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STATE ENERGY EFFICIENCY INDEX 2024

Alliance for an Energy Efficient Economy™

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External Support:
Web portal development by AAPNA Infotheek Pvt Ltd.
Report design by Aspire Design, New Delhi
Copy Editing by The Big Pitchr

Suggested citation:
Bureau of Energy Efficiency, Alliance for an Energy Efficient Economy.
State Energy Efficiency Index 2024,

Disclaimer:
This report is based on data collected by the Alliance for an Energy Efficient Economy (AEEE) from the 36 State Designated Agencies (SDAs), and data available in the state and central government reports as of November 20, 2024. It has been reviewed by AEEE and the Bureau of Energy Efficiency (BEE). Every attempt has been made to ensure the correctness of the data. However, BEE and AEEE do not guarantee the accuracy of the data or accept responsibility for the consequences of using such data.

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सत्यमेव जयते

Azadi Ka Amrit Mahotsav

ऊर्जा दक्षता ब्यूरो
(विद्युत मंत्रालय, भारत सरकार)

BUREAU OF ENERGY EFFICIENCY
(Ministry of Power, Government of India)

Message

India's energy transition is not just a response to climate imperatives—it is a strategic opportunity to foster innovation, resilience, and inclusive growth. As we chart our path toward achieving net-zero emissions by 2070 and a 45% reduction in emissions intensity by 2030, energy efficiency emerges as a foundational pillar—offering high-impact, low-cost solutions that cut across all sectors.

The State Energy Efficiency Index (SEEI) 2024 is a significant milestone in this journey. This edition brings a sharper focus on ground-level implementation, sectoral outcomes, and measurable progress. By evaluating states across critical domains—such as buildings, industry, transport, DISCOMs, and agriculture—it reflects the growing maturity of India's energy efficiency ecosystem.

This Index is not just about rankings; it is about understanding what's working, where efforts need reinforcement, and how states can learn from one another. It has evolved into a decision-support tool—enabling more strategic planning, better alignment of state priorities with national goals, and improved accountability through data-backed insights.

It is encouraging to see states increasingly embedding energy efficiency into broader planning frameworks—urban resilience, infrastructure modernization, and clean energy development. These actions are vital for building long-term institutional capacity and unlocking green investments at scale.

I appreciate the dedicated efforts of the Bureau of Energy Efficiency (BEE), State Designated Agencies (SDAs), and all contributing partners in delivering this comprehensive and credible assessment. Their collaboration has been critical in ensuring the integrity and impact of the Index.

Let us continue to work together to translate ambition into action—and action into results—for a future that is both energy-smart and climate-resilient.

New Delhi,
August 2025

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RIGHT TO INFORMATION

स्वच्छ भारत एक कदम स्वच्छता की ओर

ACKNOWLEDGEMENTS

The State Energy Efficiency Index 2024 has been collaboratively developed by the Bureau of Energy Efficiency (BEE) and the Alliance for an Energy Efficient Economy (AEEE).

BEE extends its sincere gratitude to the Ministry of Power (MoP) the Government of India (GoI) for their unwavering support in enabling the publication of the State Energy Efficiency Index 2024.

We sincerely appreciate the efforts of the State Designated Agencies (SDAs) in facilitating data collection and reviewing supplementary data gathered by BEE from various sources.

Our heartfelt thanks go to AEEE for their strategic guidance, expertise, and significant contributions to data analysis, coordination with SDAs, and the comprehensive compilation of this report.

We also express our gratitude to Energy Efficiency Services Limited (EESL), Green Business Certification Inc (GBCI), Green Rating for Integrated Habitat Assessment (GRIHA), and the Confederation of Indian Industry (CII) for sharing critical data that enriched this report.

We extend a special acknowledgement to the iNVENCO EWSA SERVICES for their invaluable assistance with data collection, validation, and analysis.

Finally, sincere appreciation is extended to Shri Milind Deore, Secretary, BEE for his vision and leadership in guiding the in-house team and AEEE during the development of the SEEI 2024; Dr. Abhishek Sharma, Director, BEE for his valuable contributions in sharing data and offering insights during the data collection process; and Shri Vikash Kumar Jha, Project Engineer, BEE for his diligent coordination with all Stakeholders for data collection and validation. Their collective efforts were pivotal to the successful completion of this report.

ABBREVIATIONS

AAI	Airport Authority of India
AC	Air Conditioner
ACS	Average Cost of Supply
ADC	Aide De-Camps
AEEE	Alliance for an Energy Efficient Economy
AgDSM	Agriculture Demand Side Management
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AO	Adjudicating Officer
APCPDCL	Andhra Pradesh Central Power Distribution Company Limited
APSECM	Andhra Pradesh State Energy Conservation Mission
APSPDCL	Andhra Pradesh Southern Power Distribution Company Limited
ARR	Average Realisable Revenue
ASCI	Administrative Staff College of India
ASTC	Assam State Transport Corporation
AT&C	Aggregate Technical & Commercial
BEE	Bureau of Energy Efficiency
BESCOM	Bangalore Electricity Supply Company Limited
BLDC	Brushless Direct Current Motor
CCMS	Centralized Control and Monitoring System
CCTS	Carbon Credit Trading Scheme
CEA	Central Electricity Authority
CII	Confederation of Indian Industry
CNG	Compressed Natural Gas
CO_2	Carbon Dioxide
COP	Conference of the Parties
CSO	Civil Society Organisation
DC	Designated Consumer
DISCOM	Distribution Company
DSM	Demand Side Management
DVVNL	Dakshinanchal Vidyut Vitran Nigam Ltd.
EC	Energy Conservation
ECBC	Energy Conservation Building Code
EE	Energy Efficiency, Energy Efficient
EESL	Energy Efficiency Services Limited
EHT	Extra High Tension
EMC	Energy Management Centre
ENS	Eco Niwas Samhita
ESCO	Energy Service Company
ESPC	Energy Savings Performance Contract
EV	Electric Vehicle
FAME	Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
FICCI	Federation of Indian Chambers of Commerce & Industry
FY	Fiscal Year

GBCI	Green Building Certification Inc
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GRIHA	Green Rating for Integrated Habitat Assessment
GSDP	Gross State Domestic Product
HESCOM	Hubli Electricity Supply Company
HKMCF	Hare Krishna Movement Charitable Foundation
HT	High Tension
HVAC	Heating, Ventilation, and Air Conditioning
IE	International Efficiency standard
IESS	India Energy Security Scenario
IGBC	Indian Green Building Council
IGEA	Investment Grade Energy Audit
IIT	Indian Institutes of Technology
INR	Indian Rupee
IoT	Internet of Things
ISO	International Organization for Standardization
JERC	Joint Electricity Regulatory Commission
KREDL	Karnataka Renewable Energy Development Limited
KSEB	Kerala State Electricity Board
KVA	Kilovolt Ampere
KVK	Krishi Vigyan Kendra
kWh	Kilowatt Hour
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LNG	Liquefied Natural Gas
LT	Low Tension
M&V	Measurement and Verification
MC	Municipal Corporation
MEA	Mandatory Energy Audit
MEDA	Maharashtra Energy Development Agency
MEEP	Municipal Energy Efficiency Programme
MNRE	Ministry of New and Renewable Energy
MoP	Ministry of Power
MoPNG	Ministry of Petroleum and Natural Gas
MoRTH	Ministry of Road Transport and Highways
MoU	Memorandum of Understanding
MSME	Micro, Small, and Medium Enterprise
MTOE	Million Tonnes of Oil Equivalent
MU	Million Units
MuDSM	Municipal Demand Side Management
MVVNL	Madhyanchal Vidyut Vitaran Nigam Ltd
MW	Mega Watt
NDC	Nationally Determined Contribution
NECA	National Energy Conservation Award
NGO	Non-Governmental Organisation

NITI	National Institution for Transforming India
NMRP	National Motors Replacement Program
NREDCAP	New and Renewable Energy Development Corporation Ltd
PAT	Perform Achieve and Trade
PEACE	Promotion of Energy Audit and Conservation of Energy
PEDA	Punjab Energy Development Agency
PM-KUSUM	Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan
PNG	Piped Natural Gas
PPP	Public Private Partnership
PSU	Public Sector Undertaking
PuVVNL	Purvanchal Vidyut Vitaran Nigam Ltd.
R&D	Research and Development
RDSS	Revamped Distribution Sector Scheme
RE	Renewable Energy
RIF	Revolving Investment Fund
SDA	State Designated Agency
SECF	State Energy Conservation Fund
SEEAP	State Energy Efficiency Action Plan
SEEI	State Energy Efficiency Index
SEEM	Society of Energy Engineers and Manager
SERC	State Electricity Regulatory Commission
S&L	Standards and Labelling Program
SLNP	Street Lighting National Programme
SLSC	State Level Steering Committee
SME	Small and Medium Enterprise
SRTC	State Road Transport Corporation
TFEC	Total Final Energy Consumption
ToD	Time of Day
TOE	Tonnes of oil equivalent
ToU	Time of Use
TGREDCO	Telangana State Renewable Energy Development Corporation Limited
UDD	Urban Development Department
ULB	Urban Local Body
UNFCCC	United Nations Framework Convention on Climate Change
UT	Union Territory

EXECUTIVE SUMMARY

As the world's third-largest energy consumer, India is witnessing a surge in energy demand driven by rapid economic growth. In response, the country has committed to a sustainable, low-carbon development pathway, targeting net-zero emissions by 2070 and a 45% reduction in GDP emission intensity by 2030. These ambitious goals are supported by robust policies and regulatory frameworks aimed at fostering energy efficiency and sustainability.

To align with global commitments, including COP28 and the G20's energy efficiency objectives, India has introduced the State Energy Efficiency Action Plan (SEEAP). This initiative focuses on implementing localized energy efficiency measures, emphasizing the need for seamless coordination between central and state governments for effective policy execution and progress monitoring.

A pivotal legislative milestone, the Energy Conservation Act of 2001, amended in 2022, empowers states to enforce energy conservation codes and establish funding mechanisms. Key national initiatives under this framework include the Carbon Credit Trading Scheme (CCTS), the Standards and Labelling (S&L) Program, and the Energy Conservation Building Code (ECBC). Additionally, Super Energy Service Companies (Super ESCOs) play a critical role in facilitating large-scale financing for energy efficiency projects.

India has introduced SEEAP in line with its global commitments: COP 28, G20 Energy Efficiency Objectives

India's leadership in global energy efficiency is further demonstrated through its active international engagements, particularly during its 2023 G20 presidency. By expanding performance standards, enhancing enforcement mechanisms, and mobilizing financial resources, India continues to advance its energy efficiency agenda. These efforts reinforce its position as a global leader in sustainable energy policies and innovative technologies, driving the transition towards a more energy-efficient future.

STATE ENERGY EFFICIENCY INDEX 2024

The State Energy Efficiency Index (SEEI) 2024 assesses the energy efficiency (EE) progress of Indian states and Union Territories (UTs) for FY 2023-24. The index aims to institutionalise state-level data monitoring, track energy footprint management, promote best practices, and encourage competitive improvements.

SEEI 2024 marks the sixth edition of this index, building upon the success of its predecessors: the State Energy Efficiency Preparedness Index 2018 and the subsequent editions of SEEI 2019, SEEI 2020, SEEI 2021-22, and SEEI 2023.

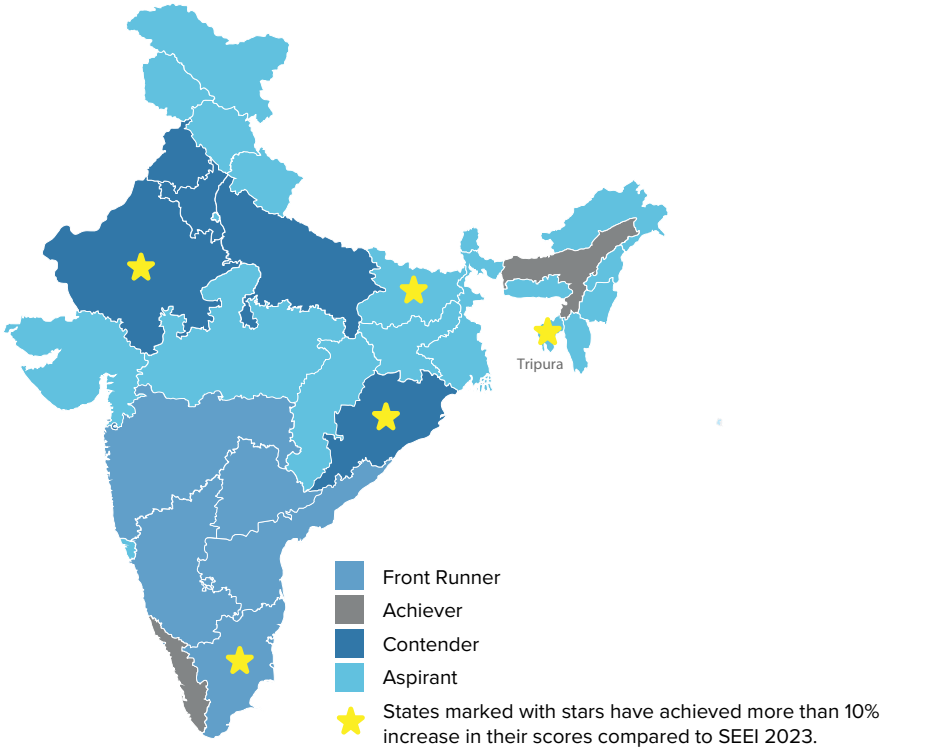
The objectives of SEEI 2024 are to:

- Help drive EE policies and programme implementation at the state and local level
- Highlight best practices and encourage healthy competition among the states
- Track progress in managing the states' and India's energy footprint
- Institutionalise state-level data capture and monitoring of EE activities by the State Designated Agencies (SDAs).

SEEI 2024 introduces a more implementation-focused framework with 66 indicators across seven key sectors: Buildings, Industry, Municipal Services, Transport, Agriculture, Electricity Distribution Companies (DISCOMs), and Cross-Sector initiatives. New indicators reflect evolving national priorities, such as the ESCO Model, Star Rating for

buildings, MSME Cluster Profiling, PAT Scheme expansion, EV demand-side incentives, and DISCOMs' demand-side management efforts.

The framework emphasises on-ground implementation through program-specific indicators assessing state-led EE initiatives. These initiatives include energy audits, retrofits, technology demonstrations, capacity-building, and fiscal incentives. SEEI 2024 sources data from BEE, SDAs, CEA, EESL, and various government and industry stakeholders. The data undergoes rigorous validation by the Alliance for an Energy Efficient Economy (AEEE) and BEE to ensure credibility. Strong EE performance is characterised not only by effective implementation but also by transparent reporting of the initiatives. SEEI 2024 serves as a critical tool for guiding state-level energy policies, driving efficiency improvements, and contributing to India's broader energy sustainability goals.



KEY FINDINGS

The classification framework adopted in SEEI 2023 has been retained in the State Energy Efficiency Index (SEEI) for evaluating the performance of the States and Union Territories UTs) based on specific metrics. Each State and UT is categorised into one of four performance groups: 'Front Runner,' for scores of 60% or above; 'Achiever,' for scores between 50% and less than 60%; 'Contender,' for scores between 30% and less than 50%; and 'Aspirant,' for scores below 30%.

The classification of States & UTs into four groups has been kept the same as in the previous SEEI version, viz., Group 1 (>15 million tonnes of oil equivalent (MTOE)), Group 2 (5-15 MTOE), Group 3 (1-5 MTOE), and Group 4 (<1 MTOE).

The top-performing states in each group are Maharashtra (Group 1), Andhra Pradesh (Group 2), Assam (Group 3), and Tripura (Group 4). Compared to seven (7) states in SEEI 2023, there are five (5) states - Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu and Telangana in the 'Front runner' category in SEEI 2024.

Two (2) states, Assam and Kerala, are in the 'Achiever' category, and five (5) states—Haryana, Punjab, Rajasthan, Odisha and Uttar Pradesh—are in the 'Contender' category.

BUILDINGS SECTOR

As reported in SEEI 2024, the Energy Conservation Building Code has been notified in twenty-four (24) States, with twenty (20) states integrating it into municipal building byelaws, reflecting a stronger regulatory enforcement. The Eco Niwas Samhita (ENS), aimed at promoting residential energy efficiency, has seen thirteen (13) states drafting the ENS versions. While six (6) states await approval for its notification. signalling a growing commitment toward energy efficiency in housing. Furthermore, nineteen (19) states have actively promoted the use of BEE star-labelled appliances in government buildings, and fourteen (14) states have extended these measures to commercial establishments, demonstrating a shift towards sustainable infrastructure. The construction of Super ECBC and Net Zero Energy Buildings has gained momentum, with several states making remarkable strides in green building certification and incentives. Karnataka emerged as the top performer in the buildings sector despite a slight decline in scores. At the same time, Maharashtra demonstrated the most substantial improvement, increasing its score by 21.8% compared to the previous evaluation. Capacity-building efforts have also expanded, with nine states reporting training programs for architects, engineers, and urban planners, ensuring that stakeholders are equipped with the knowledge and resources to implement energy-efficient building practices. The SEEI 2024 also reported the widespread adoption of energy benchmarking, penetration of electric cooking and solar energy systems, and increased financial incentives for green infrastructure.

Energy Conservation Building Code has been formally integrated into building byelaws of 20 states.

INDUSTRY SECTOR

The State Energy Efficiency Index (SEEI) 2024 underscores the continued integration of energy efficiency (EE) and energy conservation (EC) policies within the industry sector, marking significant progress in policy implementation and adoption of energy-efficient practices. ten (10) states have now incorporated EE provisions into their MSME and industrial policies, reinforcing structured energy conservation measures. Additionally, seven (7) states have established Mandatory Energy Audit (MEA) policies for non-PAT industries and MSMEs. In comparison, nine (9) states have introduced financial incentives and schemes to support the implementation of MEA recommendations, facilitating greater compliance and investment in energy efficiency. The adoption of ISO 50001 energy management standards has expanded, with nine (9) states demonstrating a commitment to structured energy conservation frameworks. Moreover, twenty-eight (28) states have actively identified energy-intensive MSME clusters. In comparison, fourteen (14) states have engaged in PAT widening and deepening initiatives, further strengthening the drive towards efficient industrial energy use. The transition to low-carbon industrial processes is accelerating, with six (6) states implementing electrification measures for end-use applications. Recognition of industrial energy conservation efforts has gained momentum, with twenty-five (25) states awarding Energy Conservation Awards to industrial units for their exemplary performance in EE. Additionally, sixteen (16) states have launched state-led energy efficiency programmes for large industries, while ten (10) states have introduced specific EE initiatives targeting MSMEs. A strong focus has been placed on capacity building, with fifteen (15) states implementing training and awareness programmes aimed at industry stakeholders, including manufacturers, industry associations, and policymakers.

MUNICIPAL SERVICES SECTOR

The SEEI 2024 highlights significant progress in municipal sustainability initiatives, with twenty-five (25) States developing a Climate Action Plan, Net Zero Plan, or Heat Action Plan to address energy efficiency and urban resilience. Among them, twelve

(12) states have reported active collaboration between State Designated Agencies (SDAs) and Urban Local Bodies (ULBs) to implement energy efficiency actions under these frameworks. A growing number of states are incorporating energy-efficient technologies in municipal operations. Fifteen (15) states have adopted energy-efficient practices in street lighting, water pumping, and sewerage systems, utilising efficient motor technologies and automation to enhance performance and reduce energy consumption. Additionally, twelve (12) states have deployed monitoring systems such as SCADA and energy management systems, enabling real-time tracking of municipal infrastructure efficiency. In a significant push for sustainable urban lighting, twenty (20) states have implemented programmes for energy-efficient street lighting, primarily focusing on LED retrofitting projects to reduce electricity demand and enhance visibility. Similarly, fourteen (14) states have launched energy-efficient water and sewerage system programmes, ensuring lower energy consumption and operational cost savings in municipal utilities. Recognising the need for capacity building, ten (10) states have introduced training programmes for municipal engineers, planners, and administrators, fostering knowledge-sharing and promoting best practices in urban energy efficiency.

States should strive to incorporate Energy Efficiency in Climate Action Plans/ Net Zero Plans/ Heat Action Plans at city level.

TRANSPORT SECTOR

The SEEI 2024 highlights a widespread adoption of electric mobility policies, with thirty-one (31) states implementing State Electric Mobility/Vehicle Policies, reinforcing efforts towards sustainable and energy-efficient transportation. Additionally, sixteen (16) states have established state transport policies or guidelines advocating fuel efficiency, ensuring a structured approach to reducing transportation-related energy consumption. To support the adoption of electric vehicles (EVs), fourteen (14) states have introduced mandates for EV charging infrastructure in commercial and residential buildings, facilitating greater accessibility to charging networks. Furthermore, fifteen (15) states have reported significant progress in EV adoption and incentives for consumers, fostering the transition to clean mobility solutions. Public transport electrification has been prioritised, with eighteen (18) states launching programmes for energy-efficient public transport, including electric bus deployments and fleet modernisation to reduce emissions. Complementing these efforts, twelve (12) states have introduced energy-efficient private transport schemes, focusing on EV incentives, hybrid vehicle promotion, and alternative fuel adoption to encourage cleaner personal transportation options. Capacity-building efforts in the transport sector have also gained momentum, with ten (10) states organising EV awareness programs, training sessions for drivers, and energy efficiency workshops, ensuring stakeholder preparedness for the evolving mobility landscape.

AGRICULTURE SECTOR

The SEEI 2024 highlights the growing emphasis on energy-efficient agricultural practices, with thirteen (13) states developing policies that support energy efficiency (EE) in integrated cold storage, water conservation, and farming machinery. These policy advancements reflect a strategic shift towards sustainable and climate-friendly agricultural operations. The adoption of EE measures in agricultural irrigation has expanded, with nine (9) states reporting on energy-efficient or solar-powered agricultural pumps. Among them, two (2) states—Andhra Pradesh and Kerala—have provided quantified data, with Kerala reporting that 74% of its agricultural pumps are energy-efficient or solar-powered, demonstrating a strong commitment to clean energy adoption in the sector. Cold storage energy efficiency is also gaining traction, with twelve (12) states integrating EE measures into agricultural cold storage systems, ensuring reduced energy consumption and enhanced sustainability in food preservation. Additionally, eleven (11) states have launched capacity-building

12 States have integrated Energy Efficiency in Cold Storage systems, reducing energy consumption and promoting sustainable agriculture pratices.

initiatives aimed at educating farmers and policymakers on EE in agriculture, solar irrigation, and sustainable cold chain management.

DISCOM SECTOR

The SEEI 2024 highlights the increasing adoption of demand-side management (DSM) strategies, with eleven (11) states now having approved DSM action plans within their Aggregate Revenue Requirement (ARR), reinforcing structured approaches to energy demand optimisation. Demand response and flexibility initiatives have expanded significantly, with twenty-eight (28) states implementing Time-of-Day (ToD)/Time-of-Use (ToU) tariffs across commercial, industrial, and domestic consumers, promoting efficient electricity usage and peak demand reduction. The penetration of smart metering has also seen notable growth, with sixteen (16) states reporting progress in smart meter installations and data analysis, leveraging technology for consumer awareness, operational efficiency, and demand forecasting. Energy accounting and audit compliance have improved, with DISCOMs in twenty-three (23) states submitting quarterly energy accounting reports. In contrast, twenty-two (22) states have submitted their annual energy audit reports to the Bureau of Energy Efficiency (BEE), ensuring greater transparency and accountability in electricity distribution. To enhance DISCOM performance and financial sustainability, fifteen (15) states have engaged in programmes to reduce Aggregate Technical & Commercial (AT&C) losses and actively participated in the Revamped Distribution Sector Scheme (RDSS) implementation, promoting grid modernisation and efficiency improvements. Additionally, twelve (12) states have introduced capacity-building programmes for DISCOM employees, focusing on load management, efficiency optimisation, and grid modernisation, equipping personnel with the necessary skills to drive sustainable energy distribution practices.

CROSS SECTOR

The SEEI 2024 highlights significant advancements in state-level energy efficiency (EE) planning and implementation, reinforcing India's commitment to national climate and energy conservation goals. A total of thirty-Five (35) states have developed State Energy Efficiency Action Plans (SEEAPs), ensuring a structured and aligned approach toward achieving national energy and sustainability targets. Energy data monitoring and reporting frameworks have improved, with seventeen (17) states strengthening their systems, enhancing transparency in energy savings and emissions reductions. Financial and regulatory support for EE initiatives has expanded, as twenty-two (22) states now offer dedicated grants, subsidies, or tax rebates to encourage investments in energy-efficient technologies and infrastructure. Cross-sectoral energy management strategies are becoming more prevalent, with eleven (11) states integrating EE measures into their Climate Action Plans and Renewable Energy Strategies, fostering a holistic and interconnected approach to sustainability. Technology adoption has accelerated, with fourteen (14) states implementing smart grids, AI-based EE analytics, and automated demand-side management (DSM) systems, optimising energy distribution and consumption. Scaling up EE interventions through public-private partnerships (PPP) has gained traction, with ewelve (12) states piloting PPP initiatives in key sectors, including buildings, industries, and municipal services, facilitating innovative financing and project execution models. Furthermore, capacity-building efforts have been prioritised, with fifteen (15) states launching training programs to enhance expertise in energy-efficient technologies and policy implementation. These initiatives have targeted key stakeholders, including government officials, municipal bodies, energy auditors, industrial associations, and financial institutions, fostering collaborative efforts to mainstream EE practices.

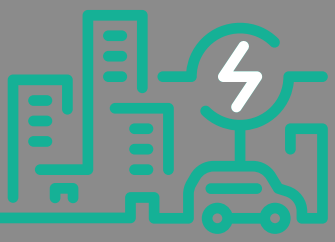
States should enhance EE investment and SDA budgets.

TAKEAWAY FOR STATES

SEEI 2024 highlights that while states have made notable progress in policy formulation and program implementation, data availability, enforcement, and outcome measurement remain key challenges. Most states have adopted sector-specific energy efficiency initiatives, such as ECBC and ENS for buildings, PAT for industries, EV policies for transport, and DSM programs for DISCOMs. However, the focus must now shift towards ensuring stronger compliance, impact assessment, and scaling best practices.

Three-Point Agenda for States & UTs:

- **Strengthen Implementation & Compliance of Energy Efficiency Policies:** Move beyond policy adoption and ensure full enforcement of ECBC, PAT, and other EE regulations to achieve measurable energy savings.
- **Improve Data Collection, Transparency, and Monitoring Mechanisms:** Address data gaps by integrating real-time energy tracking, improving state reporting systems, and ensuring public access to EE performance data.
- **Scale Up Investments & Capacity Building for Sustainable Impact:** Facilitate inter-departmental collaboration, enhance financial incentives, and train officials to expand and sustain energy efficiency programs across sectors.



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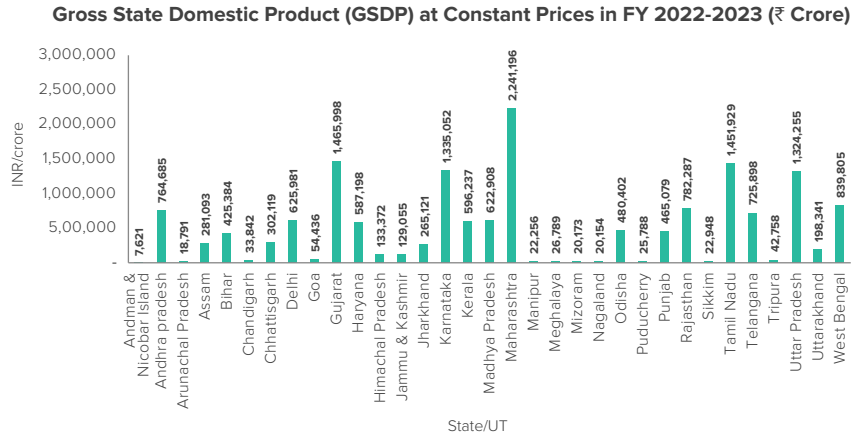
1 INTRODUCTION

India's rapid economic growth, marked by an expanding middle class and swift urbanisation, has positioned it as the third-largest energy consumer worldwide. The country's energy demand in buildings, industry, transport, and agriculture is set to increase significantly in the coming decades, underscoring the urgent need for a sustainable approach to energy consumption. To address this challenge, India has committed to a low-carbon development pathway, integrating energy efficiency as a central strategy for achieving energy security and climate resilience. In line with its commitment to global climate action, India has updated its Nationally Determined Contributions (NDCs) under the United Nations Framework Convention on Climate Change (UNFCCC). The country has pledged to achieve net-zero emissions by 2070 and reduce the emission intensity of its GDP by 45% from 2005 levels by 2030. These ambitious targets are supported by a comprehensive policy framework, regulatory measures, and state-level initiatives aimed at driving large-scale energy efficiency improvements across all sectors.

Recognising the role of energy efficiency as the most cost-effective and cleanest solution to complement renewable energy expansion, India has made substantial progress in advancing its energy efficiency agenda. To further accelerate this progress, India has aligned itself with global commitments, such as the pledge made at COP28 and the G20's voluntary action plan to double the rate of energy efficiency improvements by 2030. These commitments reflect the growing urgency to scale up energy-saving interventions while integrating them into the broader economic and industrial landscape. To translate national targets into concrete actions, the Bureau of Energy Efficiency (BEE) has launched the State Energy Efficiency Action Plan (SEEAP), ensuring localised implementation of energy efficiency measures. These plans continue to evolve, reflecting the diverse needs and capacities of different states and union territories (UTs). By addressing regional variations in economic conditions, levels of development (Figure 1 – 1), climatic conditions, and energy consumption patterns, SEEAPs serve as an essential mechanism for adapting national objectives to state-specific realities.

State Energy Efficiency Action Plan is a strategic initiative by the Bureau of Energy Efficiency, ensuring localised implementation of EE measures and incorporating EE in states' decarbonization plans

Figure 1-1: State GSDP - 2022-2023



Source: Handbook of Statistics on Indian States 2023-24: Reserve Bank of India

Note: GSDP FY 2022-2023 is not available for Dadra Nagar Haveli and Daman Diu, Ladakh, and Lakshadweep

Given India's vast and varied landscape of thirty-six States, implementing energy efficiency initiatives presents both challenges and opportunities. The success of these efforts relies heavily on coordinated action between central and state governments to ensure judicious resource allocation, harmonisation of policies across different levels of governance, and systematic tracking of progress. Regular assessment and course corrections are imperative to ensure that energy efficiency measures remain effective and responsive to evolving economic and environmental conditions.

The Energy Conservation Act of 2001 provides the legislative foundation for these efforts, with its 2022 amendments empowering state governments to enforce energy conservation codes, set energy consumption standards, and establish dedicated funding mechanisms for energy efficiency programs. Among India's key energy efficiency initiatives is the introduction of the Carbon Credit Trading Scheme (CCTS) by the Ministry of Power. This market-based mechanism aims to incentivise industries to adopt low-carbon technologies while promoting energy efficiency improvements. Other flagship programs include the Standards and Labelling (S&L) Program, which enhances the performance of appliances and equipment; the Energy Conservation Building Code (ECBC) and Eco-Niwas Samhita (ENS), which set efficiency benchmarks for commercial and residential buildings; and the National Motors Replacement Program (NMRP), which drives the adoption of high-efficiency electric motors across industries. The establishment of Energy Service Companies (ESCOs) further supports large-scale energy efficiency financing and implementation.

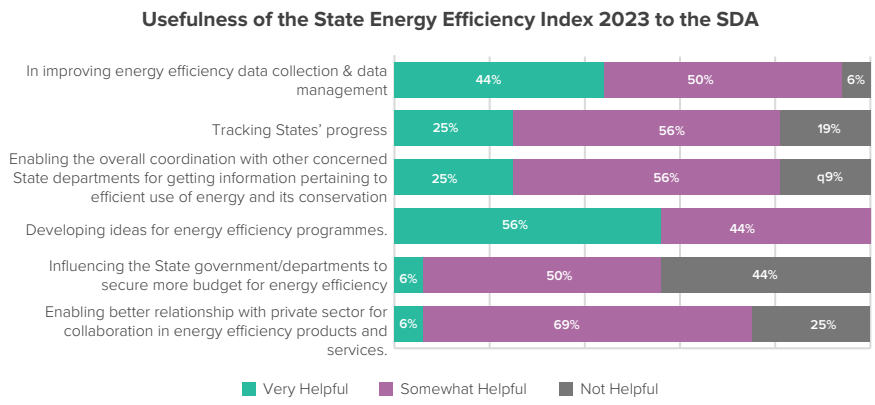
India's leadership in global energy efficiency efforts is reflected in its proactive engagement with international forums, particularly through its G20 presidency in 2023. By fostering collaborative action and developing a structured roadmap for doubling energy efficiency improvements, India has strengthened its position as a key driver of energy efficiency innovation and policy development. Moving forward, India continues to focus on expanding minimum energy performance standards, strengthening enforcement mechanisms, and mobilising finance for energy efficiency projects, ensuring a comprehensive and sustained approach toward a more energy-efficient future.

The State Energy Efficiency Index (SEEI) serves as a critical instrument for identifying and addressing gaps in state-level energy efficiency policies, programs, and investments. Developed by the Bureau of Energy Efficiency (BEE) in collaboration with the Alliance for an Energy Efficient Economy (AEEE), the SEEI monitors and evaluates the progress states make each year in implementing energy efficiency initiatives. Since its inception, the Index has evolved through multiple iterations,

beginning with the launch of the State Energy Efficiency Preparedness Index in August 2018. Subsequent editions include SEEI 2019 (released in January 2020), SEEI 2020 (October 2021), SEEI 2021-22 (April 2023), and the latest SEEI 2023, published in March 2024.

Consistent with previous editions, BEE and AEEE conducted a feedback survey in May 2024 to gather insights from State Designated Agencies (SDAs) on SEEI 2023. A total of 16 SDAs participated in the survey, providing valuable input on the Index's effectiveness and relevance. Their feedback plays a crucial role in refining and enhancing the Index for future editions. A summary of the SDAs' responses regarding the utility of SEEI in promoting energy efficiency within their states is presented in Figure 1 – 3.

Figure 1-2: Usefulness of SEEI to SDAs



Most State Designated Agencies (SDAs) identified state government departments and electricity distribution companies (DISCOMs) as the primary sources of data collection for the Index. Additionally, the program-specific indicators introduced in the previous edition were reported to be both easy to report and highly useful for the SDAs.

The sixth edition of the index, SEEI 2024, evaluates the EE progress of the States for fiscal year (FY) 2023-24 (April 2023 to March 2024).

The objectives of SEEI 2024 are structured to address the multifaceted aspects of energy efficiency at both state and national levels. These objectives are as follows:

- A framework to comprehend energy efficiency imperatives in the state/UTs
- An Index to institutionalise state-level data capture and monitoring of state's EE activities by SDAs
- Track progress in managing the states' and India's energy footprint
- Highlight the best practices and encourage healthy competition among peer States

Accordingly, the indicator framework has been expanded to focus on more implementation-specific and diverse metrics, aligning closely with India's evolving national energy efficiency priorities. Some new indicators added in SEEI 2024 include the promotion of the ESCO Model for implementing EE projects, Star Rating of Commercial and Residential buildings, MSME Cluster Profile, PAT Widening and Deepening, City-level action plans on climate change, Demand Side Incentives to EV customers and Demand Side Management in DISCOMs.

The SEEI 2024 framework places a strong emphasis on the implementation of energy efficiency initiatives while highlighting the policy framework and institutional capacity

SEEI 2024 framework places a strong emphasis on the implementation of energy efficiency initiatives while highlighting the policy framework and institutional capacity required at the sub-national level

required at the sub-national level. To align with this focus, several common indicators have been modified, requiring states to report on specific metrics that reflect the on-ground implementation of energy efficiency initiatives. This approach also provides insights into state government priorities concerning energy and resource efficiency promotion. The program-specific indicators are designed to assess the outcomes of distinct energy efficiency initiatives undertaken by SDAs, state departments, or in collaboration with BEE, industry associations, and public-private partnerships (PPPs). These targeted programs include Retrofit and greenfield projects, Energy audits and implementation of recommendations, Technology demonstration projects, Training and capacity-building programs and Fiscal incentives to encourage the adoption of energy-efficient practices.

SEEI 2024 comprises 66 quantitative, qualitative and outcome-based indicators to assess states' EE performances in seven (7) sectors: Buildings, Industry, Municipal Services, Transport, Agriculture, Electricity Distribution Companies (DISCOMs), and Cross-Sector.

The data underpinning the SEEI 2024's assessments are sourced from a wide array of reliable entities, including the SDAs, BEE, and other central and state government sources. Notable among these are the Central Electricity Authority (CEA), Energy Efficiency Services Limited (EESL), Ministry of Road Transport and Highways (MoRTH), Ministry of Petroleum and Natural Gas (MoPNG), State and Joint Electricity Regulatory Commissions (SERCs & JERCs), and industry bodies such as the Indian Green Building Council (IGBC), Green Building Certification Inc. (GBCI) India, and Green Rating for Integrated Habitat Assessment (GRIHA). All data and associated references were initially reviewed and validated by AEEE and further reviewed and vetted by BEE. Commendable performance, therefore, is not only limited to the implementation of EE activities in the states but is also characterised by the authentic reporting of these activities.

2 APPROACH

The State Energy Efficiency Index (SEEI) 2024 builds on a strong foundation established by its predecessors, including the State Energy Efficiency Preparedness Index 2018 and SEEI iterations from 2019 to 2023. As the sixth edition, SEEI 2024 retains a consistent methodology while incorporating refinements to enhance objectivity, transparency, and consistency in evaluating the energy efficiency efforts of states. The framework focuses on actionable and results-driven indicators to measure states' progress effectively.

This chapter delves into the methodology that shapes the SEEI framework. The approach includes the following steps:

- **Indicator Selection and Scoring**: Performance indicators are thoughtfully selected and weighted to highlight critical demand sectors based on energy consumption and savings potential. This process prioritises areas where state-level interventions can significantly impact energy efficiency, ensuring a focused and effective evaluation of states' efforts.
- **State Categorisation:** States are grouped according to their Total Final Energy Consumption (TFEC). This classification ensures a fair and meaningful comparison among peers with similar energy profiles.
- **Data Collection and Validation:** The evaluation relies on the most reliable and credible data available. Each state's performance is cross-checked and validated against trusted sources to maintain accuracy and reliability in the assessment process.
- **Data Analysis and Scoring:** States' initiatives and outcomes are analysed and scored comprehensively, offering valuable insights into their energy efficiency achievements and progress.

By emphasising a clear and structured approach, SEEI 2024 aims to support states in driving impactful energy efficiency interventions and fostering sustainable growth.

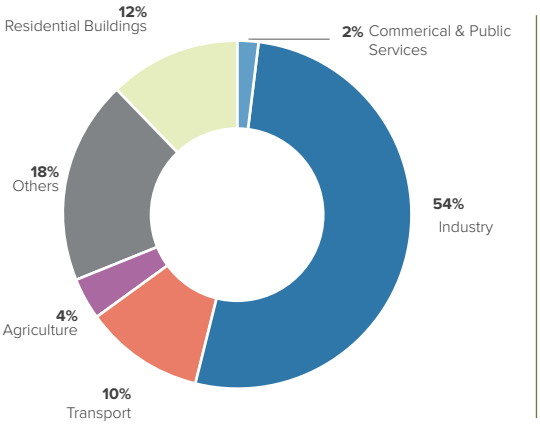
2.1 INDICATOR FRAMEWORK

In SEEI 2024, the process of selecting and weighing performance indicators is thoughtfully designed to address multiple dimensions. It highlights the significance

of different demand sectors by considering their contributions to overall energy consumption and their potential for energy savings. The approach also underscores the role of energy efficiency interventions at the state level, focusing on areas where states have greater authority and responsibility to implement impactful measures. This ensures a fair, balanced, and context-sensitive assessment of each state's energy efficiency initiatives.

