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LiFE
Lifestyle for
Environment

STATE ENERGY EFFICIENCY INDEX 2023



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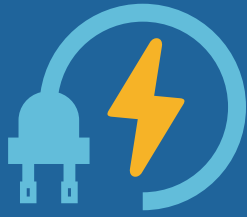
ABBREVIATIONS

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
AI	Artificial Intelligence
AJAY	Atal Jyoti Yojana
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AO	Adjudicating Officer
APCPDCL	Andhra Pradesh Central Power Distribution Company Limited
APDCL	Assam Power Distribution Company Limited
APEPDCL	Andhra Pradesh Eastern Power Distribution Company Limited
APERC	Andhra Pradesh Electricity Regulatory Commission
APMIP	Andhra Pradesh Micro Irrigation Project
APSECM	Andhra Pradesh State Energy Conservation Mission
APSEEDCO	Andhra Pradesh State Energy Efficiency Development Corporation Ltd
APSPDCL	Andhra Pradesh Southern Power Distribution Company Limited
APSRTC	Andhra Pradesh State Road Transport Corporation
ARR	Average Realisable Revenue
ASCI	Administrative Staff College of India
ASTC	Assam State Transport Corporation
BEE	Bureau of Energy Efficiency
BEEP	Building Energy Efficiency Programme
BESCOM	Bangalore Electricity Supply Company Limited
BEV	Battery Electric Vehicle
BLDC	Brushless Direct Current Motor
BOV	Battery -Operated Vehicle
CCMS	Centralized Control and Monitoring System
CCTS	Carbon Credit Trading Scheme
CEA	Central Electricity Authority
CESC	Chamundeshwari Electricity Supply Corporation Limited
CII	Confederation of Indian Industry
CNG	Compressed Natural Gas
CO₂	Carbon Dioxide
COP	Conference of the Parties
CPRI	Central Power Research Institute
CSI	Computer Society of India
CSO	Civil Society Organisation
DBT	Direct Bank Transfer
DC	Designated Consumer
DEFP	Domestic Efficient Fans Programme
DISCOM	Distribution Company
DoEFCC	Department of Environment, Forest and Climate Change
DSM	Demand Side Management
DT	Distribution Transformer
DTC	Distribution Transformer Centre

DVVNL	Dakshinanchal Vidyut Vitran Nigam Ltd.
EC	Energy Conservation
ECBC	Energy Conservation Building Code
ECSBC	Energy Conservation and Sustainable Building Code
EE	Energy Efficiency, Energy Efficient
EEB Cell	Energy Efficient Building Cell
EERF	Energy Efficiency Revolving Fund
EESL	Energy Efficiency Services Limited
EETL	Energy Efficient LED Tube Light
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
FAR	Floor Area Ratio
FI	Financial Institution
FICCI	Federation of Indian Chambers of Commerce & Industry
FY	Fiscal Year
GBCI	Green Building Certification Inc
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GHG	Greenhouse Gas
GMC	Guwahati Municipal Corporation
GRIHA	Green Rating for Integrated Habitat Assessment
GSDP	Gross State Domestic Product
GW	Giga Watt
H&UD	Housing & Urban Development
HAREDA	Haryana Renewable Energy Development Agency
HESCOM	Hubli Electricity Supply Company
HKMCF	Hare Krishna Movement Charitable Foundation
HMWS&SB	Hyderabad Metropolitan Water Supply & Sewerage Board
HT	High Tension
HVDS	High Voltage Distribution System
ICE	Internal Combustion Engine
IE	International Efficiency standard
IESS	India Energy Security Scenario
IGBC	Green Building Council
IGEA	Investment Grade Energy Audit
IIM	Indian Institutes of Management
IISc	Indian Institute of Science
IIT	Indian Institutes of Technology
INR	Indian Rupee
IO	Inspecting Officer
IoT	Internet of Things
ISHRAE	Indian Society of Heating, Refrigerating and Air Conditioning Engineers
IT	Information Technology
IWWA	Indian Water Works Association

JERC	Joint Electricity Regulatory Commission
JREDA	Jharkhand Renewable Energy Development Agency
KERC	Karnataka Electricity Regulatory Commission
KREDL	Karnataka Renewable Energy Development Limited
KSEB	Kerala State Electricity Board
KSRTC	Kerala State Road Transport Corporation
KTCO₂	Killo Tonnes of Carbon Di Oxide
KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation
KVA	Kilovolt Ampere
KVK	Krishi Vigyan Kendra
KWA	Kerala Water Authority
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
MA&UD	Municipal Administration & Urban Development
MC	Municipal Corporation
MEA	Mandatory Energy Audit
MEDA	Maharashtra Energy Development Agency
MEEP	Municipal Energy Efficiency Programme
MESCOM	Mangalore Electricity Supply Company Limited
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
MSE-CDP	Micro and Small Enterprises- Cluster Development Programme
MSME	Micro, Small, and Medium Enterprise
MtCO₂	Million Tonnes of Carbon di-oxide
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
NEERMAN	National Energy Efficiency Roadmap for Movement towards Affordable & Natural Habitat
NGO	Non-Governmental Organisation
NITI	National Institution for Transforming India
NREDCAP	New and Renewable Energy Development Corporation Ltd
OT	Operational Technology
PAT	Perform Achieve and Trade
PDMD	Per Drop More Crop
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
PSPCL	Punjab State Power Corporation Limited
PSU	Public Sector Undertaking
PuVVNL	Purvanchal Vidyut Vitaran Nigam Ltd.
R&D	Research and Development
R&M	Repair & Maintenance
RAFTAAR	Remunerative Approaches for Agriculture and Allied sector Rejuvenation
RDSS	Revamped Distribution Sector Scheme
RE	Renewable Energy
RIF	Revolving Investment Fund
RKVV	Rashtriya Krishi Vikas Yojana
S&L	Standards and Labeling
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
SHLC	State High-Level Committee
SLNP	Street Lighting National Programme
SLSC	State Level Steering Committee
SMART	Specific, Measurable, Achievable, Relevant, and Time-bound goals
SME	Small and Medium Enterprise
SNA	State Nodal Agency
SPEED	State Partnership for Energy Efficiency Demonstration
SRTC	State Road Transport Corporation
SWPS	Solar Water Pumping Systems
T&D	Transmission & Distribution
TFEC	Total Final Energy Consumption
TMC	Thousand Million Cubic-feet
ToD	Time of Day
TOE	Tonnes of oil equivalent
ToU	Time of Use
TSNPDCL	Telangana State Northern Power Distribution Company Limited
TSREDCO	Telangana State Renewable Energy Development Corporation Limited
TSSPDCL	Telangana State Southern Power Distribution Company Limited
TWh	Terawatt hour
UDD	Urban Development Department
UJALA	Unnat Jyoti by Affordable LEDs for All
ULB	Urban Local Body
UNFCCC	United Nations Framework Convention on Climate Change
UPNEDA	Uttar Pradesh New and Renewable Energy Development Agency
UT	Union Territory
WATCO	Water Corporation of Odisha
WRI	World Resources Institute
YASHADA	Yashwantrao Chavan Academy of Development Administration



Energy efficiency is the cornerstone of just and equitable sustainable energy transitions and a critical lever for decarbonisation of the economy

India's G20 Presidency in 2023 emphasised on doubling the rate of improvement in energy efficiency by 2030



Prime Minister's Mission LiFE initiative has gained global recognition, placing conscious consumption and energy efficiency as a central priority



EXECUTIVE SUMMARY

India's rapid economic growth, marked by an expanding middle class and swift urbanisation, has propelled it to become the third-largest energy consumer worldwide. From 2000 to 2020, the nation's total primary energy demand more than doubled, soaring from 417 million tonnes of oil equivalent (Mtoe) to 937 Mtoe¹. This surge underscores the critical need for a sustainable approach to energy consumption, aligning with India's ambitious goals for a low-carbon future. At the forefront of India's sustainable development commitment is its updated Nationally Determined Contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC). This pivotal move reaffirms India's target of reducing total projected carbon emissions by one billion tonnes by 2030² and transitioning to a net-zero economy by 2070. The nation's leadership role, particularly highlighted by its G20 presidency in 2023, has further cemented its position as a key influencer in shaping global climate policies and consequent actions. India's Mission on Lifestyle for Environment (Mission LiFE), introduced by the Honourable Prime Minister, Shri Narendra Modi has gained global recognition, placing conscious consumption and energy efficiency as a central priority.

Energy efficiency (EE) is the cheapest, fastest and cleanest solution to complement renewable energy in addressing climate change and achieving energy security. This importance is echoed in the global commitment made at the twenty-eighth Conference of the Parties (COP28) to double energy efficiency rates and triple deployment of renewable power capacity by 2030. EE is particularly pivotal for a country like India, where the diversity of its thirty-six (36) states and union territories (UTs) presents unique challenges and opportunities in terms of economic status, level of development, climate, and energy consumption. Collaborative efforts between central and state governments are crucial to ensure that resources for energy efficiency are allocated judiciously, policies across different levels of government are well-aligned, and progress in energy efficiency initiatives is regularly tracked and reported for timely and requisite course modification.

STATE ENERGY EFFICIENCY INDEX 2023

The State Energy Efficiency Index (SEEI) is a tool designed to track EE initiatives in the states and UTs. It provides insights on sub-national energy efficiency policies, programmes, and investments. The SEEI activity was initiated by Bureau of Energy Efficiency (BEE), in association with Alliance for an Energy Efficient Economy (AEEE), to evaluate the annual progress of EE implementation in the states. SEEI 2023 is the fifth edition of the index after the successful execution of State Energy Efficiency Preparedness Index 2018, SEEI 2019, SEEI 2020 and SEEI 2021-22.



SEEI 2023
is the fifth
edition of
the index

The objectives of SEEI 2023 are to:

- Help drive EE policies and programme implementation at the state and local level
- Highlight best practices and encourage healthy competition among 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)

Accordingly, the indicator framework has been expanded to include more specific and diverse metrics, aligning closely with India's evolving national energy efficiency priorities. Some new indicators added in SEEI 2023 include non-fossil fuel-based power procurement, EE in affordable housing, measures for electrification for end-use in industries and electric cooking in buildings, and actions for reducing the gap between average cost of supply (ACS) and average realisable revenue (ARR) of the utilities. The SEEI 2023 framework places a strong emphasis on programme-specific indicators which are designed to assess the outcomes of distinct energy efficiency initiatives undertaken by SDAs and state departments, independently or in collaboration with the BEE, industry associations, or in public-private partnerships. Examples of such targeted programmes include retrofit or greenfield projects, energy audits and implementation of recommendations, technology demonstration as well as training and capacity-building programmes.

