable energy implementation agencies (REIAs) that are individually responsible for identifying investable projects and promoting investments in the segment.

Meanwhile, to expedite project identification, a dedicated unit for resource identification and project development needs to be created. The unit can also be made self-sustaining to provide consultancy services for private developers (industries), as demand dictates.

Further, to support private developers, a single-window clearance system should be created on a digital platform to ensure implementation efficiency. For each technology, notification and implementation of standard operating procedures (SOPs) for project development with key milestones identified are crucial.

Technology-specific mechanisms

While the AREP 2022 aims to address all RE segments, the technology-specific mechanisms remain generic for several segments, especially non-solar segments. No guidance is provided for other RE categories, including small hydro, biomass, pump storage, and waste-to-energy.

Further, for the agriculture segment, the focus is solely on solar pumps and grid-connected solar plants. The policy does not address the issues related to energy access and rural livelihood enhancements with the support of distributed RE. For a Himalayan state like Assam, it is important for the state policy to provide a clear vision of DRE sector, based on clear needs assessment study. This would require building formal platforms for inter-department coordination and integration of DRE technologies in existing rural schemes.

The policy also fails to address the critical requirement of enhancing storage capacity in the state through pump hydro projects and Battery Energy Storage Systems (BESS). The focus should be on developing RE projects with storage to reduce supply variability.

Further, the policy should also promote greening existing thermal power generation by hybridising existing thermal power plants and promoting cofiring in coal-fired power plants. Models for bundling existing thermal power with new solar projects can also be explored.

Incentives

The incentives for industries under AREP, 2022, for setting up RE projects through captive/third-party/OA route are moderate relative to other state RE policies. The state has a substantial disadvantage over solar power generation relative to RE-rich states due to better quality of solar insolation and smaller project sizes. Further, the existing national policy provides for an ISTS charges waiver, which further diminishes project economics. According to iFOREST estimates, the generation tariff differential between Rajasthan and Assam is over ₹0.40/unit, while the ISTS waiver amounts to about ₹0.60/unit. The policy incentive structure must be aligned to cover these differentials to create private sector investment interest.

The state government could also consider expanding the market for state-installed RE projects by extending the overall benefits provided under the policy to projects developed for serving consumers (utility or industry) in other northeastern states.

Infrastructure support

Infrastructure support, in the form of facilitating land acquisition/leasing and grid development, is often the most crucial element of RE policy support for developers. In Assam, land is one of the biggest constraints on developing solar ground-mounted projects. While wasteland availability is limited in the state, there are a number of hurdles in land acquisition and leasing.

Land acquisition/leasing is typically a developer's responsibility across all states. However, government wasteland is made available at a concessional rate to RE projects supplying power to state utilities in several states (such as Gujarat and Madhya Pradesh). Importantly, in states like Karnataka and Rajasthan, a deemed conversion of agricultural land is allowed for RE projects. In Assam, one of the most significant steps towards RE investment promotion is for the state nodal agency to provide explicit support through land identification. Current policy provisions in this regard are inadequate.

In terms of grid infrastructure development, typically, developers are responsible for setting up the evacuation infrastructure in all states. Often, SoPs are defined for expediting interconnection clearance. Advanced RE markets like Rajasthan and Gujarat are seen to emphasise the development of comprehensive RE evacuation infrastructure development and the integration of monitoring technologies for ensuring grid security. For Assam, strengthening the grid to accommodate huge RE power requirements also needs to be understood, mainly because several new RE projects will likely be located in locations with limited or no evacuation infrastructure.

Ecosystem creation

The policy does not envision adequate provisions for demand creation. Policies in leading RE states such as Gujarat are providing for this through the introduction of green power supply tariffs for consumers willing to procure 100% RE power and by allowing discoms to procure power at a pre-fixed levelized

tariff without a competitive bidding process from smaller-sized projects. Such provisions should be incorporated into state RE policy.