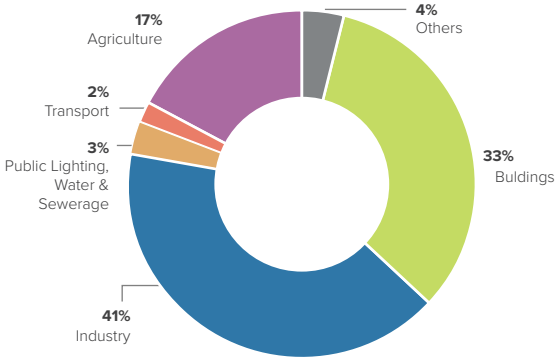
Figures 2-1 and 2-2 illustrate India's sector-wise annual final energy consumption for FY 2021-22 and all India power consumption for FY 2022-23, respectively. Figure 2-3 provides insights into the energy savings potential across sectors. Additionally, Table 2-1 outlines the specific roles of states in energy efficiency within each sector, as defined by the Energy Conservation (EC) Act 2001, its 2022 Amendment, and the Electricity Act 2003.

Figure 2-1: Sector-wise TFEC in India (FY 2020-21)



Source: MoSPI, Energy Statistics 2024

Figure 2-2: Sector-wise electricity consumption in India (FY 2022-23)



Source: CEA General Review 2024

Figure 2-3: India's sector-wise energy savings potential

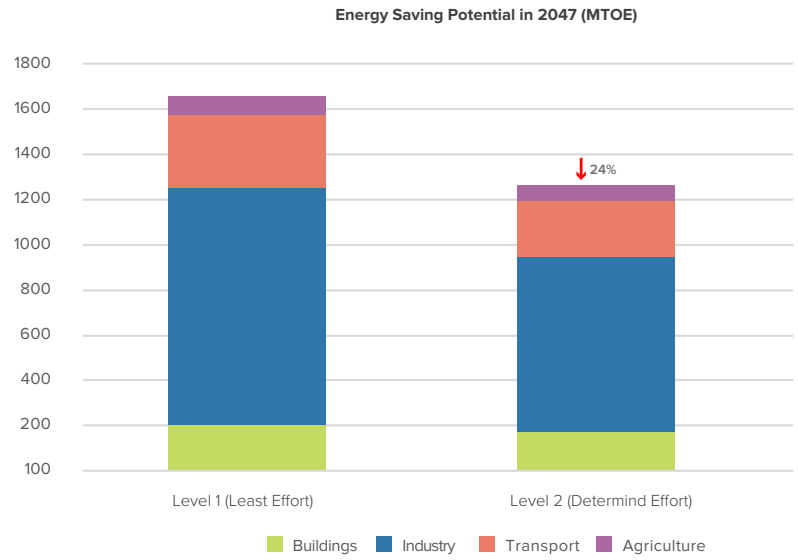


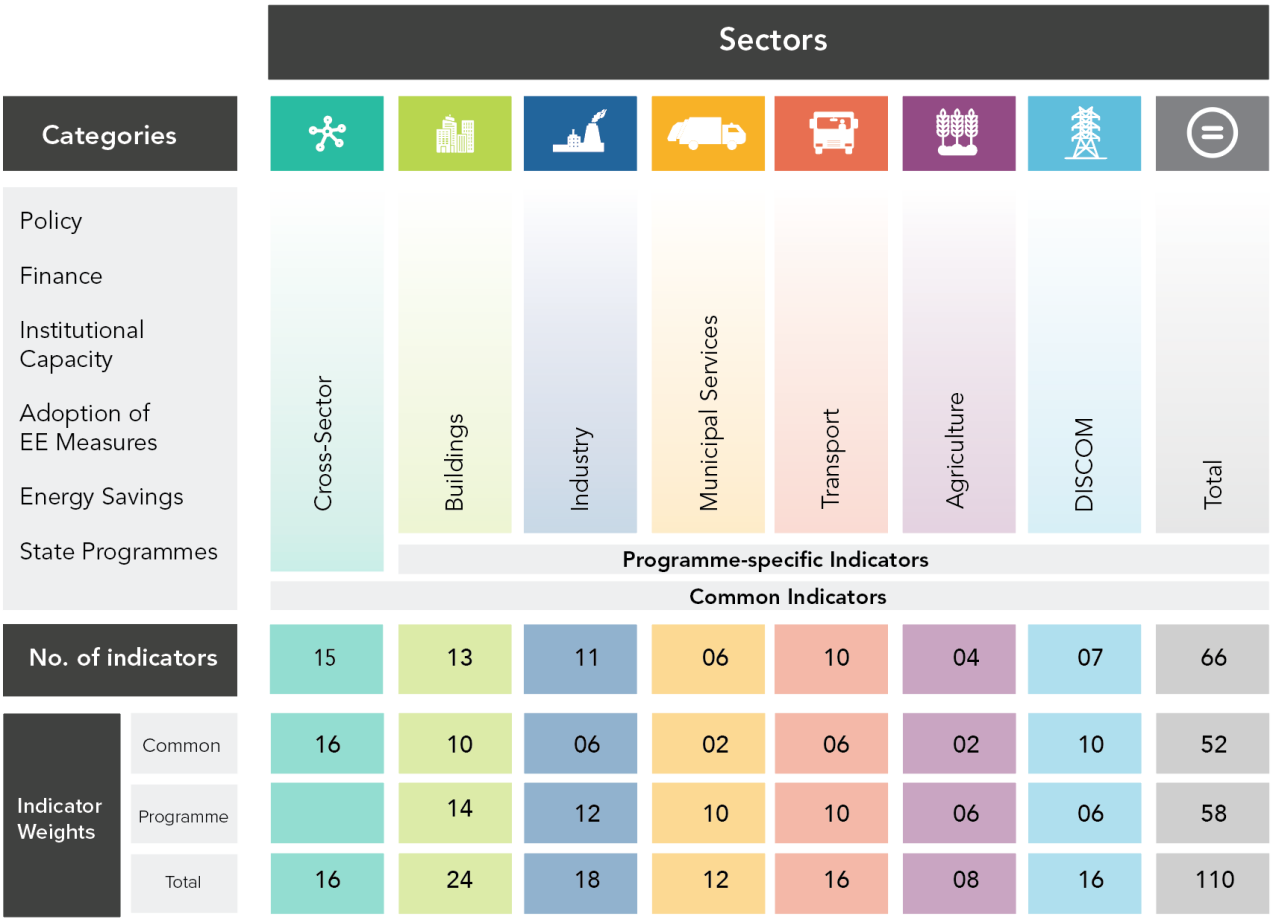
Table 2-1: States and UT's role in energy conservation

Sector	States' role and authority in driving energy efficiency
 **Buildings**	**EC (Amendment) Act, Section 2:** Definition of "building" revised to include any structure or erection or part of structure or erection constructed after the rules relating to energy conservation and sustainable building codes have been notified by the Central Government, which has a minimum connected load of 100 kilowatts (kW) or contract demand of 120 kilovolt-amperes (kVA) and is used or intended to be used for commercial purposes or as an office building or for residential purposes. The State Government may specify a lower connected load or contract demand. The phrase "Energy conservation building codes" in the Act has been substituted with the words "Energy conservation and sustainable building codes," which would provide norms and standards for energy efficiency and conservation, the use of renewable energy, and other green building requirements. **EC (Amendment) Act, Section 15:** Amend the "Energy Conservation and Sustainable Building Code" to suit the regional and local climatic conditions. Notify energy conservation and sustainable building codes with respect to the use of energy in the buildings and implement these codes through state-level building byelaws. Direct designated consumers to comply with code and/or energy audit requirements and furnish requisite data at the requisite time. **EC Act, Section 17:** Power of inspection of buildings to check compliance with requirements of the EC Act. EC Act, Section 18: Regulation of norms for energy consumption standards in any building. Regulation of the energy consumption standards for equipment and appliances. **EC Act, Section 26:** Impose penalties for non-compliance of either central or state government energy conservation regulations. **EC Act, Section 27, 28, 29:** Power to adjudicate the penalties imposed for non-compliance. **EC Act, Section 57:** Power of state government to make ECSBC rules through notification for carrying out the provisions of this act.
 **Industry**	**EC Act, Section 15:** Direct the designated consumers to comply with energy audit requirements and furnish requisite data at the requisite time. **EC Act, Section 17:** Power of inspection of industries to check compliance with requirements of the EC Act. **EC Act, Section 18:** Regulation of norms for process and energy consumption standards in any industry. Regulation of the energy consumption standards for industrial equipment and appliances, including motors. **EC Act, Section 26:** Impose penalties for non-compliance of either central or state government energy conservation regulations. EC Act, Section 27, 28, 29: Power to adjudicate the penalties imposed for non-compliance
 **Municipal Services**	**EC Act, Section 15:** Power to state government to create awareness, disseminate information, and organise training for efficient use of energy and its conservation. **EC Act, Section 18:** Regulation of the energy consumption standards for street lighting and drinking and/or wastewater pumping. **EC Act, Section 27, 28, 29:** Power to adjudicate the penalties imposed for non-compliance

Transport	Road transport under state purview. State Road Transport Corporations State Transport Department defines policies and regulations **EC Act, Section 15:** Power to state government to create awareness, disseminate information, and organise training for efficient use of energy and its conservation. **EC Act, Section 17:** Power of inspection of the appliance (Tyres/Tires) for the purpose of ensuring compliance with energy consumption standards. **EC Act, Section 18:** Regulation of the energy consumption standards for tyres/tires. **EC Act, Section 26:** Impose penalties for non-compliance of either central or state government energy conservation regulations. **EC Act, Section 27, 28, 29:** Power to adjudicate the penalties imposed for non-compliance.
Agriculture	**EC Act, Section 15:** Power to state government to create awareness, disseminate information, and organise training for efficient use of energy and its conservation. **EC Act, Section 18:** Regulation of the energy consumption standards for agricultural pumping. **EC Act, Section 27, 28, 29:** Power to adjudicate the penalties imposed for non-compliance
DISCOM	**Electricity Act, Section 23, 42, 61 and 181:** Empowers SERCs to make demand side management (DSM) regulations that are applicable to all DISCOMs in the state. **EC Act, Section 17:** Power of inspection of concerned entities to check compliance with requirements of the EC Act. **EC Act, Section 26:** Impose penalties for non-compliance of either central or state government energy conservation regulations. **EC (Amendment) Act, Section 27:** SERCs may make regulations for discharging their functions. EC Act, Section 28, 29: Power to adjudicate the penalties imposed for non-compliance.
Cross-Sector	**EC (Amendment) Act, Section 4:** BEE's Governing Council membership expanded from thirty-one to thirty-seven members to be more inclusive in representation. **EC (Amendment) Act, Section 15:** Create awareness and disseminate information for the efficient use of energy and its conservation. The SDA budget will be part of the larger state budget. **EC (Amendment) Act, Section 16:** Constitute State Energy Conservation Fund for meeting the expenses incurred for the designated agency in the discharge of its functions and for the objects and purposes of implementing EE projects authorised by the Act. **EC Act, Section 57:** Power of State Government to make rules, by notification, for carrying out the provisions of EC Act and not inconsistent with the rules, if any, made by the Central Government.

The SEEI 2024 framework features 66 thoughtfully designed indicators that blend qualitative, quantitative, and outcome-based measures. These indicators are structured to track progress in implementing energy efficiency (EE) policies, programs, and projects while minimising bias due to state-specific conditions, ensuring fair evaluations across diverse regions. The Index assigns a total score of 110, with sector-specific weights outlined in Figure 2 – 4.

Figure 2-4: Framework for SEEI 2024



The indicators span seven key demand sectors: buildings, industry, municipal services, transport, agriculture, DISCOMs, and cross-sector initiatives. To provide a detailed and well-rounded assessment, they are divided into two categories:

- **Common Indicators (47% weight):** These include measures related to policy, institutional capacity, financing, adoption of EE practices, and energy savings. Many are simple "yes/no" indicators, while others require detailed data analysis, scored on a graded scale.
- **Programme-Specific Indicators (53% weight):** These focus on evaluating state, central, or PSU-led EE programs. They consider factors such as program objectives, timelines, progress, budget allocation and utilisation, stakeholders involved, energy savings, and emissions reductions.

The emphasis on outcome-based indicators ensures a more precise measurement of EE adoption, energy savings, and reductions in energy intensity, offering a clear picture of each state's progress.

Table 2-2: Sector-wise split of common and programme-specific indicators

Sector	Common Indicator					Programme specific indicator	Total
	Policy	Finance	Institutional Capacity	Adoption of EE Measures	Energy Savings	State Programme	
Cross-sector	3	3	3	4	2	0	15
Buildings	3	0	1	5	0	4	13
Industries	2	0	1	5	0	3	11
Municipal Services	1	0	1	1	0	3	6
Transport	2	0	0	4	1	3	10
Agriculture	1	0	0	1	0	2	4
DISCOMs	3	0	0	2	0	2	7
Total Number of Indicators for State Energy Efficiency Index 2024							66

The weights reflect each sector's impact on energy use:

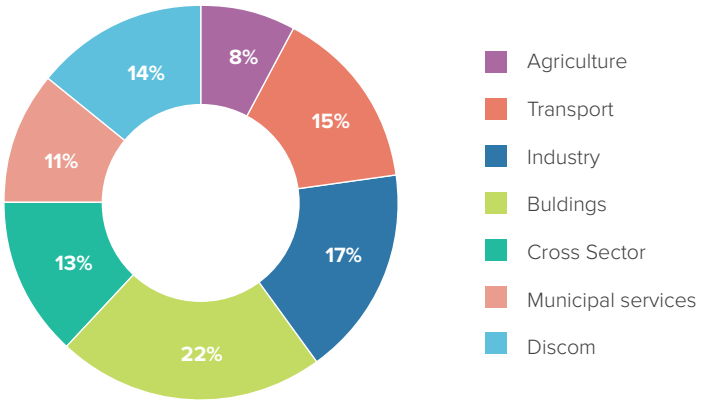
Buildings (22%): Prioritised for its significant energy consumption and the state's pivotal role in driving energy efficiency initiatives in this sector.

Industry (17%): Although the largest energy consumer, it receives slightly less weight due to limited state-level interventions. Large industries benefit from central efforts, but MSMEs pose challenges due to their diversity and decentralised nature, highlighting the need for targeted state action.

Transport (15%): Weighted to align with its substantial energy consumption and potential for energy efficiency improvements.

Other Sectors: Weights are distributed based on their relative energy use, ensuring fair representation.

Figure 2-5: Sector-wise split of score weightage in SEEI 2024



A noteworthy adjustment in SEEI 2024 is the decreased weight for cross-sector indicators, now accounting for 13% of the total score, down from 15% in the 2023 index. This adjustment reflects the evolving focus on holistic and sector-specific contributions to energy efficiency progress.

2.2 GROUPING OF STATES

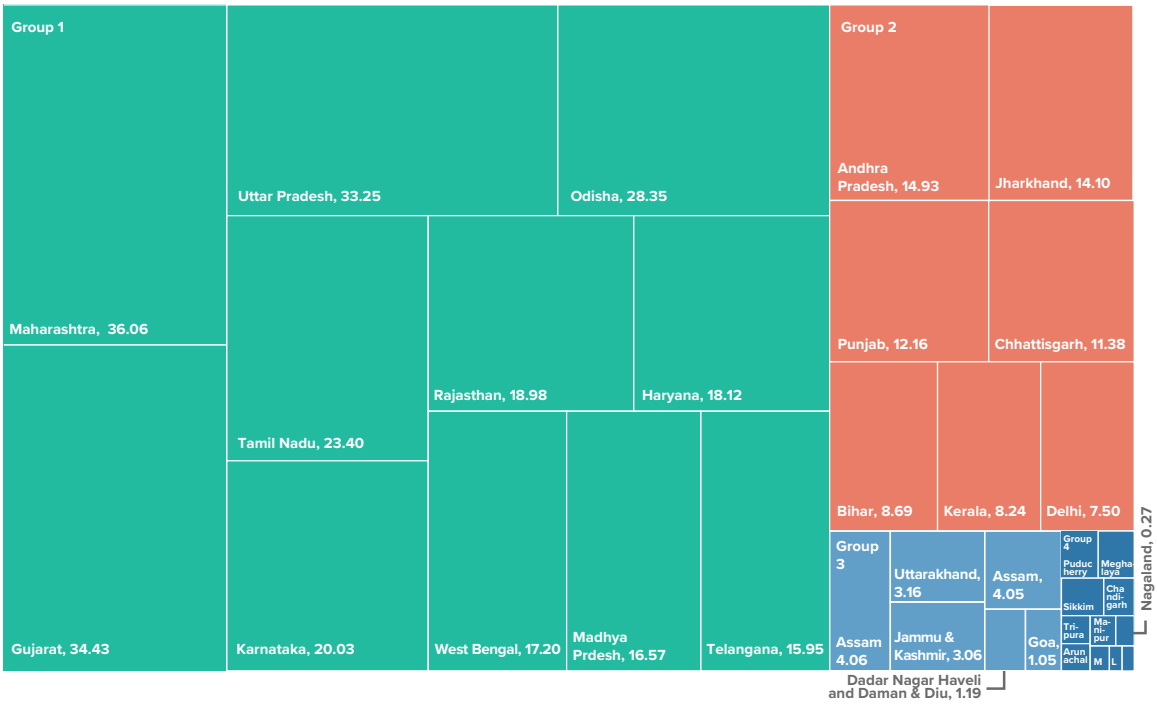
In the State Energy Efficiency Index (SEEI) 2024, states and union territories are grouped into four categories based on their Total Final Energy Consumption (TFEC) for the fiscal year 2021-2022, using the latest available data from central government sources. This categorisation allows for meaningful peer comparisons and visualisations of energy efficiency scores among states with similar energy consumption levels.

The top 15 energy-consuming states, each with consumption exceeding 10 MTOE, collectively account for a remarkable 87.5% of the total energy consumption of all Indian states. Within this, the top 11 states in Group 1 alone contribute approximately 73% of the total energy use.

While this grouping focuses solely on the magnitude of energy consumption, it does not consider the diverse geographical, socio-economic, and cultural characteristics of these states. Initially, other factors, such as the energy intensity of Gross State Domestic Product (GSDP), potential energy savings, and per capita energy consumption, were considered. However, TFEC was ultimately selected as the sole criterion for its simplicity and the limitations of data availability.

Figure 2-6: Grouping of States by TFEC

Group 1 >15 MTOE	Group 2 5-15 MTOE	Group 3 1-5 MTOE	Group 4 <1 MTOE
1. Maharashtra	1. Andhra Pradesh	1. Assam	1. Puducherry
2. Gujarat	2. Chhattisgarh	2. Uttarakhand	2. Meghalaya
3. Uttar Pradesh	3. Punjab	3. Jammu and Kashmir	3. Chandigarh
4. Tamil Nadu	4. Jharkhand	4. Himachal Pradesh	4. Manipur
5. Karnataka	5. Kerala	5. Goa	5. Tripura
6. Odisha	6. Bihar	6. Dadar Nagar Haveli and Daman & Diu	6. Arunachal Pradesh
7. Rajasthan	7. Delhi		7. Nagaland
8. Madhya Pradesh			8. Mizoram
9. West Bengal			9. Sikkim
10. Haryana			10. Andaman and Nicobar Islands
11. Telangana			11. Ladakh
			12. Lakshadweep



Source: MoSPI's India Energy Statistics, CEA General Review, MoPNG's Petroleum and Natural Gas Statistics (oil, compressed natural gas (CNG)), and the Coal Directory (coal), Reserve Bank of India (RBI) Handbook of Statistics on Indian States (GSDP).

Note: GSDP is unavailable for Dadra & Nagar Haveli and Daman & Diu, Ladakh, and Lakshadweep. The TFEC is derived from state-wise data in CEA General Review 2024 (electricity), MoPNG's Petroleum and Natural Gas Statistics 2022-23 (oil, CNG), and the Coal Directory 2021-22 (coal). TFEC per state includes final electricity consumption, electricity T&D losses, and the use of coal, oil, and gas (CNG only) for energy other than that used for power generation.

Methodology for Calculating Total Final Energy Consumption (TFEC) of Indian States (FY 2021-22) has been provided in Annexure

Data limitations are present in the state-wise final consumption figures for various fuels, particularly natural gas and biofuels. For natural gas, the index includes only Compressed Natural Gas (CNG) consumption, as disaggregated state-wise data for Piped Natural Gas (PNG) and Liquefied Natural Gas (LNG) is unavailable. Similarly, biofuels and biomass are excluded due to the absence of reliable state-wise data.

To ensure accuracy and avoid duplication, coal consumption figures have been adjusted to exclude the amount used in electric power generation. This approach helps to provide a clearer picture of actual coal usage by states. The conversion factors to a ton of oil equivalent (toe) are sourced from the Ministry of Statistics and Programme Implementation's (MoSPI) India Energy Statistics, the International Energy Agency (IEA), and the Ministry of Petroleum and Natural Gas (MoPNG), ensuring consistency and reliability in the data conversion process.

2.3 DATA COLLECTION AND REVIEW

To streamline data collection for the SEEI, the Bureau of Energy Efficiency (BEE) has designated State Designated Agencies (SDAs) as the primary coordinators in their respective states. These agencies were responsible for gathering data from relevant state departments. The data collection portal, first introduced in SEEI 2020, has been continuously improved based on user feedback, with enhancements implemented for SEEI 2021-22, SEEI 2023, and SEEI 2024 to enhance usability and simplify the process.

In addition to data provided by the SDAs, information was sourced from several central government entities, including the Central Electricity Authority (CEA), Energy Efficiency Services Limited (EESL), and the Ministry of Road Transport and Highways (MoRTH). Publicly available data from State Electricity Regulatory Commissions, private sector associations like the Confederation of Indian Industry (CII), and certification bodies such as IGBC, GBCI India, and GRIHA were also utilised.

Data submitted by the SDAs was carefully reviewed by the Alliance for an Energy Efficient Economy (AEEE) and then shared back with the SDAs for their verification. Only data that has been thoroughly validated by both the SDAs and BEE has been incorporated into SEEI 2024, ensuring accuracy and reliability in the evaluation process.

2.4 DATA ANALYSIS AND SCORING

In the final phase of the process, BEE and AEEE meticulously analysed the collected data for all states. States were scored based on a predefined set of criteria for each indicator. The results of this analysis, providing a comprehensive assessment of the state's energy efficiency efforts, are presented in the subsequent chapter.

3 RESULTS

The State Energy Efficiency Index 2024 (SEEI 2024) results offer valuable insights into the evolving Energy Efficiency (EE) scenario across India. Continuing the trend observed during its previous iteration (SEEI 2023), the SEEI 2024 witnessed proactive and enthusiastic responses from all Thirty-Six (36) State Designated Agencies (SDAs) during its data collection phase. This underscores a positive shift towards inculcation of a culture that recognises the critical role of data in evaluating the effectiveness of Energy Efficiency (EE) implementation across different regions.

A key aspect of the SEEI 2024 is the introduction of additional sub-indicators within both the common and programme-specific indicators. These sub-indicators were designed to provide a more granular and comprehensive evaluation of the efforts and achievements of the States and Union Territories (UTs) in implementing Energy Efficiency programmes across various sectors. This more detailed approach allows for a better understanding of the regional strengths and weaknesses in EE implementation, leading to more targeted interventions, policy refinement, and sharing of best practices across States. Ultimately, it reinforces the need for data-driven decision-making and accountability in achieving national energy efficiency objectives.

The classification system retained in SEEI 2023 has been continued for evaluating States and Union Territories (UTs) based on performance metrics in the State Energy Efficiency Index (SEEI) 2024.Each State/UT is categorised as 'Front Runner' (>= 60%), 'Achiever' (50 %≥ and < 60%), 'Contender' (30% ≥ and < 50%), and 'Aspirant' (< %30). This classification offers a structured approach to benchmark performance and progress over time. The distribution of States and Union Territories across the performance categories in SEEI for the years 2019, 2021, 2021-22, 2023 and 2024 is given in table 3-1 below:

Table 3-1: Year-wise Performance of States in SEEI

Performance Category	2019	2020	2021-22	2023	2024
Front Runner	0	2	5	7	5
Achiever	3	6	4	2	2
Contender	8	4	8	3	5
Aspirant	25	24	19	24	24

In SEEI 2024, Maharashtra and Andhra Pradesh have emerged as the top-performing states, securing overall scores of 80.5% and 79.3%, respectively, followed by Karnataka, Telangana and Tamil Nadu, achieving scores of 77.3%, 63.6% and 60.9% respectively.

Five states have demonstrated remarkable progress by improving their scores by over 10 points in SEEI 2024. These include Odisha, Tamil Nadu, and Rajasthan from

Group 1, Bihar from Group 2, and Tripura from Group 4. Figure 3-1 illustrates the states' performance in SEEI 2024, viz., 'Front Runner', 'Achiever', 'Contender', and 'Aspirant'. Along with the most improved states, which achieved a score increase exceeding by 10%.

Figure 3-1: State-wise SEEI 2024 Performance

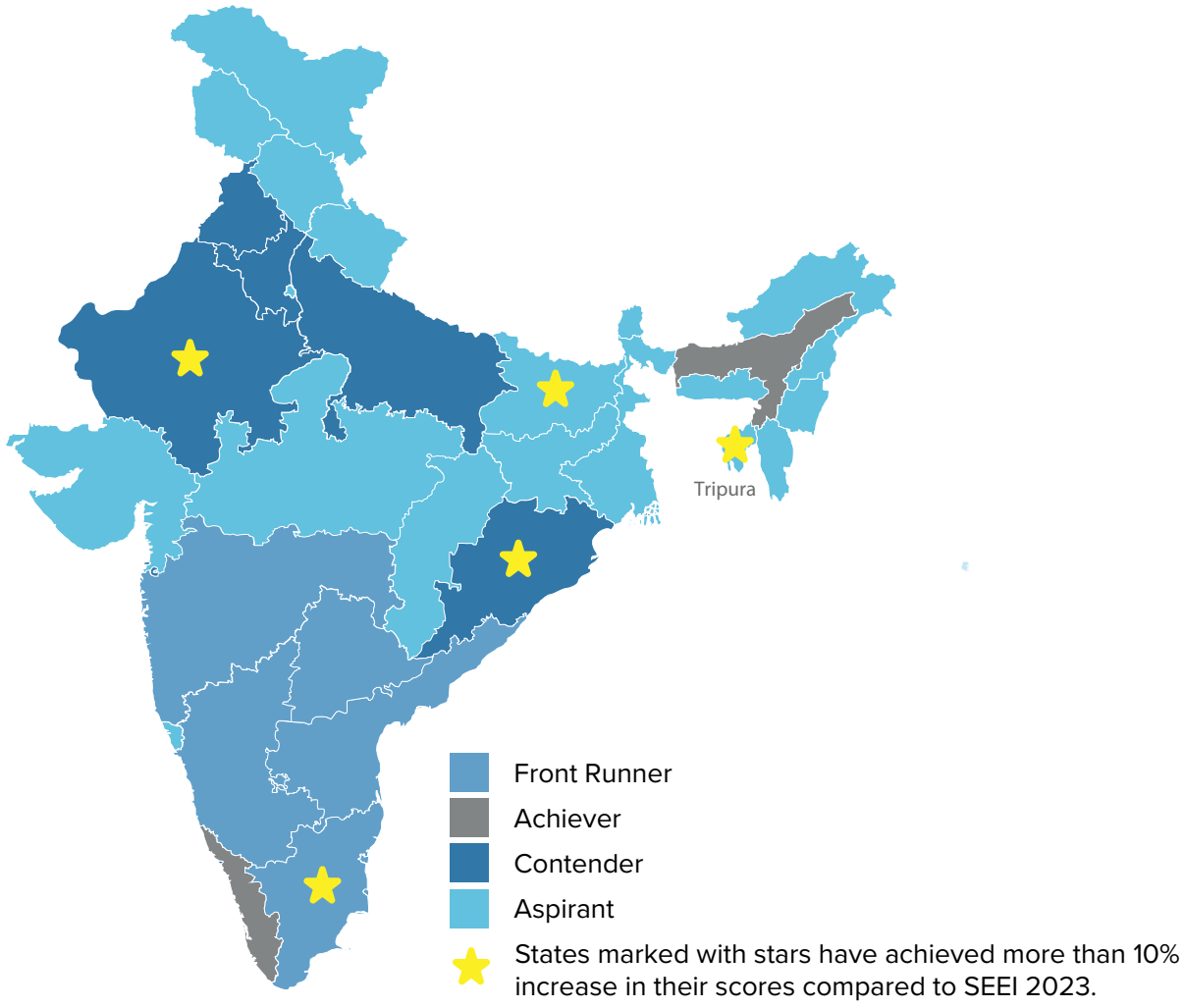
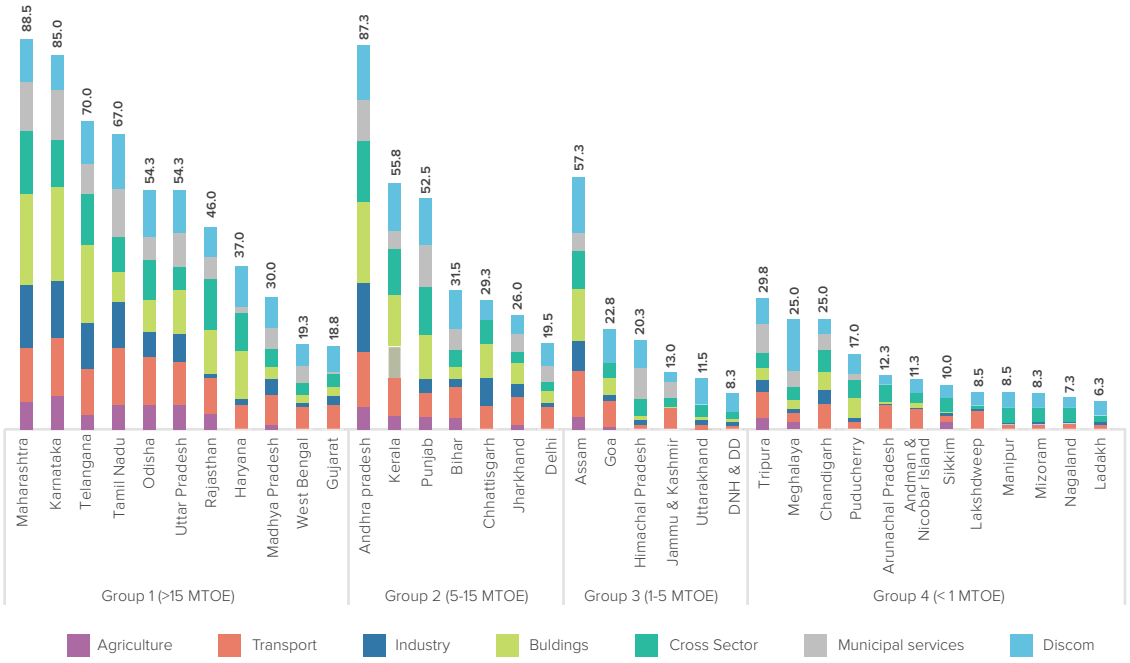


Figure 3-2 presents the state scores for TFEC, categorised group-wise. The overall decline in state scores this year can be attributed primarily to the unavailability of data for outcome-based indicators. This challenge was compounded by an increased weightage assigned to these indicators and the adoption of more rigorous scoring criteria and evaluation processes. The scores are evaluated on a 110-point scale.

Maharashtra has emerged as the top scorer in Group 1 in SEEI 2024, surpassing Karnataka, marking a significant improvement from its second position last year. Telangana, having shifted from Group 2 to Group 1, cannot be directly compared in terms of ranking but has experienced a notable drop in score, as has Karnataka, despite their strong performances in SEEI 2023. In Groups 2 and 3, the top ranks remain unchanged, though Kerala and Goa have seen a significant decline in scores, while Bihar has shown remarkable progress. In Group 4, Tripura has claimed the top position, surpassing Chandigarh and Meghalaya, a substantial improvement from its fourth rank last year, with Meghalaya and Chandigarh now tied as joint runners-up.

Figure 3-2: TFEC group-wise state total scores (All Sectors)



However, to ensure consistency and facilitate easier comparisons with previous years, the final scores are normalised to a 100-point scale, expressed as a percentage (%). This normalisation provides a clearer perspective on performance improvements or declines over the years, regardless of changes in scoring systems or methodologies. The Final Score for SEEI 2024, expressed in percentages, is illustrated in Figure 3-3 below:

Figure 3-3: TFEC group-wise state total scores (all sectors) in Percentage (%)

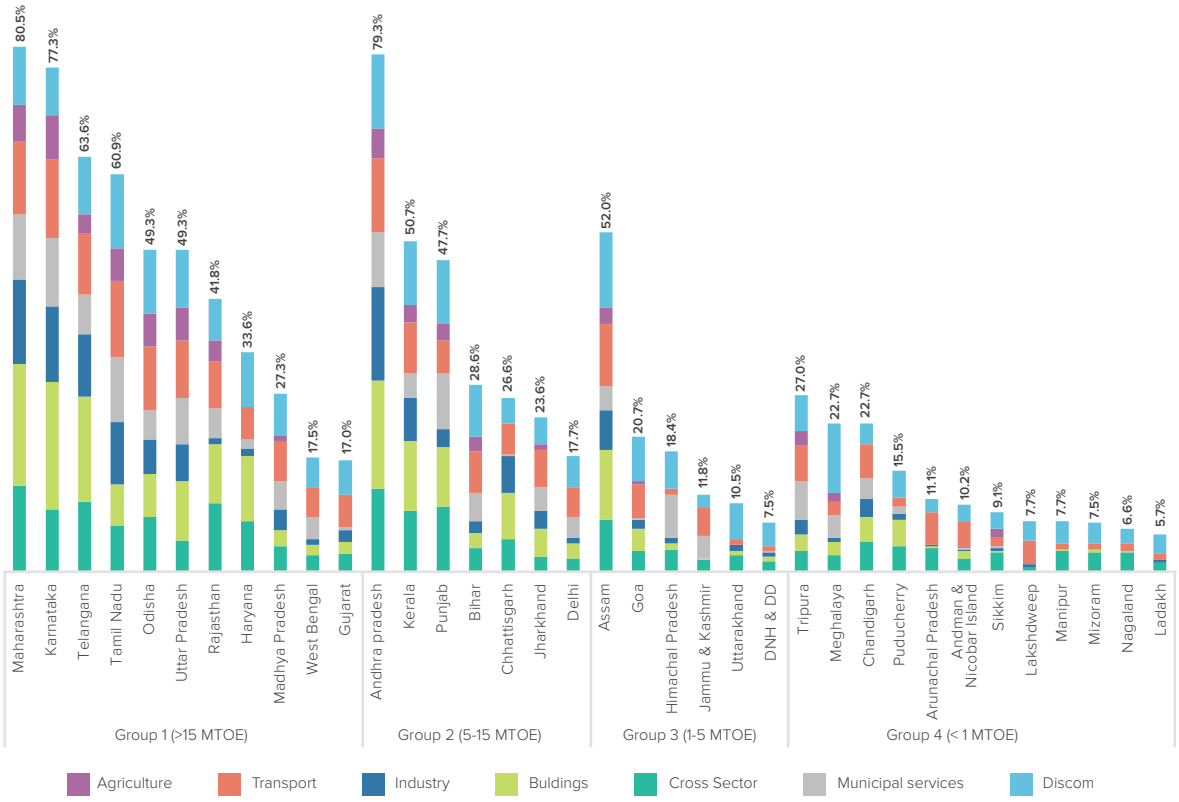


Figure 3-4 illustrates each state's progress in the SEEI for the year 2024 compared to SEEI 2023.

Figure 3-4: TFEC group-wise total score state progress – SEEI 2024 vs SEEI 2023

3.1 BUILDINGS SECTOR

OVERVIEW

The buildings sector, a significant contributor to Total Final Energy Consumption (TFEC) in India, has witnessed considerable focus due to urbanisation and economic development trends. SEEI 2024 evaluates these efforts using thirteen (13) indicators. Nine (9) of these are common indicators, which cover policy, institutional capacity building, and the adoption of energy efficiency (EE) measures in the states'. The remaining 4 (Four) indicators cover programme-specific interventions at the State's/UT level.

In SEEI 2024, nineteen (19) states have improved their scores in the buildings sector compared to SEEI 2023. This progress is primarily attributed to advancements in common indicators and enhanced data availability related to programme-specific indicators. The maximum score in this sector is twenty-four (24), with ten (10) allocated to common indicators and fourteen (14) to programme-specific ones. Table 3-2 outlines the indicators used in SEEI 2024 to assess the performance of States in the buildings sector. Figure 3-5 presents the states' scores across the four indicator categories—Policy, Institutional Capacity, Adoption of EE Measures, and Programme-Specific Initiatives—grouped based on their TFEC. Figure 3-6 illustrates the comparative progress of states in SEEI 2024 relative to SEEI 2023.