The SEEI 2023 assesses the performance of 36 states and UTs using 65 qualitative, quantitative, and outcome-based indicators measures. It is distributed across seven (7) demand sectors: buildings, industry, municipal services, transport, agriculture, electricity distribution companies (DISCOMs), and cross-sector initiatives.

Figure A-1 below shows the performance of states in SEEI 2023, with the most improved states, i.e. those that have increased their scores by 10 or more points from SEEI 2021-22, marked with a star.

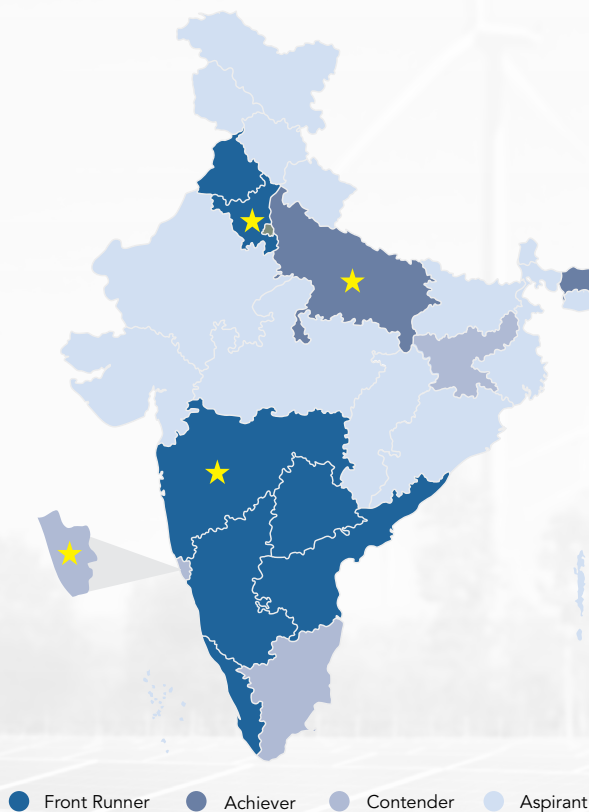


Figure A-1: Performance of states and UTs under SEEI 2023

KEY OUTCOMES

In SEEI 2023, the states and UTs are categorised as 'Front runner' (≥ 60), 'Achiever' (50-59.75), 'Contender' (30-49.75), and 'Aspirant' (< 30) based on their total scores.

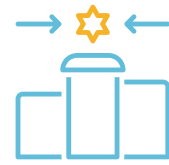
Furthermore, to enable peer-to-peer comparison of performance, all the states and UTs are classified into four groups based on their total final energy consumption (TFEC): Group 1 (> 15 million tonnes of oil equivalent (MTOE)), Group 2 (5-15 MTOE), Group 3 (1-5 MTOE), and Group 4 (< 1 MTOE).

The top-performing states in each group are Karnataka (Group 1), Andhra Pradesh (Group 2), Assam (Group 3), and Chandigarh (Group 4). Compared to five (5) states in SEEI 2021-22, there are seven (7) states - Andhra Pradesh, Haryana, Karnataka, Kerala, Maharashtra, Punjab and Telangana in the 'Front runner' category in SEEI 2023. Two (2) states, Assam and Uttar Pradesh are in the 'Achiever' category, and three (3) states—Goa, Jharkhand, and Tamil Nadu—are in the 'Contender' category.

With an overall score of 86.5 out of 100, Karnataka is the top-performing state in SEEI 2023. With the only active "Energy Conservation and Energy Efficiency Policy," the state has implemented significant measures in the buildings, industries, transport, municipal services, and agriculture sectors. In buildings, the state has adopted the Karnataka Energy Conservation Building Code (KECBC), and promoted energy-efficient appliances in commercial buildings, along with significant adoption of energy-efficient practices in new constructions, with 154 GRIHA-rated green buildings, 290 IGBC-rated green buildings, and 306 Leadership in Energy and Environmental Design (LEED)-rated green building projects. Industries benefit from focused initiatives like mandatory energy audits and capacity-building. Transport sector advancements include policies for electric vehicles (EVs) and trainings on fuel efficiency. Municipal services witnessed the implementation of energy-efficient street lighting and water pumping stations. In agriculture, the state has mandated the use of energy-efficient pump sets conforming to BEE standards in irrigation. Across sectors, the state has set ambitious targets for energy consumption reduction and has actively collaborated with renowned institutes like IISc Bangalore, IIM Bangalore, IIT Dharwad, and Central Power Research Institute (CPRI) to garner expert proposals and implement energy-efficient measures.

The second-highest performer, Andhra Pradesh, with a score of 83.25 out of 100, has adopted a multi-faceted approach to energy efficiency involving policy formulation, financial incentives, capacity-building, and collaborative initiatives across various sectors. In buildings, the state has mandated Energy Conservation Building Code (ECBC) 2017 and Eco Niwas Samhita (ENS) 2021, with significant adoption across urban local bodies and emphasis on energy-efficient appliances in government buildings. The industrial sector has integrated energy efficiency into policies, notably with mandatory energy audits for industries and Micro, Small, and Medium Enterprises (MSMEs), supported by the SDA. In transport, the Electric Mobility Policy (2018-23) promotes sustainable transportation, with an equal focus on EV adoption and charging infrastructure. Municipal services initiatives include energy-efficient street lighting and water pumping and supply systems, coupled with capacity-building programmes. The power distribution sector has made rapid progress in smart implementation and steady reduction in transmission and distribution (T&D) losses. In agriculture, the state emphasises integrated water and energy savings, promoting energy-efficient practices and equipment.

In SEEI 2023, fifteen (15) states have improved their scores compared to SEEI 2021-22. Notably, four (4) states—Goa, Uttar Pradesh, Maharashtra and Haryana—have demonstrated significant progress, improving by over 10 points relative to SEEI 2021-22. Notably, the most improved states in this assessment are Maharashtra and Haryana,



**Karnataka
is the top-
performing
state in SEEI
2023**



**Enhanced data
submission by
many SDAs,
15 states
improved
their scores,
compared to
SEEI 2021-22**

witnessing significant score increases of 18.5 and 17 points, respectively, resulting in an overall score of 72 each. The observed improvements in Maharashtra and Haryana can be attributed to enhanced data submission for common indicators and the programme-specific indicators. Conversely, the most substantial decline in score in SEEI 2023 has been observed in Rajasthan, with a decrease of 46.5 points, primarily attributed to lack of reported data.



In the building sector, the ECBC 2017 was notified in two (2) additional states in SEEI 2023, making the total number of states with gazette ECBC 2017 notification twenty (20). ECBC has been adopted in municipal building bye-laws by sixteen (16) states. Additionally, twelve (12) states have set up a government authority responsible for certifying and enforcing compliance with ECBC standards. Furthermore, seven (7) states have reported commendable progress in the construction of Super ECBC buildings within the state. Five (5) additional states have taken steps for the notification of ENS 2021, bringing the total to seventeen (17). Eleven (11) states have reported policies or notifications mandating the use of energy-efficient appliances in government buildings. Six (6) states have reported incorporating EE in affordable housing at the state level, implementing schemes, policies, and financial incentives for affordable housing projects. As many as fifteen (15) states have EE programmes in public buildings, primarily the Building Energy Efficiency Programme (BEEP). While fourteen (14) states reported the implementation of EE programmes in commercial buildings, nine (9) have reported these in residential buildings. Similarly, nine (9) states have reported capacity-building programmes on energy efficiency in the sector for concerned stakeholders viz. government agencies, utility companies, architects, building developers, energy professionals, and environmental organisations.



In the industry sector, nine (9) states have provisions for EE in their Industry/MSME policies. Institutional capacity for promoting energy efficiency in the industrial sector is undergoing positive developments, with fourteen (14) states and UTs reporting the existence of an entity dedicated to developing capacity and providing technical expertise in the sector. Thirty (30) states reported having a designated government authority to enforce EC/EE regulations or measures for the industry sector. Six (6) states reported allocating a dedicated state budget to government authorities for EE activities in the industrial sector. Ten (10) states reported the implementation of EE programmes specifically targeted at large industries while seven (7) reported the implementation of EE programmes specifically targeting MSMEs. Five (5) states have reported implementing measures for the electrification of end-use energy in industries. Energy conservation awards were bestowed upon industrial units across twenty-three (23) states and UTs with Maharashtra having the highest count, in recognition of their outstanding efforts.



In the municipal services sector, fourteen (14) states have conducted capacity-building on EE in municipal services for relevant stakeholders at the state level. Twelve (12) states have a government authority to enforce energy conservation (EC)/EE regulations in the sector. However, only three (3) states have reported a dedicated budget to the relevant government authority for EE initiatives. Twelve (12) states reported taking steps to promote the use of EE pumps and motors in municipal water and sewerage systems adopted in the municipal sector. Twenty (20) states have EE street lighting programmes while eleven (11) have EE programmes related to water/sewerage systems. Furthermore, eleven (11) states have reported having EE programmes for capacity-building in the municipal services sector.



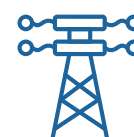
In the transport sector, twelve (12) states reported having policies/guidelines to advocate fuel efficiency. An impressive twenty-five (25) states have notified state electric mobility policies, showcasing a growing commitment to adopting cleaner transportation options. The policy is in the draft stage in three (3) other states. Twenty-five (25) states have a designated government authority to enforce EC/EE regulations while fifteen (15) have state entities to develop capacity and provide technical expertise on EE in the transport sector. However,

only four (4) states have a dedicated budget for EE activities in transport. Twelve (12) states reported having policies on EV procurement for government use and seven (7) have started rolling out charging infrastructure for all types of electric vehicles in the state. Eight (8) states have EE public transport programmes, whereas fourteen (14) states have similar programmes for private transport.