Further, a number of state policies, such as those in Madhya Pradesh and Rajasthan, define in detail the mechanism for developing the RE worker base and for building R&D capabilities within respective states. Existing skill development infrastructure in the state should be mobilised for RE skill building.

PV manufacturing presents another crucial area of RE ecosystem development. RE policies in states such as in Madhya Pradesh aim to utilize the expanding RE demand for local economic growth by aiming for mobilisation of RE equipment manufacturing investments (of ₹4,000 crore by 2024 and ₹10,000 crore by 2027). In case of Assam, there is an addition case for setting up local manufacturing due to the challenge of high equipment prices being faced by the Northeast region. The current policy does not address this.

4.2 Impact evaluation

AREP 2022 has made significant strides in accelerating RE investments in Assam, marking a transformative impact. However, there is vast potential for fostering more diverse growth, both in terms of RE technologies and investor participation.

iFOREST research indicates that 1,985 MW of capacity across 15 projects is currently under various stages of development, including 1,000 MW under the Mukhya Mantri Sauro Shakti Prokolpo' initiative. Of the remaining 985 MW capacity, majority comprises ground-mounted solar projects (625 MW), agri-PV projects (250 MW) and floating solar projects (110 MW). However, in other RE segments of solar rooftop, pump storage, small hydro, biomass, small hydro the progress remains lacking.

Large RE projects in Assam have gained significant traction, primarily due to the efforts of state nodal agencies and PSUs. In 2022, two major solar plants were commissioned in the state, backed by private developers. However, since then, all projects have been developed by government-owned companies. This indicates a lack of private investor participation, a trend the policy should address to foster a more diverse investment landscape.

4.3 Conclusion

AREP, 2022, can be seen to have a positive impact on investments in the RE sector of Assam. Against about 100 MW of RE projects added during the Solar Policy 2017-2020, about 1 GW of projects are already being developed under the policy. However, the policy and its implementation focus remain focused on large solar installations. Meanwhile, other RE segments continue to face policy action inertia. Further, the implementation support provided by the policy through incentives and other-technology-specific measures has not managed to attract private-sector investment. The policy also missed the opportunity to adopt an ecosystem approach to RE sector development, which can further contribute to local green growth and create jobs.

CHAPTER 5

Institutional strengthening



In India, renewable energy development agencies (REDAs) typically implement renewable energy (RE) related policies, programmes and schemes. In Assam, the role of the nodal agency for implementing the Assam Renewable Energy Policy, 2022 (AREP, 2022) has been assigned to the state power distribution company, Assam Power Distribution Company Limited (APDCL). The utility is new to this role of RE promotion and is steadily building its institutional capacity to meet the new requirement. While RE investment promotion is typically assigned to REDAs in most states, there are a few instances in 'low-RE' states (such as Odisha) where this role has been assigned to state utilities (in view of the low institutional capacity of REDAs). Meanwhile, under the current policy, the role and responsibility assigned to Assam Energy Development Energy (AEDA), the state REDA, is unclear.

The experience of other states indicates that there are two distinct kinds of REDAs in the country. The first kind of REDAs are set up as public limited corporations and are highly centralised in their operations, focusing mainly on utility-scale RE generation. The second kind of REDAs primarily operates in the distributed renewable energy (DRE) segment. They are decentralised in their operation with district-level presence and are established as not-for-profit societies. There is a case of institutional strengthening of both APDCL and AEDA to address the requirements of the two distinct segments of large-RE and DRE in Assam.

5.1 Role of APDCL

APDCL has been assigned the nodal agency role for the AREP 2022 implementation. As per Section 18.2 of the policy, the utility is responsible for the registration of all projects under the policy, facilitation in getting power evacuation and open access as per prevailing regulations, facilitation and processing of proposals for availing central subsidies, and carrying out all tasks related to the bidding process for solar projects. APDCL carries out these responsibilities through a dedicated New and Renewable Energy wing, with an employee strength of 10-15 resources. The present role and institutional capacity of APDCL are limited relative to the requirement.