Table 3-2: Building sector indicators under SEEI 2024

S. No	Indicator	Max. Score	Scoring Criteria
	Policy		
1	**ECBC notification and adoption in Bye-Laws**	1	
	Has the State notified mandatory compliance with norms in ECBC 2017?	0.25	Notified = 0.25, else=0
	Has the State amended/included ECBC in municipal byelaws?	0.25	Amended for the state/adopted in byelaws =0.25, else = 0
	What percentage of municipalities/ULBs have included or revised building byelaws to incorporate ECBC provisions?	0.5	Based on data provided = 0.5
2.	**Measures taken toward the adoption of Eco Niwas Samhita (ECBC-R) in the state**	1	
	Has the state/UT notified the ENS code?	0.5	Notified = 0.5, else = 0
	Has the state/UT drafted the ENS code and sent it to the cabinet for approval?	0.5	Draft ENS circulated for stakeholder comments / BEE comments/any other advancement= 0.5; else = 0
	If both above are 'No', what is the progress made in FY 2023-24?		
3.	**Policy/notification/guideline/scheme for the promotion of the use of BEE star-labelled appliances**	1	
	What are the steps undertaken to promote BEE star-labelled appliances in the following buildings? Public/Govt. buildings Commercial buildings Residential buildings	1	Steps undertaken for promotion in the following buildings in State/UT Public/Govt.= 0.5 Commercial/Residential= 0.5
	Institutional Capacity		
4.	**Advisory, certification and enforcement capacity in state government**	0.5	
	What advisory resources (e.g., guides, toolkits, online portals) are available to stakeholders to help them implement energy-efficient practices in the building sector?	0.5	Advisory Resources developed in the State/UT for stakeholders= 0.5
	Adoption of EE measures		
5.	**Adoption/penetration of ECBC in new construction**	2	
	What is the percentage of the latest ECBC-compliant buildings in the total number of buildings approved for construction in FY 2023-24?	0.25	Percentage of latest ECBC-compliant buildings approved for construction = 0.25, else = 0
	What is the total number of ECBC-compliant buildings in the state/UT? Under Construction Completed	1	No. of Under Construction ECBC compliant buildings in the state/UT = 0.5, else = 0 No of Completed ECBC compliant buildings in the state/UT = 0.5, else = 0
	What are the steps undertaken to promote and penetrate ECBC-compliant buildings in the state? (E.g. Empanelled energy auditors, TPA etc.)	0.25	Steps undertaken for the promotion and penetration of ECBC-compliant buildings in the State/UT = 0.25, else = 0

S. No	Indicator	Max. Score	Scoring Criteria
	What is the number of ECBC+/Super ECBC/Net Zero buildings in the state/UT?	0.5	No of ECBC+/Super ECBC buildings in the State/UT =0.25, else = 0 No of Net Zero buildings in the State/UT = 0.25, else = 0
6.	**Promotion/adoption of electric cooking/solar cooking in buildings**	0.5	
	Has the state/UT implemented electric cooking/solar cooking systems in govt buildings? (Provide the list of buildings and the number of systems deployed in each building)	0.5	Yes = 0.5, else = 0
7.	**Penetration of EE/EC measures in the building sector in the state/UT**	2	
	How many certified green buildings are there in the State?	1	Green certified per million connected consumers: if 0 = 0 point if ≥1 &<10) = 0.25-point if (≥10 &< 20) = 0.5-point if (≥20 &<30) =0.75 point if (≥30) = 1-point
	How many projects have availed of green building incentives?	0.25	No. of projects which have availed of green building incentives the States = 0.25, else = 0
	Is there any policy/guideline/incentive for the promotion of green buildings or EE/EC measures other than ECBC and ENS by the state? (e.g. Cool roof, green roof, etc.)	0.5	Yes = 0.5, else = 0.5
	What were the steps undertaken to promote EE/EC measures in the affordable housing projects in the state?	0.25	Steps undertaken for the promotion of EE/EC measures in the affordable housing projects in the State/UT = 0.25, else = 0
8.	**Star rating of commercial and residential building**	1.5	
	How many buildings (as per the building category mentioned below) have applied for/completed Star Rating Certification? Government Building Commercial Building Residential Building	1.5	No. of Government Buildings which have applied for/completed Star Rating Certification = 0.5, else = 0 No. of Commercial Buildings which have applied for/completed Star Rating Certification = 0.5, else = 0 No. of Residential Buildings which have applied for/completed Star Rating Certification = 0.5, else = 0
9	**Energy benchmarking in the buildings sector**	0.5	
	What steps/projects were undertaken for benchmarking energy use in buildings?	0.25	Steps/Projects undertaken for benchmarking of energy use in buildings = 0.25, else = 0
	What are the typical follow-up actions implemented by building owners after conducting a benchmarking study on their buildings?	0.25	Follow-up actions implemented by building owners after conducting a benchmarking study on their buildings = 0.25, else = 0

S. No	Indicator	Max. Score	Scoring Criteria
	State Programme		
10.	**Programmes for EE in Government/Public Buildings**	4	
	Does the state have any programmes for energy efficiency in government buildings in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date?	0.5	Budget allocated & utilised to date = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progress to date?	0.5	Progress to date = 0.5
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings)	1	Avoided emissions = 1
11.	**Programmes for EE in Commercial Buildings**	4	
	Does the state have any programmes for energy efficiency in commercial buildings in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date?	0.5	Budget allocated & utilised to date = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progress to date?	0.5	Progress to date = 0.5
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings)	1	Avoided emissions = 1
12.	**Programmes for EE in Residential Buildings**	4	
	Does the state have any programmes for energy efficiency in residential buildings in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date?	0.5	Budget allocated & utilised to date = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progress to date?	0.5	Progress to date = 0.5
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings)	1	Avoided emissions = 1

S. No	Indicator	Max. Score	Scoring Criteria
13.	**Capacity building programmes in the building sector**	2	
	Does the state have programmes for capacity building for the building sector in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the program?	0.5	The target set under the programme = 0.5
	Who is running the program?	0.25	Entities running the Programme = 0.25
	What is the progress to date?	1	Progress to date = 1

Figure 3-5: TFEC group-wise building sector state scores

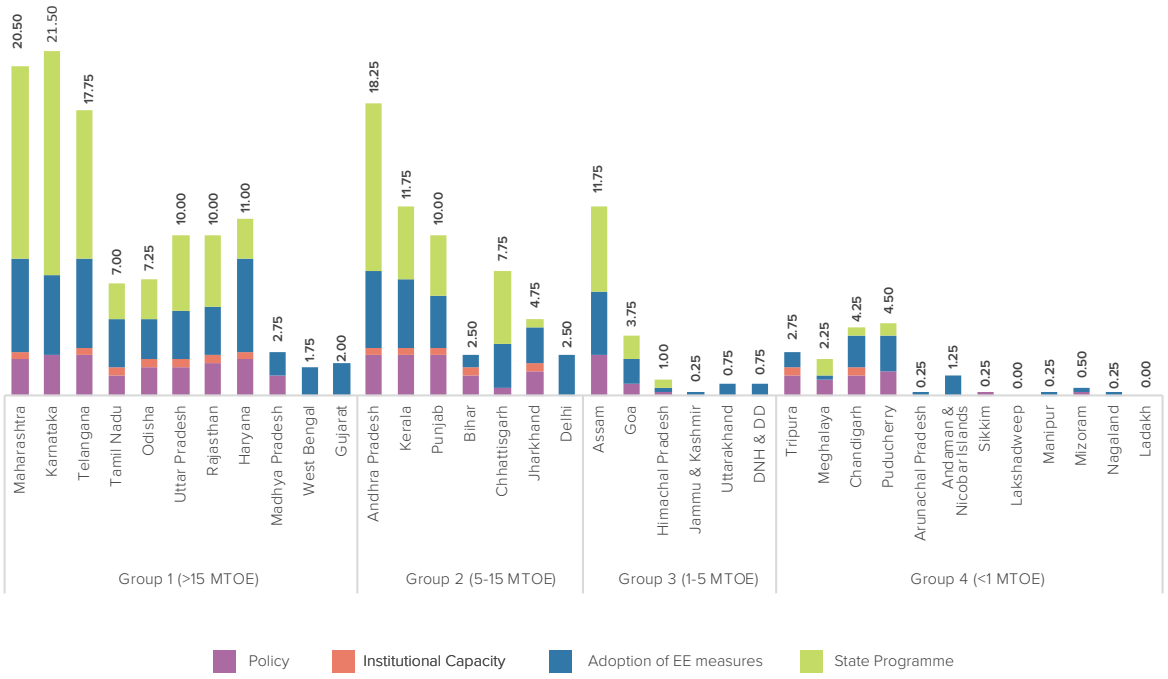
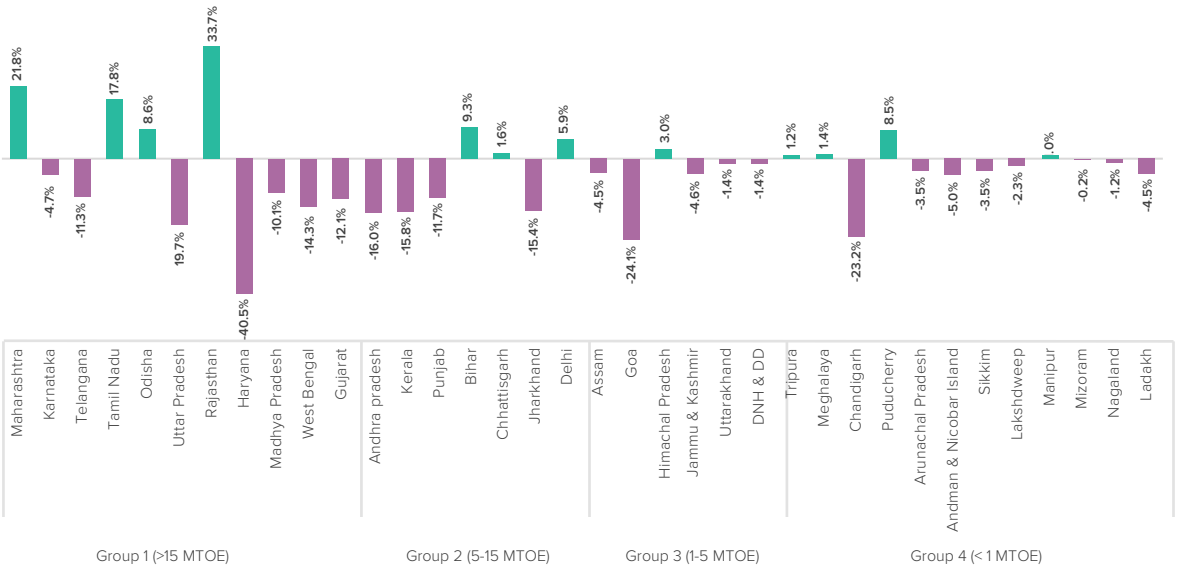


Figure 3-6: TFEC group-wise building sector state progress – SEEI 2024 vs SEEI 2023

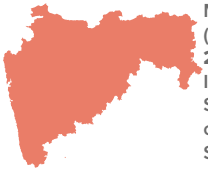


SEEI 2024 BUILDINGS SECTOR SCORE HIGHLIGHTS

Karnataka has emerged as the top scorer in Group 1 for the Building Sector despite a 4.7% score drop from last year. Maharashtra has improved significantly, securing the second-highest rank with a 21.8% score increase. Andhra Pradesh and Kerala led Group 2, while Assam and Goa emerged as the top performers in Group 3. Bihar also showed notable improvement. Puducherry secured the top spot with an 8.5% increase, followed by Chandigarh as second in Group 4. Haryana, Goa, and Chandigarh experienced over 20% score drops compared to SEEI 2023. Remarkably, Maharashtra, Tamil Nadu, and Rajasthan improved their scores by over 10% since the previous evaluation. Details of the most improved states' in Building Sector have been given in Figure 3-7.

Figure 3-7: Most improved states in building sector in SEEI 2024

Rajasthan (Group 1) **33.7%** Increase in SEEI 2024 compared to SEEI 2023



Maharashtra (Group 1) **21.8%** Increase in SEEI 2024 compared to SEEI 2023

Tamil Nadu (Group 1) **17.8%** Increase in SEEI 2024 compared to SEEI 2023

COMMON INDICATORS

Policy

There have been notable advancements in policymaking related to building energy codes and energy efficiency initiatives. The Energy Conservation Building Code (ECBC) 2017 has been notified in 24 States and amended into law in 20 of them. The details of reporting States on notification of the Energy Conservation Building Code have been presented in Table 3 - 3.

Table 3-3: Reporting States on Notification of ECBC 2017

Group 1 (>15 MTOE)	Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab and Jharkhand
Group 3 (1-5 MTOE)	Assam, Goa and Himachal Pradesh
Group 4 (<1 MTOE)	Tripura, Chandigarh, Puducherry, Sikkim and Mizoram

The details of reporting States on the amendment of building byelaws in line with the provisions of ECBC 2017 have been presented in Table 3 - 4.

Table 3-4: Reporting states on amendment of building byelaws in line with the provisions of ECBC 2017

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Odisha, Uttar Pradesh, Rajasthan, Haryana and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Puducherry

Note: The States underlined in the table above have also reported on the percentage of municipalities/ ULBs that have included or revised building byelaws to incorporate ECBC provisions

Notification of Eco Niwas Samhita is under approval in 6 States and has been drafted in 13 States/ UTs..

Table 3-5: Reporting states on Under Approval/Draft status of Eco Niwas Samhita

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Odisha, Uttar Pradesh, Haryana and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Chandigarh

Furthermore, 19 states have promoted the use of BEE star-labelled appliances in public/government buildings, while 14 states have extended this initiative to commercial buildings. The details of reporting States have been presented in Table 3 – 6.

Table 3-6: Reporting states on BEE star-labelled appliances in Public/Government buildings and Commercial Buildings

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Odisha, Uttar Pradesh, Rajasthan and Haryana (Tamil Nadu)
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, and Bihar (Chhattisgarh)
Group 3 (1-5 MTOE)	Assam and Goa
Group 4 (<1 MTOE)	Tripura, Meghalaya, Chandigarh and Puducherry

Note: The States mentioned in the table above have reported on the promotion of BEE star-labelled appliances in Public/Govt. Buildings. States underlined in the table have reported the promotion of BEE star-labelled appliances in both Public/Govt. Buildings and Commercial Buildings. Tamil Nadu - Group 1 and Chhattisgarh – Group 2 have reported promoting BEE star labelled appliances in Commercial Buildings only

Key Initiatives on Policy in the Building Sector

In the states under Group 1, Maharashtra and Madhya Pradesh have incorporated ECBC 2017 into their municipal by-laws. Significant progress has been made in Odisha, Uttar Pradesh, and Rajasthan with the introduction of policies mandating the use of energy-efficient appliances in government buildings. Under Group 2, Bihar has made substantial progress by adopting ECBC into its municipal by-laws and implementing policies for energy-efficient appliances in government buildings. Punjab has also begun the process of notifying Eco Niwas Samhita 2021.

The Energy Conservation Building Code (ECBC) 2017 has been notified in 24 States and amended into law in 20 of them.

In Group 3, Goa has demonstrated progress by introducing policies mandating energy-efficient appliances in government buildings. In Group 4, ECBC 2017 was notified in Chandigarh and Mizoram, and Puducherry has incorporated ECBC into its municipal by-laws. Meghalaya, Chandigarh, and Puducherry implemented policies mandating the use of energy-efficient appliances in government buildings, showcasing a proactive approach to reducing energy consumption.

Institutional Capacity

The SEEI 2024 findings highlight significant progress in institutional capacity and readiness across various states to implement energy efficiency (EE) measures in the building sector. Tamil Nadu, in Group 1, has emerged as a leading example, effectively promoting and implementing EE initiatives. In Group 2, Bihar and Jharkhand have demonstrated growing commitment by adopting and advancing EE measures within their building sectors.

In Group 3, Himachal Pradesh, Jammu & Kashmir, Jharkhand, and Dadra & Nagar Haveli & Daman & Diu (DNH & DD) have collectively showcased institutional readiness to integrate energy efficiency into their regional development strategies. Similarly, in Group 4, Chandigarh has established itself as a leader by demonstrating robust institutional capacity to promote EE initiatives. These findings emphasis the expanding institutional frameworks across these regions, supporting the implementation of energy efficiency measures and advancing national energy conservation goals.

The details of reporting States on advisory resources made available to stakeholders to help them implement energy-efficient practices in the building sector have been presented in Table 3 – 7.

Table 3-7: Reporting states on advisory resources developed for supporting the implementation of EE practices in the Building Sector

Group 1 (>15 MTOE)	Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh and Jharkhand
Group 3 (1-5 MTOE)	Assam, Goa, Himachal Pradesh, Jammu and Kashmir, Uttarakhand and DNH & DD
Group 4 (<1 MTOE)	Tripura, Meghalaya, Chandigarh and Puducherry

All states have shown progress in institutional capacity and readiness for EE implementation.

Adoption of EE Measures

SEEI 2024 evaluates the adoption of EE measures in States, using indicators such as the presence of certified green buildings, EE integration in affordable housing, electric cooking measures in buildings and energy use data disclosure.

The proportion of newly approved buildings complying with the latest Energy Conservation Building Code (ECBC) has been reported by 8 states, with Telangana standing out by achieving 100% compliance. Steps toward adopting and promoting the Energy Conservation Building Code (ECBC) in new constructions have been initiated by 22 states. Energy benchmarking initiatives have been implemented in 7 States, with Maharashtra, Karnataka, Rajasthan, and Haryana leading in Group 1 and Andhra Pradesh excelling in Group 2. These efforts collectively underline the growing commitment to energy efficiency and conservation across the country.

The details of reporting States on the adoption and penetration of the Energy Conservation Building Code (ECBC) in new constructions and Energy benchmarking initiatives have been presented in Table 3 – 8.

Table 3-8: Reporting states on the adoption and penetration of the Energy Conservation Building Code (ECBC) in new constructions and Energy benchmarking initiatives

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana, Madhya Pradesh, West Bengal and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh, Jharkhand and Delhi
Group 3 (1-5 MTOE)	Assam, Goa, and Uttarakhand
Group 4 (<1 MTOE)	Chandigarh

Note: States underlined in the table above have reported both adoption and penetration of the Energy Conservation Building Code (ECBC) in new constructions and Energy benchmarking initiatives.

Efforts to promote electric and solar cooking in buildings have been initiated by 12 states, while 19 states have adopted the Star Rating Program for buildings. The details of reporting States on the promotion of electric and solar cooking in buildings have been presented in Table 3 – 9.

Table 3-9: Reporting states on the promotion of electric and solar cooking in buildings

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh and Rajasthan,
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura and Puducherry

7 States have taken up Energy benchmarking initiatives in the building sector.

Green building penetration

An ideal metric for assessing green building penetration would be the ratio of green building built-up area to the total built-up area within a state. However, due to the unavailability of state-wise built-up area data, the indicator for green buildings has been standardised as the number of certified green buildings per million connected residential and commercial building consumers (i.e., electricity connections) in each state. Tables 3 – 10 and 3 - 11 present the group-wise top 3 states with the highest number of certified green buildings based on normalised and absolute figures, respectively.

Table 3-10: Top 3 States with the highest number of normalised certified green buildings

Group 1 (>15 MTOE)	Haryana (97), Maharashtra (76) and Karnataka (42)
Group 2 (5-15 MTOE)	Delhi (89), Punjab (21) and Kerala (19)
Group 3 (1-5 MTOE)	Goa (57), Dadra & Nagar Haveli, and Daman & Diu (54) and Uttarakhand (23)
Group 4 (<1 MTOE)	Chandigarh (152), Andaman & Nicobar Islands (62) and Puducherry (53)

Note: No of Certified Green Buildings is consolidated number for FY 2023-23 and FY 2023-24

Table 3-11: Top 3 States with the highest number of certified green buildings

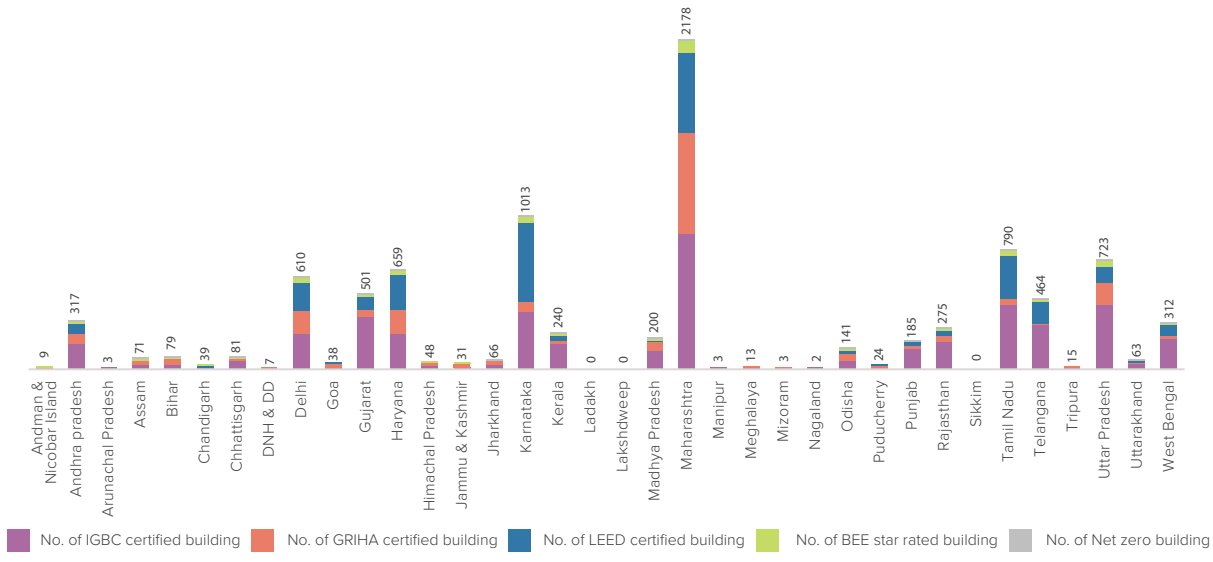
Group 1 (>15 MTOE)	Maharashtra (2178), Karnataka (1013) and Tamil Nadu (790)
Group 2 (5-15 MTOE)	Delhi (610), Andhra Pradesh (317) and Kerala (240)
Group 3 (1-5 MTOE)	Assam (71), Uttarakhand (63) and Himachal Pradesh (48)
Group 4 (<1 MTOE)	Chandigarh (39), Puducherry (24) and Tripura (15)

Note: No of Certified Green Buildings is consolidated number for FY 2023-23 and FY 2023-24

Maharashtra stands out as the leading state in implementing 2,178 Nos. Certified Green Buildings, followed by Karnataka with 1,013 Nos., Tamil Nadu with 790 Nos. and Uttar Pradesh with 723 Nos. Certified Green Building. The details on State/UT wise Green building penetration (IGBC-certified buildings, GRIHA-certified buildings, GBCI data, BEE star-rated buildings, Net zero buildings) are given below in Figure 3 – 8.

An ideal metric for assessing green building penetration would be the ratio of green building built-up area to the total built-up area within a state.

Figure 3-8: State/UT Level Certified Green Building Numbers

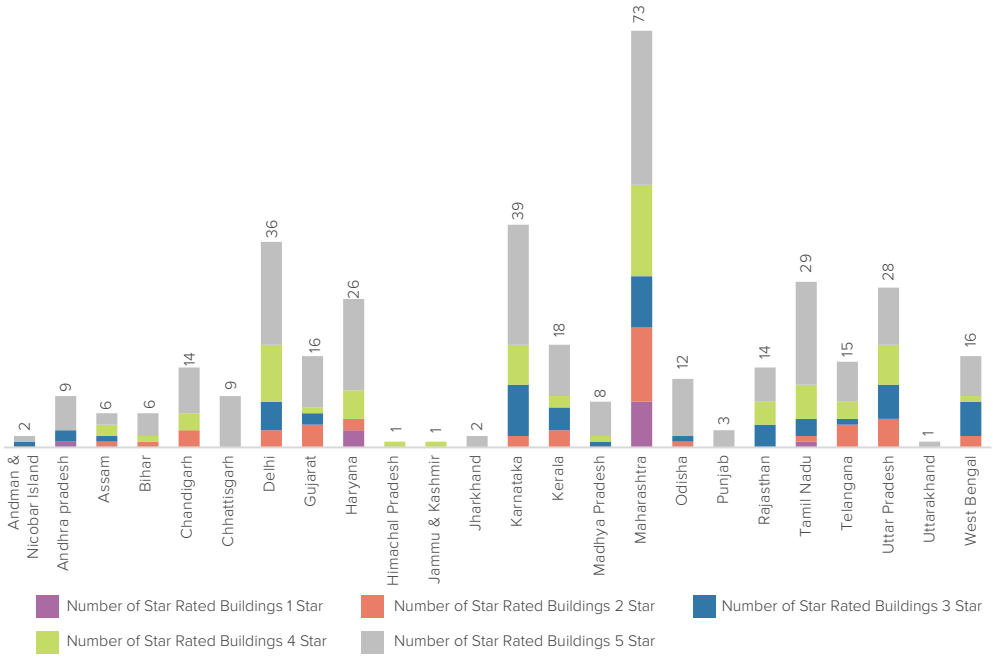


Note: No of Green Buildings is consolidated number for FY 2023-23 and FY 2023-24

Star-Rated Building Penetration

Maharashtra stands out as the leading state in implementing 73 Nos. Star-rated Buildings, followed by Karnataka with 39 Nos., Delhi 36 Nos., Tamil Nadu with 29 Nos. and Uttar Pradesh 28 Nos. Star-rated Buildings. State/UT level Star rated building penetration has been presented below in Figure 3 - 9 below:

Figure 3-9: State/UT level number of Star Rated buildings in India



Source: Bureau of Energy Efficiency, MoP - GoI

Energy Efficiency in Affordable Housing

Steps to promote energy efficiency EE/EC measures in affordable housing projects have been reported by 7 states. The details have been presented below in Table 3-12:

Table 3-12: Reporting states on steps undertaken for promotion of EE/EC measures in Affordable Housing Projects

Group 1 (>15 MTOE)	Maharashtra, Telangana, Uttar Pradesh and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Punjab
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	-

Key Initiatives in Electric Cooking/Solar Cooking in Building Sector

In Group 1 Maharashtra, MEDA has implemented 1 No. of the Solar Steam cooking system at Yashwantrao Chavan Academy of Development Administration, Pune, for cooking two meals per day for 180 people. Karnataka is implementing clean cooking projects in Government hospitals, college canteens/hostels, Government

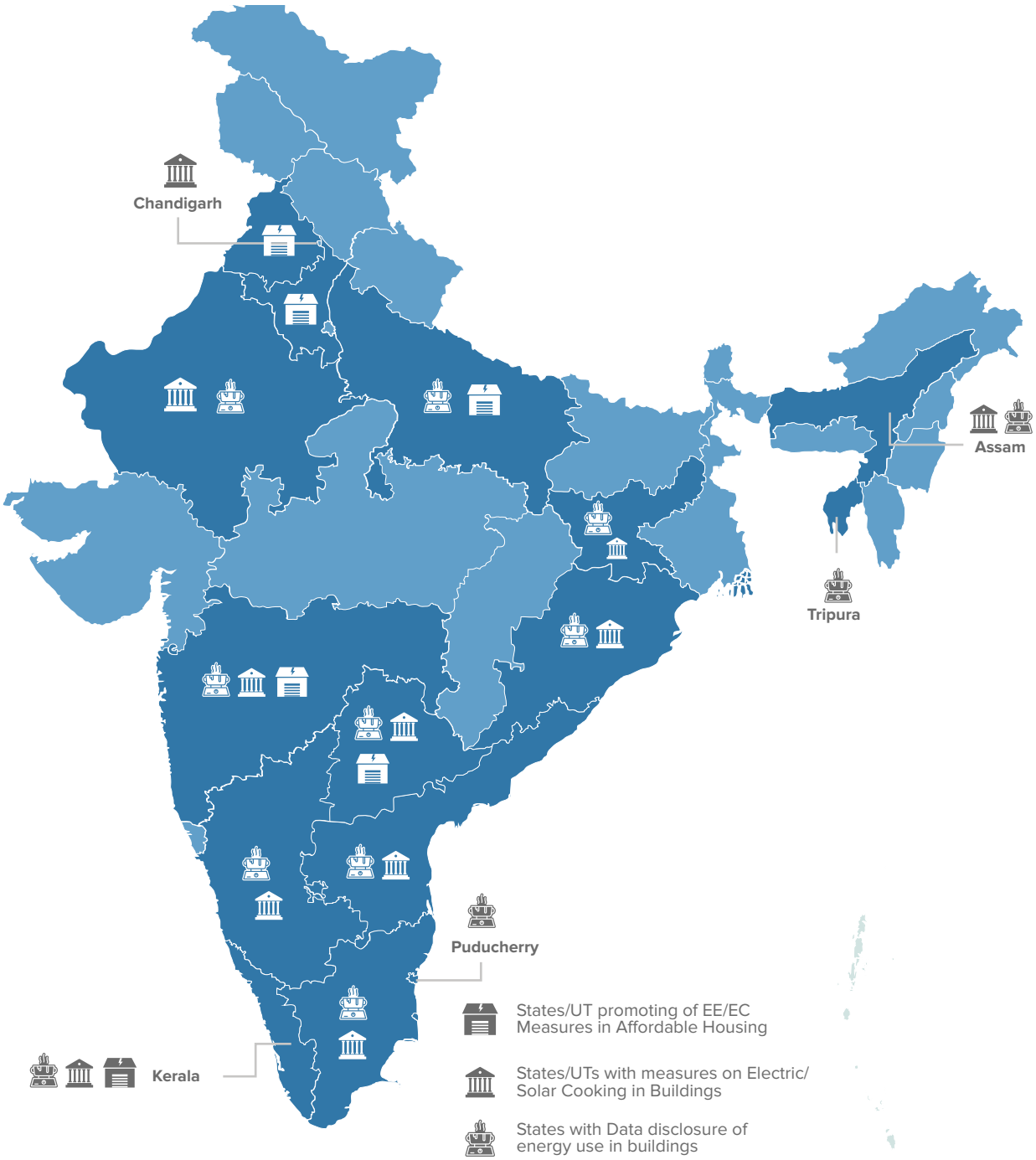
canteens and the residential sector. The Hare Krishna Movement Charitable Foundation (HKMCF) in Telangana inaugurated a centralised kitchen for a ₹5 meal scheme, utilising electric rice cookers and steam boilers. The centralised kitchen at Narsingi has shifted cooking to electric, along with the implementation of 36 Nos. Indoor solar cookers. The government of Rajasthan has a Budget Announcement for the promotion of clean cooking systems. 10000 Nos. clean cooking systems will be distributed at a 50% subsidy. The Haryana Renewable Energy Development Agency (HAREDA) provided induction stoves and solar cooking systems to Akshay Urja Bhawan and Akshay Urja Shops/Aide De-Camps (ADC) offices.

The government of Rajasthan has a Budget Announcement for the promotion of clean cooking systems. 10000 Nos. clean cooking systems will be distributed at a 50% subsidy

Under Group 2, Andhra Pradesh has reported that Tirumala Tirupati Devasthanam has installed the largest solar cooking system for preparing meals for 15,000 people per day. A clean Cooking project has been undertaken in Kerala, under which 2818 Nos. of Induction cookers have been installed (including 1 No. of Solar-based induction cookers). Jharkhand has reported the installation of 100 Nos. of double burner hybrid cooktops (550 Wp) in government buildings. In Group 3, Assam is undertaking to equip 65 Anganwadi Centers with Solar Cook Stoves and distribution of Energy Efficient Cook stoves in 9 Villages. Under Group 4, Tripura has distributed 2000 Nos. of induction cooktops in the district under the implementation of the National Clean cooking programme among Anganwadi Centres & Education Department. At the same time, Puducherry SDA has installed an Electric cooking system in 3 hospitals, 2 Community Health Centres and 95 Anganwadi centres under the demonstration program and financial support of BEE.

A map representation of the States which have reported action in the space of EE/EC measures in the Affordable Housing sector, Electric/Solar Cooking and Data disclosure of energy use in buildings has been presented in Figure 3 – 10 below:

Figure 3-10: Map showing states with EE in affordable housing, electric cooking measures and building energy use data disclosure



PROGRAMME SPECIFIC INDICATORS

Programmes for EE in Government/Public Buildings

States across India have made significant strides in implementing energy-efficient initiatives in government and public buildings, showcasing a strong commitment to sustainability. In Group 1, Karnataka retrofitted 52 government schools, saving 222,676 kWh annually and reducing CO_2 emissions by 158 tons. Haryana conducted energy audits across sectors, while Uttar Pradesh adopted ECBC-based measures for older buildings. Tamil Nadu is installing 20 MW of rooftop solar in government and educational facilities, and Odisha mandated BLDC fans and BEE Star-rated appliances, allocating ₹272.6 Crore for energy efficiency. Telangana introduced a Cool Roof Policy, retrofitted government buildings, achieved 100% green power at GMR Hyderabad International Airport, and plans to develop a 30 MW solar plant. Rajasthan allocated ₹32.25 Lakhs for upgrading government hospitals.

In Group 2, Andhra Pradesh upgraded 33 educational institutions and hospitals, saving 552,734 kWh annually and cutting CO_2 emissions by 0.45 million tons. Kerala launched EE programs for government buildings, and Punjab implemented energy-efficient appliances in schools and hospitals, promoting efficiency through awards and star ratings. In Group 3, Assam conducted compliance checks under the Demonstration Project Star Labelling for government buildings. These collective efforts signify a nationwide push to improve energy efficiency in public sector infrastructure, driving substantial energy savings and emission reductions.

The details of reporting States on programmes for energy efficiency in Government/ Public buildings have been presented in Table 3 – 13.

Table 3-13: Reporting states on Programmes for EE in Government/Public Buildings

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh and Rajasthan,
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura and Puducherry

Programmes for EE in Commercial Buildings

Significant progress has been made in promoting energy efficiency across commercial buildings in India, with states demonstrating leadership and innovation. In Group 1, Uttar Pradesh achieved compliance for 192 ECBC buildings and 364 green buildings, while Odisha organised the Baliyatra Awareness Program for commercial structures. Telangana emerged as a frontrunner, recognising energy-efficient buildings like Honeywell Technology Solutions and TCS Adibatla, the latter being an IGBC Gold-rated facility powered entirely by renewable energy with efficient HVAC systems and solar technologies. Telangana also boasts 682 IGBC-registered commercial buildings, 604 ECBC-compliant buildings, and an annual energy savings of 369 MWh.

In Group 2, Kerala allocated ₹85 Lakhs to support ECBC and energy efficiency in commercial buildings. At the same time, Punjab mandated ECBC compliance for specific structures, introduced annual energy conservation awards, and achieved

annual energy savings of 5.76 MU with a CO_2 reduction of 4,723 tonnes. Chhattisgarh contributed with a ₹50 lakh fund for energy-efficient upgrades. In Group 3, Assam conducted compliance checks under the Demonstration Project and Star Labelling for commercial buildings. These initiatives underline a strong nationwide commitment to advancing energy efficiency in the commercial building sector.

The details of reporting States on programmes for energy efficiency in Commercial Buildings, have been presented in Table 3–14.

Table 3-14: Reporting states on Programmes for EE in Commercial Buildings

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh and Rajasthan,
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura and Puducherry

13
States reported EE Programs in Commercial & residential buildings

Programmes for EE in Residential Buildings

States across India are advancing energy efficiency (EE) initiatives in the residential sector through innovative programs and targeted investments. In Group 1, Karnataka's Model Village Campaign in Dhundasi, Haveri district, distributed energy-efficient appliances such as LED bulbs, BLDC fans, and LED streetlights, achieving annual energy savings of 2,58,101 kWh and reducing CO_2 emissions by 2,11,643 tonnes with a ₹74.14 Lakhs budget. Rajasthan conducted a study on residential EE adoption, supported by ₹10 Lakhs.

In Group 2, Andhra Pradesh supplied energy-efficient appliances to 18,000 households under a ₹10 Crore project, saving 3.67 MU annually and cutting CO_2 emissions by 2.99 tonnes. Punjab advanced residential EE with ENS compliance and star-rating programs, while Chhattisgarh implemented the Eco-Niwas Samhita project with ₹50 Lakhs allocated. In Group 3, Assam conducted compliance checks and star labelling for residential buildings through its EEB Cell. These initiatives collectively underscore a strong commitment to enhancing energy efficiency in residential buildings across the country.

The details of reporting States on programmes for energy efficiency in Residential Buildings, have been presented in Table 3 – 15.

Table 3-15: Reporting states on Programmes for EE in Residential Buildings

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh and Rajasthan,
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura and Puducherry

Capacity Building Programmes in the Buildings Sector

13 States reported Capacity Building Programmes in the Buildings Sector

States across India have demonstrated a strong commitment to capacity-building initiatives in energy efficiency and sustainable practices through targeted programs and workshops. In Group 1, Karnataka organised two training programs for municipal officials to enhance their understanding of the Energy Conservation Building Code (ECBC). At the same time, HAREDA's ECBC Cell in Haryana conducted 59 physical and 56 online training sessions. Uttar Pradesh held 34 programs for building professionals, students, and the public, engaging 1,334 participants. Odisha conducted 34 capacity-building programs and 45 webinars to empower stakeholders statewide. In comparison, Telangana's Building Cell hosted 24 training programs for architects, engineers, and government officials, engaging 838 participants, alongside a 2-day ECSBC workshop in Hyderabad.

In Group 2, Andhra Pradesh delivered 17 physical and online training sessions, and Kerala organised 40 awareness programs focusing on ECBC and sustainable practices for government officials. Jharkhand held 23 capacity-building sessions under the National Career Service Project, training 676 participants, and approved 26 additional programs for state scientists. Central Coalfields Limited (CCL) in Ranchi contributed with seminars and workshops, while CREDA in Chhattisgarh conducted 14 programs in FY 2023-24.

In Group 3, Assam hosted a 2-day North-East Regional Workshop on energy efficiency, Goa organised webinars on ECBC and energy simulation, and Himachal Pradesh held 22 workshops on energy efficiency and building codes. In Group 4, Chandigarh emphasised energy conservation through awareness programs for teachers and office staff. At the same time, Meghalaya conducted workshops for officials across municipal boards, PWD, and urban and rural bodies to integrate energy-efficient practices into public sector operations. These collective efforts underscore a nationwide dedication to fostering capacity and expertise in energy efficiency and sustainability.

The details of reporting States on Capacity Building programmes on energy efficiency in the Buildings Sector have been presented in Table 3 – 16.

Table 3-16: Reporting states on capacity building programmes for EE in buildings sector

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh and Rajasthan,
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura and Puducherry

BUILDINGS SECTOR SPOTLIGHT

- **Telangana** has emerged as a leader in energy efficiency and sustainability initiatives. The state became the first in India to adopt the Cool Roof Policy 2023, covering 17,000 sq.m of slab area across 21 toll administrative buildings, reducing surface temperatures by up to 5°C and lowering power consumption. GMR Hyderabad International Airport received the 25th National Award for Excellence in Energy Management, operating with 100% green power, 95% LED lighting, and aiming for full LED conversion and a 30 MW solar installation by 2024-25. Telangana's TCS Adibatla, an IGBC Gold-rated green building, operates on 100% renewable energy, features advanced energy-efficient systems, and ensures zero waste to landfill. Additionally, the state registered 682 commercial buildings under IGBC and 604 under ECBC, collectively saving 369 MWh annually.
- **Uttar Pradesh** achieved substantial progress with 192 Nos. ECBC-compliant and 364 Nos. green buildings.
- **Punjab** has mandated ECBC compliance for buildings with a connected load of 120 kW or more and introduced annual State Level Energy Conservation Awards, including a category for commercial buildings, to promote energy-efficient practices.

3.2 INDUSTRY SECTOR

OVERVIEW

The industry sector, which represents the highest share of energy consumption, holds significant potential for energy savings. The India Energy Security Scenarios (IESS) model by NITI Aayog projects that the industry sector holds the greatest potential for energy savings in India by 2047.

In SEEI 2024, the evaluation of EE initiatives in the industry sector is based on eleven (11) indicators. Of these, eight (8) are common indicators that assess policy frameworks, institutional capacity, and the adoption of EE measures. The remaining three (3) are programme-specific indicators designed to measure the effectiveness of EE initiatives implemented at the state level. The maximum total score in this sector is eighteen (18), with six (6) points allocated to common indicators and twelve (12) points to programme-specific indicators. Table 3-17 provides a breakdown of these indicators, while Figure 3-11 presents the states' scores, normalised to a scale of 100 out of 110, based on their TFEC. Figure 3-12 showcases the progress of states in SEEI 2024 compared to SEEI 2023.

The India Energy Security Scenarios (IESS) model by NITI Aayog projects that the industry sector holds the greatest potential for energy savings in India by 2047

Table 3-17: Industry Sector indicators under SEEI 2024

S. No	Indicator	Max. Score	Scoring Criteria
	Policy		
1	EE & EC provisions in Industry/MSME policy	0.5	
	Is there any provision of EE in the state's/UT's Industry/ MSME policy?	0.5	EE provisions in Industry/MSME policy = 0.5, else = 0
2	Mandatory Energy Audit (MEA) in Non-PAT industries/ MSME.	2.0	
	Does the State/UT have any policy/guidelines for carrying out Mandatory Energy Audits (MEA) in Non-PAT industries/ MSMEs and submit the report to SDA?	0.5	Policy/Guidelines for carrying out MEA = 0.5, else = 0
	If yes, for the above indicator, how many non-PAT industries and MSMEs have been covered for MEA?	0.5	No of non-PAT industries and MSMEs covered for MEA = 0.5, else = 0
	Does the state/UT have any policy/scheme/financial incentive for implementing the recommendations of the MEAs in Non-Pat industries/MSMEs).	0.5	Policy/scheme/financial incentive for implementing the MEA recommendation = 0.5, else = 0
	If yes, for the above indicator, how many non-PAT industries and MSMEs have availed incentives for the implementation of EE/EC measures post-MEA?	0.5	No of non-PAT industries and MSMEs which availed the incentives for the implementation of EE/EC measures post MEA = 0.5, else = 0
	Institutional Capacity		
3.	Advisory, certification and enforcement capacity in state government	0.5	
	Does the Industry/MSME department of the State/UT have an entity/committee/cell to develop capacity and provide technical expertise on energy efficiency/decarbonisation in the industry/MSME sector?	0.25	Entity to develop capacity & provide technical expertise = 0.25, else= 0
	Has the SERC/JERC appointed an Adjudicating Officer (AO) as per section 27 of the Energy Conservation Act 2001?	0.25	Appointment of Adjudicating Officer by the State = 0.25, else = 0
	Adoption of EE measures		
4.	MSME Cluster Profile	0.50	
	Has the State/UT taken any steps to identify energy-intensive MSME Clusters?	0.50	Steps taken to identify energy-intensive MSME Clusters = 0.5, else = 0
5.	PAT Widening and Deepening	0.50	
	Are there any activities undertaken to widen and deepen the PAT scheme in the State/UT?	0.50	Activities undertaken for PAT Widening = 0.25, else = 0 Activities reported on PAT Deepening= 0.25, else = 0
6.	Adoption of ISO 50001 in industrial units	0.50	
	What steps have been taken by the State/UT for the adoption of ISO 50001in Industrial Units? (For Eg: Policy Notification, Scheme, etc.)	0.25	Steps taken for adoption of ISO 50001in Industrial Units = 0.25, else = 0
	How many industrial units have adopted/included ISO 50001 standards in the State/UT?	0.25	No of industrial units which have adopted/ included ISO 50001 standards = 0.25, else = 0
7.	Measures for electrification of end-use in industry	0.50	
	Are there any steps taken for the electrification of end-use energy in industries (e.g., industrial heating)	0.50	Yes=0.5, else=0

S. No	Indicator	Max. Score	Scoring Criteria
8.	Energy conservation awards	1.0	
	How many industrial units have won energy conservation awards through State/National/Industry Association Awards?	1.0	1 - 15 Awards: 0.25; 16 – 30 Awards: 0.5; 31 -45 Awards: 0.75; >45 Awards: 1
	State Programme		
9.	Programmes for energy efficiency in large industries	4.0	
	Does the state have programmes for energy efficiency in large industries in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date?	0.5	Budget Allocated & Utilised = 0.5
	Who is running the program? (list all, e.g. SDA, state dept., industry association, PPP, etc.)	0.25	Entities running the programme = 0.25
	What is the progress to date?	0.50	Progress to date = 0.50
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings)	1	Avoided emissions=1
10.	Programmes for energy efficiency in MSME industries	6.0	
	Does the state have programmes for energy efficiency in MSME industries in FY 2023-24?		
	What is the objective of the program? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	1	The target set under the programme = 1
	What is the timeline?	0.5	Timeline = 0.5
	How much budget has been allocated & utilised to date?	1	Budget Allocated & Utilised = 1
	Who is running the program? (list all, e.g. SDA, state dept., industry association, PPP, etc.)	0.25	Entities running the programme = 0.25
	What is the progress to date?	1	Progress to date = 1
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings)	1	Avoided emissions=1
11.	Capacity building programmes in industry sector	2	
	Does the state have programme(s) for capacity building in the industry sector in FY 2023-24?		
	What is the objective of the program? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.5	The target set under the programme = 0.5
	Who is running the program? (list all, e.g. SDA, state dept., industry association, PPP, etc.)	0.25	Entities running the programme = 0.25
	What is the progress to date?	1	Progress to date = 1

Figure 3 – 11 shows the TFEC state scores for the Industry Sector in SEEI 2024.