In the agriculture sector, four (4) states reported having policies to encourage the development of EE and climate-friendly cold chain infrastructure in the state while ten (10) have notified policies related to integrated water and energy savings. Fifteen (15) states reportedly have a state designated entity to develop capacity and provide technical expertise on EC/EE in agriculture for farmers, producer organisations, government officials, and other stakeholders in the value chain. Ten (10) states have a government authority to enforce EC/EE regulations, of which eight (8) have reported allocating budgets for developing capacity to implement EE measures in agriculture. EE programmes in agriculture are reported to be undertaken in nine (9) states.



In the DISCOM sector, a total of twenty-six (26) states have reported adopting ToD/ToU tariffs for commercial or industrial consumers, while ten (10) states have extended the application of ToD/ToU tariffs to domestic consumers. Thirty (30) states have submitted periodic energy accounting reports to BEE. Nine (9) states have taken steps to reduce the ACS-ARR gap to zero by FY 2024-2025. Twenty-six (26) states have provided data on the number of utility consumers equipped with smart meters, and almost all states have reported data about the metering completed in the feeder and DT levels. Fourteen (14) states reported programmes for DSM, and ten (10) reported capacity-building programmes on EE in the DISCOM sector.



In cross-sectoral initiatives, the development of State Energy Efficiency Action Plans (SEEAPs) is gaining momentum, with eight (8) states having operational plans and five (5) additional states having the draft SEEAPs at the time of finalizing the SEEI 2023 results. Of these, twelve (12) states have reported EE and energy savings targets at the state and sector levels. Further, the growing understanding of the importance of state level EE/EC policies is evident with three (3) states having notified policies and another three (3) states having policies in draft stage. Eight (8) states reported having a state policy, programme, or financial instrument on the promotion of innovation and research and development (R&D) in EE. However, only five (5) states have utilised more than 80% of the funds allocated by BEE for implementing their annual action plans for fiscal year 2023. A dedicated state budget for the SDAs to undertake EE/EC activities has been reported in only seven (7) states. Twenty-seven (27) states and UTs reported contributing matching funds to the State Energy Conservation Fund (SECF). However, only two (2) SDAs have utilised the SECF for EE adoption in the state during the fiscal year 2022-23. Twenty-one (21) states have formed a State-Level Steering Committee headed by the Chief Secretary for a sustainable energy transition. Nine (9) SDAs have collaborated with government entities and eight (8) with private entities to promote EE in different sectors. Only eight (8) SDAs furnished data on activities undertaken by their Inspecting Officers (IOs) appointed under section 17 of the EC Act, 2001.



FINDINGS AND RECOMMENDATIONS FOR STATES

The key findings of SEEI 2023 are summarised below:

- States have shown notable progress in developing EE policies and regulations, with a shift towards creating state energy efficiency action plans. Some states are even advancing towards specific state-level EE policies. Nonetheless, the availability of outcome-based data remains a challenge for SDAs.



**SEEAP
implementation,
sustainable
funding for EE
and synergised
efforts
for energy
transition
should be
prioritized**

- The extent of data reporting varied among states. Notably, in SEEI 2023, the increase in front runner states are accompanied by a surge in states in the aspirant category compared to SEEI 2021-22. This underscores the imperative need for most states to improve the comprehensiveness of their reporting.
- A number of SDAs took proactive steps in initiating data collection early in the year, with several showcasing exceptional performance in both the quality of their reporting and the scale of their advancements in energy efficiency.

Based on the above findings, some recommendations are outlined below to assist the states in furthering EE implementation:

- **Advancing comprehensive energy data management at the subnational level:** To ensure effective energy efficiency strategies, states must prioritize data collection, measurement, and monitoring at both the state and local levels. By systematically collecting and analysing data on energy usage patterns, states can identify areas of high consumption, inefficiencies, and potential energy savings. This data-driven approach allows for tailored energy conservation strategies and implementation of effective energy efficiency programmes.
- **Effective implementation of the SEEAP:** Formulating the SEEAPs is a crucial step towards achieving India's NDCs. However, the actual benefits will be realised only through their effective implementation. Translating the SEEAP recommendations into tangible outcomes requires strategic policies, impact-oriented programmes, Specific, Measurable, Achievable, Relevant, and Time-Bound (SMART) goals, investment analysis, comprehensive metrics to assess impacts, and a robust monitoring and evaluation framework. Forming working groups, transparent reporting, and stakeholder engagement are vital for success.
- **Synergise efforts for state energy transition:** The State Level Steering Committee (SLSC) on Energy Transition constituted under the Chief Secretaries of states focuses on targeted actions in renewables, energy efficiency, biomass, and green hydrogen to drive sustainable economic growth and energy transition. Synchronised efforts among state departments, SDAs, and State Nodal Agencies (SNAs) for renewable energy are essential to leverage knowledge, data, and resources and align strategies with climate and energy goals. Regular stakeholder engagement, transparent reporting, and sharing best practices will enhance the viability of each component to be supervised and managed by the SLSC, contributing to a more efficient, clean energy driven future.
- **Leveraging SECF in the revolving investment fund (RIF) mode:** By allocating a portion of SECF funds to a revolving pool, states can create a sustainable engine for energy efficiency project implementation. This approach ensures the fund's sustainability by reinvesting repayments from financed projects into new energy efficiency initiatives. The SECF-RIF model aims to boost commercial lending for energy efficiency by providing low-interest loans to financial institutions, which in turn, finance energy efficiency projects for businesses and consumers.
- **Enabling the adoption of energy efficiency through Energy Service Companies (ESCOs) in states:** ESCOs offer comprehensive energy management services, from audits to project execution. However, the ESCO market in India faces several policy and financial challenges, including limited credit access, lack of awareness, and performance risk concerns. To unlock its full potential, states should create a supportive environment by protecting ESCO interests, aggregating demand, developing comprehensive policy frameworks, standardising contracts, and fostering a favourable financial landscape. Engaging ESCOs not only boosts energy efficiency but also supports job creation and energy optimisation in crucial sectors like MSMEs and buildings.

- **Integrating gender equality and social inclusion (GESI) in state-level energy efficiency policies and programmes:** Achieving energy efficiency requires inclusive strategies that consider the diverse needs and challenges faced by different genders and social groups. Implementing the GESI framework helps policymakers design more effective targeted interventions. Examples include offering incentives for energy audits in women-led enterprises, focusing on clean cooking solutions, integrating energy efficiency measures in affordable housing projects, and providing access to finance for energy-efficient technologies. Building capacity within government agencies and organisations to understand and implement GESI principles is essential for long-term success.
- **Leverage the carbon market for energy efficiency:** The proposed Carbon Credit Trading Scheme (CCTS) will create a unified domestic carbon market in India. States must leverage this opportunity to benefit from market mechanisms by promoting energy-efficient technologies through public procurement and raising awareness among stakeholders about the link between energy efficiency and carbon credits. Training initiatives, financial incentives, and supportive policies are essential for the growth of energy efficiency within the carbon market, resulting in reduced emissions and promoting sustainability.



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45%

Energy efficiency is a key lever for India to achieve the NDC of reducing emission intensity of GDP by 45% by 2030 from 2005 level.



Centre-state collaboration is crucial for enhanced energy efficiency to ensure:

- alignment of policies
- allocation of resources
- monitoring of progress

1. INTRODUCTION

India's rapid economic growth, marked by an expanding middle class and swift urbanisation, has propelled it to become the third-largest energy consumer worldwide. From 2000 to 2020, the nation's total primary energy demand more than doubled, soaring from 417 million tonnes of oil equivalent (Mtoe) to 937 Mtoe. Further, India's energy demand in buildings, industry, transport, and agriculture is set to increase 3.5 times to 1,788 Mtoe³, in 2047 from 2022 levels. This surge underscores the critical need for a sustainable approach to energy consumption, aligning with India's ambitious goals for a low-carbon future. At the forefront of India's commitment to sustainable development are its updated Nationally Determined Contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC)⁴. This pivotal move reaffirms India's target of transitioning to a net-zero economy by 2070 and reducing its emission intensity of GDP by 45% from 2005 levels by 2030. The nation's leadership role, particularly highlighted by its G20 presidency in 2023, has further cemented its position as a key influencer in shaping global climate policies and consequent actions.

Given that energy is responsible for over three-fourths of India's total greenhouse gas (GHG) emissions, the role of energy efficiency (EE) in achieving these targets is paramount. Energy efficiency is the cheapest, fastest and cleanest means to complement renewable energy in addressing climate change and achieving energy security. This importance is echoed in the global commitments made at the G20 summit and COP28 to double the rate of improvement of energy efficiency by 2030. To align with these ambitious climate targets, India is committed to translating national objectives into specific, actionable energy-saving measures at the state level. India's Mission on Lifestyle for Environment (Mission LiFE), introduced by the Honourable Prime Minister, Shri Narendra Modi has gained global recognition, placing conscious consumption and energy efficiency as a central priority.

The foundation of India's energy efficiency framework stems from the Energy Conservation (EC) Act of 2001. Central to this structure is the Bureau of Energy Efficiency (BEE), which, along with state designated agencies (SDAs) across the states and union territories (UTs), develops, facilitates, implements, and enforces EE policies and programmes. Over the years, the BEE has been instrumental in spearheading numerous successful energy efficiency initiatives across the country. These include the Standards and Labelling (S&L) programme for appliances and equipment, the Energy Conservation Building Code (ECBC) for commercial buildings, the Eco-Niwas Samhita (ENS) for residential buildings and the Perform Achieve and Trade (PAT) scheme targeting energy-intensive industries, buildings, and other facilities.

The 2022 amendment to the EC Act has empowered state governments to play a more active role in India's energy transition. This includes enhanced powers to amend and implement Energy Conservation and Sustainable Building Codes (ECSBC), levy fees, establish budgets, manage dedicated funds, and set energy consumption standards for promoting the efficient use of energy and its conservation. A significant development has been the introduction of SEEAP for each Indian state, initiated by BEE⁵. Tailored to each state's unique needs and capacities, the SEEAPS are crucial in integrating energy efficiency measures into the most energy-intensive sectors of the economy. These plans are increasingly taking shape, demonstrating the varied requirements and capabilities of different states and UTs, and are essential in localising national objectives into effective actions.