A detailed assessment of advanced RE states like Rajasthan, Karnataka, Maharashtra, Telangana and Chhattisgarh indicates that state nodal agencies play a crucial role in stimulating, fostering and anchoring sectoral growth. A review of their areas of operation, institutional structures, and operational practices points to two core requirements. The first requirement is expanding the role of state nodal agencies into state-owned think tanks for RE growth that can assess and communicate opportunities, devise technology and policy solutions, engage with stakeholders and facilitate investments. The second requirement is for these institutions to adopt institutional structures and practices that support efficiency in operations.

1. APDCL as an anchor and facilitator of RE growth

- **Identify RE investment opportunities:** A state nodal agency is best placed to build facilities that can undertake detailed techno-economic assessment of the state's available RE generation potential across sources. This is important to help shape the state policy and incentive package accordingly and create a bank of potential projects/sites for development. This is particularly crucial for Assam, given the limited wasteland availability. The nodal agency must take responsibility for identifying suitable land parcels for the benefit of solar developers and other RE resources that can be built in the state.
- **Build investment case for RE projects:** The next crucial area of engagement for the nodal agency is to initiate a comprehensive set of activities that help build the investment case for the RE sources. This may entail developing and implementing business models aligned with the techno-commercial feasibility of RE resources in the state, engaging with state and central decision-makers to create a conducive policy and incentive environment for investments, and engaging with state regulators to ensure that regulatory hurdles are adequately removed. The nodal agency may also need to design and implement pilot projects for technology or business model demonstrations and coordinate with other agencies for project development and demand aggregation.
- **Create and provide ease of investment to developers:** For RE project development, there are three crucial elements of support that state nodal agencies must provide to create an investment-friendly environment in the state.
 - » Identifying land parcels/sites for project development, especially in a state like Assam, where land identification is a major challenge.
 - » Facilitating developers in timely securing the required approvals (from discom, transco, SLDC, electrical inspector, etc.). This is ideally achieved through an online single-window clearance system that streamlines the approval process and reduces approval timelines.
 - » Planning for and ensuring the development of the required support infrastructure for RE projects.
- **Nurture developer ecosystem:** The state nodal agency has an important responsibility of engaging with RE developers and vendors to communicate the investment potential and the business case for these investments. This would entail a dedicated structured communication strategy, ranging from investment conclaves to one-to-one meetings.
- **Identify and foster new avenues of growth through collaborations:** The nodal agency must adopt a forward-looking approach to RE growth in the respective state. The focus should not just be on the 'in-vogue' technologies and trends but also on new opportunities and future possibilities. This can be explored through collaborations with academic institutions, technical institutions, think tanks, and policy research organisations.

2. Adopting institutional best practices to ensure operational efficiency

- Strong leadership, whose sole responsibility is to promote RE growth in the state, is crucial. As MD, APDCL continues to provide oversight, the NRE division must be given adequate autonomy to innovate and act promptly.
- The NRE wing must be adequately staffed to deliver on policy targets. There should be a logical division of verticals, typically driven by technologies (as identified in the state policy). This is important for assigning clear responsibility and for regular review.
- In addition to adequate staffing, the nodal agency must develop a structured training and capacity-building programme for technical and non-technical staff. RE technology and policy are highly dynamic, and the NRE wing must be updated with the latest discourse.
- Some activities can be outsourced to a policy/project management unit (PMU) to ensure the internalisation of best practices and RE sector knowledge.

5.2 Role of AEDA

AEDA was formally constituted in July 2002 under the Societies Registration Act (1860) to act independently as the nodal agency for new and renewable energy sources under the Department of Science Technology & Environment, Government of Assam. The role assigned to AEDA entailed initiating, promoting, supporting and coordinating all activities in the field of non-conventional energy sources, especially for the rural, hilly and border areas not connected with the conventional grid. Under the current RE policy, AEDA has been assigned the limited role of 'supporting' the implementation of RE in rural areas.