Figure 3-11: TFEC group-wise industry sector state scores

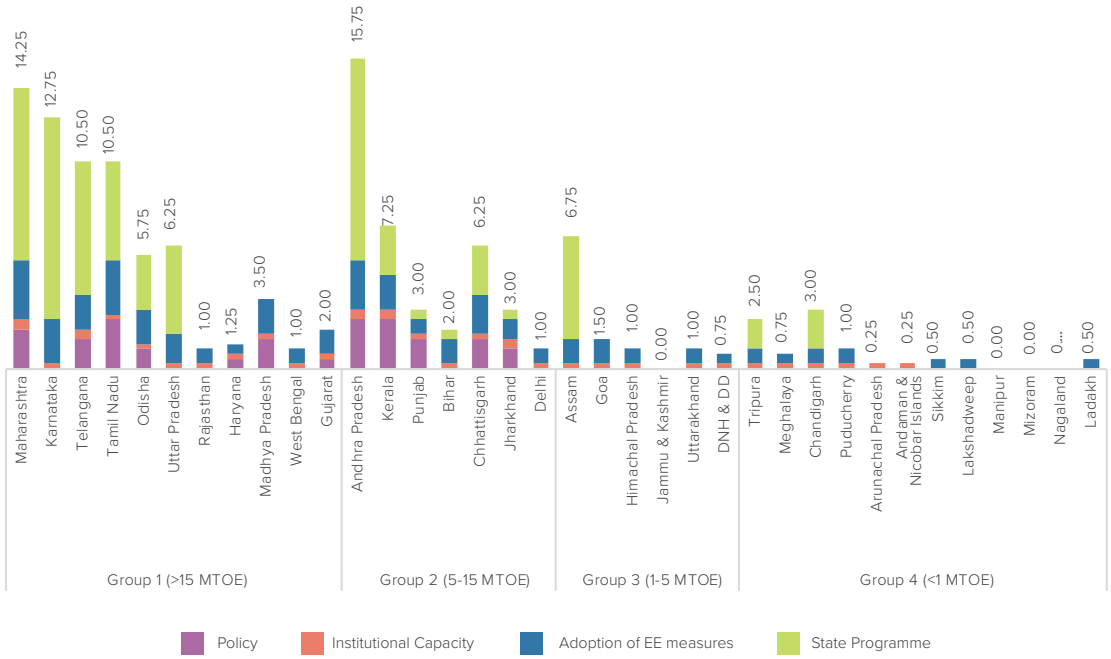
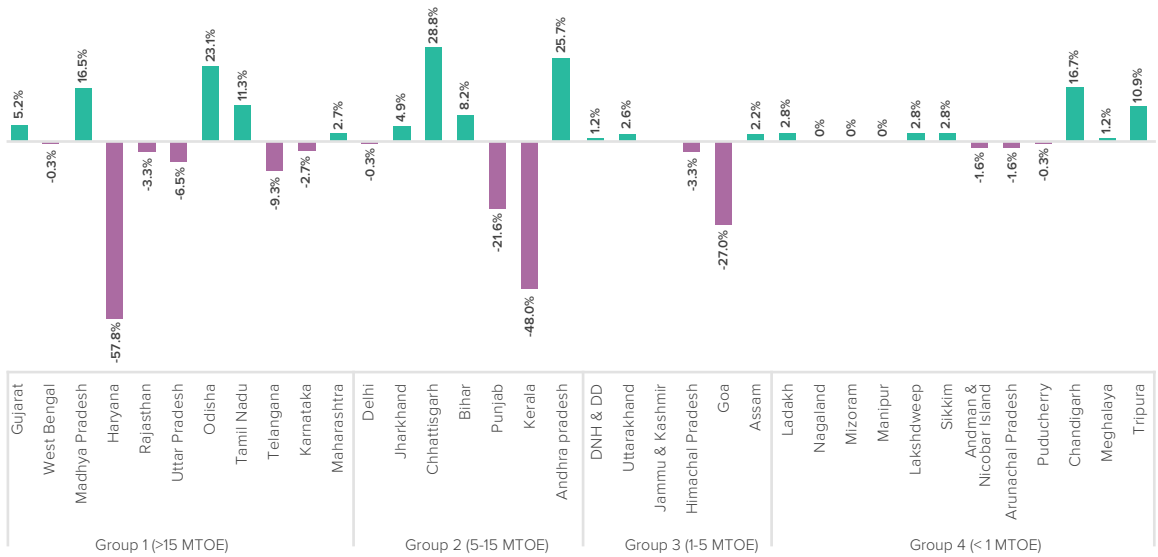


Figure 3 – 12 depicts the progress of the industry sector for each state in SEEI 2024 in comparison to SEEI 2023.

Figure 3-12: TFEC group-wise industry sector state progress – SEEI 2024 vs SEEI 2023

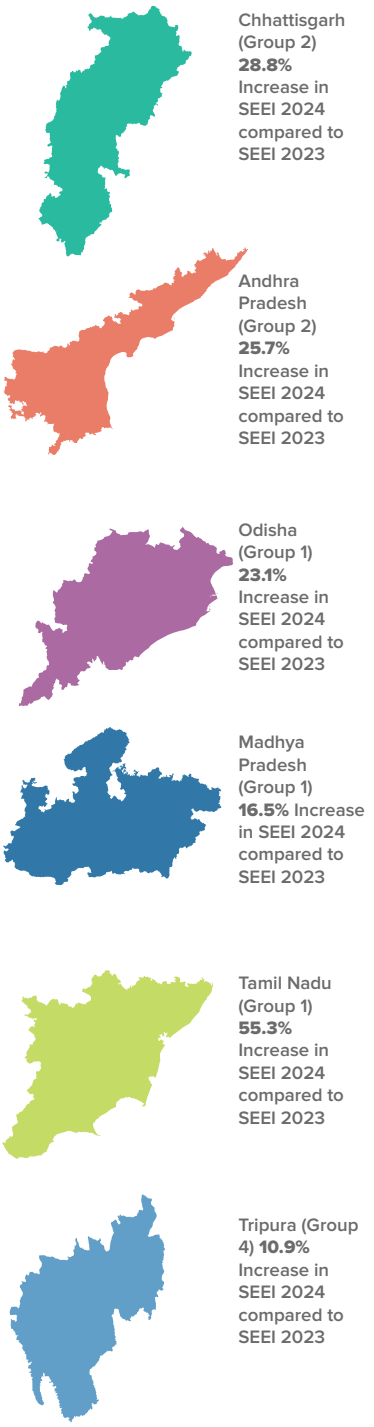


SEEI 2024 INDUSTRY SECTOR SCORE HIGHLIGHTS

Andhra Pradesh emerged as the top performer in the industry sector, demonstrating remarkable improvement. In Group 1, Maharashtra led with a 2.7% increase in score, whereas Karnataka, despite ranking second, saw a 2.7% decline. In Group 2, Andhra Pradesh claimed the top position with a significant 27.5% improvement, followed

by Kerala in second place, despite a steep 48% drop compared to SEEI 2023. In Group 3, Assam topped the rankings with a 2.2% improvement, with Goa in second place but facing a 27% drop. In Group 4, Chandigarh led with a 16.7% improvement, followed by Tripura with a 10.9% increase. Notably, Tamil Nadu, Odisha, Madhya Pradesh, Andhra Pradesh, Chhattisgarh, Tripura, and Chandigarh achieved over 10% score improvements, while Haryana, Kerala, Punjab, and Goa faced declines exceeding 10%. This highlights the varying progress in energy efficiency across different states. Details of the most improved states' in Industry Sector have been given in Figure 3-13.

Figure 3-13: Most Improved State in the Industry Sector



COMMON INDICATORS

Policy

A total of 10 states and Union Territories (UTs) have incorporated Energy Efficiency (EE) and Energy Conservation (EC) provisions in their Industry/MSME policies. The implementation of Mandatory Energy Audits (MEA) in non-PAT industries/MSMEs varies significantly across States. Policies or guidelines for Monitoring, Evaluation, and Audit (MEA) have been established by 7 states, while 9 states have introduced policies, schemes, or financial incentives to support the implementation of MEA recommendations. In terms of policy execution, Tamil Nadu, Andhra Pradesh, and Kerala lead in the implementation of energy-efficient policies in the industry sector. Maharashtra also stands out for its well-structured policies and significant progress in execution. Telangana, Madhya Pradesh, Punjab, and Chandigarh have made notable strides but are still working towards full integration and enforcement of energy efficiency measures within industries.

Key Initiatives on Policy in the Industry Sector

In Group 1, Karnataka has introduced the Energy Conservation and Energy Efficiency Policy 2022-27 for the MSME sector, which is voluntary. Maharashtra's energy policy targets heavy industries and MSMEs, with 162 energy audits completed in FY 2023-24, while offering financial assistance for both detailed and walk-through audits. Tamil Nadu's Industrial and MSME policy provides incentives, such as a 25% subsidy for energy efficiency measures like electric vehicles and green buildings, along with support for captive power plants and energy certifications. The PEACE scheme in Tamil Nadu offers financial assistance for energy audits and the implementation of audit recommendations. Odisha's policy reimburses 75% of energy audit costs for new enterprises investing in energy conservation. Telangana's Industrial and Textile policies offer financial incentives for energy, water, and environmental conservation infrastructure, benefiting 80% of MSMEs.

In Group 2, Andhra Pradesh has mandated Investment Grade Energy Audits (IGEA) for industries with a contract demand of 1000KVA and above, aiming to conduct audits every three years. The state is developing guidelines and has covered MSMEs in sectors like gold ornaments, imitation jewellery, pharma, and food processing. Kerala mandates energy audits for HT/EHT industries and provides financial incentives for companies. Punjab offers a reimbursement of up to 75% for energy, water, safety, environment, and steam audits for MSMEs under its Industrial and Business Development Policy 2022, with financial support for implementing audit recommendations. Jharkhand and Chhattisgarh have also introduced energy efficiency policies for industries and MSMEs.

The details of reporting States on EE & EC provision in their Industry/MSME Policies have been presented in Table 3 - 18.

Table 3-18: Reporting states on EE & EC provision in their Industry/MSME Policy

Group 1 (>15 MTOE)	Maharashtra, Telangana, Tamil Nadu, Odisha and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Chhattisgarh and Jharkhand
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	-

The details of reporting States on Policies/Guidelines for mandatory energy audits in Non-PAT Industries/MSME have been presented in Table 3-19.

Table 3-19: Reporting states on Policy/Guidelines for mandatory energy audit in Non-PAT Industries/MSMEs

Group 1 (>15 MTOE)	Maharashtra, Tamil Nadu, Haryana and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Chhattisgarh
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	-

The details of reporting States on Policy/Scheme/Financial Incentives for further implementation of the recommendations of a mandatory energy audit in Non-PAT Industries/MSME have been presented in Table 3-20.

Table 3-20: Reporting states on Policy/Scheme/Financial Incentives for implementation of the recommendations of a mandatory energy audit in Non-PAT Industries/MSME

Group 1 (>15 MTOE)	Maharashtra, Telangana, Tamil Nadu and Odisha
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Chhattisgarh and Jharkhand
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	-

Institutional Capacity

Five states and Union Territories (UTs)—Maharashtra, Telangana, Andhra Pradesh, Kerala, and Jharkhand—have established dedicated entities, committees, or cells within their Industry/MSME departments to build capacity and provide technical expertise on energy efficiency. Furthermore, 30 states have appointed an Adjudicating Officer (AO) under Section 27 of the Energy Conservation Act, 2001, through their respective State Electricity Regulatory Commissions (SERC) or Joint Electricity Regulatory Commissions (JERC).

The details of reporting States on appointing an Adjudicating Officer (AO) under Section 27 of the Energy Conservation Act, 2001, have been presented in Table 3 – 21.

Table 3-21: Reporting states on appointing an Adjudicating Officer (AO) under Section 27 of the EC Act, 2001

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana, Madhya Pradesh, West Bengal and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh, Jharkhand and Delhi
Group 3 (1-5 MTOE)	Assam, Goa, Himachal Pradesh, Uttarakhand, Dadra & Nagar Haveli and Daman & Diu
Group 4 (<1 MTOE)	Tripura, Meghalaya, Chandigarh, Puducherry, Arunachal Pradesh and Andaman & Nicobar Islands

Note: The underlined states reported in the table above have also reported their Industry/MSME department having an entity/committee/cell to provide technical expertise on energy efficiency/decarbonization in the industry/MSME sector.

Adoption of EE measures

Measures to identify energy-intensive MSME clusters have been implemented by 28 states. Additionally, 14 states have actively undertaken PAT widening and deepening initiatives. The details of the reporting states have been presented in Table 3 – 22.

Table 3-22: Reporting states on the identification of energy-intensive MSME clusters and pursuing PAT Widening and Deepening

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana, Madhya Pradesh, West Bengal and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh, Jharkhand and Delhi
Group 3 (1-5 MTOE)	Assam, Goa, Himachal Pradesh, Uttarakhand, Dadra & Nagar Haveli and Daman & Diu
Group 4 (<1 MTOE)	Tripura, Chandigarh, Sikkim, Lakshadweep and Ladakh (Puducherry)

Note: The underlined states reported in the table above have also reported pursuing PAT Widening & Deepening. (Including Puducherry)

ISO 50001 has been implemented in industrial units across 9 states, contributing to enhanced energy efficiency. Meanwhile, 5 states have reported initiatives aimed at electrifying end-use applications in industry. The details of the reporting states have been presented in Table 3 – 23.

Table 3-23: Reporting states on implementation of ISO 50001 and electrification of end-use in industry

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Odisha, and Uttar Pradesh (Tamil Nadu)
Group 2 (5-15 MTOE)	Andhra Pradesh and Kerala (Chhattisgarh)
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	Tripura and Meghalaya

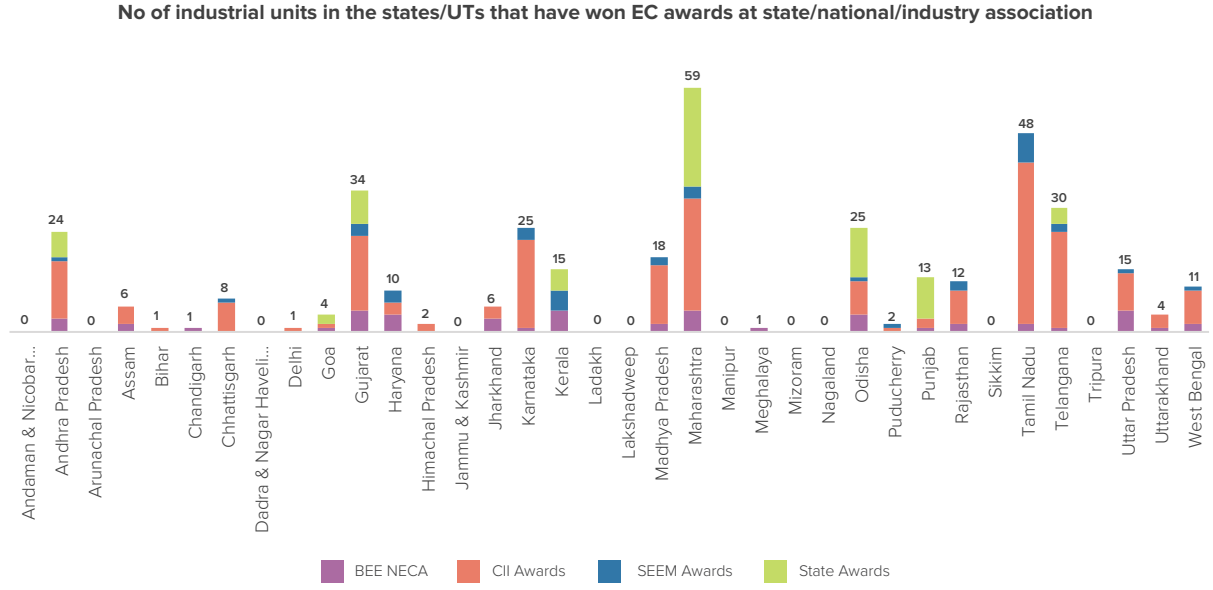
Note: The underlined states reported in the table above have also reported electrification of end-use in the industry (Tamil Nadu – Group 1, and Chhattisgarh – Group 2, have also reported the same)

Towards recognition of energy conservation, 25 States have received Energy Conservation Awards, with Maharashtra, Tamil Nadu, and Odisha leading in the number of awards, followed by Gujarat. Notably, Maharashtra recognised 59 industrial units with energy conservation awards, the highest in any state, while Tamil Nadu and Gujarat followed with 48 and 34 units, respectively. Figure 3 - 14 illustrates the States that have received energy conservation awards for industrial units through state, national, and industry association awards.

Key Initiatives on Adoption of EE measures in the Industry Sector

- 4 clusters (Cashew, Coir, Shrimp hatchery, Rice mills) in Andhra Pradesh have been identified in 2023-24. Also, an Energy Efficiency /Decarbonisation study has been done in 5 units per cluster, and primary Energy Efficiency measures were implemented in 4 clusters, which include Pharmaceutical, Gold Ornaments, Imitation Jewellery and Food Processing.
- In Karnataka, the State Designated Agency has identified six major sectors for focused energy efficiency efforts. These include the rice industry in Karatagi and Gangavathi, the poha/puffed rice industry in Chitradurga, resin production in the grape-growing regions of Vijayapur and Bagalkot, tool room industries supporting auto manufacturing in Hubli and Bidar, the spices cluster in Sirsi, and the steel and foundry cluster in Belgaum, Shimoga, and Bangalore. The Karnataka Energy Efficiency Policy (2022–27) emphasizes the adoption of certified energy management systems, such as ISO 50001, in industries. Additionally, the Karnataka Industrial Policy (2022–25) offers incentives to industries for obtaining quality certifications. Karnataka EE Policy (2022-27) emphasises a certified energy management system (ISO 50001) in industries. Further, Karnataka Industry Policy 2022-25 provides incentives to industries for Quality Certification.
- Maharashtra has taken various steps to identify energy-intensive MSME clusters, viz a preliminary survey and walk-through audit at winery, textile, rice, general engineering, etc. clusters through divisional offices. Further, the state has identified Energy Intensive Clusters at Kolhapur Foundry and Engineering in MSME and conducted detailed Energy Audits in MSME. MEDA has also prepared data on Sugar industries, i.e., a list of cooperative sugar factories, Pvt Sugar Factories, their capacity, code, commissioned details, etc., and provided to BEE to incorporate into the next PAT cycle F.Y.2024-25.

Figure 3-14 : States and UT's with Energy Conservation Awards for industrial units



PROGRAMME SPECIFIC INDICATORS

In SEEI 2024, there are three (3) programme-specific indicators i) Programmes for energy efficiency in large industries; ii) Programmes for energy efficiency in MSME industries; and iii) Capacity-building initiatives within the Industry sector to monitor and assess the implementation of programmes by SDAs, state government entities through interdepartmental collaborations or in partnerships with BEE, industry associations, or in PPPs to advance EE in the industry sector.

Programmes for EE in large industries

In Group 1, the Bureau of Energy Efficiency's (BEE) Perform, Achieve, and Trade (PAT) program is being implemented across several states, including Karnataka, Maharashtra, Telangana, Andhra Pradesh, Uttar Pradesh, Odisha, and Assam, aiming to reduce energy consumption in energy-intensive industries through a market-based mechanism allowing the trading of excess energy savings. Karnataka's PAT program has resulted in annual energy savings of 1,74,091 TOE and a reduction of 5,43,709 tonnes of CO_2 emissions, with an investment of ₹21,737 Lakhs in FY 2023-24. Maharashtra has achieved 440,078.6 kWh in energy savings and a reduction of 5,600 tonnes of CO_2 emissions, investing ₹48.675 Lakhs. Uttar Pradesh's PAT Cycle V has contributed to energy savings of 0.08 million TOE and a reduction of 7 lakh tonnes of CO_2 emissions annually.

Karnataka's PAT program has resulted in annual energy savings of 1,74,091 TOE and a reduction of 5,43,709 tonnes of CO2 emissions

In Group 2, Andhra Pradesh has reported significant results, with energy savings of 2,03,685 TOE and a reduction of 6,31,423 tonnes of CO_2 emissions annually, backed by an investment of ₹55.45 Crore for 42 designated consumers (DCs). Kerala has launched the Kerala State Energy Conservation Award and established the Kerala State Energy Conservation Fund with a budget of ₹6 Crore to promote energy efficiency in industries. In Group 3, Assam has implemented BEE's PAT program to reduce specific energy consumption in energy-intensive industries. In Group 4, Tripura is advancing the Strengthening and Generation Efficiency Improvement project for its Gas Thermal Power Plant at Rokhia and Baramura, funded by the Asian Development Bank (ADB), to enhance energy security and supply efficiency, with the Letter of Award (LOA) pending after environmental clearance.

The details of the reporting states on Programmes for Energy Efficiency in Large Industries have been presented in Table 3 – 24.

Table 3-24: Reporting states on Programmes for Energy Efficiency in Large Industries

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Odisha, and Uttar Pradesh,
Group 2 (5-15 MTOE)	Andhra Pradesh, and Kerala,
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura

Programmes for EE in MSME industries

In Group 1, several states have implemented energy efficiency initiatives for MSMEs. Karnataka has replaced electric motors with energy-efficient models, resulting in a reduction of 106 tonnes of CO_2 emissions, with an investment of ₹8,18,395. Maharashtra's MEDA scheme supports energy and efficiency projects based on energy audit reports, particularly in the Forging and Paper and Pulp industries, achieving total savings of 77,500 kWh per year and a reduction of 65.45 tonnes of

CO_2 emissions. Tamil Nadu's PEACE programme allocated ₹10 Lakhs for awareness programs, ₹45 Lakhs for training, ₹107.53 Lakhs for energy audit subsidies, and ₹97.02 Lakhs for implementation efforts. Telangana's TGREDCO conducted energy audits in 20 MSME clusters and is working on demonstrating energy-efficient technologies based on audit recommendations. Additionally, the state is promoting a Green Finance Scheme (GFS) to support energy-efficient and sustainable manufacturing in the MSME sector, contributing to the national goal of reducing greenhouse gas emissions.

In Group 2, Andhra Pradesh has initiated mandatory Investment Grade Energy Audits (IGEA) for industries with a Contracted Maximum Demand (CMD) of 1000 KVA and above, to be conducted every three years. Cluster studies in sectors such as Gold ornaments, Imitation Jewellery, Food Processing, and Pharmaceuticals have led to significant energy savings of 0.67 MU per annum and a reduction of 0.54 million tonnes of CO_2 emissions annually, with an investment of approximately ₹80 Lakhs. Kerala's Energy Management Centre (EMC) has conducted energy audits for MSME units and is implementing energy efficiency measures in selected units.

The details of the reporting states on Programmes for Energy Efficiency in MSME have been presented in Table 3 – 25.

Table 3-25: Reporting states on Programmes for Energy Efficiency in MSME

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana and Tamil Nadu
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Chhattisgarh
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	-

Capacity building programmes in industry sector

In Group 1, several states have initiated programs to promote energy efficiency (EE) and financing. Karnataka hosted an Investment Bazar for Energy Efficiency Financing and a regional workshop on the PAT Scheme for Designated Consumers (DCs) and financial institutions to discuss EE measures and financing. Maharashtra's MEDA also conducted an investment Bazar to raise awareness about energy-efficient projects in the industrial sector. Uttar Pradesh organised six workshops, training programs, and webinars through its PAT Cell to educate MSMEs and industries on energy-saving measures. Odisha held a capacity-building workshop for MSMEs on EE financing, while Telangana's TGREDCO actively promoted energy efficiency in MSMEs and industries, collaborating with financial institutions. The state hosted workshops on efficiency studies in MSME clusters, an investment Bazar for EE, and 21 webinars for PAT DCs and MSMEs.

In Group 2, Andhra Pradesh's APSECM organised virtual and physical workshops for DCs under the PAT Scheme to raise awareness about the latest technologies. Kerala's EMC carried out capacity-building programs to enhance knowledge and skills in energy management practices, and it also organised four Investment Bazars for Energy Efficiency. Punjab conducted webinars and workshops targeting over 100 participants per session, aiming to hold 10 workshops annually and sensitise over 1,000 industry workers. Jharkhand organised 10 training workshops for MSMEs and industries, promoting energy conservation and efficiency.

In Group 3, Assam's State Designated Agency (SDA) organised multiple capacity-building initiatives, including a Stakeholder Consultation Workshop to develop the State Energy Efficiency Action Plan, a webinar for DCs on non-compliance under the PAT Scheme, and a regional workshop for PAT cells and SDAs from the East and North-East zones under BEE's PAT program. In Group 4, Chandigarh's State Energy

Tamil Nadu's PEACE programme has allocated ₹10 Lakhs for awareness programs, ₹45 Lakhs for training, ₹107.53 Lakhs for energy audit subsidies, and ₹97.02 Lakhs for implementation efforts

Efficiency Action Plan directed the SDA to organise awareness programs for MSMEs. At the same time, Tripura held 15 awareness and capacity-building programs with industry stakeholders and NGOs to promote energy efficiency initiatives.

The details of the reporting states on capacity building programmes in the industry are presented in Table 3 – 26:

Table 3-26: Reporting states on capacity building programmes in industry sector

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha and Uttar Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura and Chandigarh

INDUSTRY SECTOR SPOTLIGHT

- **Maharashtra's** Energy Conservation (EC) policy has provided financial support for energy audits through empanelled firms, yielding annual savings of 440,078.6 kWh and a CO_2 reduction of 5,600 tonnes with an investment of around ₹48.675 Lakhs. Further, Maharashtra's MEDA scheme has focused on energy efficiency (EE) projects in the forging and paper pulp industries, resulting in potential savings of 77,500 kWh and a CO_2 reduction of 65.45 tonnes.
- **Karnataka** has contributed to CO_2 reduction by encouraging MSMEs to replace electric motors, cutting 106 tonnes of CO_2 and investing ₹8,18,395.
- **Tamil Nadu's** PEACE program has driven energy efficiency efforts for MSMEs, with FY 2023-24 investments totalling ₹259.57 Lakhs for awareness, training, energy audit subsidies, and implementation initiatives.
- **Andhra Pradesh** has mandated Investment Grade Energy Audits (IGEA) for industries with a Contracted Maximum Demand (CMD) of 1000 KVA or more, conducted every three years. Cluster studies in Gold Ornaments, Imitation Jewellery, Food Processing, and Pharmaceuticals sectors have led to significant energy efficiency measures, achieving energy savings of 0.67 million units (MU) annually and reducing CO_2 emissions by 0.54 million tonnes, with an investment of ₹80 Lakhs.

3.3 MUNICIPAL SERVICES

OVERVIEW

Municipal services in India, including water supply, sewage treatment, and street lighting, are key components of urban infrastructure and among the most energy-intensive sectors. With around 30% of the population living in urban areas—a number that continues to rise—there is a pressing need to improve energy efficiency (EE) in these services. Enhancing EE can significantly improve access to essential utilities such as water, electricity, heating, and cooling for urban residents.

Adopting energy-efficient technologies and practices not only reduces energy and water consumption but also lowers operational costs and enhances service quality. Furthermore, it supports environmental sustainability and helps address the urban heat island effect that affects many Indian cities. Strengthening EE in municipal systems is therefore vital for fostering inclusive, cost-effective, and climate-resilient urban development.

SEEI 2024 assesses EE progress in the municipal services sector using six (6) indicators, focusing on street lighting and water/ sewerage systems. These comprise three (3) common indicators evaluating policy frameworks and EE adoption, along with three (3) programme-specific indicators measuring on-ground implementation. The maximum score in this sector is twelve (12), with two (2) points allotted for common indicators and ten (10) for programme-specific indicators. Table 3-27 details these indicators, while Figure 3-15 presents the states' scores, normalised to a scale of 100 out of 110, based on their TFEC. Figure 3-16 highlights the states' progress in SEEI 2024 compared to SEEI 2023.

Table 3-27: Municipal Services sector indicators under SEEI 2024

S. No	Indicator	Max. Score	Scoring Criteria
	Policy		
1	City-level action plan on climate change	0.5	
	How many cities in the State/UT have developed Climate Action Plan/Net Zero Plan/Heat Action Plan/any other to mitigate/adapt to the effects of climate change?	0.25	Data provided by State/UT = 0.25, else = 0
	Has the SDA collaborated with ULB/Municipal Corporation on energy efficiency actions under their Climate Action Plan/ Net Zero Plan/Heat Action Plan/any other plan?	0.25	Yes = 0.25, else = 0
	Institutional Capacity		
2.	Advisory, certification and enforcement capacity in state government	0.5	
	Has the UDD/PHED issued any advisory on energy efficiency practices in municipal services?	0.25	Yes = 0.25, else = 0
	Does the state have a Government authority to enforce EC/ EE regulations or measures for municipalities?	0.25	Government authority to enforce EC/EE regulations measures for municipalities = 0.25, else = 0
	Adoption of EE measures		
3.	Adoption of EE practices in street lighting, water pumping and sewerage systems	1	
	What energy efficiency practices have been implemented in street lighting (e.g., feeder level pillar, smart street lighting systems) and in water pumping and sewerage systems (e.g., IE2 or higher efficiency class motors, VFDs)?	0.5	Energy-efficient practices implemented in Streetlighting = 0.5
	Which systems have been deployed to monitor street lighting, water pumping stations, and sewerage treatment plants? (For ex. SCADA, Energy Management System, etc.)	0.5	Monitoring systems deployed for Streetlighting/Water Pumping/ Sewerage Pumping = 0.5
	State Programme		
4.	Programmes for energy-efficient street lighting	4	
	Does the state have programmes for energy-efficient street lighting in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date?	0.5	Budget Allocated & Utilised = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progress to date?	0.5	Progress to date = 0.5
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings	1	Avoided emissions = 1

S. No	Indicator	Max. Score	Scoring Criteria
5.	Programmes for energy-efficient water/sewerage system	4	
	Does the state have programmes for energy-efficient water/sewerage systems in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date	0.5	Budget allocated & utilised to date = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progress to date?	0.5	Progress to date = 0.5
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings	1	Avoided emissions = 1
6.	Capacity building programmes in the municipal services sector	2	
	Does the state have programme(s) for capacity building in the municipal services sector in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.5	The target set under the programme = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progress to date?	1	Progress to date = 1

Figure 3-15: TFEC group-wise municipal services sector state scores

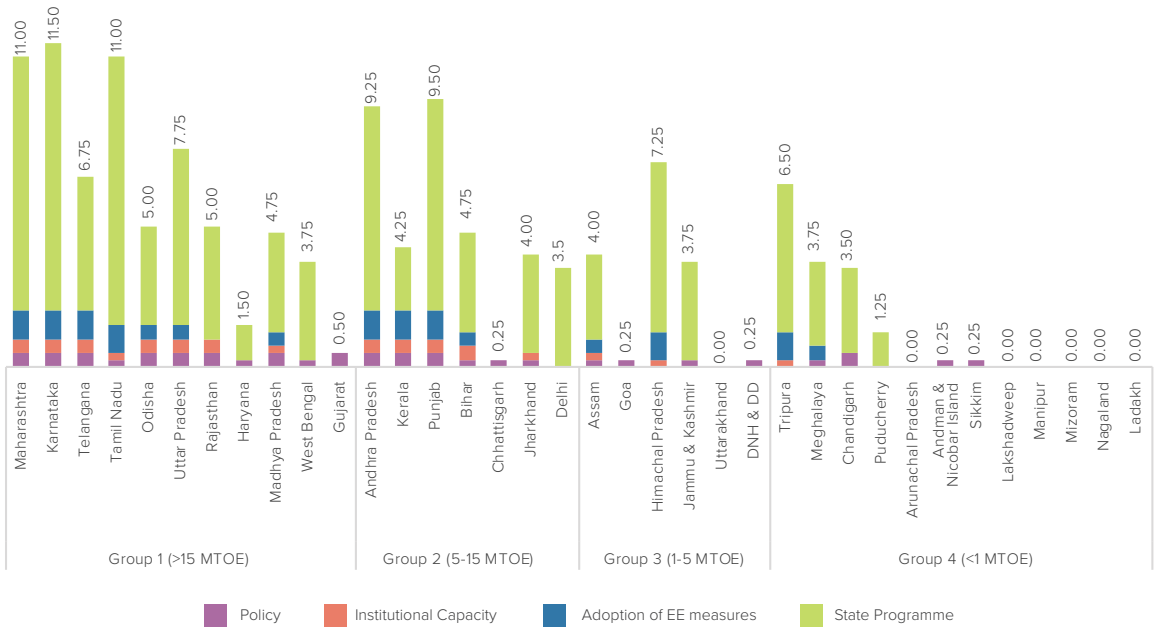
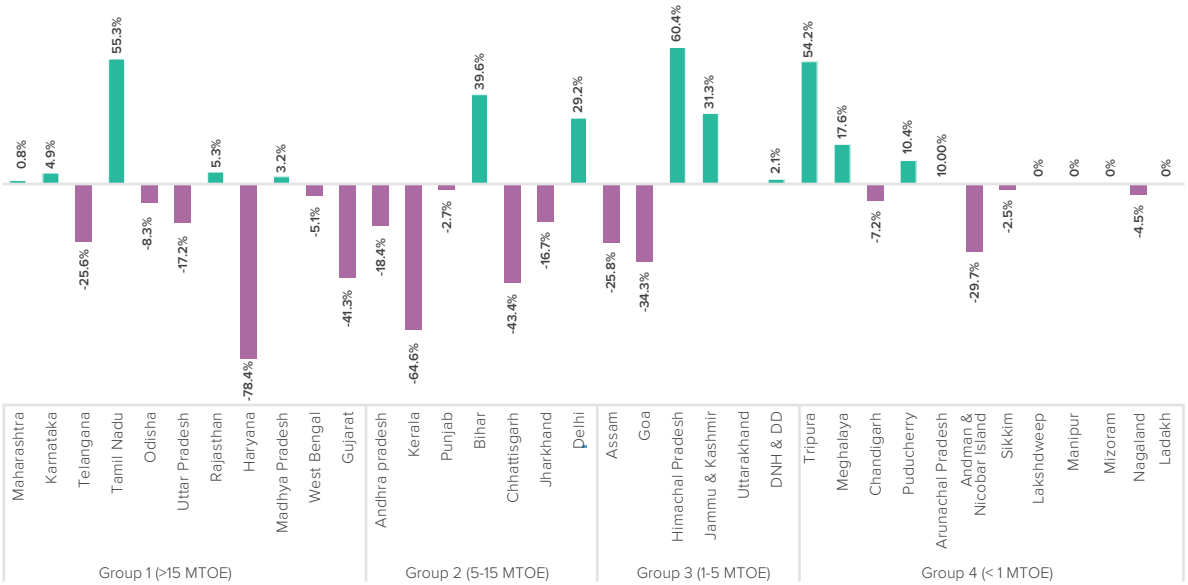


Figure 3-16: TFEC group-wise municipal services sector state progress – SEEI 2024 vs SEEI 2023



SEEI 2024 Municipal Services Sector Score Highlights

In Group 1, Karnataka emerged as the top scorer, with an improvement of 4.9%, while Maharashtra ranked second, improving its score by 0.8%. In Group 2, Punjab ranked first but experienced a decline of 2.7%, while Andhra Pradesh held the second position, with a significant drop of 18.4%. In Group 3, Himachal Pradesh showed remarkable improvement, emerging as the top scorer with a 60.4% increase, while Assam, previously the top scorer, dropped significantly by 18.4%. In Group 4, Tripura topped the municipal sector with a significant improvement of 54.2%, and Meghalaya, although improving its score by 17.6%, held the second-highest rank after being the leader last year.

Notably, 18 states demonstrated remarkable improvements, increasing their scores by over 10% compared to the previous evaluation, and have been presented below in Figure 3 – 17.

Karnataka emerged as the top scorer with a score of 10.45%, while Maharashtra ranked second with a score of 10%

COMMON INDICATORS

Policy

A total of 25 states and union territories (UTs) have developed City-level Climate Action Plans, Net Zero Plans, or Heat Action Plan. Among these 25 states, State Designated Agencies (SDAs) in 12 have partnered with Urban Local Bodies (ULBs) or Municipal Corporations to implement energy efficiency measures as part of their respective Climate Action Plans, Net Zero Plans, or Heat Action Plans. The details of reporting States have been presented in Table 3 – 28.