To double the rate of improvement of energy efficiency by 2030, the national objectives must be translated to specific, actionable energy-saving measures at the state level

Energy efficiency is pivotal for a country like India, where the diversity of its thirty-six (36) states and union territories (UTs) presents unique challenges and opportunities in terms of economic status (Figures 1-1), level of development, climate, and energy consumption (Figures 1-2 & 1-3). Collaborative efforts between central and state governments are crucial

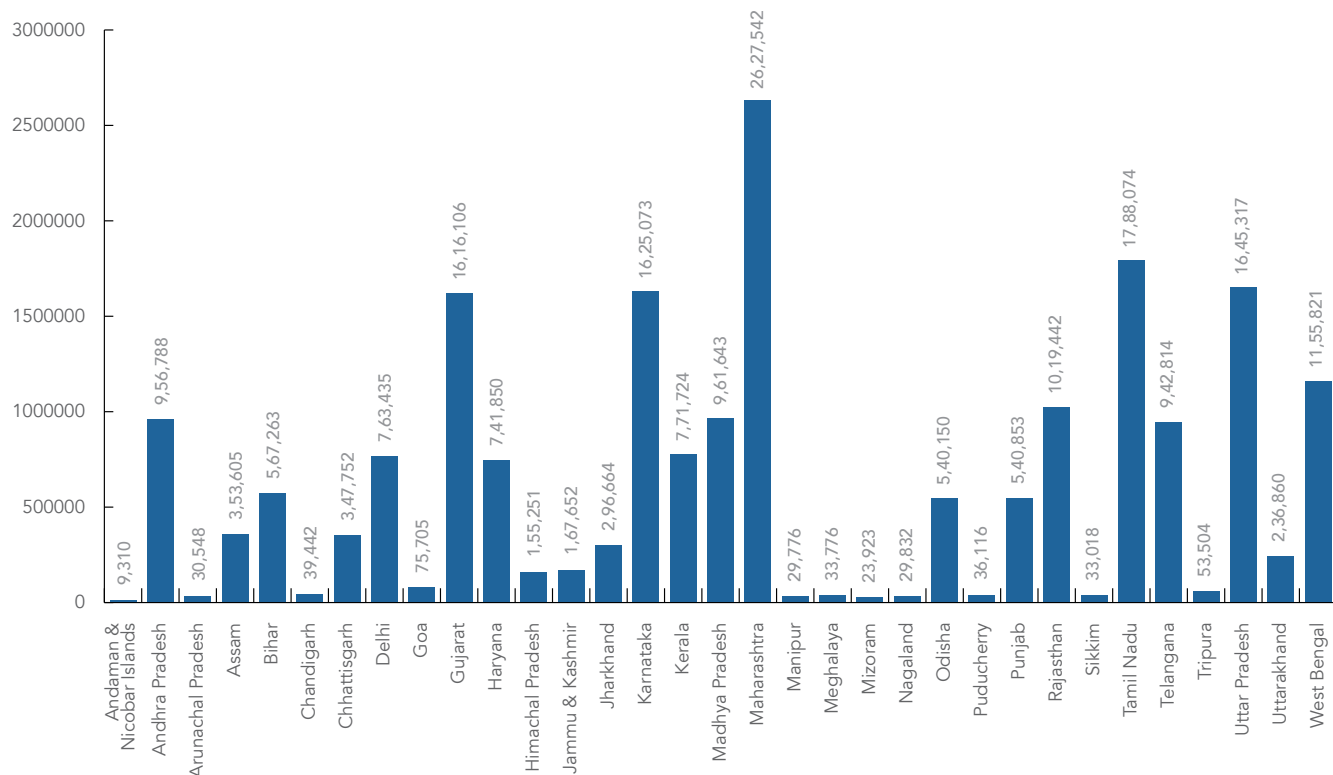


Figure 1-1: State GDP – 2020-2021

Source: RBI Handbook of Statistics on Indian States, GSDP at constant prices, base 2011-2012 Note: GDP FY 2020-2021 not available for Dadra Nagar Haveli and Daman Diu, Ladakh, and Lakshadweep

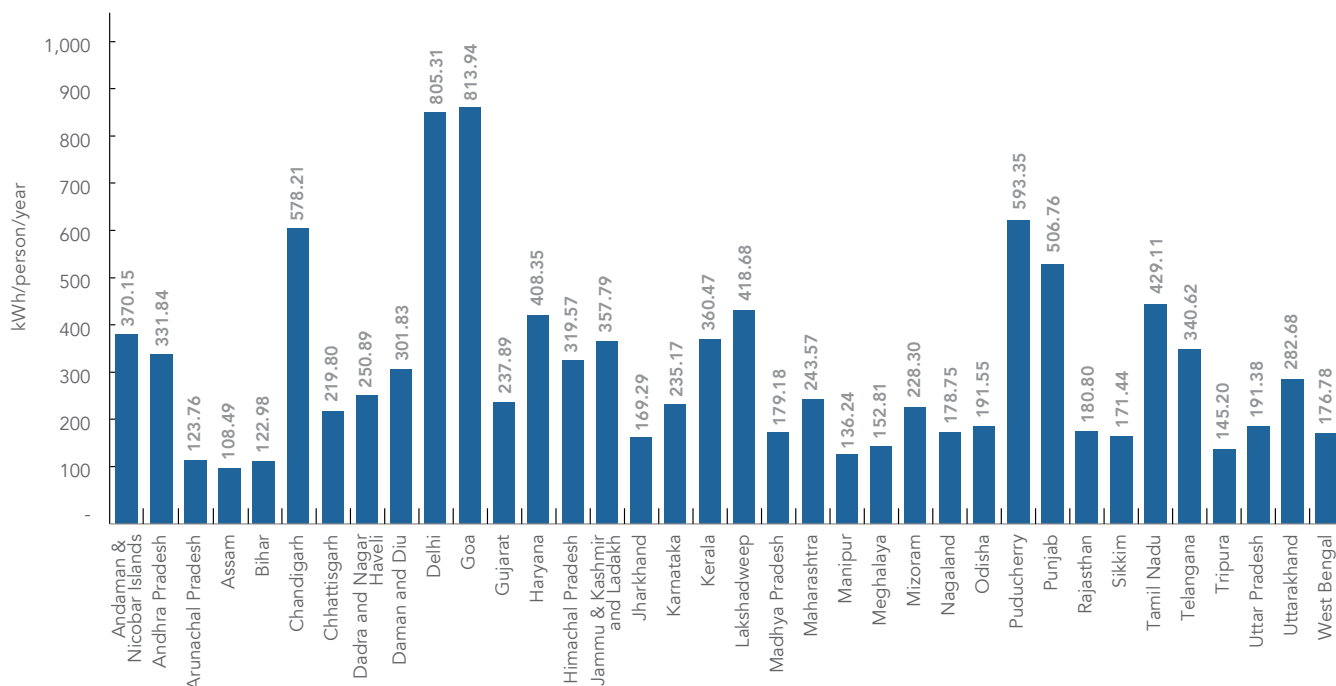


Figure 1-2: State per capita residential electricity consumption – 2020-2021

Source: CEA General Review 2022

Note: Data for Ladakh is not provided separately; it is included in the data for Jammu and Kashmir

to ensure that resources for energy efficiency are allocated judiciously, policies across different levels of government are well-aligned, and progress in energy efficiency initiatives is regularly tracked and reported to integrate timely and requisite course modifications

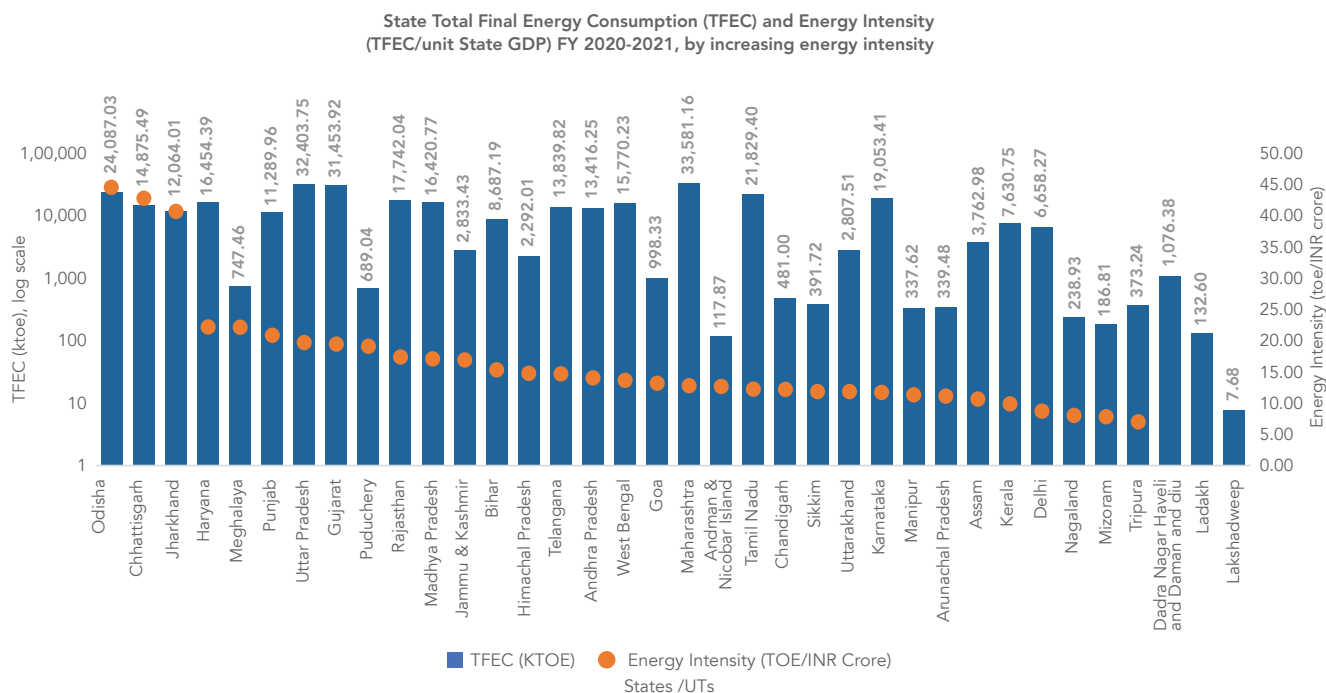


Figure 1-3: State total final energy consumption & energy intensity – 2020-2021

Source: Ministry of Statistics and Programme Implementation (MoSPI), CEA General Review, Petrol and Natural Gas Statistics, Coal Directory, NITI Aayog India Energy Dashboard, RBI

The State Energy Efficiency Index (SEEI) identifies and addresses gaps concerning state-level energy efficiency policies, programmes, and investments. The SEEI was developed by BEE, in collaboration with Alliance for an Energy Efficient Economy (AEEE), to evaluate the annual progress of EE implementation in the states. The first edition, State Energy Efficiency Preparedness Index, was launched in August 2018, followed by SEEI 2019 in January 2020, SEEI 2020 in October 2021 and SEEI 2021-22 in April 2023.