The role and capacity of AEDA need to be substantially built to act as an anchor for addressing the specific requirements of the DRE segment, given the vast existing requirements and opportunities. According to the WRI's Energy Access Explore most recent data (for the year 2020), 24.6 per cent of Assam's area, corresponding to 37.8 per cent of the state's population, has a high potential for energy access interventions. Further, several sectors such as agriculture, tea industry, handloom/ sericulture, bamboo, tourism, fisheries, and livestock have a significant potential for DRE-based solutions to increase productivity. While multiple agencies are engaged in DRE implementation, institutionalising its adoption through an implementation and up-scaling body working to provide technical support to projects across departments is crucial. AEDA is ideally positioned to take up this role.

- **Clear assignment of duties:** To revive AEDA as a facilitator for the DRE segment, the state government must clearly identify the long-term areas of responsibility for the organisation. Large RE and DRE are two very different markets with disparate financing mechanisms, business models, target consumers, vendors and service providers. While a REDA can develop comprehensive capabilities to service both markets, typically, REDAs in India seem to have a unilateral focus (either on large RE or DRE). Thus, as APDCL continues to focus on large RE projects, the specific responsibility of DRE deployments can be explicitly assigned to AEDA for execution. This responsibility is aligned with the organisation's institutional experience.
- **Business plan development:** To ensure strategic engagement, AEDA must develop a business/engagement plan for at least three years, with due consideration of the market requirement. The plan should address – which DRE interventions are most needed and can have maximum impact. What should AEDA's role be as a facilitator of DRE deployments? A comprehensive needs assessment/scoping analysis is necessary to identify the required DRE applications/technologies to focus on. The specific areas of intervention identified in the business plan must aim to create an ecosystem for sustainable DRE deployments in the states. This must include consumer education, vendor base development, IT-enabled monitoring, effective after-sales service delivery, etc.
- **Facilitate DRE deployments:** AEDA's role needs to expand to that of a DRE ecosystem enabler/facilitator in Assam. This would entail comprehensive engagement in designing, deploying, and managing DRE investments.
 - » Designing the engagement would entail identifying farm and non-farm end-use cases for DRE deployment, developing delivery models (scheme/non-scheme based) in coordination with relevant state departments/agencies, and identifying funding sources and raising grants & low-cost loans for deployment.

- » Deployment stage interventions would entail building demand through consumer awareness, enrollment, engagement, and education, as well as building supply through the creation of a vendor ecosystem through local enterprise development. AEDAs role in ensuring high quality and timely execution/delivery by vendors is crucial.
- » At the management stage, AEDAs' role should expand to monitoring assets through online and offline tools and ensuring delivery of after-sales services through a network of local technicians and vendors.
- **Financial self-sufficiency:** ADEA must aim to achieve financial self-sufficiency. A review of revenue avenues of leading REDAs indicated the following revenue streams can be considered:
 - » Fees as the nodal agency for the implementation of central government schemes.
 - » Design and propose state-level DRE schemes by seeking state funding or low-cost development sector funding, creating a stable revenue stream as fees and implementation charges.
 - » Engage with relevant ministries to integrate DRE into existing and proposed rural schemes, charge fees and implementation support charges.
 - » Raise targeted funds as grants from philanthropies/CSR for specific community support applications.
 - » Develop services that can be provided on a consulting basis.
- **Institutional strengthening:** Clear assignment of duties must be followed by the development of an institutional structure that supports efficient operations and financial self-sufficiency. REDAs in multiple states have been corporatised to support efficient operations. While both corporations and societies can excel at building their revenue sources, corporations have an inbuilt pressure to perform efficiently and be self-sustaining (due to missing budgetary support). Key institutional best practices identified based on practices followed by leading REDAs are shared below:
 - » **Dedicated leadership:** The head of the organisation should have a dedicated role in promoting DRE.
 - » **Strong governing body:** Since the DRE segment is highly integrated with rural development and livelihood creation, the board of directors must include representation from relevant state agencies/departments. The board should have an engaging role and at least a quarterly cycle of performance review and strategic guidance.
 - » **Efficient staffing planning:** The staffing structure should focus on a strong district presence to ensure execution and asset management efficiency and on a strong HQ presence for business development and innovation.
 - » **Staff training:** A formal training plan should be developed for the staff aligned with job roles and responsibilities.
 - » **IT-based project management:** An IT-backed formal programme management system should clearly delineate responsibilities and ensure regular tracking.
 - » **IT-based asset monitoring:** RMS systems for asset management should be made mandatory under all installations. This should be monitored at all levels, with MIS reports reviewed by HQ regularly.