Table 3-28: Reporting states on the development of Climate Action Plans/Net Zero Plans/Heat Action Plan

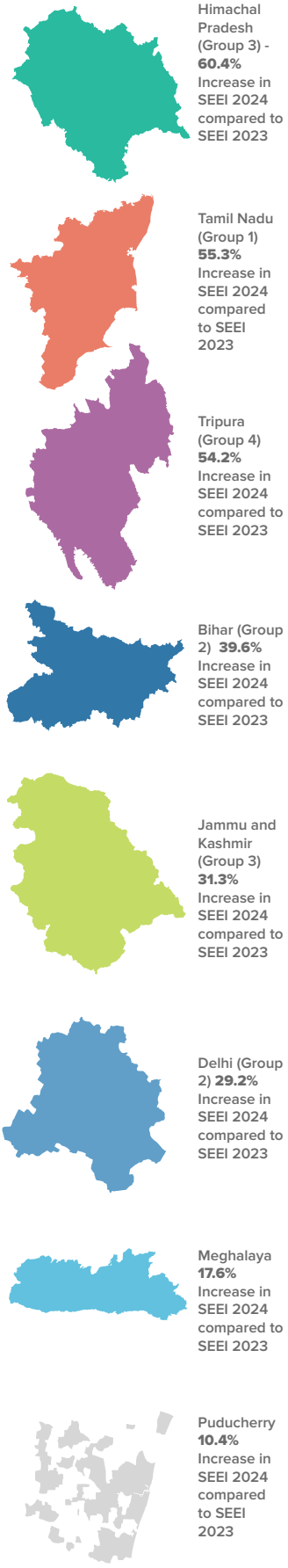
Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana, Madhya Pradesh, West Bengal and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh and Jharkhand
Group 3 (1-5 MTOE)	Assam, Goa, Jammu & Kashmir, Dadra & Nagar Haveli and Daman & Diu
Group 4 (<1 MTOE)	Meghalaya, Chandigarh, Andaman & Nicobar Islands and Sikkim

Note: The underlined states reported in the table above, have also reported their SDAs collaborating with the ULBs/Municipal Corporations on the development of Climate Action Plans, Net Zero Plans, or Heat Action Plans

Key Initiatives in Municipal Sector Policy

- The government of Telangana has notified the Environment Protection Training and Research Institute (EPTRI) as a Nodal Agency for Clean Development Mechanism (CDM) and Centre for Climate Change and is developing the latest climate action plan for the state. Govt. of Telangana, under the climate action plan, issued a cooled roof policy. It is the first kind of policy & to adapt to the effects of climate for all ULBs of the State.
- **Odisha** has developed a climate change action plan along with a climate budget to address the climate change issue.
- **APSECM** is collaborating with municipal corporations in Andhra Pradesh to develop strategies. for State Energy Efficiency Action Plan (SEEAP) targets. It is also collaborating with the Department of Municipal Administration and Urban Development to develop mitigation and adaptation strategies for state action plans for climate change. Further, APSECM, in collaboration with ULBs, has conducted energy audits in 16 municipal corporations and implemented EE measures in a few municipal corporations.
- **Punjab** has prepared action plans for Clean Air in Amritsar, Jalandhar, Ludhiana and Khanna. Punjab Energy Development Agency has collaborated with ULB/Municipal Corporation on energy efficiency actions in the Buildings and Transport sector under the State Energy Efficiency Action Plan (SEEAP) for short-term targets up to 2025 and long-term targets up to 2030.
- **Gujarat** Energy Development Agency (GEDA) has been organising and Conducting One-day Capacity Building Programs for the officials of Urban Local Bodies (ULBs), Urban Development Department (UDDs), Municipal Corporation (MCs) and Jal Nigam in the State of Gujarat under the Municipal Demand Side Management Programme of BEE.

Figure 3-17: Most improved states in the Municipal Services Sector



Institutional Capacity

Advisories on energy efficiency practices in municipal services have been issued by the Urban Development Department (UDD) or Public Health Engineering Department (PHED) in 14 states. Furthermore, 12 states have reported having the authority to enforce energy conservation and efficiency regulations in municipalities. The details of reporting States have been presented in Table 3 – 29.

Table 3-29: Reporting states on advisory issued by UDD/PHED on EE practices in the Municipal Services Sector

Group 1 (>15 MTOE)	Maharashtwtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh and Jharkhand
Group 3 (1-5 MTOE)	Assam, Goa, Jammu & Kashmir, Dadra & Nagar Haveli and Daman & Diu
Group 4 (<1 MTOE)	Meghalaya, Chandigarh, Andaman & Nicobar Islands and Sikkim

Note: The underlined states reported in the table above, have also reported a Government authority to enforce EC/ EE regulations or measures for municipalities

Key Initiatives on Institutional Capacity

Karnataka has issued guideline for 100% street light replacement with LEDs and implementation of CCMS in smart cities via a PPP Model

Advisories on energy efficiency practices in municipal services have been issued by the Urban Development Department (UDD) or Public Health Engineering Department (PHED) in 14 states. Furthermore, 12 states have reported having the authority to enforce energy conservation and efficiency regulations in municipalities. In Group 1, Karnataka has formed a high-level committee led by the Additional Chief Secretary of the Energy Department to promote EE measures across various sectors, including buildings, municipalities, agriculture, and industries. The state has also issued guidelines for 100% streetlight replacement with LEDs and the implementation of Centralised Control and Monitoring Systems (CCMS) under a PPP model in all smart cities. Maharashtra has started implementing energy-efficient street lighting through an agreement between the Urban Development Department (UDD) and Energy Efficiency Services Ltd. (EESL). Uttar Pradesh has mandated the use of LED lights in the offices of the Housing and Development Council and associated projects. Tamil Nadu Water Supply and Drainage Board (TWAD) has adopted a pump set policy to procure energy-efficient pump sets, resulting in over 55% savings in operation and maintenance costs.

In Group 2, Kerala has introduced Energy Conservation Rules with directives for municipal services to improve EE across various sectors. In Group 3, Assam's Guwahati Municipal Corporation launched the "Project Jyoti – Own Your Street Light" initiative to enhance the city's image and security without additional financial burdens. The Government of Assam also plans to install 15,000 energy-efficient LED lights across all Urban Local Bodies (ULBs) in the state.

Adoption of EE Measures

Energy efficiency (EE) practices have been adopted in street lighting, water pumping, and sewerage systems across 15 states. Additionally, 12 states have reported the use of monitoring systems to track performance in these municipal services. The details of reporting States have been presented in Table 3 – 30.

Table 3-30: Reporting states on the adoption of EE practices in Streetlighting/ Water Pumping/Sewerage Systems

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar and Jharkhand
Group 3 (1-5 MTOE)	Assam and Himachal Pradesh
Group 4 (<1 MTOE)	Tripura and Meghalaya

Note: The underlined states reported in the table above, have also reported utilisation of Monitoring systems for street lighting /water pumping /sewerage systems

Key Initiatives on Adoption of EE measures

Efforts to promote the use of energy-efficient pumps and motors in municipal water and sewerage systems have been reported by 15 states—Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Kerala, Punjab, Bihar, Assam, Himachal Pradesh, Tripura, and Meghalaya. In Group 1, Karnataka is integrating LED lighting with Centralized Control and Monitoring Systems (CCMS) and SCADA in water treatment plants, along with IE2 motors and plans for IE3 motors in future projects. Maharashtra has replaced old pumps with energy-efficient models and implemented monitoring systems, including auto sensors, SCADA, and timers for both water pumping and street lighting. Uttar Pradesh has replaced over 1.2 million streetlights with LEDs and installed CCMS, in addition to replacing pumps in Ayodhya with energy-efficient models. Tamil Nadu's Water Supply and Drainage Board has installed 18 SCADA systems for monitoring pump operations. In Madhya Pradesh, 62 urban local bodies have installed approximately 86,000 LED streetlights, saving over 15 million kWh annually. At the same time, Telangana has implemented energy efficiency measures across street lighting, water pumping, and sewerage systems.

In Madhya Pradesh, 62 urban local bodies have installed around 86,000 LED streetlights resulting in annual savings of over 15 million kWh

In Group 2, Andhra Pradesh has converted almost all street lighting to LEDs and replaced old pumps with IE3 motors, with 63,858 CCMS for streetlights and 71,239 pump sets connected to control panels. Jharkhand has retrofitted streetlights through the Street Lighting National Programme (SLNP) and enrolled in the Municipal Energy Efficiency Program (MEEP) to enhance water pumping efficiency. Bihar has replaced streetlights with energy-efficient LEDs across most Urban Local Bodies. In Group 3, Assam has implemented advanced sensor-based streetlight projects in Shilapathar and Dhemaji municipalities. In Group 4, Meghalaya's SDA conducted a demonstration project for LED street lighting in various municipal boards. At the same time, Tripura is focusing on energy management by installing electronic time switches and energy-efficient street lighting systems.

PROGRAMME SPECIFIC INDICATORS

SEEI 2024 assesses the implementation of programmes undertaken by the SDAs and state government entities individually, through interdepartmental collaboration or in conjunction with BEE, or in PPPs to advance EE in the municipal services sector. Three (3) Programme-Specific indicators have been used, which are i) Programmes for energy-efficient street lighting; ii) Programmes for energy-efficient water/sewerage systems; and iii) Capacity building programmes in the municipal services sector.

Programme for energy-efficient street lighting

23
States reported EE Programmes in Municipal Streetlighting

In Group 1, several states have made notable advancements in energy-efficient street lighting. Karnataka is retrofitting 10,65,334 LED streetlights with a Centralised Control and Monitoring System (CCMS) under a PPP model across city corporations and districts. Maharashtra, in partnership with EESL, is installing advanced systems like auto sensors, timers, and SCADA to enhance electricity savings in municipal streetlights. Uttar Pradesh has replaced inefficient streetlights with LEDs through a combination of EESL and municipal efforts. Telangana has successfully upgraded streetlights to LEDs in 74 Urban Local Bodies and 874 Gram Panchayats, with support from EESL, demonstrating significant progress.

In Group 2, states have made further strides in energy-efficient street lighting initiatives. Andhra Pradesh is replacing conventional streetlights with LED systems across all Urban Local Bodies and 29 villages in the capital region through EESL. Kerala is retrofitting streetlights with LEDs and integrating CCMS in Trivandrum as part of the Nilavu project in collaboration with local government departments, KSEB, and EESL. Punjab is advancing energy efficiency through the Street Lighting National Programme (SLNP) in Urban Local Bodies under an agreement with EESL. In Group 4, Tripura has reported that Agartala Municipal Corporation, in partnership with EESL, is replacing 32,216 conventional streetlights, including 4,000 High-Pressure Sodium Vapour (HPSV) lamps and 28,216 Compact Fluorescent Lamps (CFL), with energy-efficient LED lights, significantly reducing energy consumption and environmental impact.

The details of reporting States have been presented in Table 3 – 31:

Table 3-31: Reporting states on state programme on energy-efficient street lighting

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Madhya Pradesh and West Bengal
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Jharkhand and Delhi
Group 3 (1-5 MTOE)	Assam, Himachal Pradesh and Jammu & Kashmir,
Group 4 (<1 MTOE)	Tripura, Meghalaya, Chandigarh and Puducherry

Programme for energy-efficient water pumping/ sewerage system

In Group 1, Karnataka has implemented energy-efficient water pumping and sewerage systems powered by renewable energy at the Bangalore Water Supply and Sewerage Board (BWSSB) sewage treatment plants. Maharashtra's Maharashtra Energy Development Agency (MEDA) is running a demonstration project in the water pumping sector under the Bureau of Energy Efficiency's (BEE) Annual Action Plan. At the same time, Uttar Pradesh has conducted Investment Grade Energy Audits (IGEA) for 61 AMRUT cities, with pump replacements underway in Ayodhya Municipality. Tamil Nadu is replacing or upgrading inefficient pump sets over 15 years old and 50 HP with energy-efficient models.

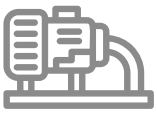
In Group 2, Andhra Pradesh has upgraded its drinking water infrastructure by replacing old pump sets with energy-efficient models in Punganuru Municipality and Guntur Municipal Corporation. Kerala has allocated funds to improve energy efficiency at water pumping stations. Punjab is implementing various initiatives, including AMRUT-1 and AMRUT-2, Used Water Management under SBM 2.0, and

solar power projects to enhance water and energy sustainability. In Group 3, Tripura is improving the energy efficiency of its municipal water pumping systems by retrofitting them with BEE Star-rated pumps under the Department of Drinking Water and Sanitation.

The details of reporting States have been presented in Table 3 – 32:

Table 3-32: Reporting states on state programme on energy-efficient water pumping/ sewerage systems

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Punjab
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	Tripura, Meghalaya and Chandigarh



13 States reported EE Programmes in Water Pumping/ Sewerage Pumping systems

Programme for Capacity Building in the Municipal Services Sector

In Group 1, Karnataka has conducted six programs for municipal corporation officials, while Maharashtra, through the Maharashtra Energy Development Agency (MEDA), organised training sessions for municipal council officials, technicians, and operators under the Municipal Demand Side Management (MuDSM) program. Tamil Nadu provided various energy efficiency training programs to municipal employees. Telangana's State Designated Agency (SDA) conducted capacity-building sessions for pump operators, engineers, and officers from Urban Local Bodies (ULBs), Public Works, and sewage departments.

In Group 2, Andhra Pradesh, through the State Energy Conservation Mission (APSECM), organised training programs for municipal officials and ULB technicians on energy efficiency and conservation measures. Punjab also conducts annual workshops for municipalities under the MuDSM program, led by the Punjab Energy Development Agency (PEDA). At the same time, Jharkhand has implemented the MuDSM program to enhance energy efficiency in municipalities. In Group 4, Meghalaya's State Designated Agency (SDA) organised multiple workshops for municipal officials to promote energy efficiency. Tripura conducted three capacity-building programs during fiscal year 2023-24 to enhance the skills and knowledge of municipal personnel.

The details of reporting States have been presented in Table 3 – 33.

Table 3-33: Reporting states on state programme on Capacity Building in Municipal Services sector

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Punjab
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	Tripura, Meghalaya and Chandigarh

MUNICIPAL SERVICES SECTOR SPOTLIGHT

- Karnataka is leading a large-scale retrofitting project for energy-efficient LED streetlights, utilising a Centralised Control and Monitoring System (CCMS), which covers over 10 lakh units across city corporations and districts under a PPP model.
- Telangana has upgraded street lighting systems by replacing inefficient units with LED lights in 74 Urban Local Bodies (ULBs) and 874 Gram Panchayats (GPs), supported by Energy Efficiency Services Limited (EESL).
- Tamil Nadu is focusing on replacing outdated pump sets (over 50 HP and more than 15 years old) with energy-efficient alternatives to improve operational efficiency.
- Tripura - Agartala Municipal Corporation, in collaboration with EESL, is replacing 32,216 streetlights in the city with energy-efficient LED lights, including the replacement of 4,000 High-Pressure Sodium Vapour (HPSV) lamps and 28,216 Compact Fluorescent Lamps (CFL), aiming to enhance energy efficiency across the city.

3.4 TRANSPORT

OVERVIEW

India's transport sector, a vital engine for economic growth and connectivity, is facing escalating energy demands and environmental challenges.90% of transport energy sourced from fossil fuels, the sector significantly contributes to greenhouse gas emissions and urban air pollution. Rapid urbanization, rising vehicle ownership, and increased freight movement further strain energy resources, highlighting the urgent need for energy efficiency. Enhancing fuel economy, promoting electric mobility,

SEEI 2024 evaluates energy-efficiency initiatives in the transport sector through ten (10) indicators. Of these, seven (7) are common indicators covering policy, institutional capacity, EE adoption, and energy savings, while three (3) are programme-specific indicators assessing state-led implementation efforts. The maximum score in this sector is sixteen (16), with six (6) points allocated to common indicators and ten (10) points to programme-specific indicators. Table 3-34 provides a detailed list of these indicators, while Figure 3-18 presents the states' scores, normalised to a scale of 100 out of 110, based on their TFEC. Figure 3-19 highlights the comparative progress of states in SEEI 2024 relative to SEEI 2023.

Table 3-34: Transport Sector Indicators under SEEI 2024

S. No	Indicator	Max. Score	Scoring Criteria
Policy			
1	State transport policy or guidelines to advocate fuel efficiency	0.25	
	Does the State have transport policy/guideline to advocate fuel efficiency?	0.25	Yes = 0.25, else = 0
2.	State Electric Mobility/Vehicle Policy	0.25	
	Has the state notified an Electric Mobility/Vehicle Policy?	0.25	Notified = 0.25, else = 0
Adoption of EE measures			
3.	Demand Side Incentives to Consumers	1.5	
	Does the State provide subsidies to consumers for the purchase of 2-wheeler/3-wheeler/4-wheeler/e-Tractors/e-Cycles/Strong Hybrid Vehicle? (Apart from provided under FAME - II)	0.5	Subsidies provided to consumers for the purchase of 2-wheeler/3-wheeler/4-wheeler/e-Tractors/e-Cycles/Strong Hybrid Vehicle (Apart from provided under FAME - II) = 0.5, else = 0
	Does the State provide subsidy to consumers on interest rates for purchase of EVs?	0.5	Subsidy provided to consumers on interest rates for purchase of EVs = 0.5, else = 0
	How many people have applied and received incentives for purchasing EVs?	0.5	No of people that have applied and received incentive for purchasing EVs = 0.5, else = 0
4.	Adoption of electric/hybrid vehicles	2.0	
	What percentage of the targets under the EV policy for transport fleet electrification (bus fleet and government vehicle fleet) has been achieved?	1.0	Percentage of target achieved in Bus Fleet= 0.5, else = 0 Percentage of target achieved in Govt. Vehicle Fleet= 0.5, else = 0
	What is the penetration of hybrid and electric vehicles in transport in FY 2023-24?	1.0	>0% to <=10%: 0.25; >10% to <=20%: 0.5; >20% to <=30%: 0.75; >30%: 1
5.	Availability of charging infrastructure for electric mobility	1.25	
	Has the State/UT provided guidelines/mandate for charging infrastructure in the commercial/residential buildings?	0.50	Guidelines/Mandate for charging infrastructure in Commercial Buildings = 0.25 Guidelines/Mandate for charging infrastructure in Residential Buildings = 0.25
	What is the ratio of Charging Stations per EV in the State/UT?	0.75	<10%: 0.25; 10% - 20%: 0.5; >20% = 0.75
6.	Adoption of biofuels in the state	0.50	
	What is the proportion of ethanol blended with petrol (sales) in the state?	0.25	Data provided by the State/UTs = 0.25
	What is the proportion of biodiesel mixed with diesel (sales) in the state?	0.25	Data provided by the State/UTs = 0.25
Energy Savings			
7.	Fuel efficiency of SRTC fleet	0.25	
	What is the fuel efficiency achieved by SRTC in the state in terms of km/Liter?	0.25	Fuel efficiency achieved by SRTC = 0.25, else = 0

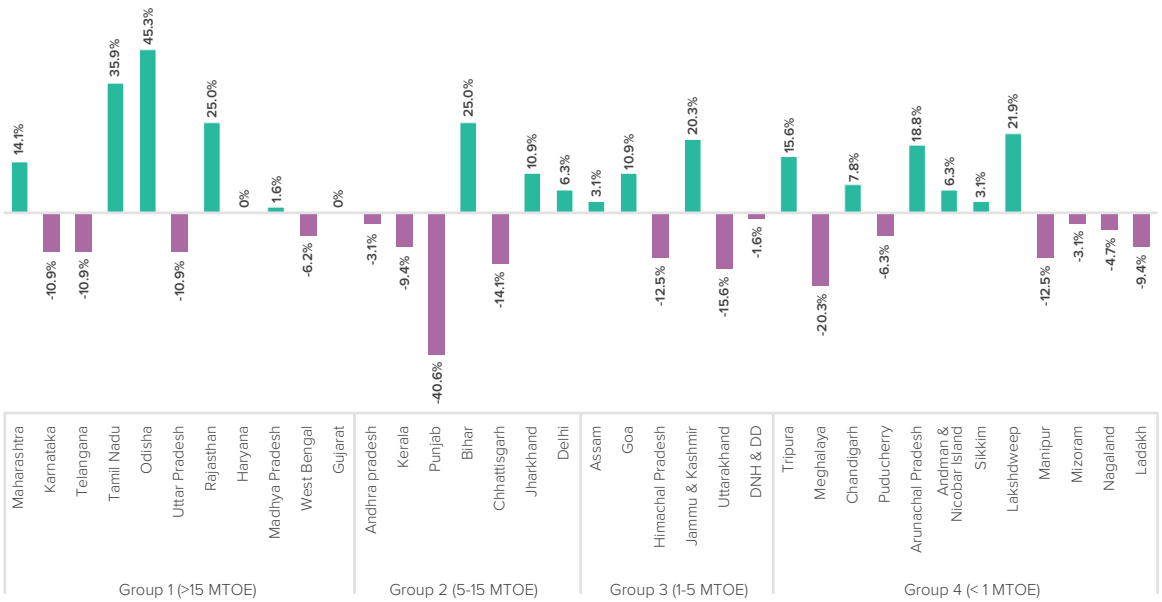
S. No	Indicator	Max. Score	Scoring Criteria
	State Programme		
8.	Programmes for energy-efficient public transport	4.0	
	Does the state have programmes for energy-efficient public transport in FY 2023-24?		
	What is the objective of the program? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the program?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date	0.5	Budget Allocated & Utilised = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progress to date?	0.5	Progress Reported = 0.50
	What is the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings	1	Avoided emissions = 1
9.	Programmes for energy-efficient private transport	4.0	
	Does the state have programmes for energy-efficient private transport in FY 2023-24?		
	What is the objective of the program? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the program?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date	0.50	Budget Allocated & Utilised = 0.5
	Who is running the program? (list all, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is progress to date?	0.50	Progress Reported = 0.50
	What are energy savings? (deemed or measured)	1.0	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings)	1.0	Avoided emissions = 1
10.	Capacity building programmes in the transport sector	2.0	
	Does the state have programmes for capacity building in the transport sector in FY 2023-24?		
	What is the objective of the program? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the program?	0.50	The target set under the programme = 0.50
	Who is running the program?	0.25	Entities running the Programme = 0.25
	What is progress to date?	1.0	Progress to date = 1.0

Figure 3 – 18 shows the TFEC state scores for the Transport Sector in SEEI 2024:

Figure 3-18: TFEC group-wise transport sector state scores

Figure 3 – 19 depicts the progress of the Transport Sector for each state in SEEI 2024 in comparison to SEEI 2023.

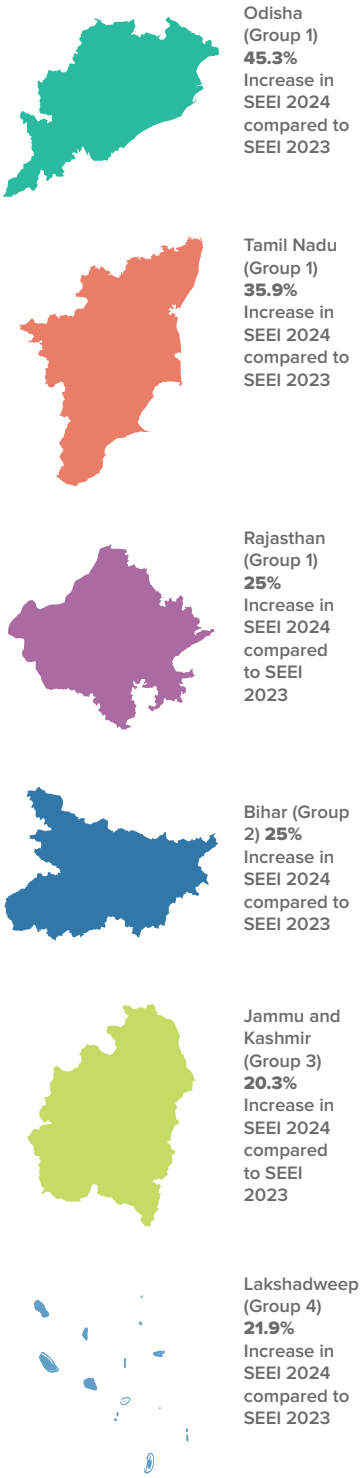
Figure 3-19: TFEC group-wise transport sector state progress – SEEI 2024 vs SEEI 2023



SEEI 2024 TRANSPORT SECTOR SCORE HIGHLIGHTS

In Group 1, Karnataka emerged as the top scorer despite a notable 10.9% score drop, while Tamil Nadu secured the second-highest rank with a remarkable 35.9% improvement. Group 2 saw Andhra Pradesh as the top performer, albeit with a 3.1% score reduction, while Kerala ranked second, experiencing a 9.4% decline. In Group 3, Assam led with a 3.1% improvement, followed by Goa, which showed substantial progress with a 10.9% increase. Group 4 Tripura is the top scorer with a notable 15.6% improvement, and Chandigarh secured the second spot with a 7.8 % gain. Additionally, six states—Tamil Nadu, Odisha, Rajasthan, Bihar, Jammu & Kashmir, and Lakshadweep—demonstrated exceptional progress, achieving over 20% score increases compared to the previous evaluation.

Figure 3-20 : Most Improved States in the Transport Sector



COMMON INDICATORS

Policy

State Electric Mobility or Vehicle Policies aimed at advancing electric transportation have been introduced in 31 states. In parallel, 16 states have reported implementing transport policies or guidelines focused on promoting fuel efficiency. The details of reporting States have been presented in Table 3-35.

Table 3-35: Reporting states on State Electric Mobility/Vehicle Policy

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana, Madhya Pradesh, West Bengal and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh, Jharkhand and Delhi
Group 3 (1-5 MTOE)	Assam, Goa, Himachal Pradesh and Uttarakhand
Group 4 (<1 MTOE)	Tripura, Meghalaya, Chandigarh, Arunachal Pradesh, Andaman & Nicobar Islands, Sikkim, Manipur, Mizoram and Ladakh

Note: The underlined states reported in the table above, have also reported having State Transport Policy or Guideline to advocate Fuel Efficiency

Adoption of EE Measures

In Group 1, states are actively advancing the adoption of electric vehicles (EVs) through policies and incentives. Karnataka mandates at least two charging stations for large buildings and exempts EVs from taxes and fees, with over 24,000 pure EVs and 4.2 lakh battery-operated vehicles registered. Maharashtra offers subsidies for various EV types and mandates charging infrastructure in buildings. Uttar Pradesh provides tax rebates, subsidies, and incentives for private EVs and aims for public transport electrification in 17 cities by 2025 and full government vehicle electrification by 2030. Tamil Nadu, with KFW's support, plans to procure 2,000 electric buses and mandates EV charging infrastructure in line with its 2023 EV policy. Odisha offers subsidies for EV purchases under its amended 2021 policy. Telangana promotes EV adoption through an app providing affordable purchase options and interest subsidies, along with support for charging stations and waived charges.

In Group 2, states are promoting EV adoption with targeted policies and incentives. Andhra Pradesh exempts consumers from registration charges and road tax for EVs but does not offer interest subsidies. Punjab provides incentives for EV purchases under its 2022 EV Policy, including a 5% GST rate (down from 18%) and a ₹1.5

lakh income tax deduction on loan interest for EVs. The state also mandates EV-ready infrastructure, requiring 1 Electric Charging Spot (ECS) per 3 parking slots in commercial buildings and 1 ECS per 5 slots in residential buildings, with 100% readiness in new and renovated structures. Jharkhand has also issued guidelines for EV charging infrastructure in commercial and residential buildings.

In Group 3, Assam is driving the adoption of electric vehicles (EVs) through significant incentives and policy measures. These include a 5-year exemption from registration charges and road tax for 2, 3, and 4-wheeler EVs, along with a 100% waiver on parking charges. The state also offers a retrofitment incentive of 15% (up to ₹15,000) for three-seater auto-rickshaws. Notably, the Government of Assam has launched 200 electric buses and 100 e-bikes to further promote sustainable transportation.

The details of reporting States on incentives on EVs and subsidies on interest rates for EV purchase have been presented in Table 3–36.

Table 3-36: Reporting states on EV Incentives and Subsidy on Interest Rates for EV Purchase

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana₹, Tamil Nadu, Odisha₹, Uttar Pradesh, Rajasthan₹, Madhya Pradesh₹ and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar, Chhattisgarh, Jharkhand and Delhi
Group 3 (1-5 MTOE)	Assam, Goa, Himachal Pradesh and Uttarakhand
Group 4 (<1 MTOE)	Tripura, Meghalaya, Chandigarh, Arunachal Pradesh, Andaman & Nicobar Islands, Sikkim, Manipur, Mizoram and Ladakh

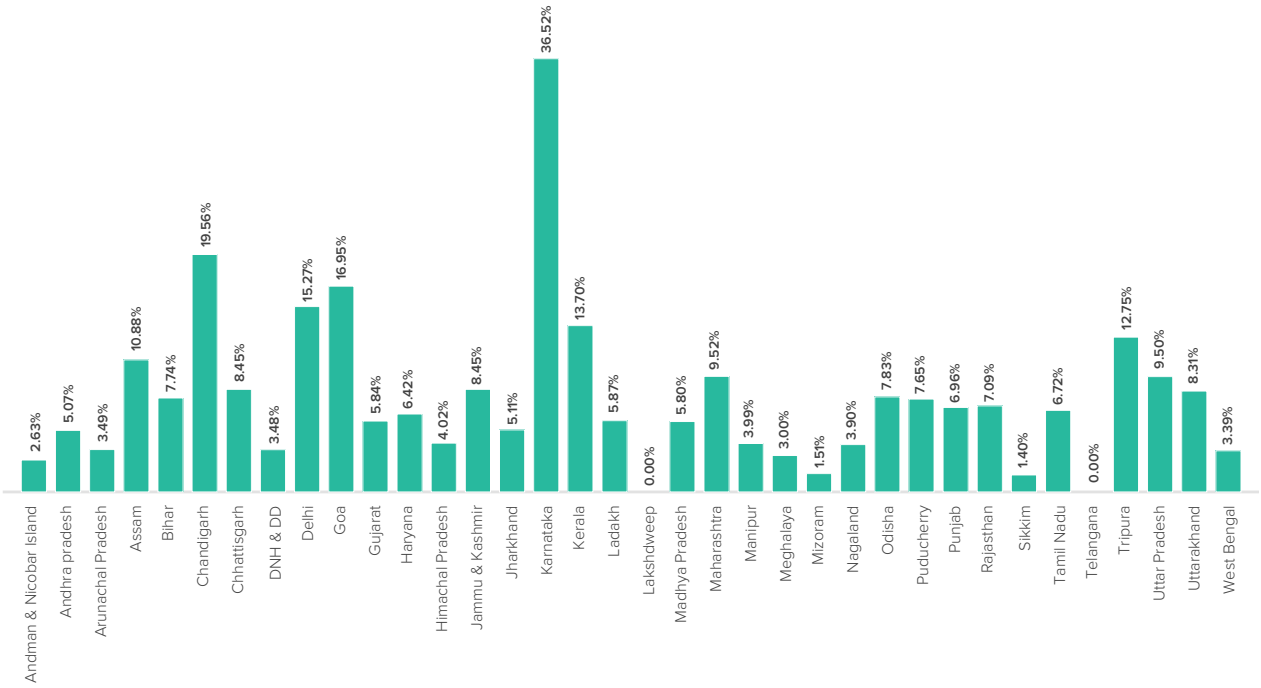
Note: The underlined states reported in the table above have reported on the number of consumers that have availed the EV Incentives. The States with "₹" have provided subsidies on Interest Rates for EV purchases.

Karnataka has the highest hybrid and electric vehicle penetration in the fiscal year 2023–24

The analysis of hybrid and electric vehicle penetration among registered passenger vehicles highlights notable trends. In Group 1, Karnataka recorded the highest penetration rate, improving significantly from 8.63% to 36.52% (a 27.89% increase), with Maharashtra ranking second at 9.52%. In Group 2, Delhi led with a 15.27% penetration rate, followed by Kerala at 13.70%. Group 3 saw Goa achieve the highest penetration rate at 16.95%, with Assam at 10.88%. In Group 4, Chandigarh topped with a 19.56% penetration rate, followed by Tripura at 12.75%. Across all groups, Karnataka achieved the highest overall penetration rate this year, surpassing Delhi, which led last year with 13.52%.

The penetration of hybrid and electric passenger vehicles continues to grow, with FY 2023-24 registration rates derived from the VAHAN dashboard reflecting a clear shift toward sustainable mobility solutions. The penetration of hybrid and electric vehicles among registered passengers is shown in Figure 3-21 below.

Figure 3-21: State-wise penetration of hybrid and electric passenger vehicles (2023-24)



Source: VAHAN Portal, MoRTH - GoI: https://vahan.parivahan.gov.in/vahan4dashboard/vahan/vahan/view/reportview.xhtml

Note: Data is not available for Telangana

Guidelines or mandates for charging infrastructure in commercial and residential buildings have been introduced by 14 states. Among them, Odisha, Madhya Pradesh, and Rajasthan have shown strong performance in Group 1, while Arunachal Pradesh, Sikkim, and Nagaland have excelled in Group 4. The remaining 29 states are currently at initial to moderate stages of implementation. Further, the details of ratio of Charging Infrastructure per EV in the state has been presented below in Table 3 – 37.

Table 3-37: Ratio of Charging Infrastructure per EV for all States

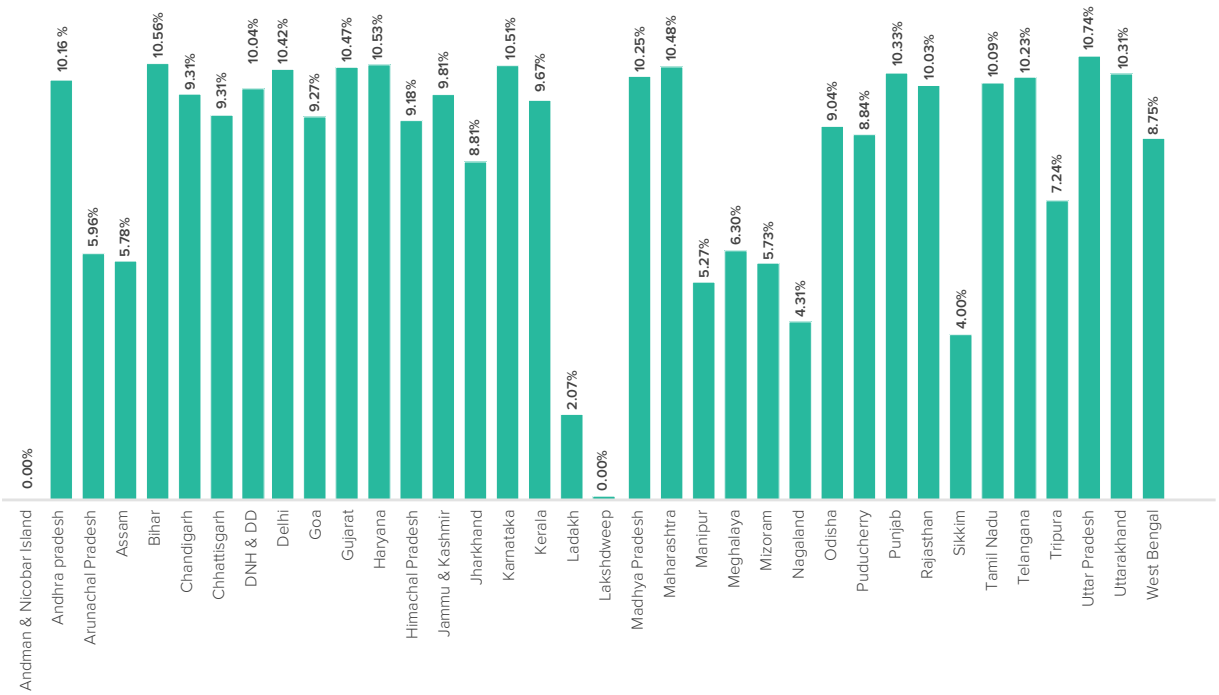
States /Uts	No. of EV	No. of operational public charging infrastructure	Ratio
Andaman & Nicobar Islands	250	4	1.60%
Andhra Pradesh	120132	601	0.50%
Arunachal Pradesh	77	41	53.25%
Assam	197178	276	0.14%
Bihar	284426	347	0.12%
Chandigarh	15446	13	0.08%
Chhattisgarh	106511	271	0.25%
Dadra & Nagar Haveli and Daman & Diu	699	6	0.86%
Delhi	322631	1941	0.60%

States /Uts	No. of EV	No. of operational public charging infrastructure	Ratio
Goa	25215	137	0.54%
Gujarat	229019	992	0.43%
Haryana	110916	709	0.64%
Himachal Pradesh	4011	106	2.64%
Jammu & Kashmir	25103	159	0.63%
Jharkhand	64064	256	0.40%
Karnataka	437296	5765	1.32%
Kerala	189404	1212	0.64%
Ladakh	92	2	2.17%
Lakshadweep	0	1	-
Madhya Pradesh	193441	903	0.47%
Maharashtra	551646	3728	0.68%
Manipur	1538	46	2.99%
Meghalaya	864	43	4.98%
Mizoram	614	12	1.95%
Nagaland	76	28	36.84%
Odisha	130252	488	0.37%
Puducherry	8903	41	0.46%
Punjab	79416	593	0.75%
Rajasthan	296453	1129	0.38%
Sikkim	21	5	23.81%
Tamil Nadu	301467	1413	0.47%
Telangana	151116	956	0.63%
Tripura	24017	50	0.21%
Uttar Pradesh	959217	1989	0.21%
Uttarakhand	69960	177	0.25%
West Bengal	108416	763	0.70%

Source: EV Yatra Portal - Bureau of Energy Efficiency, MoP-GoI: https://evyatra.beeindia.gov.in/state-govt/

To support low-carbon development in the transport sector, India has prioritized the increased use of biofuels, especially through ethanol blending in petrol. Ethanol blending with petrol has been adopted by 33 states, while biodiesel mixed with diesel is in use in Telangana, Andhra Pradesh, and Punjab. Additionally, 15 states have reported ethanol blending rates of 10% or higher. Uttar Pradesh led the group with a blending rate of 10.74%. Figure 3-22 illustrates the proportion of ethanol blending in petrol across states.

Figure 3-22: Proportion of Ethanol blending in Petrol across States (FY 2021-22)



Source:Indian Petroleum & Natural Gas Statistics 2022-23: MoPNG Economic & Statistics Division – GoI - Table IX.3: State-wise Percentage of Ethanol Blended with Petrol (Sales) by CPSEs

ENERGY SAVINGS

Fuel efficiency standards directly impact carbon emissions per litre of fuel and overall mileage. To meet CO_2 reduction targets and encourage the adoption of alternative fuel vehicles, implementing robust corporate-level fuel efficiency standards is essential. While Bharat Stage VI norms were introduced to improve emission standards, the measures addressing energy reduction and the carbon footprint of vehicles remain insufficient. The details of reporting States have been presented in Table 3–38.

Uttar Pradesh has reported highest fuel-efficiency (5.38 Km/Litre) of its SRTC

Table 3-38: Reporting states on Fuel efficiency of SRTCs

Group 1 (>15 MTOE)	Maharashtra (4.32 Km/Litre), Karnataka (4.79 Km/Litre), Telangana (5.17 Km/Litre), Tamil Nadu (5.25 Km/Litre), Odisha (4.25 Km/Litre), Uttar Pradesh (5.38 Km/Litre) and Rajasthan (5.13 Km/Litre).
Group 2 (5-15 MTOE)	Andhra Pradesh (5.19 Km/Litre)
Group 3 (1-5 MTOE)	Assam (4.70 Km/Litre)
Group 4 (<1 MTOE)	Puducherry (4.33 Km/Litre)

PROGRAMME SPECIFIC INDICATORS

Programme for energy-efficient public transport

In Group 1, Karnataka has initiated state mobility projects, including the installation of 833 public EV charging stations, with plans to increase this to 3,269 by 2030. Maharashtra aims to electrify 25% of its public transport by 2025. Uttar Pradesh is expanding EV buses on key routes through PPP models and has introduced special tariffs for EV charging. Tamil Nadu plans to deploy 3,000 e-buses under funding from

KFW and the World Bank. Odisha launched 200 e-buses in March 2024, with plans to expand the fleet to 400, including double-decker e-buses. Telangana State Road Transport Corporation (TGSRTC) targets 100% e-bus operations with 2,400 e-buses by 2025 while also incorporating fuel-efficient BS-VI buses to improve operational sustainability.

In Group 2, Andhra Pradesh has successfully deployed 100 electric buses, achieving significant environmental and economic benefits by saving 21.59 lakh Liters of diesel annually. In Group 3, Assam and Goa have made significant strides in adopting electric mobility under government initiatives. Assam procured 15 electric buses through the FAME-I Scheme. It launched Baayu, a collaboration between ASTC and Bikozee Ecotech, aimed at creating 5,000 driver livelihoods and reducing 29,000 tons of carbon emissions annually. The initiative aligns with NITI Aayog's Shoonya Zero Pollution Mobility campaign to enhance air quality. In Goa, KTCL procured 50 twelve-meter and 27 nine-meter electric buses under the FAME-II scheme, further promoting sustainable transportation.

14 States have reported programmes on EE in Public Transport

The details of reporting States have been presented in Table 3 – 39.

Table 3-39: Reporting states on State Programme on Energy-Efficient Public Transport

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan and West Bengal
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab and Bihar
Group 3 (1-5 MTOE)	Assam and Goa
Group 4 (<1 MTOE)	-

Programme for energy-efficient private transport

In Group 1, Maharashtra has launched programs to promote energy-efficient private transport, focusing on electric and hybrid vehicles as well as cleaner fuel options. Tamil Nadu has commissioned two solar-powered EV charging stations at the Secretariat and DPI campus in Chennai. Telangana offers lifetime tax and registration fee exemptions for 5,000 EV cars and 1 lakh two-wheelers, along with fixed battery and swappable charging systems for three-wheelers and financing for retrofitting old three-wheelers.