As conducted for previous editions, a feedback survey was undertaken by BEE and AEEE with the SDAs in August 2023 to gather their insights on SEEI 2021-22. A total of twenty-five (25) SDAs participated in this survey, providing valuable feedback on the effectiveness and utility of the index. The responses and key findings from this survey are summarised and presented in Figure 1-4.

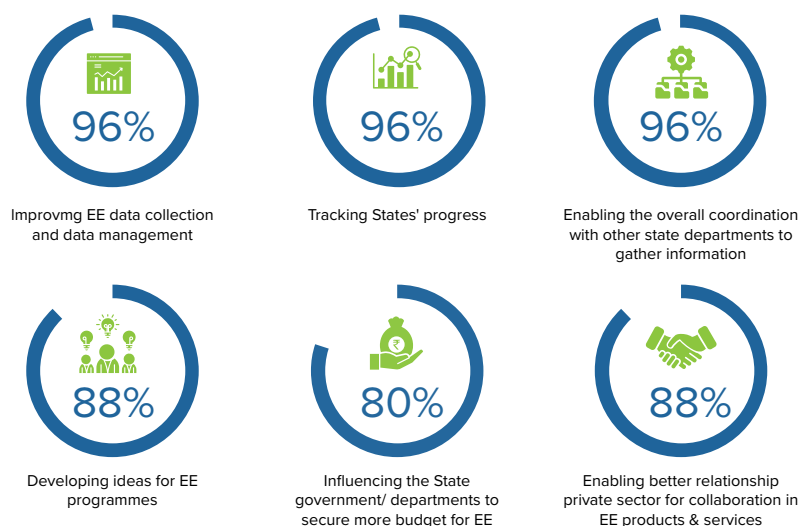


Figure 1-4: Usefulness of SEEI to SDAs

Most SDAs stated that the state government departments and electricity distribution companies (DISCOMs) are key sources of data collection for the index. Further, the programme-specific indicators introduced in the last edition were found to have been easy to report and useful to the SDAs. The fifth edition of the index, SEEI 2023, evaluates the EE progress of the states and UTs for fiscal year (FY) 2022-23 (April 2022 to March 2023).

The objectives of SEEI 2023 are structured to address the multifaceted aspects of energy efficiency at both state and national levels. These objectives are as follows:

- Help drive EE policies and programme implementation at the state and local level
- Highlight best practices and encourage healthy competition among 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)

Accordingly, the indicator framework has been expanded to focus on more specific and diverse metrics, aligning closely with India's evolving national energy efficiency priorities. Some new indicators added in SEEI 2023 include non-fossil fuel-based power procurement, EE in affordable housing, measures for electrification for end-use in industries and electric cooking in buildings, and actions for reducing the gap between average cost of supply (ACS) and average realisable revenue (ARR) of the utilities. The SEEI 2023 framework places a strong emphasis on programme-specific indicators, which are designed to assess the outcomes of distinct energy efficiency initiatives undertaken by SDAs, state departments, independently or in collaboration with the BEE, industry associations, or public-private partnerships (PPPs). Examples of such targeted programmes include retrofit or greenfield projects, energy audits and the subsequent implementation of their recommendations, technology demonstration projects, as well as training and capacity-building, programmes. Additionally, initiatives for fiscal incentives aimed at increasing the adoption of energy-efficient practices are also considered.



SEEI 2023 aims to drive energy efficiency adoption by showcasing best practices and presenting inclusive indices that focus on targeted efforts and capacity-building

SEEI 2023 comprises 65 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 initiatives.

The data underpinning the SEEI 2023'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 Electricity Regulatory Commissions (SERCs), 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.

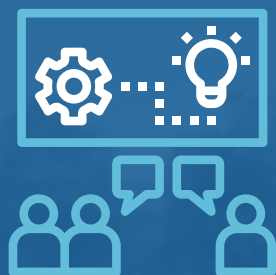


States and UTs are evaluated using qualitative, quantitative, and outcome-based indicators



Performance indicators and maximum score allocations are determined by considering

- ➔ The sectoral share in India's final energy consumption.
- ➔ The energy savings potential within the sector.
- ➔ The state's contribution to promoting energy efficiency across various sectors



SEEI 2023 has been expanded to include indicators on capacity-building efforts and outcomes from various initiatives

2. APPROACH

The State Energy Efficiency Index 2023 (SEEI 2023) evolves from its predecessors - State Energy Efficiency Preparedness Index 2018, SEEI 2019, SEEI 2020 and SEEI 2021-22, while maintaining methodological consistency. The SEEI framework prioritises objectivity, transparency, and consistency in evaluating the annual performance and progress of states. SEEI 2023, marking its fifth iteration, builds upon the foundation established by the SEEI 2021-22, with an enhanced focus on assessing results-driven and actionable indicators.

This chapter outlines the approach underpinning of the SEEI framework. The methodology encompasses several key steps:

- **Indicator selection and scoring:** Performance indicators are carefully chosen and weighted to reflect the importance of different demand sectors in terms of energy consumption and savings potential. Additionally, the selection emphasises areas where state-level energy efficiency interventions play a crucial role, ensuring a targeted and effective evaluation of each state's efforts.
- **State categorisation:** States are categorised based on their Total Final Energy Consumption (TFEC). This classification facilitates a fair peer-to-peer comparison among states.
- **Data collection and validation:** Each state's performance is rigorously evaluated using the best available data. This data is validated against credible sources to ensure accuracy and reliability.
- **Data analysis and scoring:** The performance and progress of states are analysed and scored, providing a comprehensive assessment of their energy efficiency initiatives and outcomes.

2.1 INDICATOR FRAMEWORK

In SEEI 2023, the process for selecting and weighting performance indicators is multi-dimensional, focusing on the significance of various demand sectors. It considers their respective contributions to total energy consumption and their potential for energy savings. Additionally, the process emphasises the impact of energy efficiency interventions at the state level, prioritising areas where states bear greater responsibility and authority in implementing these measures. This approach ensures a balanced and context-specific evaluation of each state's energy efficiency landscape. Figures 2-1 and 2-2 show India's sector-wise annual final energy consumption and electricity consumption in 2019-2020. Figure 2-3 shows the sector-wise energy savings potential. Table 2-1 summarises the state's role in EE in each sector as per the EC Act 2001, EC (Amendment) Act 2022⁶, and Electricity Act 2003⁷.

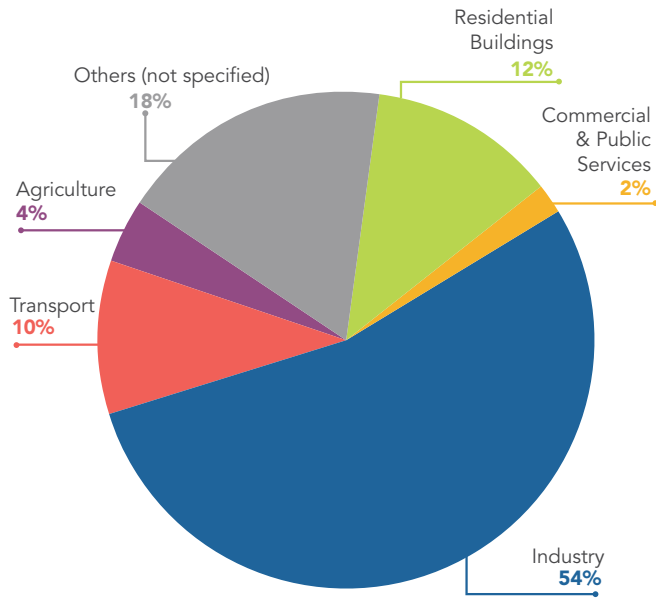


Figure 2-1: Sector-wise TREC in India (FY 2020-21)

Source: MoSPI India Energy Statistics 2023; Excludes non-energy use of energy commodities

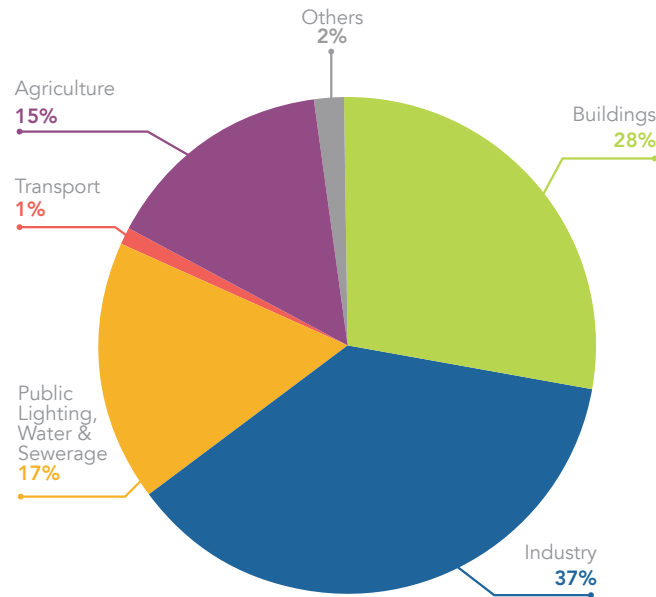


Figure 2-2: Sector-wise electricity consumption in India (FY 2020-21)