5.3 Conclusion

To stimulate RE growth, it is crucial for the state nodal agency for RE promotion to adopt the comprehensive role of a think tank that constantly works to identify and implement solutions aligned with the local requirements and limitations. The larger objective is creating a conducive environment for developers and vendors to scale up RE. The existing policy has assigned APDCL a limited role. However, to take up the expanded role of stimulating and facilitating RE growth in Assam, the NRE division of APDCL needs to be institutionally strengthened. Further, there is an immediate requirement for AEDA to be developed as a dedicated organization to focus on the DRE segment and expand its role as an ecosystem enabler/facilitator. This would require substantial institutional building and integrating institutional best practices to ensure efficient operations.

CHAPTER 6

Summary



Assam is steadily expanding its renewable energy (RE) installed base under the new Assam Renewable Energy Policy, 2022. At present, thermal power generation dominates the utility installed capacity in the state of 2,037 MW and a captive installed capacity of 529 MW. However, the state government is now recognising the urgent requirement of increasing RE penetration, with the new policy aiming to stimulate investments in new RE capacity aggregating 1,200 MW by 2027.

Over the past year, driven by the effort of state-owned and central-owned public sector undertakings (PSUs), the tendering and project development activities concerning large RE projects have increased. At present, about 15 ground-mounted, floating solar, and agri-PV projects aggregating 1,985 MW of capacity are under various stages of development.

While the government's renewed focus on the RE segment is commendable, several concerns must be addressed for RE scale-up in Assam. These challenges include:

- Low perceived potential for RE projects due to lack of ground-level research for potential assessment and identification of specific sites.
- Project development challenges due to land acquisition/mobilisation-related hurdles and limited infrastructure support.
- High generation cost due to higher project development costs and relatively lower capacity utilisation of solar installations.
- Lack of interest from RE developers, as the capacity expansion continues to be driven by state and central PSUs.
- Lack of policy attention to other RE segments, including small hydro, biomass, pump storage and DRE.

Addressing these structural challenges is crucial as new demands on large scale RE scale up emerging. There are vital push factors necessitating large-scale renewable energy scale-up in the state. Power demand is expanding fast in the state and is projected to double over the next decade. RE sources (primarily solar) provide one of the cheapest sources for power procurement.

Further, there are strong regulatory requirements from the central government in the form of renewable purchase obligations (RPOs) that mandate 29.91% of the total energy consumption to be sourced from RE sources in 2024-25 and 43.3% in 2029-30. Given this and the projected electricity demand, the RE-based electricity requirement of Assam will expand significantly to about 3,000 MW by 2026-27 and 5,000 MW by 2031-32, which is likely to be met mainly by solar. Further, there is a strong case for local procurement of this RE power not only due to energy security concerns but also to build the local economy and support green economic growth.