24 States have reported programmes on EE in Private Transport

In Group 2, Andhra Pradesh's NREDCAP has introduced a scheme offering electric two-wheelers to government employees on an EMI basis, with 129 vehicles procured so far. Kerala provides tax reductions for electric vehicles and conducts awareness campaigns to promote EV adoption. In Group 3, Assam's Gyan Deepika Scheme awards e-scooters to girl students with first division marks in the Higher Secondary examination, along with a 2% motor vehicle tax subvention and exemption from registration fees to encourage EV adoption. Similarly, Goa's Department of Transport has exempted electric vehicles from motor vehicle tax and registration fees to further boost EV registration. In Group 4, Tripura has introduced incentive-based policies offering a 25% reduction in road tax, depending on the type of vehicle. The details of reporting States have been presented in Table 3 – 40.

Table 3-40: Reporting states on State Programme on Energy-Efficient Private Transport

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana, Madya Pradesh and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Bihar, Chhattisgarh, Jharkhand and Delhi
Group 3 (1-5 MTOE)	Assam, Goa and Jammu & Kashmir
Group 4 (<1 MTOE)	Tripura, Chandigarh, Arunachal Pradesh, Andaman & Nicobar Islands and Lakshadweep

Capacity Building Programmes in the Transport Sector

In Group 1, Karnataka's BESCOM organised two EV stakeholder workshops and introduced the EV Yatra portal to ease the transition to electric vehicles (EVs). Maharashtra's state government, through MEDA, has raised awareness about EVs, including showcasing models at the KISAN Agri Show. Uttar Pradesh has trained 3,482 drivers to operate EVs, while Tamil Nadu has conducted 135 EV awareness campaigns. Rajasthan has established a driver training institute, and Odisha offers fuel efficiency training at Ashok Leyland's HMV driver training institute. Telangana's TGSRTC, with ASCI support, has implemented programs for fleet operators and drivers to improve fuel efficiency and reduce costs.

In Group 2, Andhra Pradesh's NREDCAP organised the "Go Electric Campaign" across districts to promote EVs. At the same time, Punjab held a one-day capacity-building workshop at MC Mohali to increase knowledge about EVs. In Group 3, Assam's State Designated Agency (SDA) hosted the EV EXPO 2023 to raise awareness about electric vehicles. In Group 4, Tripura's SDA organised a roadshow and exhibition to promote EVs.

The details of reporting States have been presented in Table 3 – 41.

Table 3-41: Reporting states on State Programme on Capacity Building in Transport Sector

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, and Uttar Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Punjab
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura and Meghalaya

TRANSPORT SECTOR SPOTLIGHT

- Maharashtra has initiated multiple programs to promote energy-efficient public transport, setting a target for 25% of its public transportation to be electric by 2025.
- Tamil Nadu is set to introduce 2,000 electric buses with KFW funding and an additional 1,000 buses through World Bank support.
- Odisha launched 200 electric buses in March 2024, aiming to reduce 1,000 tons of CO_2 and 420,000 litres of diesel over the next decade, with plans to add 400 more.
- Telangana's State Road Transport Corporation aims for a 100% electric bus fleet, with 2,400 electric buses planned for Greater Hyderabad by 2025.
- Andhra Pradesh has deployed 100 electric buses, collectively saving 21.59 Lakhs litres of diesel annually.
- Goa's KTCL has procured 50 twelve-meter and 27 nine-meter electric buses under the FAME-II scheme, with a total of 100 buses planned.

AGRICULTURE

OVERVIEW

India's agriculture sector, a cornerstone of the economy, consumes substantial energy for irrigation, processing, and storage—often with outdated and inefficient technologies. With over 21 million pump sets in use, enhancing energy efficiency is vital to reduce operational costs and environmental impacts. Adopting solutions like solar pumps, energy-efficient motors, and micro-irrigation can significantly boost productivity, promote sustainability, and ensure reliable energy access for millions of smallholder farmers across the country.

SEEI 2024 assesses EE initiatives in the agriculture sector using four (4) indicators. Of these, two (2) are common indicators evaluating policy frameworks and the adoption of EE measures, while the remaining two (2) are programme-specific indicators measuring the implementation of EE initiatives at the state level. The maximum score in this sector is eight (8), with two (2) points assigned to common indicators and six (6) points to programme-specific indicators. Table 3-42 details these indicators, while Figure 3-23presents the states' scores, normalised to a scale of 100 out of 110, based on their TFEC. Figure 3-24 highlights the states' progress in SEEI 2024 compared to SEEI 2023.

Table 3-42: Agriculture sector indicators under SEEI 2024

S. No	Indicator	Max. Score	Scoring Criteria
Policy			
1	Policy for encouraging EE and climate-friendly agriculture and allied sector practices in the state	1.5	
	Does the state/UT have any policy/guidelines/ regulations/scheme to incorporate EE/EC measures in the development of the following: • Integrated cold storage infrastructure • Integrated water and energy savings • Farming machinery	1.5	Policy/Guidelines/Regulations/Schemes to incorporate EE/EC measures in Integrated cold storage infrastructure= 0.5, else = 0 Policy/Guidelines/Regulations/Schemes to Integrated water and energy savings= 0.5, else = 0 Policy/Guidelines/Regulations/Schemes to incorporate EE/EC measures in Farming machinery= 0.5, else = 0
Adoption of EE measures			
2.	Adoption of EE measures in the agriculture sector	0.5	
	What percentage of total agricultural pumps in the state are energy efficient/solar powered?	0.5	Percentage of Energy Efficient/Solar Powered agriculture pumps out of total agriculture pumps = 0.5, else = 0
State Programme			
3.	Programmes for EE in agriculture	4	
	Does the state have any programmes for energy efficiency in agriculture in FY 2023-24?		
	What is the objective of the programme? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date?	0.5	Budget Allocated & Utilised = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progess to date?	0.5	Progress reported = 0.5
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (based on energy savings	1	Avoided emissions = 1
4.	Capacity building programmes in the agriculture sector	2	
	Does the state have programmes for capacity building in the agriculture sector in FY 2023-24?		
	What is the objective of the program? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the program?	0.50	The target set under the programme = 0.50
	Who is running the program?	0.25	Entities running the Programme = 0.25
	What is the progress to date?	1	Progress reported = 1

Figure 3 – 23 shows the TFEC group-wise scores for the agriculture sector in SEEI 2024.

Figure 3-23: TFEC group-wise agriculture sector state scores

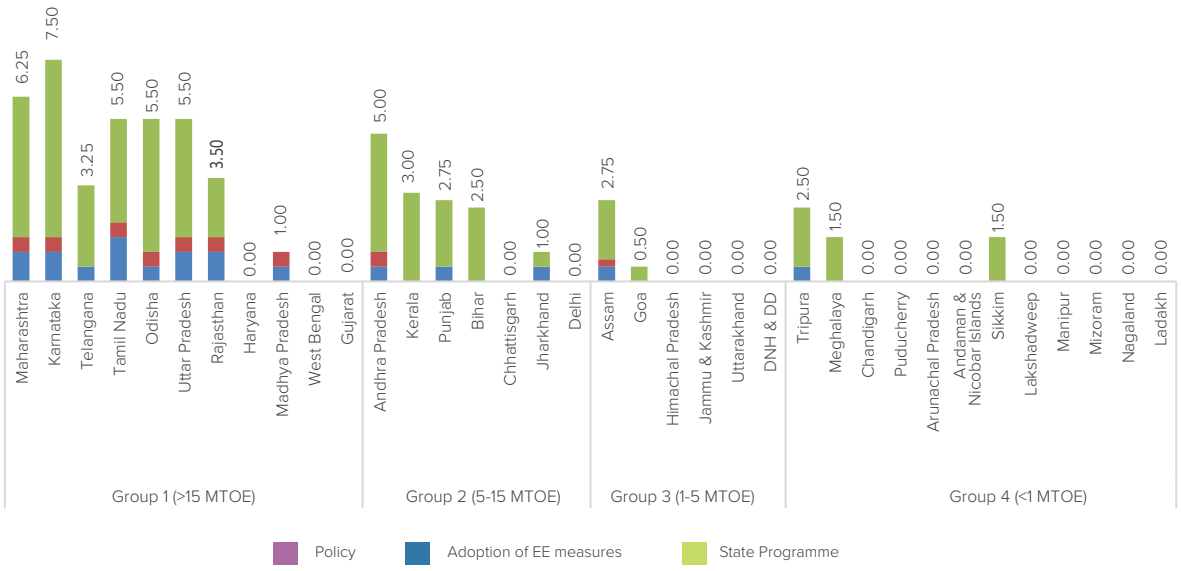


Figure 3 – 24 depicts the progress of the agriculture sector for each state in SEEI 2024 in comparison to SEEI 2023.

Figure 3-24: TFEC group-wise agriculture sector state progress – SEEI 2024 vs SEEI 2023

SEEI 2024 AGRICULTURE SCORE HIGHLIGHTS

Karnataka led Group 1 in the agriculture sector, scoring 6.82 % out of 7.27 %, with Maharashtra securing second place with a score of 5.68 % despite a 21.9 % decline from SEEI 2023 performance. In Group 2, Andhra Pradesh emerged as the top performer, while Kerala ranked second but faced significant score declines of 18.8% and 37.5%, respectively. Assam led Group 3, though its score dropped by 9.4%, while Goa secured the second position. In Group 4, Tripura demonstrated remarkable progress with a 31.3% increase, surpassing Meghalaya, which ranked second. Notably, five states—Madhya Pradesh, Odisha, Tripura, Bihar, and Sikkim—showed significant advancements, each improving their scores by over 10% compared to the previous evaluation.

Policy

Policies promoting energy efficiency and climate-friendly practices in agriculture and allied sectors have been reported by 13 states. These policies cover areas such as integrated cold storage infrastructure, combined water and energy savings, and the use of energy-efficient farming machinery.. The details of the reporting states have been presented in Table 3 – 43.

Table 3-43: Reporting states on Policies for the promotion of Energy Efficiency and Climate Friendly practices in Agriculture and Allied sectors

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Punjab and Jharkhand
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Tripura

Key Initiatives on Policy in Agriculture

Karnataka State Water Policy 2019 has integrated water as well as energy savings for the agriculture sector. It promotes the technologies of wastewater and sewage water treatment with lower energy consumption. The government of Karnataka has made mandatory the use of Energy Efficient Star-rated irrigation pump sets, confirming the Bureau of Energy Efficiency. Telangana state government is implementing the integrated cold chain infrastructure with the support of central and state schemes.

Tamil Nadu has developed an integrated cold storage infrastructure to prevent losses due to the deterioration of perishable fruits and vegetables. The state is also promoting off-grid solar-powered pumping systems linked with the micro irrigation system with subsidy assistance to the farmers as a climate-friendly water and energy-saving measure. Rajasthan has a policy in Cold Storage and provides subsidies on EE pumps in Agriculture.

Adoption of EE Measures

Under SEEI 2024, a total of 9 States have reported on the adoption of EE measures on energy efficient/solar-powered pumps for agriculture. Of which, only 2 states, Andhra Pradesh and Kerala, provided the exact detail on the percentage of Energy Efficient/Solar Powered agriculture pumps out of the total agriculture pumps installed. The details of reporting States have been presented in Table 3-44.

Figure 3-25: Most improved states in the Agriculture Sector

Odisha (Group 1) **68.8%** Increase in SEEI 2024 compared to SEEI 2023

Madhya Pradesh (Group 1) **12.5%** Increase in SEEI 2024 compared to SEEI 2023

Bihar(Group 2) **33.7%** Increase in SEEI 2024 compared to SEEI 2023

Tripura (Group 4) **31.4%** Increase in SEEI 2024 compared to SEEI 2023

Sikkim (Group 4) **18.8%** Increase in SEEI 2024 compared to SEEI 2023

Table 3-44: Reporting states on the adoption of EE measures on Energy Efficient/ Solar Powered Pumps

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan and Madhya Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	-

Key Initiatives on Adoption of EE measures

9 States have reported adoption of EE measures on Energy Efficient/ Solar Powered Pumps.

Karnataka has installed 7,661 energy-efficient and solar-powered agricultural pumps out of an estimated 500,000 in the state through KREDL. Maharashtra has installed 113,200 solar-powered pumps under the PM KUSUM Scheme, achieving over 62% of its target, along with 100 energy-efficient pumps. Uttar Pradesh has installed 32,212 solar pumps, representing 1.67% of its target. In comparison, Tamil Nadu has installed 8,216 off-grid solar pumps and replaced 2,612 inefficient pumps with energy-efficient models, although only 0.10% of total pumps are solar-powered.

Andhra Pradesh has reported that about 5% of agricultural pump sets are energy-efficient, including 28,887 EE pump sets under APSPDCL, 26,401 under APCPDCL, and 12,680 solar off-grid pump sets. In Kerala, 74% of the total agricultural pumps are energy-efficient or solar-powered, showcasing a significant adoption of sustainable practices in agriculture.

In Assam, a total of 3,302 energy-efficient and solar-powered agricultural pumps have been installed, contributing to the state's efforts in promoting sustainable agricultural practices.

The state-wise details on the solarisation status of agriculture pumps, under components B & C of the Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan (PM-KUSUM), have been presented below in Table 3 – 45:

Table 3-45: State-wise solarization status under Components B & C of PM-KUSUM scheme

State	%ge of Installed Pumps/ Sanctioned Pumps (Component B)	%ge of Installed Pumps/ Sanctioned Pumps (Component C – Individual Pump Solarisation)	%ge of Installed Pumps/ Sanctioned Pumps (Component C – Feeder Level Solarisation)
Andaman And Nicobar	0 %	0 %	-
Arunachal Pradesh	61 %	-	-
Assam	0 %	0 %	-
Andhra Pradesh	-	-	0 %
Bihar	-	-	0 %
Chhattisgarh	0 %	-	-
Goa	8.88 %	-	6.36 %
Gujarat	62.66 %	-	6.86 %
Haryana	71.06 %	-	0 %
Himachal Pradesh	55.35 %	-	-

State	%ge of Installed Pumps/ Sanctioned Pumps (Component B)	%ge of Installed Pumps/ Sanctioned Pumps (Component C – Individual Pump Solarisation)	%ge of Installed Pumps/ Sanctioned Pumps (Component C – Feeder Level Solarisation)
Jammu And Kashmir	40.56 %	0 %	-
Jharkhand	68 %	0 %	-
Karnataka	4.37 %	-	0.34 %
Kerala	100 %	2.61 %	24.71 %
Ladakh	0 %	-	-
Madhya Pradesh	12.33 %	-	1.66 %
Maharashtra	49.45 %	-	4.05 %
Manipur	52 %	-	-
Meghalaya	3.16 %	-	-
Mizoram	2.35 %	-	-
Nagaland	24.52 %	-	-
Odisha	33.58 %	0 %	0 %
Punjab	39.24 %	0 %	0 %
Rajasthan	57.07 %	31.52 %	2.22 %
Tamil Nadu	78.19 %	-	0 %
Telangana	-	-	0 %
Tripura	33.19 %	1.92 %	-
Uttar Pradesh	51.03 %	16.66 %	0 %
Uttarakhand	10.36 %	0 %	-
West Bengal	-	2.85 %	-

Note: "-"has been marked in the table, where the portal has no data available for the state: https://pmkusum.mnre.gov.in/#/landing#state-wise-details

PROGRAMME SPECIFIC INDICATORS

For programme-specific indicators, the approach during SEEI 2023 has been carried forward in SEEI 2024, viz., i) Programmes for Energy Efficiency in the Agriculture Sector; and ii) Programme for Capacity Building in the Agriculture Sector. Table 3 - 46 shows the reporting States with programmes on EE and capacity-building in the agriculture sector:

Table 3-46: Reporting states on Programme Specific Indicators

	Programmes for Energy Efficiency in the Agriculture Sector	Programme for Capacity Building in the Agriculture Sector
Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Rajasthan
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar	Andhra Pradesh, Kerala, Punjab, Bihar, Jharkhand
Group 3 (1-5 MTOE)		Assam, Goa
Group 4 (<1 MTOE)	Meghalaya	Meghalaya, Tripura, Sikkim

Programmes for Energy Efficiency in the Agriculture Sector

States under Group 1 have made notable progress in promoting energy-efficient agricultural pumps through government initiatives. Karnataka, under KUSUM B and C schemes, has installed 7,661 solar pumps, with 2,800 more underway, resulting in annual energy savings of 16,803 MU and reducing CO_2 emissions by 15,190 tonnes. Maharashtra's MEDA initiative replaced 100 old pumps and introduced real-time power audit devices, saving 346,500 units of energy and cutting CO_2 emissions by 284.13 tonnes annually. Uttar Pradesh has replaced 8,125 pumps and installed 14,500 solar pumps, achieving annual energy savings of 1,127.06 lakh units and reducing CO_2 emissions by 28,651.43 MT. Telangana improved irrigation systems across 18,169 hectares and replaced inefficient chillers, saving 7 lakh energy units and reducing CO_2 emissions by 5,800 tonnes. Tamil Nadu replaced 2,612 pumps, while Rajasthan installed 61,491 solar pumps, aiming for 198,884. Odisha installed 2,565 solar pumps, saving 8.7 MU annually and cutting CO_2 emissions by 6,396.39 MT.

In Group 2, Andhra Pradesh replaced 30 inefficient aerators in Krishna district with energy-efficient models, saving 78,300 units annually and reducing CO_2 emissions by 63,814 tons. Kerala's Department of Agriculture retrofitted 100 outdated dewatering pumps with modern, energy-efficient vertical axis turbine pumps to improve performance and reduce energy consumption.

11 States reported EE programmes in Agriculture

Programmes for Capacity Building in the Agriculture Sector

Karnataka, in Group 1, conducted 34 training programs through DATCs and ICAR KVKs, while Maharashtra's MEDA completed six AgDSM training programs for farmers and organised stakeholder consultations to advance energy efficiency plans. Tamil Nadu hosted 32 sessions, benefiting around 700 farmers and officials, and Odisha held 31 awareness programs on energy-efficient pump sets via KVKs. Telangana implemented capacity-building programs supported by NPC and organised water conservation training focused on energy efficiency.

In Group 2, Andhra Pradesh's SDA conducted multiple training programs, including three for farmers, two for equipment technicians, and six for cold storage professionals, alongside five sessions for cold storage owners under AgDSM. Kerala's EMC, in collaboration with BEE and FICCI, launched workshops on energy-efficient cold chain technologies, climate resilience, and 32 Karshika Jyothi awareness programs to promote sustainable farming. Punjab's PEDA conducted eight programs at KVKs, while Jharkhand focused on AgDSM training for irrigation systems and pump sets. In Group 3, Assam organised 10 farmer training programs, a workshop for cold chain owners and OEMs, and a state-level stakeholder meeting. Goa's ICAR held 39 capacity-building programs and workshops on cold chain energy efficiency. In Group 4, Meghalaya and Tripura conducted awareness campaigns and demonstrations on energy conservation in agriculture, showcasing advanced energy-efficient technologies.

16 States reported capacity building initiatives for EE in Agriculture Sector

AGRICULTURE SECTOR SPOTLIGHT

- Telangana has upgraded irrigation systems over 18,169 hectares and replaced inefficient chillers in cold chain facilities, resulting in annual savings of 7 lakhs units of energy and a CO_2 reduction of 5,800 tonnes.
- Tamil Nadu has developed an integrated cold storage infrastructure to prevent losses due to the deterioration of perishable fruits and vegetables. Cold storage facilities with a total capacity of 20,000 MT have been established in six locations. Additionally, at the farm level, 5 MT solar micro cold storage units have been set up in 80 locations at a cost of ₹100 Crore. The state is also promoting off-grid solar-powered pumping systems linked with the micro irrigation system, with subsidies for farmers, as a climate-friendly water and energy-saving measure.

3.6 DISCOM

OVERVIEW

India's DISCOMs are central to powering the economy and enabling the clean energy transition, yet face challenges like high losses and aging infrastructure. Enhancing energy efficiency through smart meters, upgraded transformers, and digital systems can reduce costs, improve reliability, and strengthen financial sustainability. Crucially, efficient DISCOM operations are key to integrating renewable energy and advancing national climate and energy goals

SEEI 2024 evaluates EE progress in the DISCOM sector using seven (7) indicators. Of these, five (5) are common indicators assessing policy frameworks and the adoption of EE measures, while two (2) are programme-specific indicators measuring the implementation of EE initiatives at the state level. The maximum score in this sector is sixteen (16), with ten (10) points allocated to common indicators and six (6) points to programme-specific indicators. Table 3-47 provides a detailed summary of these indicators, while Figure 3-27 presents the states' scores, normalised to a scale of 100 out of 110, based on their TFEC. Figure 3-28 highlights the progress of states in SEEI 2024 compared to SEEI 2023.

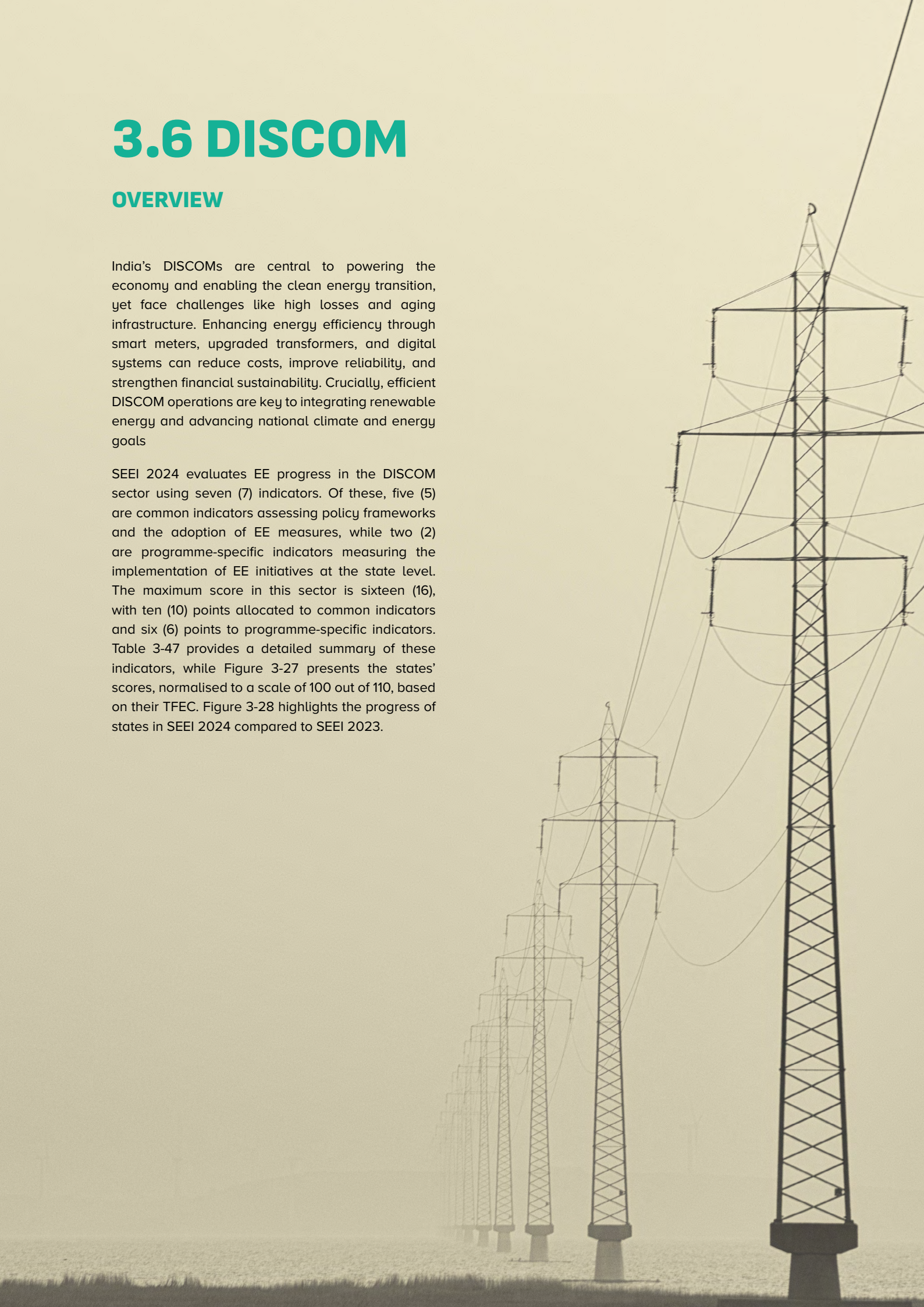


Table 3-47: DISCOM Sector indicators under SEEI 2024

S. No	Indicator	Max. Score	Scoring Criteria
	Policy		
1.	Demand side management (DSM)	0.75	
	Provide the list of DISCOMs (both govt and private) in the state/UT.		
	Has the electricity regulatory commission of State/ UT approved the DSM action plan submitted by DISCOMs (both government and private) in Aggregate Revenue Requirement (ARR)?	0.25	Yes = 0.25, else = 0
	Did the DISCOMs (both govt and private) of the State/UT conduct a study on load research for a consecutive 3-year cycle and execute their DSM action plan?	0.5	Load Research conducted by DISCOMs for consecutive 3 Year Cycle = 0.25, else = 0 Implementation of DSM action plan by DISCOMs= 0.25, else = 0
2.	Demand Response and Demand Flexibility	1.25	
	Have DISCOMs in the state implemented ToD/ToU tariff for the following consumers (Commercial/ Industrial)	1.0	ToD/ToU tariff for Commercial Consumers= 0.25, else = 0 ToD/ToU tariff for Industrial Consumers = 0.25, else = 0 ToD/ToU tariff for Domestic Consumers = 0.25, else = 0 ToD/ToU tariff for EV Connections = 0.25, else = 0
	Have DISCOMs in the state implemented ToD/ToU tariff for the following consumers (Domestic/EV connection)		
	Have the DISCOMs in the state/UT taken the initiative/implemented a pilot project on automated demand response/behavioural demand response?	0.25	Initiative/Pilot project on automated demand response/behavioural demand response = 0.25, else = 0
3.	Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit (Accounting) in Electricity Distribution Companies) Regulations, 2021	2.0	
	Have the DISCOM/DISCOMs in the state submitted all periodic (quarterly) energy accounting reports for the FY 2023-24?	0.25	DISCOM/DISCOMs have submitted periodic (quarterly) accounting reports = 0.25; else- 0
	Have the DISCOM/DISCOMs in the state submitted the annual energy audit report for the FY 2023-24?	0.25	DISCOM/DISCOMs have submitted the annual energy audit report- 0.25, else = 0
	Indicate target and actual T&D losses in percentage of all DISCOMs in the State/UT	1.25	<10%: 1; >=10% & <20%: 0.75; >=20% & <30%: 0.5; >=30% & <40%: 0.25; >=40%: 0 Improvement from previous assessment = 0.25, else = 0
	What steps have been taken by the DISCOMs (both private & govt) in the State/UT to reduce the T&D loss in FY 2023-24?	0.25	Steps taken by DISCOMs to reduce the T&D loss = 0.25
	Adoption of EE measures		
4.	Revamped Distribution Sector Scheme (RDSS)	2.5	
	What steps have been taken by the DISCOMs (both private & govt) in the State/UT to reduce the ACS-ARR gap to zero in FY 2023-24?	0.5	Steps taken to reduce ACS-ARR gap = 0.5, else = 0
	Please provide the ACS-ARR gap for the FY 2023-24	0.75	<0: 0.75 >=0-<2: 0.5 >=2: 0.25
	What steps have been taken by the DISCOMs (both private & govt) in the State/UT to reduce the AT&C loss in FY 2023-24?	0.5	Steps taken to reduce AT&C loss gap = 0.5, else = 0
	Please provide the AT&C loss of the DISCOMs (both private & govt).	0.75	Data provided by the State/UT = 0.75

S. No	Indicator	Max. Score	Scoring Criteria
5.	Metering status	3.5	
	What is the proportion of consumers with smart meters?	1	0% – 10%: 0.25; >= 10% -<20%: 0.5; >= 20% -<30%: 0.75; >= 30%: 1
	Is the smart meter data analysed or used for consumer awareness, to enhance DISCOM operational efficiency, etc?	0.25	Smart meter data analysed & used for consumer awareness, to enhance DISCOM operational efficiency, etc.=0.25, else=0
	Has system metering at the Feeder and Distribution Transformer (DT) level been completed?	0.25	Yes = 0.25, else = 0
	What is the proportion of communicable metering completed at the Feeder level?	0.75	0% -<30%: 0.25; >= 30% -<70%: 0.5; >= 70%: 0.75
	What is the proportion of communicable metering completed at the Distribution Transformer (DT) level?	0.75	0% -<32%: 0.25; >= 32% -<64%: 0.5; >= 64%: 0.75
	What is the proportion of agriculture feeders segregated?	0.5	0% -<50%: 0.25; >= 50%: 0.5
State Programme			
6.	Programmes for Demand Side Management (DSM)	4	
	Does the state have programmes for Demand-side Management in FY 2023-24?		
	What is the objective of the program? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the programme?	0.25	The target set under the programme = 0.25
	What is the timeline?	0.25	Timeline = 0.25
	How much budget has been allocated & utilised to date?	0.5	Budget Allocated & Utilised = 0.5
	Who is running the program? (list all actors, e.g. SDA, state dept., municipality, industry association, PPP, etc.)	0.25	Entities running the Programme = 0.25
	What is the progress to date?	0.5	Progress to date = 0.5
	What are the energy savings? (deemed or measured)	1	Energy savings (deemed or measured) = 1
	How much emissions were avoided? (Based on energy savings	1	Avoided emissions = 1
7.	Capacity building programmes in DISCOMs	2	
	Does the state have programmes for capacity building in the DISCOM sector in FY 2023-24?		
	What is the objective of the program? (2 sentences)	0.25	Objective of the programme = 0.25
	What is the target set under the program?	0.5	The target set under the programme = 0.5
	Who is running the program?	0.25	Entities running the Programme = 0.25
	What is the progress to date?	1	Progress to date = 1

Figure 3 – 26 shows the TFEC group-wise state scores for the DISCOM sector in SEEI 2024.

Figure 3-26: TFEC group-wise DISCOM sector state scores

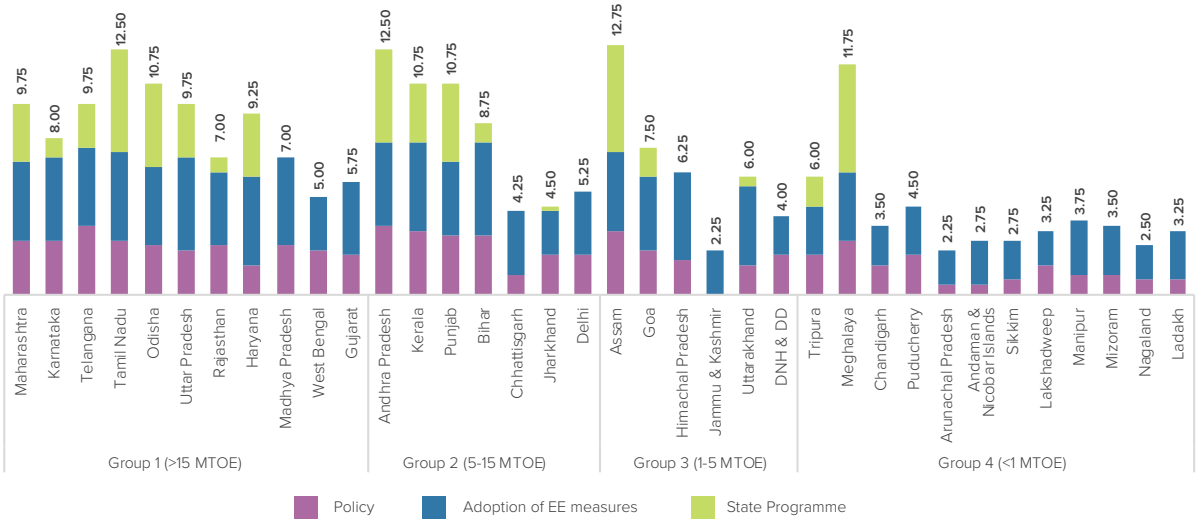
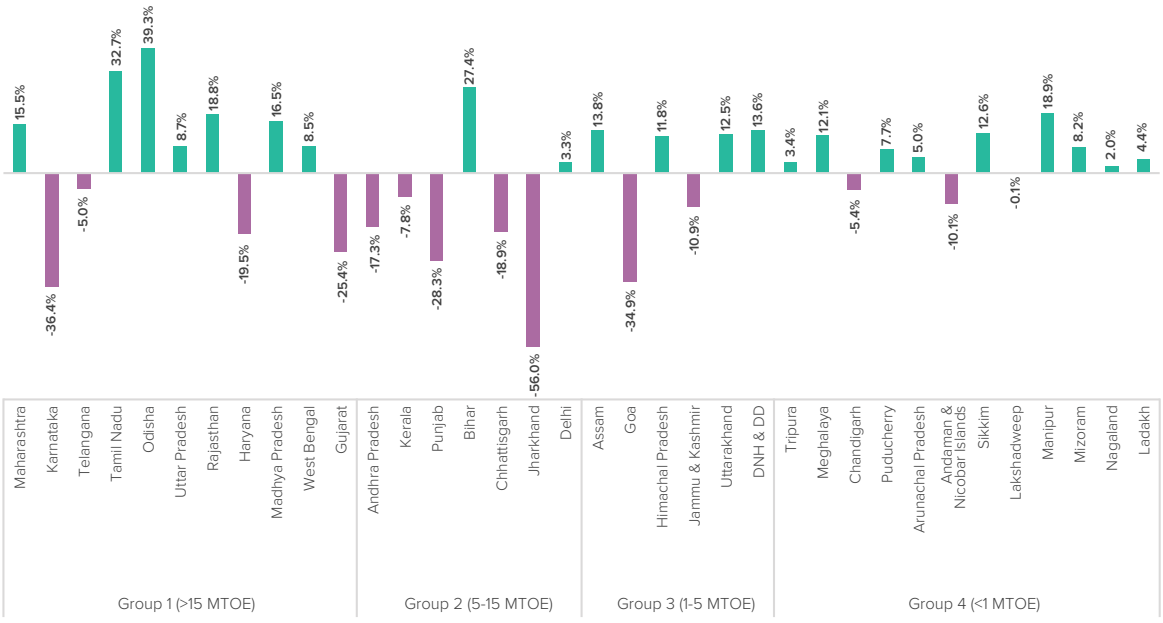


Figure 3 – 27 depicts the progress of the agriculture sector for each state in SEEI 2024 in comparison to SEEI 2023

Figure 3-27: TFEC group-wise DISCOM sector state progress – SEEI 2024 vs SEEI 2023



SEEI 2024 SCORE HIGHLIGHTS

In Group 1, Tamil Nadu and Odisha lead, with Tamil Nadu excelling in the State Programme Indicator and DISCOM sector, though not ranking in the overall standings.

In Group 2, Andhra Pradesh, Kerala, and Punjab emerge as top performers, while Assam and Goa lead in Group 3. In Group 4, Meghalaya and Tripura excel, with Meghalaya achieving the highest scores in the State Programme Indicator, Adaptation of EE Measures, and the DISCOM sector, securing the second-best rank overall. Notably, states leading in the State Programme Indicator also dominate the DISCOM sector rankings in Groups 2 and 3, solidifying their positions as top performers.

Uttar Pradesh (Group 1), Bihar (Group 2), and Himachal Pradesh (Group 3) score the highest in the EE Measure Indicator but do not achieve high rankings in the DISCOM sector or overall standings.:

Figure 3-28: Most improved states in the DISCOM Sector

Odisha (Group 1)
39.9 %
Increase in SEEI 2024 compared to SEEI 2023

Tamil Nadu (Group 1)
32.7%
Increase in SEEI 2024 compared to SEEI 2023

Bihar (Group 2)
27.4%
Increase in SEEI 2024 compared to SEEI 2023

Manipur (Group 4)
18.9 %
Increase in SEEI 2024 compared to SEEI 2023

Rajasthan (Group 1)
18.8 %
Increase in SEEI 2024 compared to SEEI 2023

Madhya Pradesh (Group 1)
16.5%
Increase in SEEI 2024 compared to SEEI 2023

COMMON INDICATORS

Policy

A total of 11 States have reported policy-level action to highlight significant developments in demand-side management (DSM), demand response and flexibility, and energy auditing. Telangana, Tamil Nadu, Andhra Pradesh, Kerala, Bihar, Assam, and Meghalaya reported notable achievements. Demand Side Management (DSM) action plans have been approved by the State Electricity Regulatory Commission (SERC) in the Aggregate Revenue Requirement (ARR) of 7 states. Additionally, 9 states have conducted load research studies for three consecutive years, and eight states have implemented DSM action plans.

Actions toward demand response and flexibility have been reported by 28 states, with Madhya Pradesh emerging as the most progressive. All 28 states have implemented Time-of-Day (ToD) or Time-of-Use (ToU) tariffs for industrial and commercial consumers, with some extending these tariffs to domestic and electric vehicle (EV) connections. Additionally, 5 states—Maharashtra, Telangana, Madhya Pradesh, Kerala, and Tripura—have initiated or implemented pilot projects for automated or behavioural demand response programs. Table 3 – 48 provides the State/UT-wise details on the implementation of ToD/ToU tariffs.