Source: CEA General Review 2023

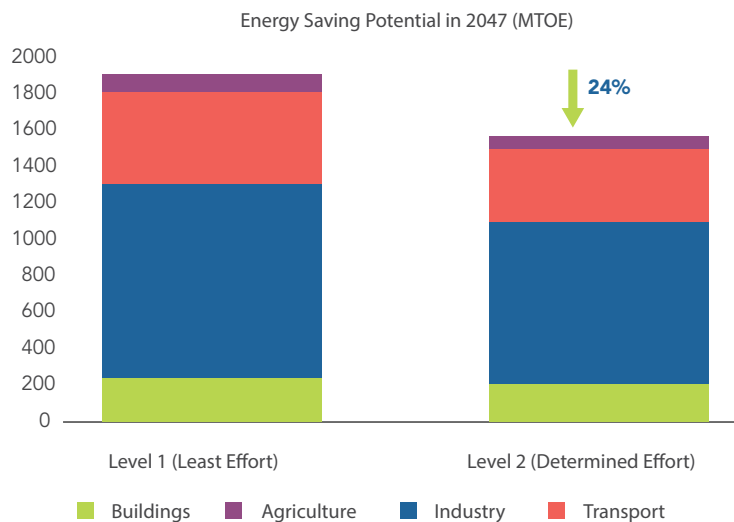





Figure 2-3: India's sector-wise energy savings potential

Source: NITI Aayog IESS

Table 2-1: States and UTs role in energy conservation

Sector	States' role and authority in driving energy efficiency
<p>Buildings</p> 	<p>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.</p> <p>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 its conservation, use of renewable energy, and other green building requirements for a building.</p> <p>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 use of energy in the buildings and implement these codes through state-level building bye-laws. Direct designated consumers to comply with code and/or energy audit requirements and furnish requisite data at requisite time.</p> <p>EC Act, Section 17: Power of inspection of buildings to check compliance with requirements of the EC Act.</p> <p>EC Act, Section 18: Regulation of norms for energy consumption standards in any building. Regulation of the energy consumption standards for equipment and appliances.</p> <p>EC Act, Section 26: Impose penalties for non-compliance of either central or state government energy conservation regulations.</p> <p>EC Act, Section 27, 28, 29: Power to adjudicate the penalties imposed for non-compliance</p> <p>EC Act, Section 57: Power of state government to make ECSBC rules through notification for carrying out the provisions of this act</p>
<p>Industry</p> 	<p>EC Act, Section 15: Direct the designated consumers to comply with energy audit requirements and furnish requisite data at requisite time.</p> <p>EC Act, Section 17: Power of inspection of industries to check compliance with requirements of the EC Act.</p> <p>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.</p> <p>EC Act, Section 26: Impose penalties for non-compliance of either central or state government energy conservation regulations.</p> <p>EC Act, Section 27, 28, 29: Power to adjudicate the penalties imposed for non-compliance</p>
<p>Municipal Services</p> 	<p>EC Act, Section 15: Power to state government to create awareness, disseminate information, and organise training for efficient use of energy and its conservation.</p> <p>EC Act, Section 18: Regulation of the energy consumption standards for street lighting and drinking and/or waste water pumping.</p> <p>EC Act, Section 27, 28, 29: Power to adjudicate the penalties imposed for non-compliance</p>

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 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 for 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 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.

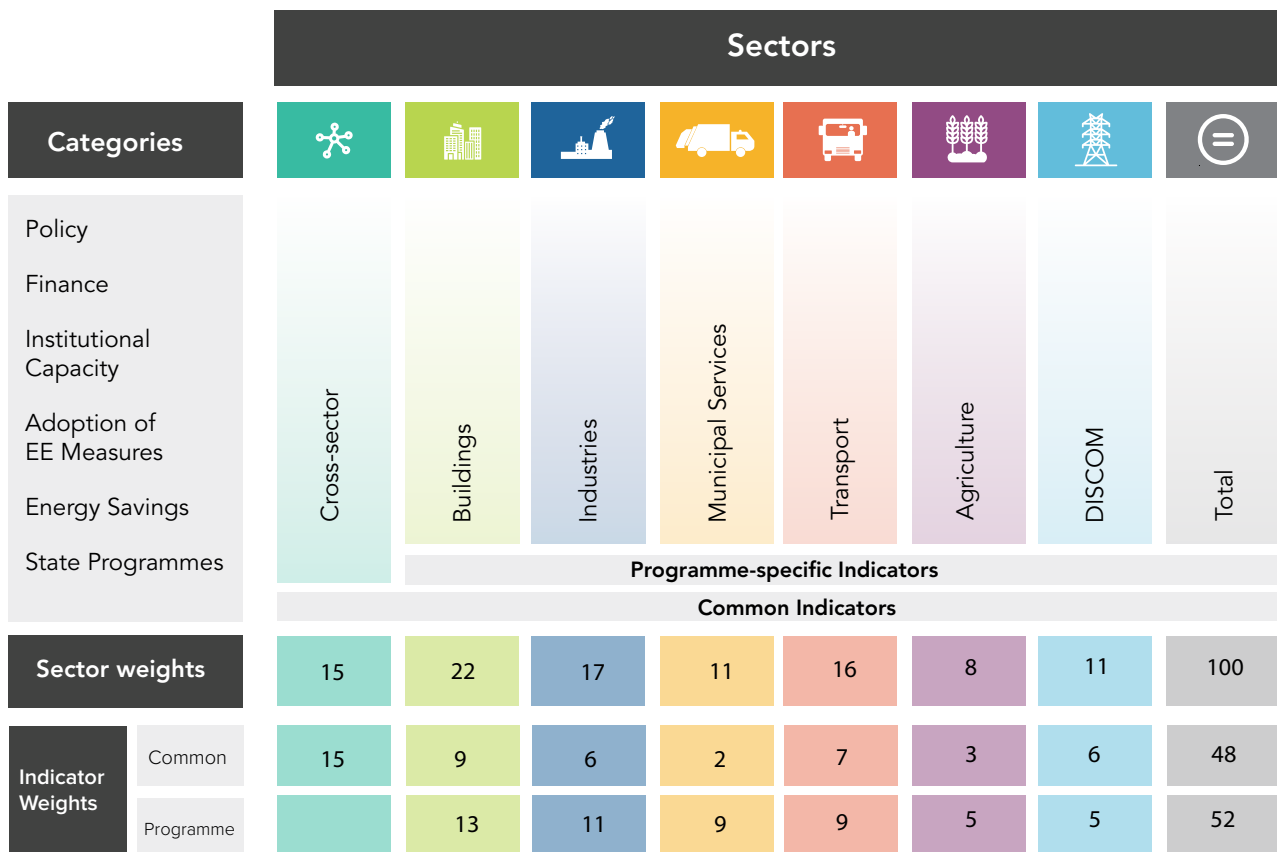


Figure 2-4: Framework for SEEI 2023

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

Sector	Common indicators	Programme-specific indicators	Total
Cross-Sector	14	0	14
Buildings	10	4	14
Industries	5	3	8
Municipal Services	2	3	5
Transport	8	3	11
Agriculture	4	2	6
DISCOM	5	2	7
Overall	48	17	65

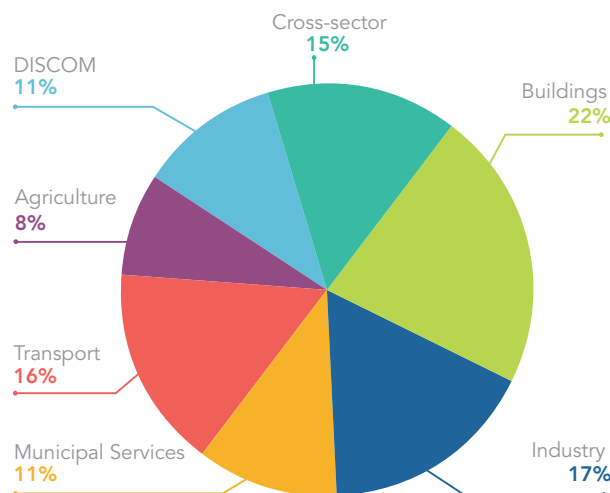


Figure 2-5: Sector-wise split of score weightage in SEEI 2023

The SEEI 2023 consists of 65 indicators, encompassing qualitative, quantitative, and outcome-based measures, to track progress in the implementation of EE policies, programmes, and projects. These indicators are carefully structured to minimise subjectivity influenced by state-specific conditions, ensuring a fair assessment across different regions.

The indicators are distributed across seven demand sectors: buildings, industry, municipal services, transport, agriculture, DISCOMs, and cross-sector initiatives. Within each sector, they are further divided into common and programme-specific categories to provide a comprehensive evaluation of each state's performance.

- **Common indicators:** These account for 48% of the overall scoring and include measures for policy, institutional capacity, finance, adoption of EE measures, and energy savings. Many of these indicators are straightforward 'yes/no' type, while others require data analysis, for which scoring is done on a graded scale.
- **Programme-specific indicators:** With a slightly higher weighting of 52%, these indicators focus on the outcome-based assessment of state-run EE programmes. They evaluate the programmes based on objectives, timelines, progress, budget allocation and utilisation, entities involved, estimated energy savings, and emissions reduction.

The choice of these indicators, particularly the outcome-based ones, is designed to accurately quantify the adoption of EE measures, the resulting energy savings, and the reduction in energy intensity across different sectors. This balanced approach ensures a detailed and result-oriented representation of each state's progress in energy efficiency.

The Index has a total score of 100, with sector-wise maximum scores detailed in Figure 2.4. The allocation of these scores is strategic, reflecting the varying impacts of different sectors on energy use. The buildings sector, accounting for 22% of the total weight, is prioritised due to its significant energy consumption and the influential role states play in enhancing its energy efficiency. This sector is recognised for its potential to achieve substantial energy savings through state-level initiatives.

The industry sector, despite being the largest consumer of energy in the economy, is assigned a slightly lower weight of 17%. This decision stems from the observation that state-level interventions in industrial energy efficiency have not yet reached their full potential, as indicated by previous indices. While larger industries have benefited from central government interventions, Micro, Small, and Medium Enterprises (MSMEs) present a unique challenge. They are often less organised and diverse, making state-driven energy efficiency measures more complex yet essential.



65

qualitative, quantitative, and outcome-based indicators across sectors – buildings, industries, municipal services, transport, agriculture, DISCOMs, and cross-sector



Common Indicators constitute 48% of the score assessing policies, institutional capacities and adoption of energy-efficiency measures

The transport sector, with the third-largest energy consumption, is assigned 16% of the weight, aligning with its share in energy use. The weights for other sectors are determined following a similar rationale, ensuring each sector's impact on energy use is adequately represented.

A notable change in SEEI 2023 is the increased weightage for cross-sector indicators, now at 15%, up from 12% in the 2021-22 index and 5% in the 2020 edition. This increase aims to bolster the emphasis on integrated and cross-cutting state-level energy efficiency efforts, continuing the trend set in the previous year.