State policy plays a crucial role in stimulating transformational change. While AREP 2022 is still in the early implementation stage, it can be seen to have a positive impact on investments in the RE sector of Assam. Against about 100 MW of RE projects added during the Solar Policy 2017-2020, about 1 GW of projects are already being developed under the policy. However, to stimulate the next phase of RE growth in the state, the following recommendations are identified:

- The RE growth target must be aligned with the state's expected electricity consumption growth and the new RPO trajectory (3,000 MW by 2027 and nearly 5,000 MW capacity by 2030) to address energy security concerns and boost local green growth.
- While AREP 2022 provides the broad framework for RE growth, technology-specific detailed policies/guidance should be provided for focus segments – water resource-based RE projects, urban and rural DRE, biomass, etc. Technology-specific mechanisms, especially in the non-solar segments, must be significantly strengthened.
- While APDCL, as a nodal agency, remains responsible for ensuring policy implementation, specific duties for key RE segments should be assigned to specialised organisations/agencies, such as AEDA for DRE projects.
- Private investments require a significant boost. To support this, project identification, infrastructure support, clearance facilitation through a digital platform, and the implementation of standard operating procedures (SOPs) need to be expedited.
- Incentives under the policy should be aligned to cover the generation tariff differential with large RE states, as well as the prevailing ISTS waiver.
- An ecosystem approach to RE sector growth must focus on comprehensive demand creation, skill building and PV manufacturing.

In addition to policy strengthening, it is equally important to build the institutional capacity of state nodal agencies to act as investment facilitators. Under the AREP 2022, Assam Power Distribution Company Limited (APDCL) has been made the nodal agency for implementing the policy. Meanwhile, the role of promoting DRE has traditionally been vested in Assam Energy Development Agency (AEDA). There is a case of institutional strengthening of both APDCL and AEDA to address the requirements of the two distinct segments of large-RE and DRE in Assam.

In the case of APDCL, there is a need to expand its role into state-owned think tanks for RE growth that can assess and communicate opportunities, devise technology and policy solutions, engage with stakeholders and facilitate investments. This would entail:

- Identifying RE investment opportunities based on a detailed techno-economic assessment of the state's available RE generation potential.
- Building investment case for RE projects through developing and implementing business models aligned with their techno-commercial feasibility.
- Engaging with state and central decision-makers and regulators to create a conducive investment policy and incentive environment.
- Designing and implementing pilot projects for technology or business model demonstrations and coordinating with other agencies for project development and demand aggregation.
- Creating and providing ease of investment to developers through developer engagement, identification of investable projects, and facilitating project development.
- Identifying and fostering new avenues of growth through collaborations with academic institutions, technical institutions, think tanks, and policy research organisations.

The second requirement is for these institutions to adopt institutional structures and practices that support efficiency in operations.

In the case of AEDA, its role and capacity must be substantially built to act as an anchor for addressing the specific requirements of the DRE segment. To achieve this, the state government must clearly identify DRE as the organisation's area of responsibility. To ensure strategic engagement, AEDA must develop a business/engagement plan for at least three years, with due consideration of the market requirement. Once the specific areas of intervention are identified, the aim should be to create an ecosystem for sustainable DRE deployments in the states.

AEDA's role must expand to that of a DRE ecosystem enabler/facilitator in Assam. This would entail comprehensive engagement in designing, deploying, and managing DRE investments. In doing so, AEDA must aim to achieve financial self-sufficiency by identifying new areas of finances.

Finally, institutional strengthening of the organisation is crucial. This would entail possible corporatisation of the organisation, dedicated leadership, a strong governing body, efficient staffing planning (with strong district presence) and training, and incorporation of IT-based project management tools and IT-based asset monitoring systems.

Overall, the shift towards RE in Assam's energy growth strategy is a commendable move, given its potential to reduce dependence on fossil fuels and ensuring energy security. However, there are several concerns that need to be addressed for the successful scale-up of RE in the state, through policy tightening and institutional capacity building.