Table 3-48: States with implementation of ToD/ToU

State	Domestic	Commercial	Industrial	EV Connection
Andaman & Nicobar	No	No	No	No
Andhra Pradesh	Yes	Yes	Yes	No
Arunachal Pradesh	No	Yes	Yes	No
Assam	No	Yes	Yes	Yes
Bihar	No	Yes	Yes	No
Chandigarh	No, HT Optional	Yes	Yes	No
Chhattisgarh	No	No	HT	No
Dadra & Nagar Haveli	Yes (Optional)	Optional	Yes (Optional)	No
Delhi	No	Yes, 10kW or above /11kVA	Yes, 10kW or above /11kVA	No
Goa	No, HT Optional	Yes, LT (Optional)	Yes, LT (Optional)	No
Gujarat	No	Yes, 10kW or above	Yes, 10kW or above	No

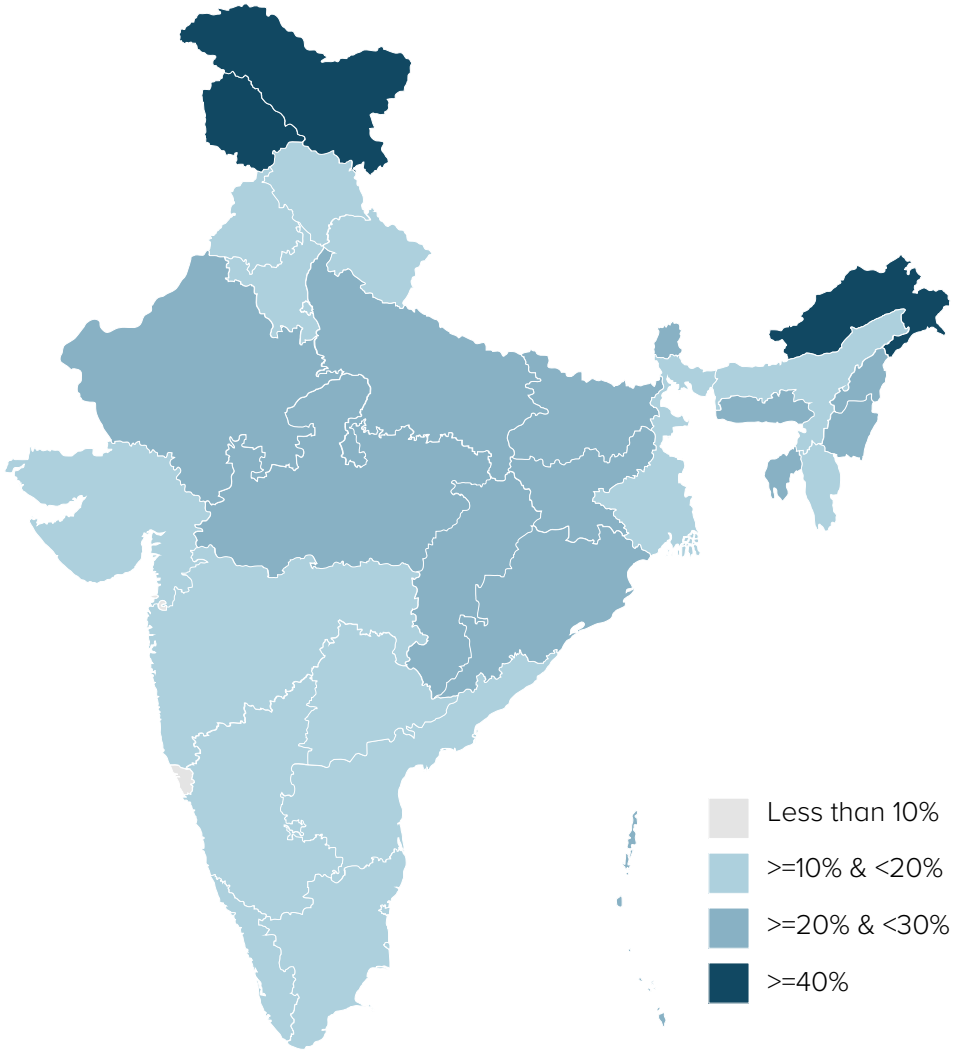
State	Domestic	Commercial	Industrial	EV Connection
Haryana	No, HT Optional	HT	HT	No
Himachal Pradesh	No	No	Yes, HT only	No
Jammu & Kashmir	No	No	Yes, HT	No
Jharkhand	No, HT Optional	HT Only	HT Only	Yes
Karnataka	No	HT Only	HT Only	Yes
Kerala	No	Yes	Yes	HT only
Ladakh	No	No	Yes, HT	No
Lakshadweep	No	No	No	No
Madhya Pradesh	No	Yes, 10 kW or above	Yes, 10 kW or above	Yes
Maharashtra	No	Yes	Yes	No
Manipur	No	No	No	No
Meghalaya	No	No	Yes	No
Mizoram	No	No	No	No
Nagaland	No	No	No	No
Odisha	No	Yes	Yes	No
Puducherry	No	Yes, HT only	Yes, HT only	No
Punjab	No	Yes	Yes	Yes
Rajasthan	No	Yes	Yes	Yes
Sikkim	No	No	No	No
Tamil Nadu	No	Yes	Yes	Yes
Telangana	No	Yes, HT only	Yes, HT only	HT only
Tripura	No	Yes	Yes	No
Uttar Pradesh	No	Yes	Yes	Yes
Uttarakhand	No	No	Yes	No
West Bengal	Yes Optional	Yes (LT Optional)	Yes	Yes

Source: Tariff Orders of SERCs/ JERCs

Under the BEE's Conduct of Energy Audit (Accounting) in Electricity Distribution Companies) Regulations 2021, DISCOMs are required to perform and submit quarterly energy accounting reports and conduct an independent annual energy audit across all consumer categories. For the fiscal year 2023-24, DISCOMs from 23 states have reported submitting their quarterly energy accounting reports, while DISCOMs from 22 states submitted their annual energy audit reports to BEE. This reporting plays a critical role in promoting transparency and accountability within DISCOMs, facilitating improved monitoring and management of resources.

The T&D Losses in the country have decreased by 3.05% from 20.73% in FY 2021-22 to 17.68 % in FY 2022-23. Dadra & Nagar Haveli and Daman & Diu, with 5.2% T&D loss and Goa, with 7.05%, is the most efficient state in the country, which achieved T&D losses below 10%. There are 8 states in the range of 10% and 15%, 10 states in the range of 15% and 20%, and 15 states in which T&D loss exceeds 20%. A Map representation of T&D Losses of States is given in the below Figure 3 - 29 below:

Figure 3-29: T&D Losses of States and UT's



Source: All India Electricity Statistics - General Review 2024 (Table 6.4)

Adoption of EE Measures

SEEI 2024 has evaluated the adoption of energy efficiency (EE) measures in the DISCOM sector across states and union territories (UTs) by gauging the progress made by them under the Revamped Distribution Sector Scheme (RDSS) and Smart Metering status measures.

Revamped Distribution Sector Scheme (RDSS)

The Revamped Distribution Sector Scheme (RDSS), launched by the Central Government in July 2021, aims to enhance the quality and reliability of power supply while ensuring the financial sustainability and operational efficiency of the power distribution sector. The scheme is designed to achieve two key objectives:

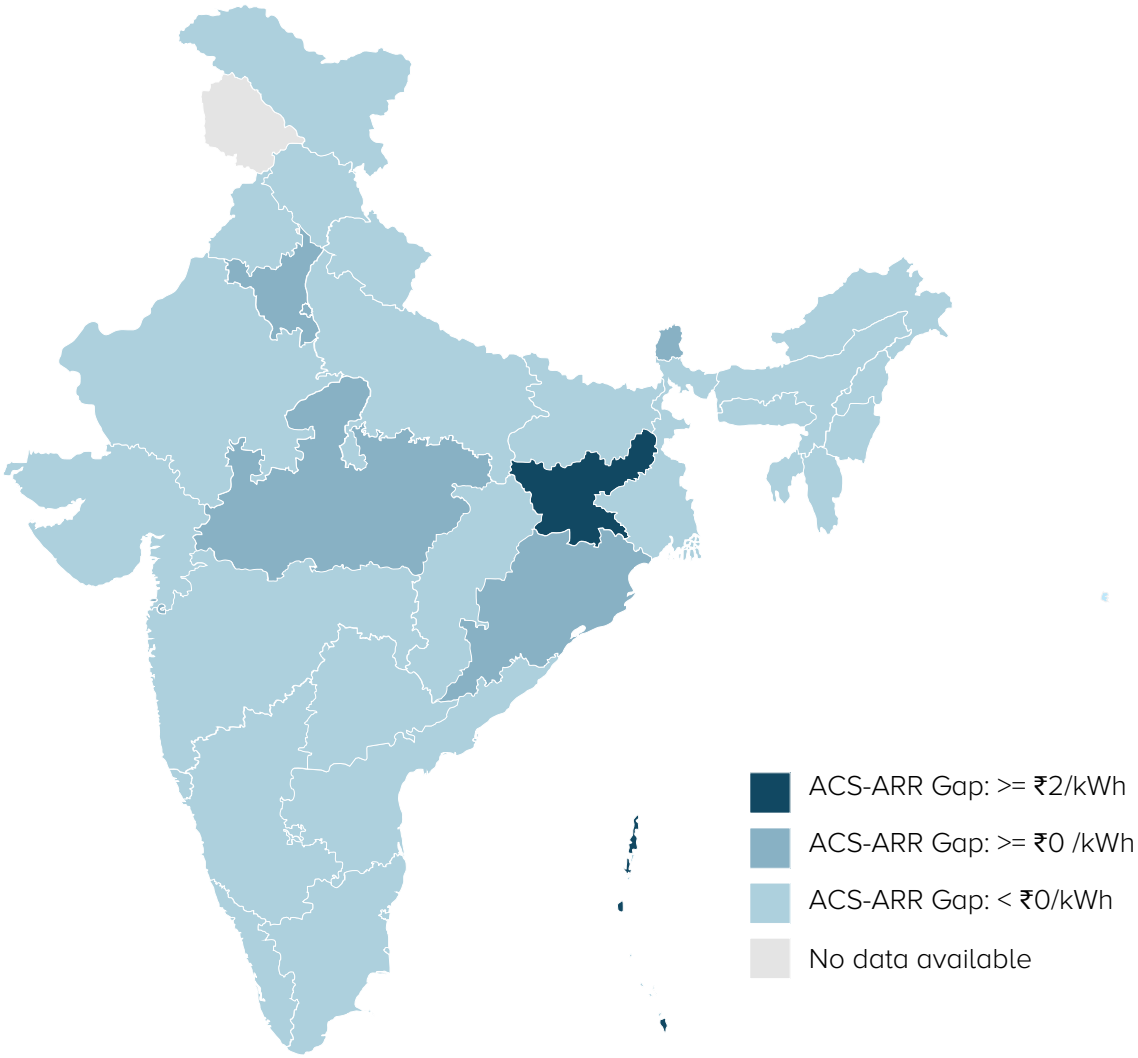
- Reduction in AT&C Losses: Aims to lower Aggregate Technical and Commercial (AT&C) losses to a pan-India level of 12-15%.
- Eliminating the ACS-ARR Gap: Seeks to achieve a zero gap between the Average Cost of Supply (ACS) and Average Revenue Realised (ARR) by 2024-25.

As reported under SEEI 2024, in Group 1, Karnataka has enhanced vigilance, improved revenue collection, and replaced meters to address theft and inefficiencies. Uttar Pradesh has focused on improving revenue realisation, billing efficiency, and loss reduction. Tamil Nadu has upgraded its distribution network, adopted smart technologies, and strengthened revenue controls. Gujarat has reduced AT&C losses to 8.28% through timely billing and online payments.

In Group 3, Assam has advanced its electricity distribution infrastructure through initiatives under the RDSS and Distribution System Enhancement and Loss Reduction (DSELR), with 23.6% of consumers now equipped with smart meters in prepaid mode, along with feeder and Distribution Transformer level metering.

A Map representation of the ACS-ARR gap of States is given in Figure 3 – 30.

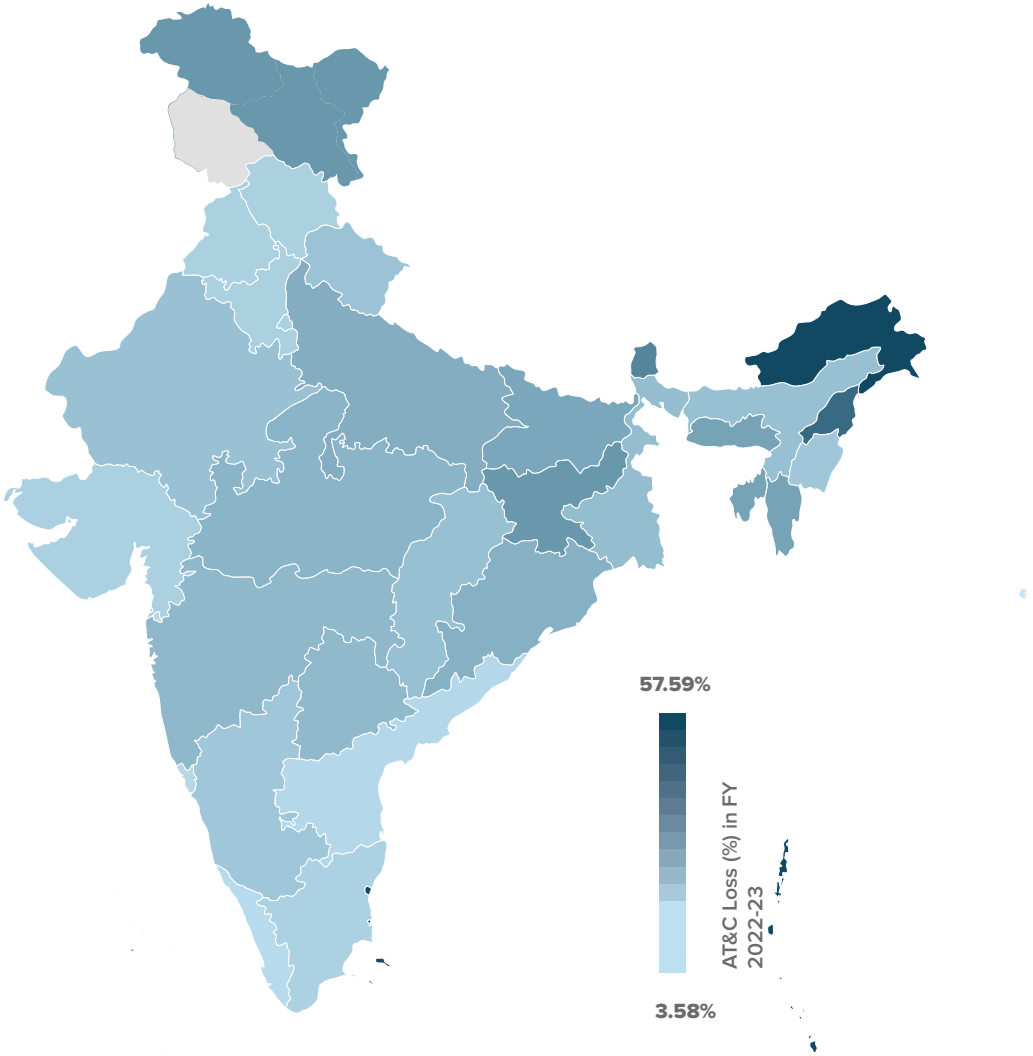
Figure 3-30: ACS – ARR gap of States



Source: RDSS Portal, MoP – GoI: https://rdss.powermin.gov.in/dashboard

A map representation of AT & C loss of States is given in Figure 3 - 31.

Figure 3-31: AT & C loss of States



Source: RDSS Portal, MoP – GoI: https://rdss.powermin.gov.in/dashboard

METERING STATUS

Under Group 1, Maharashtra's MSEDCL has installed 1.6 Crore smart meters, with further expansion plans. Madhya Pradesh and Rajasthan have made progress with 100% metering at the feeder and Distribution Transformer levels, while Odisha has modernised its grid and installed 459,584 smart meters. Telangana has successfully installed 23,699 smart meters and achieved 100% feeder metering.

In Group 2, Andhra Pradesh has installed 20,987 smart meters and completed 100% feeder metering. Jharkhand has achieved 100% metering at both the consumer and Distribution Transformer levels. Bihar, a leader in smart metering adoption, has installed over 8 million smart meters, accounting for 33% of India's total, with plans for universal smart prepaid metering by 2026 under the Revamped Distribution Sector Scheme (RDSS) and non-RDSS projects.

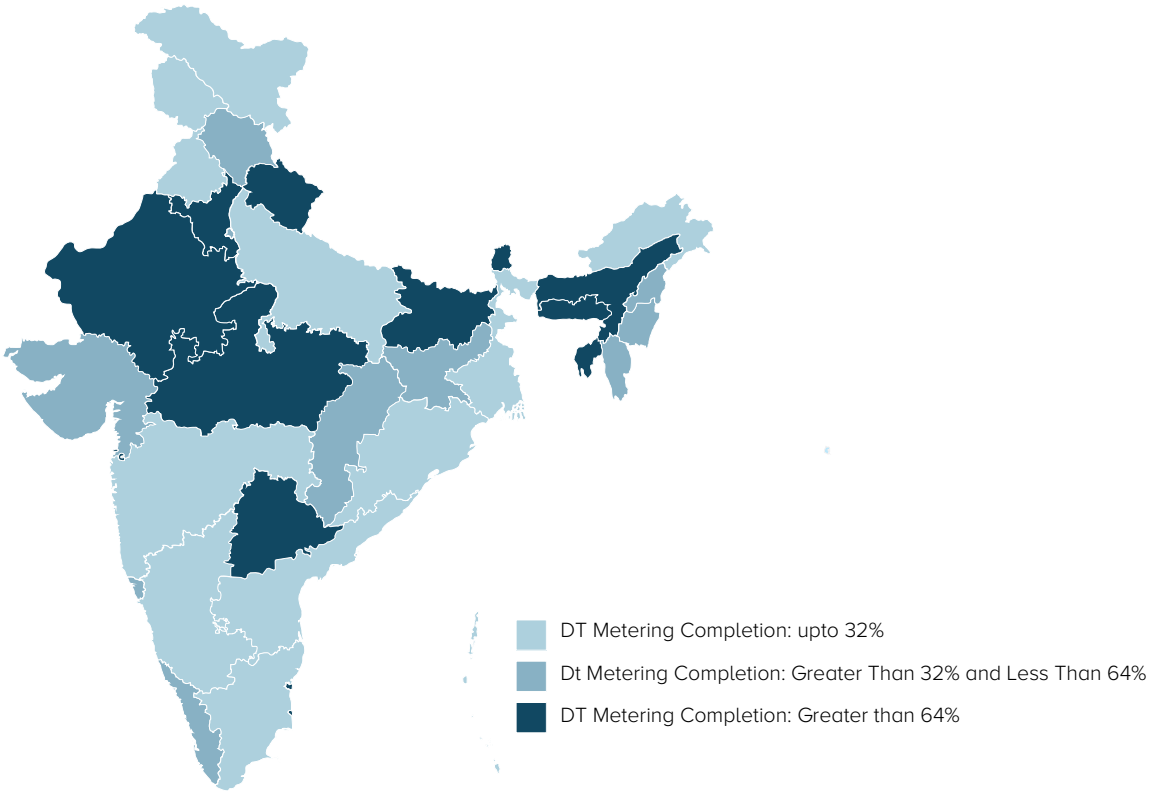
Table 3 - 49 provides State/UT wise details on completion of Feeder Level metering.

Table 3-49: State-wise Feeder Metering completion status

States /UT's	Percentage of 11 KV Feeder Metering completed	Percentage 66/33/22kV Feeder Metering completed
Andaman & Nicobar Islands	74.68%	100 %
Andhra Pradesh	100 %	100 %
Arunachal Pradesh	86.37%	61.90%
Assam	98.28%	99.06%
Bihar	99.02%	100 %
Chandigarh	98.93%	23.53%
Chhattisgarh	99.32%	100 %
Dadra & Nagar Haveli and Daman & Diu	100 %	100 %
Delhi	100 %	100 %
Goa	100 %	100 %
Gujarat	100 %	100 %
Haryana	100 %	100 %
Himachal Pradesh	98.94%	95.82%
Jammu & Kashmir	100 %	100 %
Jharkhand	93.12%	71.03%
Karnataka	100 %	100.00%
Kerala	100 %	100.00%
Ladakh	100 %	100.00%
Lakshadweep	100 %	-
Madhya Pradesh	99.89%	99.09%
Maharashtra	100 %	100.00%
Manipur	83.02%	100 %
Meghalaya	90.24%	100 %
Mizoram	87.86%	100 %
Nagaland	81.36%	55.13%
Odisha	94.50%	90.83%
Puducherry	100 %	100 %
Punjab	97.41%	100 %
Rajasthan	99.83%	100 %
Sikkim	88.10%	34.67%
Tamil Nadu	100 %	100 %
Telangana	100 %	100 %
Tripura	100 %	100 %
Uttar Pradesh	98.06%	99.50%
Uttarakhand	100 %	100 %
West Bengal	100 %	100 %

Further, a map representation of the State-wise Distribution Metering completion status is given in Figure 3 – 32.

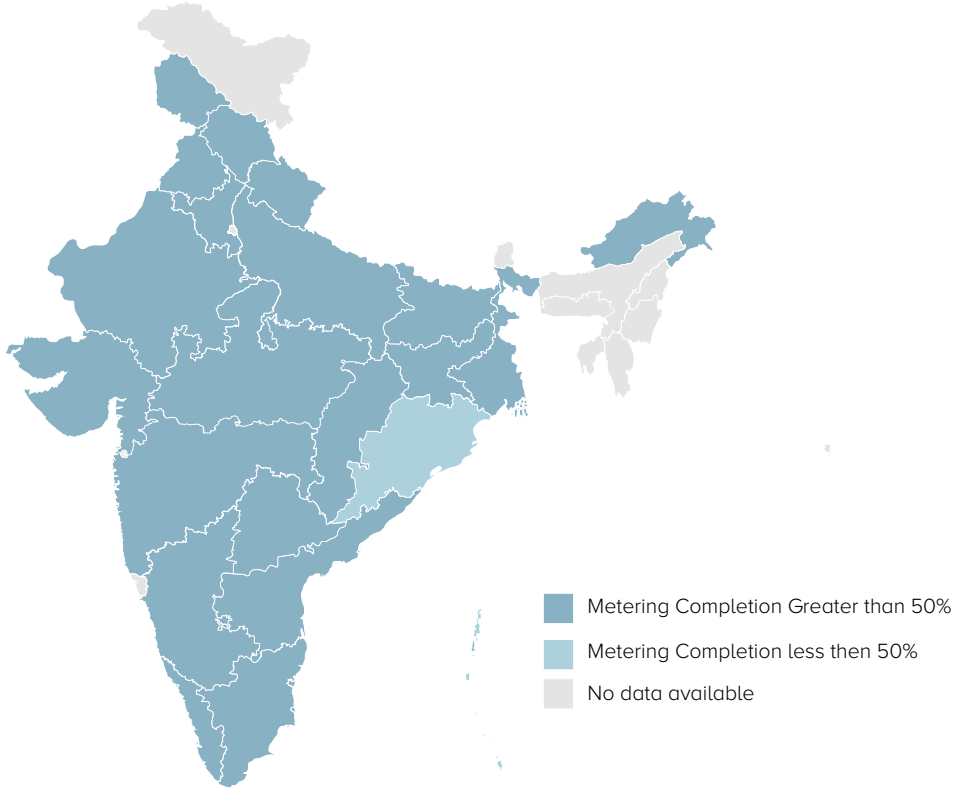
Figure 3-32: State-wise DT Metering completion status



Source: Report on Status of Metering In The Country – June 24: CEA, MoP - GoI

Map representation of State-wise metering status of feeders with agriculture load >30% is given in Figure 3 – 33.

Figure 3-33: State-wise metering status of feeder with agriculture load >30%



Source: Report on Status of Metering In The Country – June 24: CEA, MoP - GoI

PROGRAMME SPECIFIC INDICATORS

For Programme specific indicators, the approach during SEEI 2023 has been carried forward in SEEI 2024, viz., i) Programmes for Demand Side Management; and ii) Programme for Capacity Building in the Agriculture Sector. Table 3 – 50 shows the States with programmes on EE and capacity-building in the agriculture sector:

Table 3-50: Reporting states on Programme Specific Indicators

	Programmes for Energy Efficiency in Demand Side Management	Programme for Capacity Building in the DISCOM Sector
Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana,	Telangana, Tamil Nadu, Odisha, Uttar Pradesh
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar	Andhra Pradesh, Kerala, Punjab, Jharkhand
Group 3 (1-5 MTOE)	Assam	Assam, Goa, Uttarakhand
Group 4 (<1 MTOE)	Tripura, Meghalaya	Meghalaya

Programmes for Demand Side Management

DISCOMs across Karnataka, Maharashtra, Tamil Nadu, Andhra Pradesh, Haryana, Assam, Meghalaya, Telangana, Odisha, Kerala, Punjab, Tripura, and Bihar have implemented various Demand Side Management (DSM) measures and introduced energy-efficient appliances, such as BLDC fans, agricultural pumps, and LED lamps. In Group 1, Karnataka's HESCOM is replacing inefficient pumps, air conditioners, and fans with energy-efficient alternatives, achieving 31.57 MU in annual energy savings and reducing CO_2 emissions by 22,570 tonnes. Tamil Nadu's TEDA has installed rooftop solar systems and energy-efficient lighting in government buildings, saving 1.34 MU of energy annually and preventing 1102.82 tonnes of CO_2 emissions annually. Odisha's DISCOMs have advanced energy efficiency through PAT Scheme implementation, promotion of energy-efficient products, solar adoption, and awareness programs on kVAh billing. These initiatives have led to annual savings of 1,093.78 MU and CO_2 abatement of 896,899.6 tonnes. In Group 3, Assam's APDCL has implemented DSM initiatives, including replacing outdated transformers and installing smart meters for agricultural consumers, achieving 4 MU in annual energy savings.

15 States reported state-level DSM programmes

Programmes for Capacity Building in the DISCOM Sector

The SEEI 2024 report highlights capacity-building initiatives in the DISCOM sector across 12 States, including Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Andhra Pradesh, Kerala, Punjab, Jharkhand, Assam, Goa, Uttarakhand, and Meghalaya. In Group 1, Uttar Pradesh conducted three capacity-building workshops for DISCOM officials from MVVNL, PuVVNL, and DVVNL, focusing on Demand Side Management (DSM) strategies, energy conservation, and fostering a shift in mindset. Tamil Nadu's TANGEDCO and TANTRANSCO provided regular training throughout the year to enhance the technical and managerial skills of their employees. In Group 3, Assam implemented capacity-building programs aimed at reducing peak demand and energy consumption. Goa's State Designated Agency organised a two-day workshop for DISCOM officials, covering topics such as DSM, energy efficiency, the Energy Conservation Building Code, and solar potential utilisation.

12 States reported capacity-building initiatives for EE in DISCOMS

DISCOM SECTOR SPOTLIGHT

- Karnataka's HESCOM replaced 1,000 inefficient pumps, 1,000 air conditioners, and 160,000 fans with BLDC and 5-star rated models, saving 31.57 MU annually, reducing demand by 10.38 MW, and cutting CO_2 emissions by 22,570 tonnes.
- Tamil Nadu's TEDA installed 210 rooftop solar systems across government buildings and replaced 21,215 bulbs and streetlights, resulting in annual energy savings of 1.34 MU and a reduction of 1,102.82 tonnes of CO_2 emissions.
- Odisha's DISCOMs achieved notable progress by implementing the PAT Scheme, promoting energy-efficient products, facilitating solar adoption, and conducting awareness programs on kVAh billing. These efforts collectively resulted in annual energy savings of 1,093.78 MU and CO_2reductions of 896,899.6 tonnes.
- Assam's APDCL replaced outdated distribution transformers with 91 units of 100 KVA, 54 units of 63 KVA, and 7 units of 25 KVA, alongside installing 29,388 smart meters for agricultural consumers, resulting in energy savings of 4 MU annually.

3.7 CROSS SECTOR

OVERVIEW

The cross-sector category in SEEI 2024 evaluates overarching energy efficiency policies and initiatives that extend beyond individual sectors. It comprises of fifteen (15) common indicators, with a maximum achievable score of sixteen (16). These indicators cover diverse areas, including State Energy Efficiency Action Plans (SEEAPs) and State Action Plans on Climate Change (SAPCCs), EE and energy conservation policies, research and development (R&D) in EE, utilisation of Bureau of Energy Efficiency (BEE) funds, dedicated state budgets, the State Energy Conservation Fund (SECF), and State-Level Steering Committees for Energy Transition. Additionally, indicators assess state-level energy conservation awards, energy intensity, and the share of clean energy in electricity consumption.

Table 3-51 provides a comprehensive summary of the cross-sector indicators. Figure 3-34 illustrates the states' scores in this category, with states grouped based on their Total Final Energy Consumption (TFEC). Figure 3-35 showcases the progress of states in SEEI 2024 compared to SEEI 2023.

Table 3-51: Cross Sector indicators under SEEI 2024

S. No	Indicator	Max. Score	Scoring Criteria	
	Policy			
1.	State Action Plan on energy efficiency/climate change	2		
	Has the State Energy Efficiency Action Plan (SEEAP) been finalized and approved?	0.25	SEEAP finalised and approved = 0.25, else = 0	
	What are the state-level and sector-level targets set under the SEEAP?	0.25	Targets for energy efficiency/ energy savings at the sector level =0.25, else=0	
	What are the steps/projects/programmes initiated to implement the SEEAP in the state/UT?	0.5	Steps/Projects/Programmes initiated to implement the SEEAP = 0.5, else = 0	
	Has the state/UT allocated any budget for the implementation of SEEAP in FY 2023-24?	0.5	Budget Allocated = 0.5	
	Which EE/EC measures have been included and implemented under the SAPCC in the State?	0.5	EE/EC measures included and implemented under the SAPCC = 0.5, else	
2.	Energy Efficiency (EE) & Energy Conservation (EC) Policy	1.5		
	Does the state have a notified EE & EC policy?	1	Notified=1/Draft=0.5, else = 0	
	If yes, what are the steps/programmes/projects initiated to implement the policy?	0.5	Steps/Projects/Programmes initiated to implement the policy = 0.5	
3.	Promotion of Innovation and R&D in Energy Efficiency	0.25		
	Does the state have any policy/programme/ financial instrument for the promotion of innovation and R&D in energy efficiency?	0.25	Yes = 0.25, else = 0	
	Finance			
4.	State budget of designated agency as per 15A of EC Act (amended) 2022	1.0		
	Has the SDA prepared a form containing the detailed budget for FY 2024-25 and submitted it to the State Government for inclusion in the state annual budget?	0.5	Budget prepared and submitted to state govt= 0.5, else = 0	
	If yes, has the State govt approved the budget & included the same in the annual state budget? (For ex. budget head against building, industry, municipal, transport, agriculture, DISCOM)	0.5	Budget approval by the State govt. and inclusion in the annual state budget= 0.5, else = 0	
5.	Fund utilisation	1.75		
	What is the percentage of utilisation of the funds allocated by the BEE for the annual action plans for FY 2023-24?	0.75	<25% = 0; 25 - 50% = 0.25; 50 - 75% = 0.5; >75% = 0.75	
	What is the percentage of utilisation of the funds allocated by the state government to the SDA for FY 2023-24?	1.0	Data Provided = 1	

S. No	Indicator	Max. Score	Scoring Criteria	
6.	Establishment and utilisation of the State Energy Conservation Fund (SECF)	1.5		
	Has the state notified SECF rule and allocated matching funds for SECF?			
	Has the state tapped into other sources of funds to increase the corpus for SECF? E.g. State fund (other than matching fund), Multilateral/bilateral funding, Cess/tax etc.	0.5	Yes = 0.5, else = 0	
	How has the state utilised the SECF for energy efficiency adoption in FY 2023-24? (E.g. for admin costs, grants, RIF, risk guarantee etc.)	1.0	Grant mode= 0.5 RIF/VGF/Credit guarantee/ESCO etc= 0.5	
Institutional Capacity				
7.	Timely submission of monthly progress report to BEE	0.5		
	Does the SDA submit monthly progress reports to BEE on time?	0.5	1st - 5th of the next month = 0.5; 5th - 10th of the next month = 0.25; after 10th of the next month = 0	
	If not, what are the challenges SDA faced during the submission of the monthly progress report to BEE?			
8.	Formation of State-Level Steering Committee for Energy Transition	0.75		
	Is the state-level Steering Committee headed by the Chief Secretary for Energy Transition formed in the state?	0.25	Yes = 0.25, else = 0	
	If yes, what are the steps undertaken by the State/ UT towards Energy Transition in FY 2023-24?	0.50	Steps undertaken towards Energy Transition = 0.5	
9.	Collaboration with SDA	1.0		
	Is there any collaboration between the SDA and the state govt departments on energy efficiency action/ climate action/net zero action plans in different sectors?	0.5	Collaboration between SDA and the state govt departments on energy efficiency action/climate action/net zero action plans in different sectors = 0.5, else = 0	
	Is there any collaboration of the SDA with the private sector/industry associations/CSO/academic institutions/ESCOs to promote energy efficiency in different sectors?	0.5	Collaboration between SDA with the private sector/industry association/CSO/academic institutions/ESCOs to promote energy efficiency in different sectors = 0.5, else = 0	
Adoption of EE measures				
10.	Activities undertaken by the SDA Inspecting Officer	0.5		
	Has the SDA inspecting officer filed any petitions as per the Enforcement Manual of BEE under the EC Act 2001 in FY 2023-24?	0.5	Petitions filed by Inspecting Officer = 0.5, else = 0	

S. No	Indicator	Max. Score	Scoring Criteria	
11.	Collection of end-use energy data	1		
	Is there any practice for the periodic collection of energy consumption data at the SDA? (give example: use of mandatory audit data, other examples of existing practices other than the BEE's mandate)	0.5	Standard practice for collection of end-use energy data by SDA = 0.5, else=0	
	How are the end-use energy data utilised to advance energy efficiency in the state? (give an example)	0.5	Energy data utilised to advance energy efficiency in the state = 0.5, else=0	
12.	State Energy Conservation Awards	0.25		
	Do the SDA or other state organisations administer state-level energy conservation awards to recognise outstanding performers in any one or more sectors – buildings categories such as offices, hotels, hospitals, industrial categories such as MSMEs, etc., or any other sector?	0.25	Yes = 0.25, else = 0	
	If any, please list out the details of such awards.			
13.	Promotion of ESCO Model	1.0		
	What steps has the state/UT taken to encourage the implementation of EE/EC projects or programmes through the Energy Service Company (ESCO) model? (Apart from conducting energy audit)	0.5	Steps undertaken to encourage the implementation of EE/EC projects or programmes through the Energy Service Company (ESCO) model = 0.5, else = 0	
	Has the State/UT conducted any training program on Measurement & Verification (M & V)?	0.5	Training program on Measurement & Verification (M & V) = 0.5, else = 0	
Energy Savings				
14.	Energy Intensity	2		
	What is the energy intensity (TFEC in toe per unit GSDP) of the state for FY 2023-24?	2	States score for each TFEC group = Range (Max-Min) for each TFEC Group divided into 3 segments for scoring (lower third - 1.5, middle third - 1, highest third - 0.5); 1.5 points for state scores = Min to (Min + (Max-Min)/3) in each TFEC group; 1 point for state scores = (Min + (Max-Min)/3) to (Min + 2 (Max-Min)/3) in each TFEC group; 0.5 points for state scores =Min + (2(Max-Min)/3) to Max in each TFEC group. 2) Improvement from last year= 0.5	
15	Clean energy mix in electricity consumption	1		
	What percentage of the total electricity consumption is sourced from non-conventional energy sources in the state? (Please provide a breakup, i.e. solar, wind, biomass, hydro, etc.)	1	Data Provided = 1, else = 0	

Figure 3 – 34 shows the TFEC group-wise scores for the Cross-sector in SEEI 2024.

Figure 3-34: TFEC group-wise Cross sector state scores

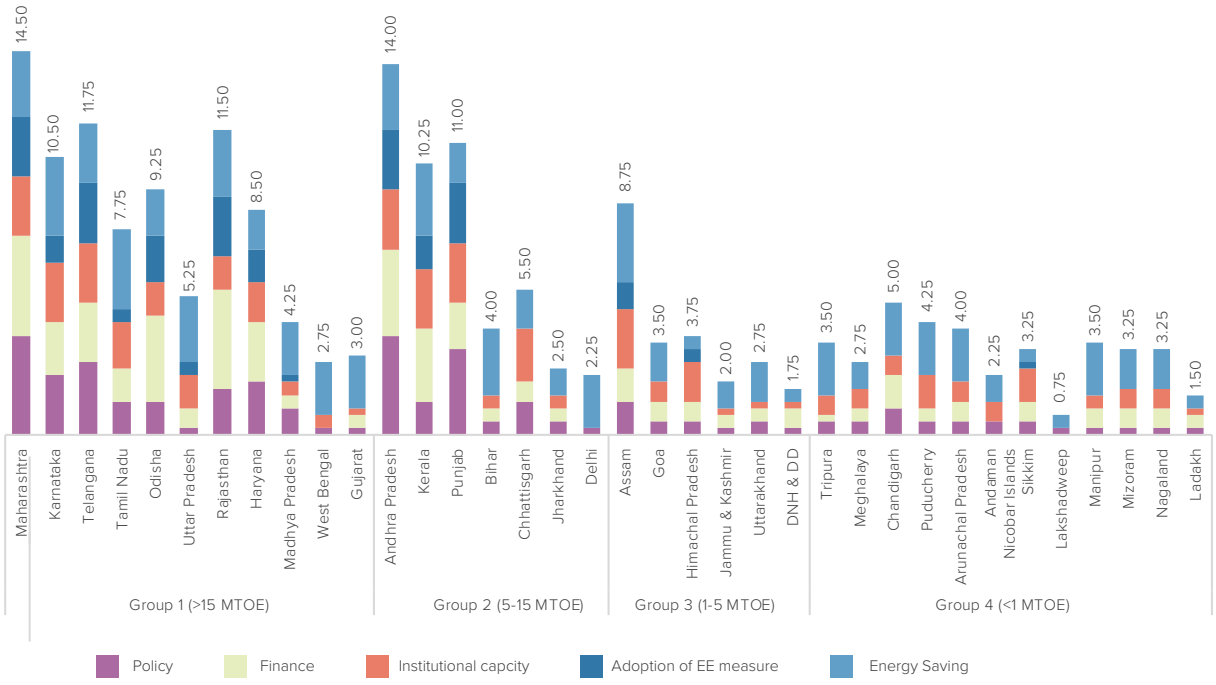


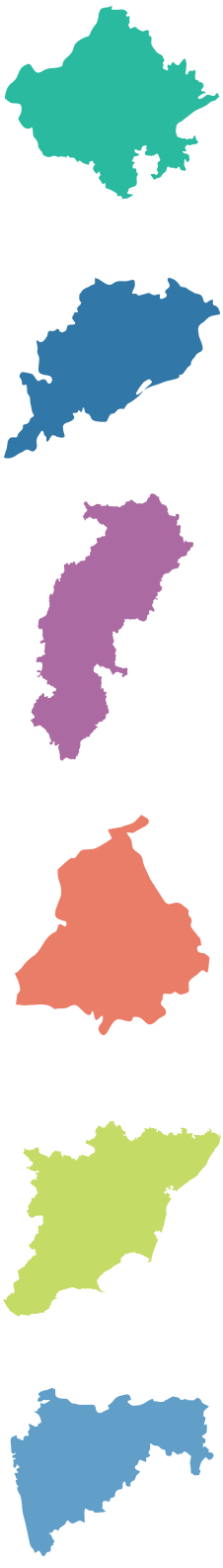
Figure 3 – 35 depicts the progress of the cross-sector for each state in SEEI 2024 in comparison to SEEI 2023.

Figure 3-35: TFEC group-wise Cross Sector state progress – SEEI 2024 vs SEEI 2023

SEEI 2024 CROSS SECTOR SCORE HIGHLIGHTS

Maharashtra emerged as the top scorer in Group 1, showing a significant improvement of 10.6%, with Telangana securing the second position. Andhra Pradesh and Punjab led the Group 2 states, demonstrating a notable score increase of 22.1%. Assam topped Group 3, while Himachal Pradesh, despite experiencing a slight decline in its score held the second position. In Group 4, Chandigarh was the top scorer, with Puducherry following closely behind, improving their scores by 7.9% and 9.9%, respectively. Additionally, states such as Rajasthan, Odisha, Punjab, Chhattisgarh, Tamil Nadu, and Maharashtra showed remarkable progress, boosting their scores by over 10% compared to the previous evaluation. A Map representation of the most improved states Cross Sector by more than 10% is given in Figure 3 – 36 below:

Figure 3-36 : Most improved states in Cross Sector



COMMON INDICATORS

Policy

The State Energy Efficiency Action Plan (SEEAP) has been finalized and approved in 35 states. Among them, six states have initiated steps, projects, or programs to implement the plan, while five states have allocated budgets for its implementation in FY 2023–24. Table 3 – 52 provides the details of reporting States on the status of State Energy Efficiency Action Plans, their approval & implementation steps, and Budget Allocation for SEEAP.

Table 3-52: Reporting states on State Energy Efficiency Action Plans, their approval & implementation steps, and Budget Allocation for SEEAP

Group 1 (>15 MTOE)	Maharashtra₹, Karnataka, Telangana, Odisha, Rajasthan₹ Haryana₹, Madhya Pradesh₹, Tamil Nadu, Gujarat and West Bengal
Group 2 (5-15 MTOE)	Andhra Pradesh₹, Kerala, Bihar, Chhattisgarh, Jharkhand, Delhi and Punjab
Group 3 (1-5 MTOE)	Assam, Goa, Himachal Pradesh, Jammu & Kashmir, Uttarakhand and Dadra & Nagar Haveli and Daman & Diu
Group 4 (<1 MTOE)	Tripura, Meghalaya, Chandigarh, Puducherry, Arunachal Pradesh, Andaman & Nicobar Islands, Sikkim, Lakshadweep, Manipur, Mizoram, Nagaland and Ladakh

Note: The underlined states reported in the table above, have also reported initiating steps/projects/ projects in line with their SEEAP. The states with "₹" have reported budget allocation for the implementation of their SEEAP.

Additionally, 11 States have incorporated and implemented energy efficiency and energy conservation measures within their State Action Plans on Climate Change (SAPCC). Table 3 – 53 provides the details of reporting States on implementing EE/ EC measures under their State Action Plans on Climate Change.