2.2 GROUPING OF STATES

In the State Energy Efficiency Index 2023, states and union territories are categorised into four groups based on their Total Final Energy Consumption (TFEC) for the fiscal year 2020-2021, using the most recent data from central government sources. This categorisation aims to enable a peer comparison and visualisation of energy efficiency scores among states with comparable levels of energy consumption. The top 15 energy-consuming states all have a consumption of over 10 Mtoe each. Collectively, the top 15 states contribute an impressive 87.8% of the total energy consumption of Indian states¹. Meanwhile, the top 10 states account for about 68.2% of the total energy consumption. It's important to note that this grouping, while focused on the magnitude of energy consumption, does not account for the diverse geographical, socio-economic, and cultural backgrounds of the states. Although other factors such as the energy intensity of Gross State Domestic Product (GSDP), potential energy savings, and per capita energy consumption were initially considered, the reliance on TFEC as the sole criterion was chosen for its simplicity and the constraints posed by data availability.



Programme-specific indicators (52%) reflect the outcomes of state-run energy efficiency programmes



¹ Note: This excludes energy consumption that cannot be attributed to activities within a state's boundaries. For instance, it omits energy usage for central government or defense purposes which operate beyond the confines of a single state.

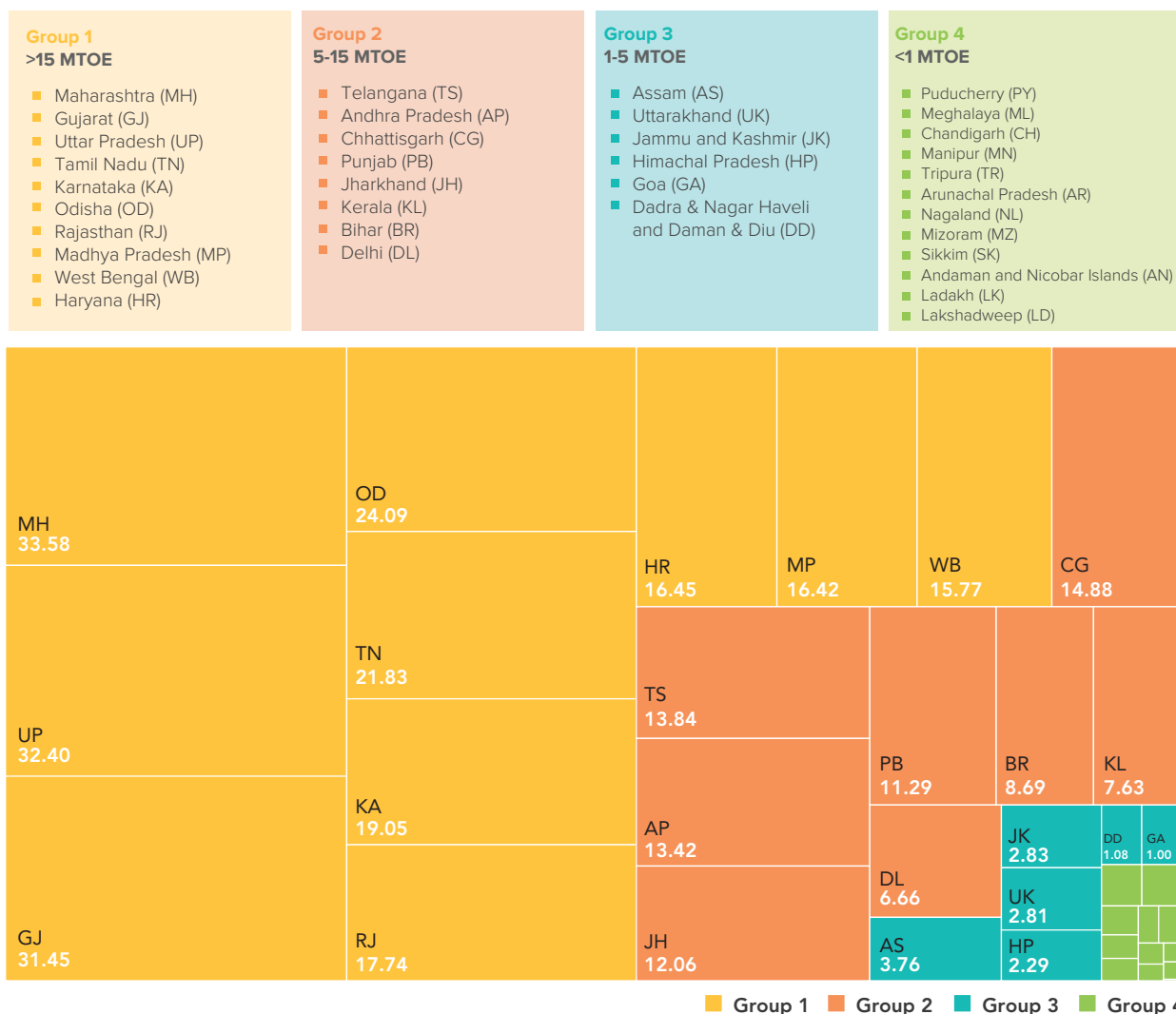


Figure 2-6: Grouping of states and UTs by TFEC

Source: MoSPI's India Energy Statistics, CEA General Review⁸, MoPNG's Petroleum and Natural Gas Statistics (oil, compressed natural gas (CNG))⁹, and the Coal Directory (coal)¹⁰, Reserve Bank of India (RBI) Handbook of Statistics on Indian States (GSDP)¹¹

Note: TFEC is unavailable for Ladakh, and 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 2021 (electricity), MoPNG's Petroleum and Natural Gas Statistics 2021 (oil, CNG), and the Coal Directory 2021 (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.

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 tonne 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 facilitate data collection for the SEEI, the BEE appointed SDAs as the central coordinating bodies in their respective states. These agencies were tasked with gathering data from relevant state departments. The data collection portal, first introduced in SEEI 2020, underwent enhancements for the SEEI 2021-22 and SEEI 2023 based on user feedback to improve user experience and streamline the data gathering process.

In addition to the information provided by the SDAs, data was also sourced from various central government entities, including the Central Electricity Authority (CEA) General Review, EESL, and the Ministry of Road Transport and Highways (MoRTH). Further, publicly accessible data from State Electricity Regulatory Commissions, private sector business associations like the Confederation of Indian Industry (CII), and certification bodies such as IGBC, GBCI India, and GRIHA, were also incorporated.

The data compiled by the AEEE, after being furnished by the SDAs, was shared back with the SDAs for review. The SEEI 2023 incorporates only the data that has been thoroughly vetted by both the SDAs and the BEE.



The SDAs are the central coordinating bodies in respective states for data collection

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 states' energy efficiency efforts, are presented in the subsequent chapter.





In SEEI 2023, 15 states improved their scores compared to SEEI 2021-22



7 'Front runner' states compared to '5' in the last edition



2 'Achiever' states



3 'Contender' states

Top Performing States



Karnataka
86.25



Andhra Pradesh
83.25

Most Improved States



Maharashtra by
18.5



Goa by
17

3. RESULTS

OVERVIEW OF SEEI 2023 RESULTS

The SEEI 2023 results offer insights into a dynamic landscape, shedding light on the EE performances of states across diverse sectors. In the context of the SEEI for the fiscal year 2022-23, the significant participation of all thirty-six (36) State Designated Agencies (SDAs), encompassing twenty-eight (28) states and eight (8) Union Territories (UTs) stands out. Notably, most SDAs have demonstrated enthusiasm by promptly providing relevant data, indicating a positive shift towards a culture that values data for the effective assessment of EE implementation.

A key aspect of SEEI 2023 is the introduction of more sub-indicators in both the common and the programme-specific indicators, aimed at evaluating endeavours and achievements in implementing EE programmes across all sectors in states and UTs. SEEI serves as a valuable tool for SDAs, facilitating the establishment of a systematic approach to measure and monitor the effects of EE initiatives. This development highlights achievements and underscores the growing importance of a data-centric approach to enhance energy efficiency practices.

The classification system introduced in SEEI 2020 was retained in SEEI 2023, wherein each state and UT is categorised as 'Front runner' (≥ 60), 'Achiever' (50-59.75), 'Contender' (30-49.75), or 'Aspirant' (< 30) based on its performance. This system provides a clear framework for evaluating and benchmarking the states and UTs. Table 3-1 presents the distribution of states across these performance categories in SEEI 2019, SEEI 2021, SEEI 2021-22, and SEEI 2023.

Table 3-1: Performance of states and UTs in SEEI 2019, SEEI 2020, SEEI 2021-22 and SEEI 2023

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

In SEEI 2023, Karnataka and Andhra Pradesh have emerged as the top-performing states, securing impressive overall scores of 86.25 and 83.25, respectively, out of a total of 100. Following closely are Kerala and Telangana, both achieving scores of 77.5 each. Notably, the most improved states in this assessment are Maharashtra and Haryana, witnessing significant score increases of 18.5 and 17 points, respectively, resulting in an overall score of 72 each.

The observed improvements in Maharashtra and Haryana can be attributed to enhanced data submission for common indicators and programme-specific indicators. Conversely, Rajasthan has experienced the most substantial decline in score in SEEI 2023, with a decrease of 46.5 points, primarily attributed to lack of reported data.

On December 14, 2023, in commemoration of National Energy Conservation Day, the President of India bestowed recognition upon the ten (10) states distinguished as the best performers in each of the four (4) groups within the State Energy Efficiency Performance Award under the Institutions category. This acknowledgement underscores their exceptional achievements and contributions to energy efficiency and conservation.

Notably, four (4) states, Goa, Uttar Pradesh, Maharashtra, and Haryana, have demonstrated significant progress, improving by over 10 points relative to SEEI 2021-22. However, a broader evaluation reveals a substantial decline, with improvement evident in only fifteen (15) states and UTs in SEEI 2023, fewer than the twenty-eight (28) states and UTs that demonstrated progress in the SEEI 2021-22 assessment.

Figure 3-1 illustrates the state performance in SEEI 2023, identifying the most improved states that have raised their scores by more than 10 points from SEEI 2021-22, denoted with a star.