Annexure

A1. Targets set under Assam Renewable Energy Policy 2022

Sl. No.	Description	Target Capacity (MW)
A	Grid Connected Solar Power	
A.1	Solar Park	
	a. Normal Solar Park	50
	b. On water bodies	50
	Sub-total	100
A.2	Solar Power Plants for sale to APDCL	
	a. With storage	250
	b. Without storage	50
	Sub-total	300
A.3	Solar Power Plants for sale of power to any entity other than APDCL	50
A.4	Solar Power Plants under REC mechanism	50
A.5	Solar Power Plant in Agriculture sector	100
A.6	Captive Solar Power Plant	20
	Sub — Total (A)	620
B	Grid Connected Roof-top solar	
B.1	a. Industrial with storage	100
B.2	b. Residential	100
B.3	c. State Govt. installations	100
	Sub-Total	300
C	Off-grid Solar	
C.1	Solar Pump	25
C.2	Mini / Micro Grid Solar Power Plant. Solar Home Light, Solar Street Light, Off Grid Solar Power Plant	5
C.3	State Govt. installations	50
	Sub - Total (C)	80
	Grand Total Solar	1,000
D	Other renewable	
D.1	Small hydro	25
D.2	Pump storage	50
D.3	Biomass based	25
D.4	Solid waste	100
	Sub - Total (D)	200
	Grand Total	1,200

Source: Assam Renewable Energy Policy 2022.

References

1. Central Electricity Authority. (2024). All India Installed Capacity of Power Stations. https://cea.nic.in/wp-content/uploads/installed/2024/02/IC_Feb_2024allocation_wise.pdf
2. Central Electricity Authority. (2023). All India Electricity Statistics . https://cea.nic.in/wp-content/uploads/general/2022/GR_Final.pdf
3. Ministry of New and Renewable Energy. (2024). State-wise installed capacity of Renewable Power including Off-grid. <https://cdnbbsr.s3waas.gov.in/s3716e1b8c6cd17b771da77391355749f3/uploads/2024/03/20240311381278964.pdf>
4. GOVERNMENT OF ASSAM. (2022). Assam Renewable Energy Policy 2022. https://dpns.assam.gov.in/sites/default/files/swf_utility_folder/departments/directorate_printing_uneecopscloud_com_oid_3/menu/document/no._715_pel_230-2021-138_dated_13-10-22.pdf
5. Government of Assam. (2023). Economic Survey, Assam, 2023-24. <https://des.assam.gov.in/information-services/economic-survey-assam>
6. Central Electricity Authority. (2023). 20th Electric Power Survey of India. https://cea.nic.in/wp-content/uploads/ps___lf/2022/11/20th_EPS___Report___Final___16.11.2022.pdf
7. Ministry of Power. (2023). Notification Regarding Renewable Purchase Obligation (RPO). https://powermin.gov.in/sites/default/files/Notification_Regarding_Renewable_Purchase_Obligation_RPO.pdf
8. Assam Electricity Regulatory Commission. (2023). Assam Power Distribution Company Limited Tariff Order for 2023-24. https://www.apdcl.org/website/docs/acts_and_rules/Tariff_Order_31032023.pdf
9. Ministry of Power. (2023). Waiver of Inter-state Transmission Charges on Transmission of the Electricity Generated from Solar and Wind. https://powermin.gov.in/sites/default/files/Waiver_of_Inter_State_Transmission_Charges_on_transmission_of_the_electricity_generated_from_solar_and_Orders.pdf

iFOREST

INTERNATIONAL
FORUM
FOR ENVIRONMENT,
SUSTAINABILITY
& TECHNOLOGY

International Forum for Environment, Sustainability & Technology (iFOREST) is an independent non-profit environmental research and innovation organisation. It seeks to find, promote and scale-up solutions for some of the most pressing environment–development challenges. It also endeavours to make environmental protection a peoples’ movement by informing and engaging the citizenry on important issues and programs.

<https://iforest.global>