Table 3-53: Reporting states on implementing EE/EC measures under their State Action Plans on Climate Change

Group 1 (>15 MTOE)	Maharashtra, Tamil Nadu, Odisha, Rajasthan and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Chhattisgarh and Punjab
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Chandigarh

Energy Efficiency (EE) and Energy Conservation (EC) policies have been officially notified by four states. Detailed information on the states reporting such policies is provided in Table 3–54.

Table 3-54: Reporting states on Energy Efficiency & Energy Conservation Policy

Group 1 (>15 MTOE)	Maharashtra, Karnataka, and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	-

Note: The underlined states reported in the table above, have also reported initiating steps/projects/ projects in line with the EE & EC Policies

Promotion of innovation and research & development (R&D) in energy efficiency has been reported by 13 states. These states are listed in Table 3–55.

Table 3-55: Reporting states on the promotion of Innovation and R & D in Energy Efficiency

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab and Chhattisgarh
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	-

Key Initiatives in Cross-Sector Policy

In Group 1, Karnataka introduced the EE & EC Policy 2022-2027 to promote energy efficiency and conservation across various consumer categories. Maharashtra launched its Green Hydrogen Policy in 2023. Haryana implemented mandatory standardised energy audits every three years for all units with energy consumption below the Perform, Achieve, and Trade (PAT) threshold, excluding MSMEs. Odisha published its Renewable Energy Policy 2022, emphasising biomass-based power, biogas, and biofuels and encouraging green power procurement by government bodies and local authorities.

In Group 2, Andhra Pradesh introduced the Pumped Storage Power Promotion Policy (2022), the Green Hydrogen & Green Ammonia Policy (2023), and the Energy Efficiency and Energy Conservation Policy (2023-2028). Kerala mandated energy audits for High Tension and Extra High-Tension consumers, including high-rise buildings, every three years. Chhattisgarh implemented an Innovation & Entrepreneurship Development Policy to foster technological growth.

In Group 3, Assam's State Designated Agency (SDA) launched an AI-based digital assistant to assist electricity consumers in selecting appropriately sized appliances, reducing electricity bills, and promoting energy-efficient product choices through data-driven recommendations.

13 states now have dedicated policies, programmes, or financial instruments to support innovation and research in energy efficiency, up from 8 states in the SEEI 2023 assessment

Finance

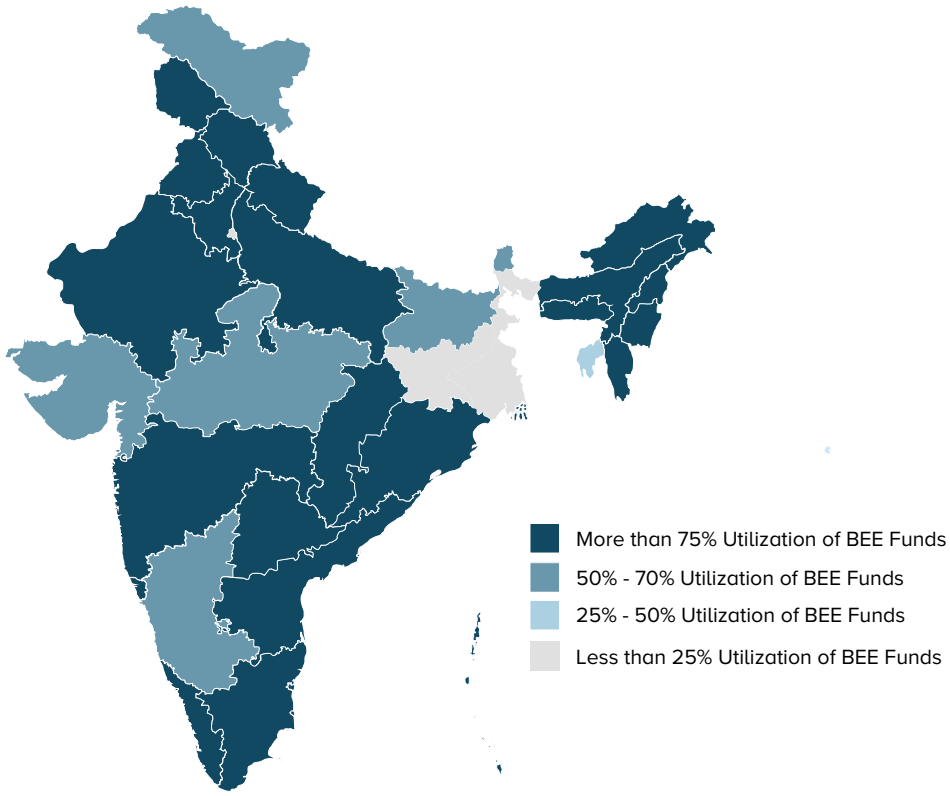
As per Section 15A of the amended Energy Conservation Act (2022), a total of 11 States have reported preparing and submitting their action plans and had their action plans approved and incorporated into the annual state budget. The details are presented below in Table 3- 56.

Table 3-56: Reporting states on preparing Action Plan and approval from state government & inclusion in Annual State Budget

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Odisha, Uttar Pradesh, Rajasthan and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab and Chhattisgarh
Group 3 (1-5 MTOE)	-
Group 4 (<1 MTOE)	-

The analysis of fund utilisation by the State Designated Agencies shows that 31 States have reported utilising funds allocated by the Bureau of Energy Efficiency (BEE). 23 states have reported utilising more than 75% of the funds allocated by BEE, 7 states have reported utilising more than 50% - 75% of the funds allocated by BEE, 1 state Tripura has reported utilising less than 25% - 50% of the funds allocated by BEE and 5 states have reported utilising less than 25% of the funds allocated by BEE. A map representation of the insights has been provided below in Figure 3 – 37.

Figure 3-37: State-wise BEE Fund Utilisation Status



All states have notified the State Energy Conservation Fund (SECF) rules and have allocated matching funds. However, only three states—Maharashtra, Rajasthan, and Kerala—have reported accessing additional funding sources. Furthermore, eight states have reported adequate utilisation of the SECF. Detailed information is provided in Table 3–57.

Table 3-57: Reporting states on Utilisation of SECF

Group 1 (>15 MTOE)	Maharashtra, Telangana, Tamil Nadu, Odisha and Rajasthan
Group 2 (5-15 MTOE)	Andhra Pradesh and Kerala
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	-

Note: The underlined states reported in the table above have also reported tapping into other funds for increasing the corpus of SECF

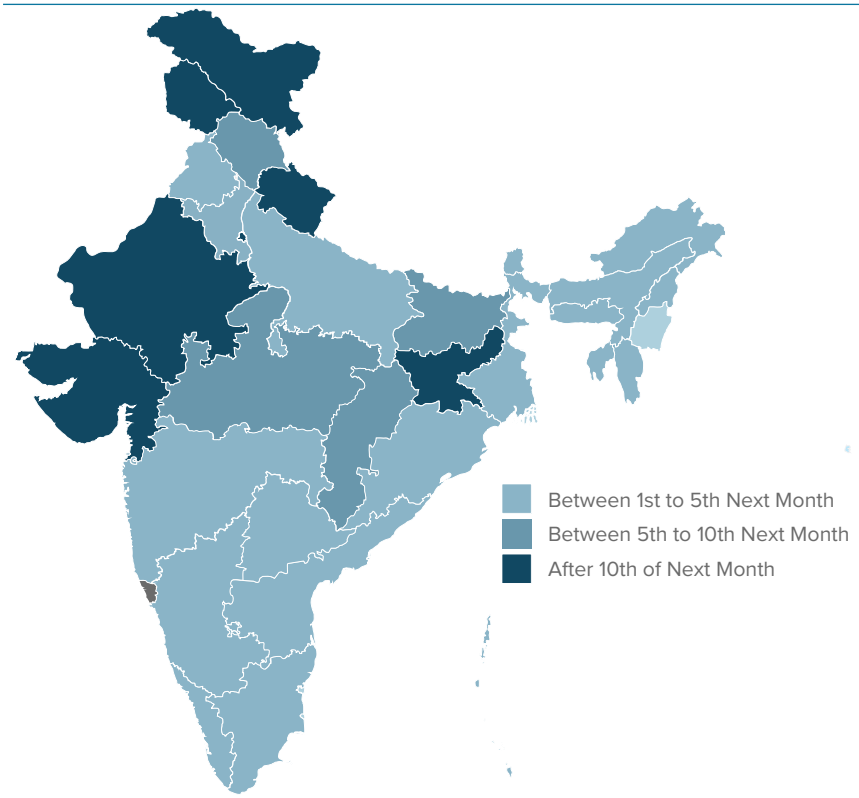
Key Initiatives on Finance in Cross-Sector

Karnataka Renewable Energy Development Limited (KREDL) has approved ₹365 Lakhs for various EE & EC activities. Maharashtra has sanctioned ₹44.4 Lakhs for energy conservation programs, while Haryana has allocated a substantial ₹370 Lakhs towards Energy Efficient Building Programme and Supporting Programmes for New & Renewable Energy source and Energy Conservation. Rajasthan has announced a budget of ₹15 Crores to promote clean cooking systems, planning to distribute 10,000 units at a 50% subsidy to reduce dependence on fossil fuels. Meanwhile, Odisha has approved a total budget of ₹204.87 Lakhs, with ₹12 Lakhs specifically allocated by SDA Odisha for a demonstration project in agricultural demand-side management at OUAT, KVK, Puri.

Institutional Capacity

State Designated Agencies (SDAs) are tasked with regularly reporting their activities to the Bureau of Energy Efficiency. Out of 28 States reporting progress on the timely submission of monthly progress reports to the Bureau of Energy Efficiency (BEE), 21 submitted their reports on time, within the 1st to 5th of the following month. Seven States submitted between the 5th and 10th, while the remaining eight either submitted after the 10th or have not reported the status. A map representation has been provided below in Figure 3 – 38.

Figure 3-38: State-wise Monthly Progress reporting to BEE



State-Level Steering Committees for Energy Transition have been established in 31 States, with 10 States taking additional steps toward advancing energy transition initiatives. The details on the same have been presented in Table 3- 58 below:

Table 3-58: Reporting states on the formation of State level Steering Committee on Energy Transition

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, Haryana, Madhya Pradesh and Gujarat
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Bihar and Chhattisgarh
Group 3 (1-5 MTOE)	Assam, Goa, Himachal Pradesh, Jammu & Kashmir and Uttarakhand
Group 4 (<1 MTOE)	Tripura, Meghalaya, Chandigarh, Puducherry, Arunachal Pradesh, Andaman & Nicobar Islands, Sikkim, Manipur, Mizoram, Nagaland and Ladakh

Note: The underlined states in the table above, have also reported steps taken towards energy transition

31 States have set up a State-Level Committee on Energy Transition

Collaboration between State Designated Agencies (SDAs) and various state government departments on energy efficiency, climate, and net-zero action plans has been reported by 14 states. Additionally, SDAs in 15 states have established partnerships with private sector entities, industry associations, civil society organisations, academic institutions, and Energy Service Companies (ESCOs) to advance energy efficiency initiatives. The details of the reporting states are provided in Table 3–59.

Table 3-59: Reporting states on collaboration between State Designated Agencies and Private Stakeholders/Industry Associations/CSO/Academic Institutions/ESCOs

Group 1 (>15 MTOE)	Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Uttar Pradesh, Rajasthan, and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala, Punjab, Chhattisgarh and Jharkhand
Group 3 (1-5 MTOE)	Assam and Himachal Pradesh
Group 4 (<1 MTOE)	-

Note: The underlined states reported in the table above have also reported collaboration between the State Designated Agencies and stakeholder State Government Departments.

Key Initiatives on Institutional Capacity in Cross-Sector

15 states have partnered with private sector entities to advance energy efficiency initiatives

In Group 1, Karnataka has signed an MOU with the Shakti Foundation to implement the Energy Efficiency (EE) and Energy Conservation (EC) policy, supported by a State Energy Efficiency Action Plan (SEEAP) and a high-level committee overseeing the efforts. Maharashtra has formed an Energy Transition Committee and signed an MOU between EESL and MEDA to advance energy initiatives. Tamil Nadu established a State-Level Technical Expert Committee, involving key stakeholders like TNSDA and Anna University, to drive energy efficiency innovation. Odisha partnered with OUTR and IIT Bhubaneswar to engage students in energy efficiency R&D and signed an MOU with CLASP to enhance appliance standards under BEE's Standards & Labelling scheme. Telangana's Innovation Cell, in collaboration with the Administrative Staff College of India, promotes energy conservation through an MOU with TGREDCO.

In Group 2, Kerala launched its Clean Energy Innovation and Business Incubation Centre (CEIBIC) on June 22, 2022, as part of a partnership between the Energy

Management Centre (EMC) - Kerala, Kerala Development and Innovation Strategic Council (KDISC), and Clean Energy International Incubation Centre (CEIIC). The state aims to achieve green and decarbonisation goals, with ongoing studies by CSTEP to diversify its energy mix and reduce reliance on external sources. The "Kerala Energy Transition Roadmap 2040," prepared by CSTEP, was released to guide the state's energy transition efforts.

Adoption of EE Measures

Activities carried out by Inspecting Officers at the respective State Designated Agencies (SDAs) have been reported by 8 states, while 9 states have outlined practices for the periodic collection of energy consumption data through their SDAs. Among these, 6 states have actively utilised the collected end-use energy data to drive energy efficiency initiatives. Further details are presented in Table 3–60.

Table 3-60: Reporting states on activities reported by Inspecting Officers and collection of End-Use energy data

	Reporting of Activities by Inspecting Officers	Periodic collection of Energy Consumption data at State Designated Agency
Group 1 (>15 MTOE)	Maharashtra, Telangana and Odisha,	Maharashtra, Karnataka, Telangana, Tamil Nadu, Rajasthan and Haryana
Group 2 (5-15 MTOE)	Andhra Pradesh, Kerala and Punjab,	Andhra Pradesh, Kerala, and Punjab
Group 3 (1-5 MTOE)	Assam and Himachal Pradesh	-
Group 4 (<1 MTOE)	-	-

Note: The underlined states reported in the table above have also reported using the End-Use energy data to advance Energy Efficiency initiatives in the state.

Eight States have instituted State Energy Conservation Awards to recognize efforts in energy efficiency and conservation. These include Maharashtra, Telangana, Odisha, Rajasthan, Haryana, Andhra Pradesh, Kerala, Punjab, and Uttar Pradesh.

Initiatives to promote the ESCO model have been undertaken in 9 states—Maharashtra, Telangana, Odisha, Rajasthan, Madhya Pradesh, Andhra Pradesh, Punjab, Assam, and Sikkim—focusing on the implementation of energy efficiency (EE) and energy conservation (EC) projects. Additionally, 4 states—Telangana, Odisha, Uttar Pradesh, and Rajasthan—have conducted training programs on Measurement and Verification (M&V) to further support these initiatives. The details of the reporting states are provided in Table 3–61.

9 States have reported promotion of ESCO model for implementation of EE programmes.

Table 3-61: Reporting States on the promotion of ESCO models and Measurement and Verification

Group 1 (>15 MTOE)	Maharashtra, Telangana, Odisha, Rajasthan, and Madhya Pradesh (Uttar Pradesh)
Group 2 (5-15 MTOE)	Andhra Pradesh and Punjab
Group 3 (1-5 MTOE)	Assam
Group 4 (<1 MTOE)	Sikkim

Note: The underlined states reported in the table above have reported both on the Promotion of ESCO Models and conducting training programs on Measurement and Verification. Barring *Uttar Pradesh, which has reported conducting training programs on Measurement and Verification.

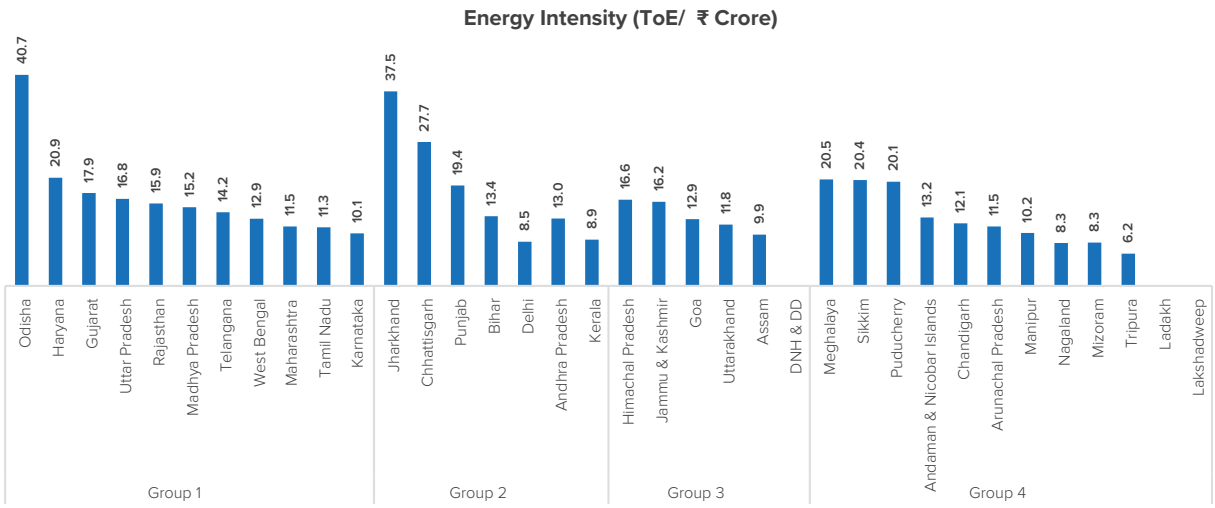
Key Initiatives on Adoption of EE Measures in Cross-Sector

In Group 1, the State Designated Agencies (SDAs) in Karnataka, Maharashtra, and Haryana are responsible for regularly collecting energy consumption data, supplementing the mandatory Perform, Achieve, and Trade (PAT) program to ensure comprehensive energy usage monitoring and management across these states. In Group 2, Distribution Companies (DISCOMs) in Andhra Pradesh are gathering energy consumption data from energy-intensive industries across various sectors. This initiative aims to improve the understanding of energy usage patterns, facilitating more efficient energy management and informed policy development to support sustainable growth in the region.

Energy Savings

Energy intensity is defined as the total final energy consumption normalised per unit of economic value. It is calculated as the TFEC in ToE per unit of GSDP for a state. Figure 3 – 39 depicts each state's energy intensity, grouping states based on their TFEC.

Figure 3-39: State/UT wise Energy Intensity (FY 2021-22)

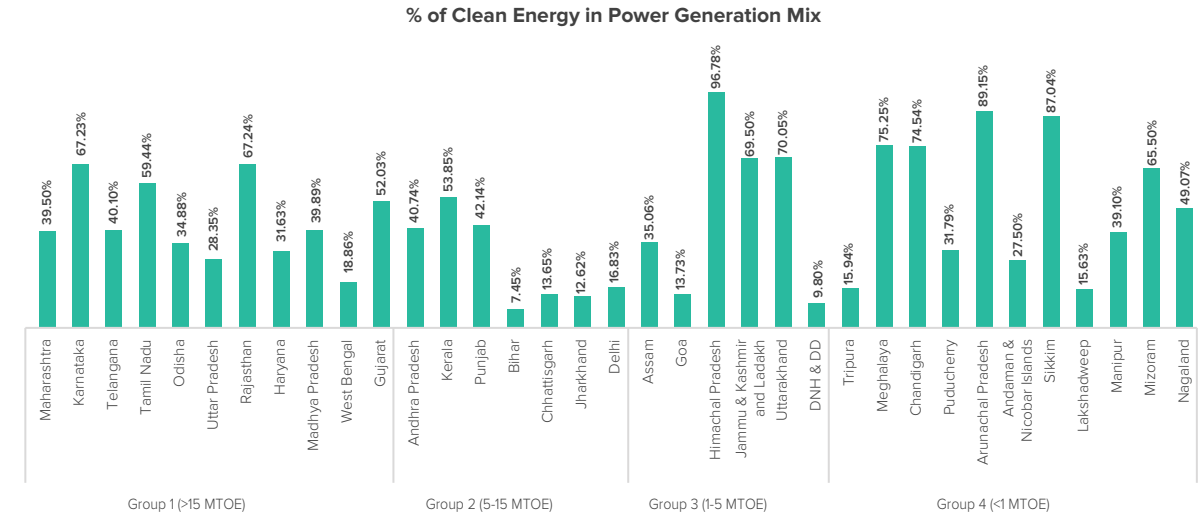


Source: MoSPI, Energy Statistics 2024, CEA General Review 2023, MoPNG's Petroleum and Natural Gas Statistics 2022-23 (oil, compressed natural gas (CNG)), and the Coal Directory 2021-22 (coal), Reserve Bank of India (RBI) Handbook of Statistics on Indian States 2023-24 (GSDP).

GSDP (FY 2021-22) is unavailable for Dadra & Nagar Haveli and Daman & Diu, Ladakh, and Lakshadweep.

Odisha from Group 1 has the highest energy intensity at 40.7 TOE/₹Crore, and Tripura from Group 4 has the lowest at 6.2 TOE/₹Crore. Chhattisgarh, Jharkhand, Meghalaya, Sikkim, and Haryana also have relatively high energy intensity levels. However, this energy intensity is linked to the structure of the States in terms of commercial, industrial and domestic share in the GSDP. A comprehensive overview of the clean energy mix in the generation is given in Figure 3 - 40 below:

Figure 3-40: %ge of Clean Energy in Power Generation Mix of States

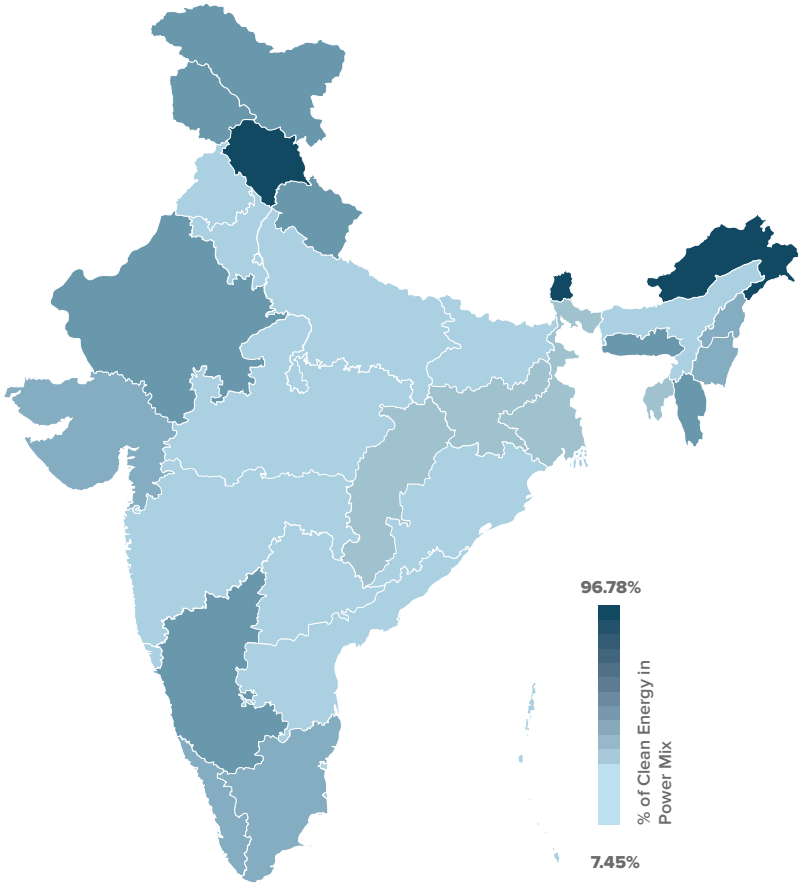


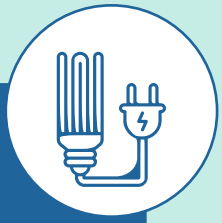
Source: Annual Report 2023-24, Ministry of Power - Government on India

States in hilly terrains with hydropower generation, including Himachal Pradesh, Jammu & Kashmir and Ladakh, Uttarakhand, Meghalaya, Arunachal Pradesh, Sikkim, Manipur, Mizoram, and Nagaland, have a significant clean energy mix. Additionally, several states with solar and/or wind power generation include Maharashtra, Karnataka, Telangana, Tamil Nadu, Odisha, Rajasthan, Haryana, Madhya Pradesh, Gujarat, Andhra Pradesh, Kerala, Punjab, Assam, and Puducherry.

A Map representation of the Clean Energy Generation Mix is given in Figure 3 - 41 below.

Figure 3-41: %ge of Clean Energy in Power Generation Mix





CROSS SECTOR SPOTLIGHT

- Karnataka has notified EE & EC Policy 2022-2027 with the aim of driving energy efficiency and conservation of different consumer categories for the state.
- Maharashtra has notified Green Hydrogen Policy in 2023, SAPCC has been prepared for 2023-2030 by the Ministry of Environment & Forest.
- Andhra Pradesh has Pumped Storage Power Promotion Policy -2022, Green Hydrogen & Green Ammonia Policy – 2023, and Energy Efficiency and Energy Conservation Policy 2023-2028
- Odisha has partnered with OUTR (Odisha University of Technology and Research) and IIT Bhubaneswar to engage PhD and M. Tech students in innovation and R&D related to energy efficiency. This initiative aims to foster academic involvement in the development of energy-efficient technologies and solutions. An MOU has been signed with CLASP (Collaborative Labelling and Appliance Standards Program) for the promotion and implementation of activities under the S&L (Standards & Labelling) scheme of BEE (Bureau of Energy Efficiency). The collaboration aims to enhance energy performance standards for appliances and products in Odisha.
- Telangana State Innovation Cell is dedicated to fostering a culture of innovation from the school age, aiming to bring together government and innovators to drive progress and solutions. An MOU has been signed with the Administrative Staff College of India for the implementation of Energy Conservation (EC) activities and programs in collaboration with TGREDCO (Telangana State Renewable Energy Development Corporation). This partnership seeks to promote energy efficiency and conservation across the state.
- Kerala launched its First Clean Energy Tech Focussed Clean Energy Innovation and Business Incubation Centre (CEIBIC) on the 22nd of June 2022 as a partnership between the Energy Management Centre (EMC) - Kerala, Kerala Development and Innovation Strategic Council (KDISC) and Clean Energy International Incubation Centre (CEIIC) supported by Kerala State Electricity Board (KSEB), Agency for New and Renewable Energy Research and Technology (ANERT) and Department of Electrical Inspectorate, Government of Kerala. Kerala has been keen to develop a plan of action to achieve its green and decarbonisation goals. The state's energy dynamics are being studied by the Centre for Study of Science, Technology and Policy (CSTEP), which aims to diversify its energy mix, reduce dependency on external sources, and build a more sustainable energy system. A book titled "Kerala Energy Transition Roadmap 2040", prepared by CSTEP, was released during the event.

4 RECOMMENDATIONS

Building on the strong participation observed in SEEI 2023, the SEEI 2024 has once again received comprehensive engagement from all 36 SDAs, representing the 28 states and 8 UTs. This year, the Index reveals a nuanced shift in state performance, with changes observed across the performance categories. The number of 'Front Runner' states has decreased from seven in 2023 to five in 2024, indicating the challenges in maintaining high levels of performance amidst evolving regulatory and implementation landscapes. This decline reflects the increasing rigour of the outcome-based indicators and the need for sustained efforts in policy enforcement, data transparency, and on-ground implementation.

Concurrently, the number of 'Contender' states has increased, signalling a positive trend of states transitioning from the 'Aspirant' category. The data reveals that this upward movement can be attributed to enhanced institutional capacity, greater adoption of sector-specific programs like the Energy Conservation Building Code (ECBC) and the Perform, Achieve, and Trade (PAT) scheme, and proactive participation in state-level energy efficiency action plans. However, challenges persist, particularly in the municipal and agriculture sectors, where data availability and inter-departmental coordination remain areas for improvement. Moving forward, fostering cross-sectoral collaborations, strengthening capacity-building initiatives, and leveraging digital tools for real-time data tracking will be critical for sustaining and accelerating this momentum.

The findings of SEEI 2024 provide a foundation for a set of actionable recommendations designed to help states accelerate the adoption of energy efficiency practices. These recommendations focus on critical areas such as establishing comprehensive energy data management systems, optimising the use of the State Energy Conservation Fund, and integrating energy efficiency in the State's Energy Transition Plans.

Additionally, the recommendations underscore the importance of promoting energy efficiency through Energy Service Companies (ESCOs) and leveraging the upcoming carbon market to maximize benefits. The implementation of the State Energy Efficiency Action Plan (SEEAP) is emphasised, highlighting the need for strategic policy development, targeted interventions, and robust monitoring mechanisms. Together, these initiatives aim to build a resilient, energy-efficient future, aligning state-level efforts with national and global climate objectives.

STRENGTHENING COMPREHENSIVE ENERGY DATA MANAGEMENT

To achieve effective and sustainable energy efficiency, states must prioritize comprehensive energy data management. Developing standardized protocols for data collection, analysis, and reporting across all SDAs is essential. Investing in modern energy databases and promoting collaborations with institutions like CII, EESL, and GRIHA will enhance data reliability and usability. Training local bodies to collect and utilise energy data for planning and monitoring will build grassroots capacity. Additionally, exploring advanced technologies like AI and IoT can optimise energy usage, predict demand patterns, and provide actionable insights for informed

decision-making. States should also consider conducting regular workshops and training programs for government officials, data analysts, and other stakeholders to reinforce best practices in energy data management and utilization. Clear milestones, such as completing state-level energy databases within 12 months and training 100 personnel per state within six months, should be established. Assigning responsibility to SDAs and conducting quarterly performance reviews will ensure sustained momentum.

TRANSITIONING TO A TARGET-BASED APPROACH FOR SEEAP IMPLEMENTATION

The successful implementation of State Energy Efficiency Action Plans (SEEAPs) requires a strategic shift from planning to execution. States must set clear, measurable, and time-bound goals to translate strategies into action. Forming cross-sectoral working groups with industry, government, and civil society representatives can facilitate resource mobilisation and expertise sharing. Creating accessible online portals to track and report energy efficiency progress will improve transparency and stakeholder engagement. Evaluating outcomes through defined metrics like energy savings, emissions reduction, and job creation will provide insights into program effectiveness and areas for improvement. Additionally, conducting periodic reviews and audits will ensure that deviations from targets are detected early and corrective actions can be taken proactively. States should create an implementation roadmap with phase-wise activities and designate a lead agency for coordination.

FOSTER COLLABORATIVE GOVERNANCE FOR STATE ENERGY TRANSITION

Achieving a sustainable energy transition requires synergistic efforts across departments and sectors. States can leverage the State Level Steering Committee (SLSC) to integrate energy efficiency with renewable energy initiatives like biomass and green hydrogen. Promoting interdepartmental workshops and establishing shared databases will help identify synergies, prevent overlaps, and streamline implementation. Regular stakeholder engagement is crucial to gathering feedback, adapting strategies, and resolving inter-departmental challenges effectively. By fostering collaborative governance, states can maximise the impact of their energy transition efforts. States should also explore international best practices, participate in global forums, and foster partnerships with academic institutions to stay updated on emerging trends and innovative practices in energy transition. Actionable steps include conducting biannual workshops and publishing a collaborative action plan within the first quarter of the year.

LEVERAGING SECF TO ENABLE FINANCING OF SCALED-UP ENERGY EFFICIENCY PROJECTS

The State Energy Conservation Fund (SECF) can be a powerful tool for scaling up energy efficiency initiatives if utilised strategically. While the Revolving Investment Fund (RIF) model is a proven approach that enables continuous reinvestment of repayments into new projects, other innovative mechanisms can also be explored. For instance, SECF can be used to provide partial risk guarantees to attract private sector investments. States can also use the fund to establish dedicated energy efficiency lending programs in collaboration with commercial banks. Grant-based funding for pilot projects and demonstration initiatives can serve as a catalyst for large-scale adoption. Additionally, performance-based financing,

where disbursements are linked to verified energy savings, can be implemented to ensure accountability. SECF can also support energy efficiency bonds that allow municipalities and utilities to raise capital for large-scale EE projects. Conducting thorough impact analyses to assess energy savings, economic benefits, and job creation outcomes will reinforce the fund's effectiveness and inform future funding decisions. Additionally, states should implement a transparent monitoring system to track fund utilization, measure its impact, and disseminate success stories to inspire similar initiatives across other regions. Each state should aim to implement at least five large-scale projects annually, with documented outcomes and learnings.

ESTABLISHING A COMPREHENSIVE FRAMEWORK FOR THE ESCO MECHANISM

Energy Service Companies (ESCOs) play a critical role in unlocking energy efficiency potential across sectors. To stimulate ESCO growth, states must establish a supportive regulatory framework that addresses performance risks and ensures fair contract terms. Developing a comprehensive ESCO mechanism framework involves several steps. First, risk assessment models should be formulated to identify technical, financial, and operational risks associated with EE projects. Performance risk can be mitigated through Energy Savings Performance Contracts (ESPCs) that link payments to actual savings achieved. Financial risks can be reduced by providing partial credit guarantees and access to concessional loans. States should promote the aggregation of smaller projects to create viable investment opportunities for ESCOs. Introducing performance-based incentives can motivate ESCOs to deliver measurable results. Standardising contracts and processes will build market confidence, particularly in sectors like MSMEs and public buildings, where energy savings can be significant. Facilitating partnerships between SDAs, financial institutions, and ESCOs can further accelerate energy efficiency adoption. States should also conduct awareness programs to educate stakeholders about the benefits of ESCO-based models and create platforms for sharing best practices and success stories. Establishing a state-level ESCO task force to review progress every six months and developing sector-specific ESCO programs can enhance implementation.

ALIGNING STATE INITIATIVES WITH CARBON MARKET MECHANISMS

The emerging domestic carbon market presents significant opportunities for states to advance energy efficiency. Aligning state-level initiatives with the National Carbon Credit Trading Scheme (CCTS) will enable participation in carbon credit generation and trading. Promoting energy-efficient technologies in public procurement can demonstrate leadership and influence private sector practices. Raising stakeholder awareness about the carbon market's mechanisms and potential benefits will encourage broader engagement. Providing targeted incentives for SMEs to adopt energy-efficient measures can unlock additional carbon credit generation and contribute to national climate goals. Additionally, states should facilitate the establishment of carbon registries, provide technical assistance to businesses in developing carbon credit projects, and explore collaborations with international carbon markets to maximise opportunities. States should develop an annual carbon market engagement plan with clear targets for credit generation and stakeholder training sessions.

These recommendations collectively aim to strengthen state-level energy efficiency efforts, ensuring alignment with national and global climate objectives and providing clear implementation pathways.

ANNEXURES

METHODOLOGY FOR CALCULATING TOTAL FINAL ENERGY CONSUMPTION (TFEC) OF INDIAN STATES (FY 2021–22)

OBJECTIVE

Total Final Energy Consumption (TFEC) represents the total energy consumed by end-use sectors in each state/UT and is used in the State Energy Efficiency Index (SEEI) 2024 for peer-grouping. TFEC is expressed in thousand tonnes of oil equivalent (ktoe) and includes major commercial fuels—coal, lignite, petroleum products, natural gas (CNG), and electricity. Traditional biomass is acknowledged but excluded due to lack of state-level data. Applicable Conversion Factors have been obtained from **Energy Statistics India 2024** report by MoSPI – GoI.

DATA SOURCES AND FUELS INCLUDED

Fuel Type	Source of Information
Coal & Lignite	Coal Directory of India 2021–22 (Table 4.24) – state-wise Dispatch/Off-Take data
	CEA General Review 2023 – Coal consumption for power generation
Petroleum Products	MoPNG Statistics 2022–23 – State-wise refined fuel consumption (Table V.10 – V.23)
	CEA General Review 2023 – Petroleum consumption for power generation
Natural Gas (CNG)	MoPNG Statistics 2022–23 – Sales data; excludes PNG/LNG due to data gaps (Table III.27)
Electricity	CEA General Review 2023 – Consumption and T&D losses

COMPUTATIONS AND ADJUSTMENTS

1. **Unit Conversion:** All source data in physical units (metric tonnes, kilolitres, cubic meters, GWh, etc.) are converted into energy units of thousand tonnes of oil equivalent (ktoe) using standard conversion factors:

Fuel Type	Unit Conversion
Coal	1 Metric Tonne of Coal = **0.394** toe (based on an energy content of 16.86 PJ per million tonnes).
Lignite	1 Metric Tonne of Lignite = 0.223 toe (9.546 PJ per million tonnes).

Petroleum Products	
LPG	1 Metric Tonne of LPG = **1.13** toe
Motor Spirit (gasoline)	1 Metric Tonne of Motor Spirit = **1.07** toe
Kerosene	1 Metric Tonne of Kerosene = **1.045** toe
Diesel (HSD)	1 Metric Tonne of Diesel (HSD) = **1.035** toe
Furnace Oil	1 Metric Tonne of Furnace Oil = **0.985** toe
LSHS (low sulphur heavy stock)	1 Metric Tonne of LSHS (Low Sulphur Heavy Stock) = **0.985** toe
Petroleum coke	1 Metric Tonne of Petroleum Coke = **0.764** toe
Natural Gas (CNG)	1 Billion Cubic Meters (BCM) of Natural Gas = **0.9** MTOE (million toe) 1 Metric Tonne of Natural Gas = **1.18** toe[1]
Electricity	1 GWh of Electricity = **0.0841** ktoe

2. **Avoiding Double Counting**: Fuels used in electricity generation are subtracted from the primary fuel totals (e.g., coal, diesel) to prevent duplication with electricity consumption.

Subtracting Power Sector Coal and Lignite use:

State-wise coal off-take and coal used in power generation (utility and captive) are sourced from the Coal Directory and converted to ktoe (1 tonne = 0.394 toe). Power sector use is subtracted to avoid double counting, yielding coal TFEC for non-power sectors.

- **Coal TFEC = (Total off-take – Power use) × 1000 × 0.394**

  The same method applies to lignite, using a conversion factor of **0.223 toe/tonne.**

Subtracting Power Sector Oil Use:

State-wise diesel (HSD/LDO) and fuel oil (FO/LSHS) consumption in power generation is sourced from CEA and converted to ktoe using standard density and energy content values (e.g., diesel: ~0.83 ton/kL, 1.035 TOE/ton). Power sector use is subtracted from total consumption to avoid double counting

3. **Electricity Consumption:** State-wise electricity consumption is calculated as electrical energy sold plus T&D losses, reflecting total demand.

- **Total Electricity (GWh) = Electrical Energy Sold + T&D losses**

  This is converted to ktoe using the factor 1 GWh = 0.0841 ktoe, representing the state's final electricity use.

4. **Natural Gas:** Only CNG used in transport is included in TFEC, converted using **1.18 toe/ton or 0.9 ktoe/MMSCM** under standard conditions. PNG, LNG, and power sector gas are excluded due to lack of state-level data, leading to underestimation in gas-intensive states. TFEC from natural gas reflects only CNG consumption.

5. **Non-Energy Use Exclusion - Petroleum Products:** Petroleum products not used as fuels—such as bitumen, lubricants, and waxes—are excluded from TFEC, as they do not contribute to energy consumption.

1 Assuming standard methane density and heating value). An assumption of standard conditions at 1 atm and 15.56°C is used for gas volume to mass conversion

ASSUMPTIONS AND LIMITATIONS

- **Traditional Fuels Excluded:** Biomass use is not quantified due to lack of recent disaggregated data.
- **State Splits and Mergers:** Adjustments made for J&K/Ladakh split and DNH & Daman-Diu merger.
- **Missing Data:** Missing values treated as zero where appropriate.
- **Natural Gas Coverage:** Industrial gas consumption (PNG/LNG) is underestimated due to data gaps.

LIMITATIONS AND CAVEATS

While this methodology provides a comprehensive measure of final energy use, there are several limitations and points to note:

- **Traditional Biomass** excluded due to lack of state-level data, leading to underestimation of TFEC in biomass-reliant states. The index focuses on commercial energy use.
- **Natural Gas Limitation:** TFEC calculation excludes PNG and industrial LNG due to data gaps, leading to underestimation in gas-intensive states. Only transport CNG is included.
- **Captive Power Generation Caveat:** Coal and diesel used in known captive power plants are deducted to avoid double counting. However, unreported use of other fuels (e.g., gas, biomass) in industrial captive generation may introduce minor inaccuracies.

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