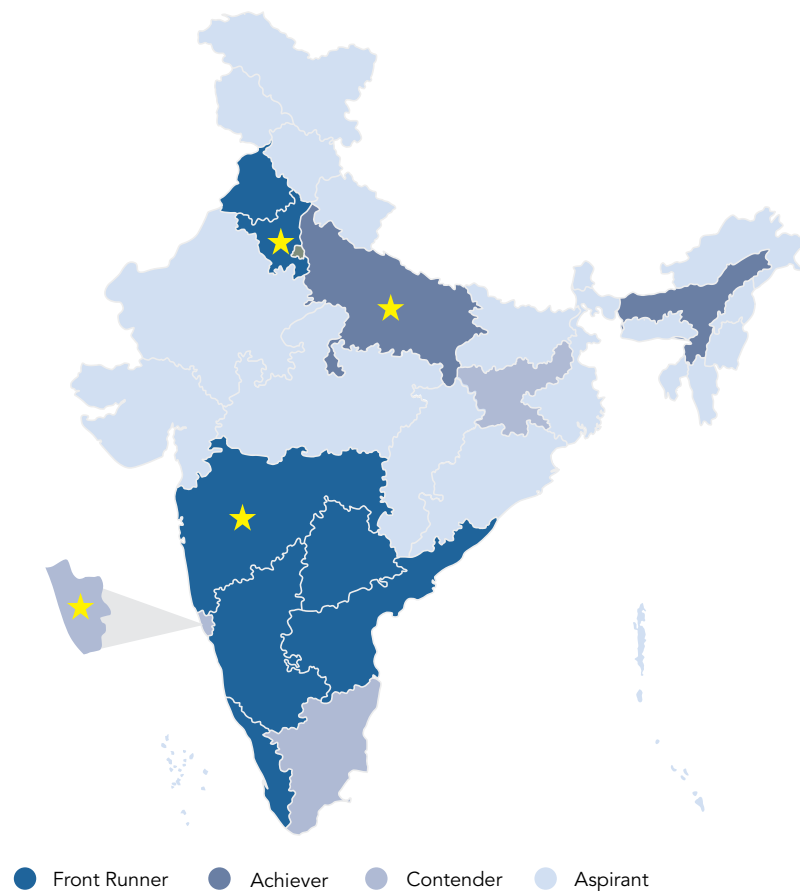


Figure 3-1: State-wise SEEI 2023 performance

Figure 3-2 offers a comprehensive overview of the Total Final Energy Consumption (TFEC) group-wise state total scores across all seven (7) sectors: buildings, industry, municipal services, transport, agriculture, DISCOMs, and cross-sector initiatives. This visualisation provides a detailed representation of the state's performance in each sector, contributing to a holistic understanding of their EE efforts.

TFEC group-wise state Total score

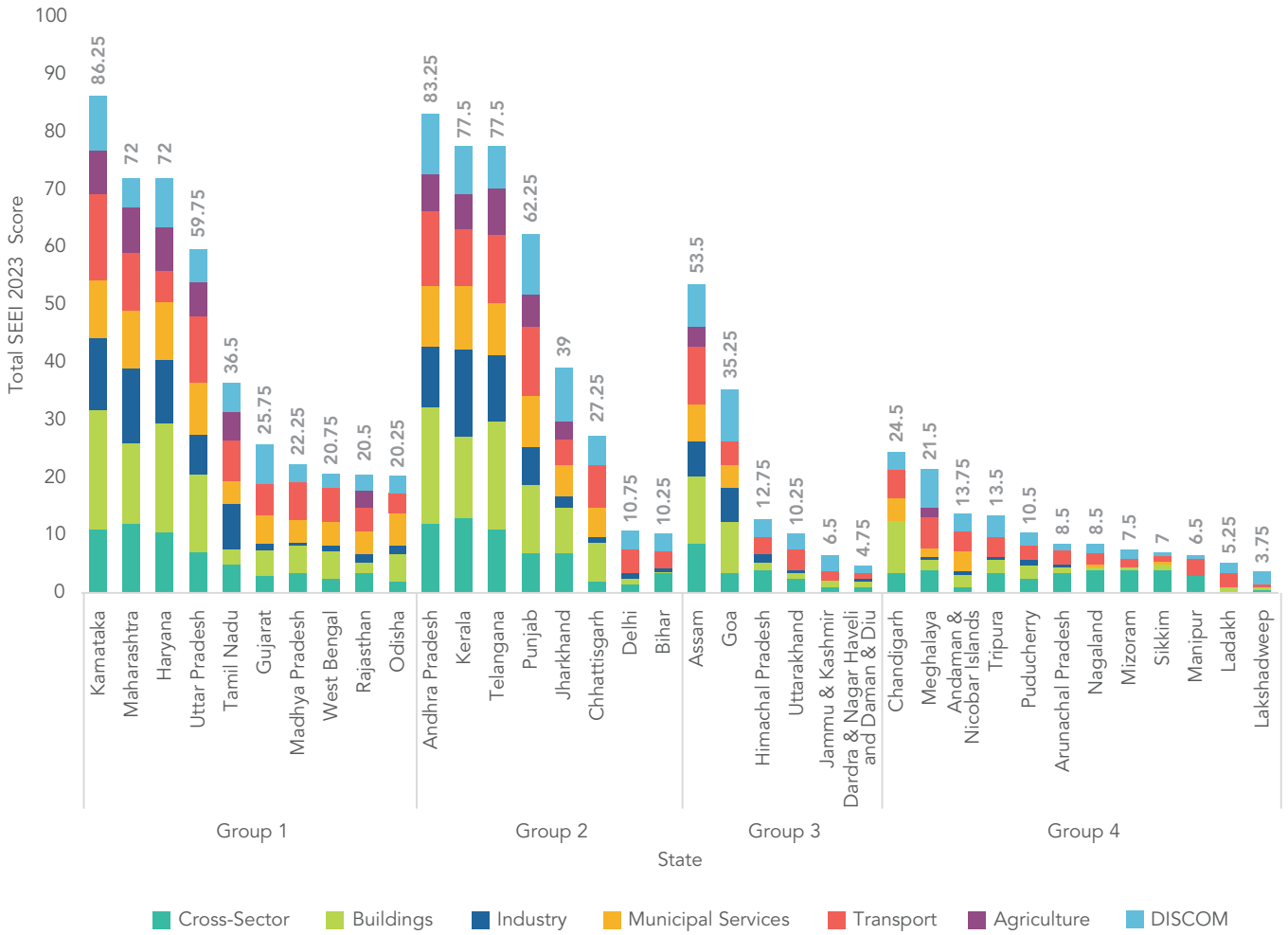


Figure 3-2: TFEC group-wise state total scores (all sectors)

Figure 3-3 illustrates each state’s progress in the SEEI for the year 2023 compared to SEEI 2021-22.

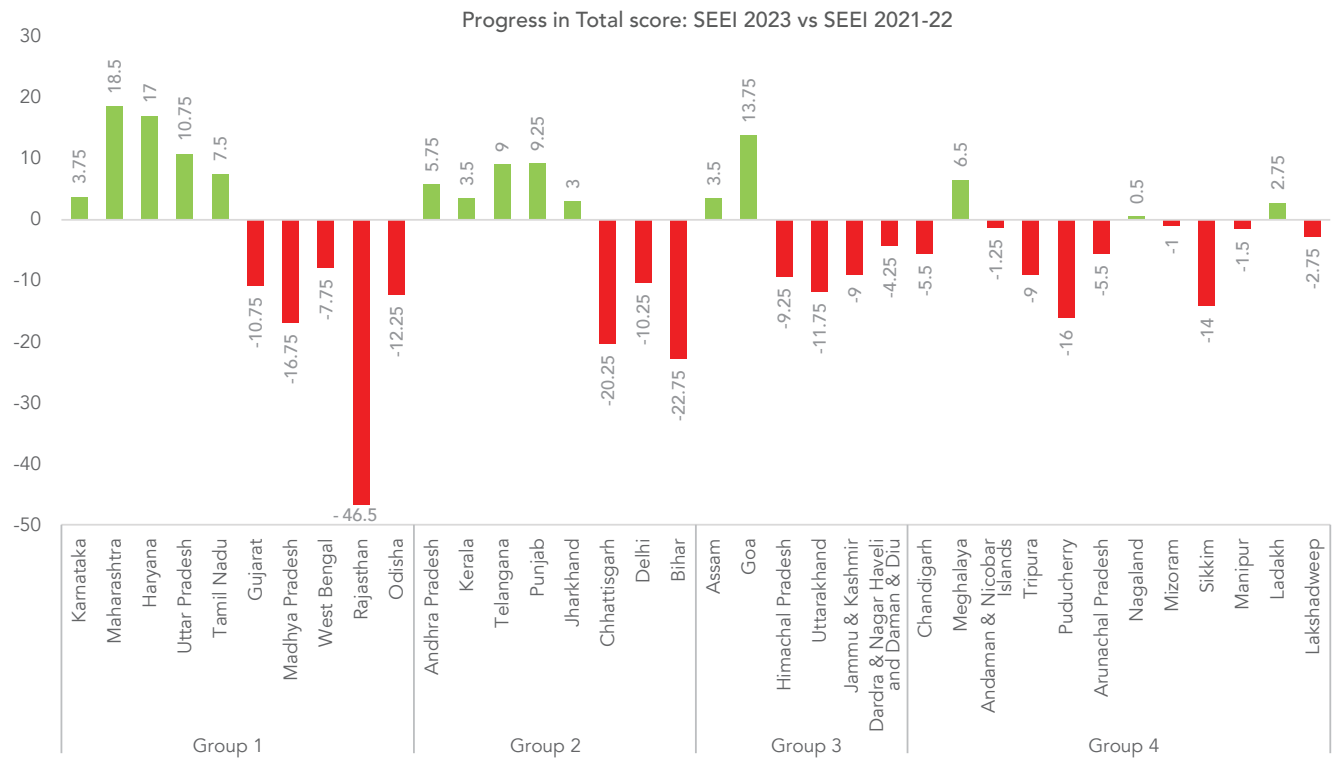


Figure 3-3: TFEC group-wise total score state progress – SEEI 2023 vs SEEI 2021-22

3.1 BUILDINGS

OVERVIEW

The buildings sector is the second-highest contributor to TFEC¹², and its growth is expected to escalate in India due to the rapid pace of urbanisation and concurrent economic development. Given these circumstances, it is imperative for India to formulate and implement EE strategies with a specific focus on the building sector, to curtail the unsustainable escalation in energy demand.

SEEI 2023 evaluates these efforts using fourteen (14) indicators. Ten (10) of these are common indicators, covering areas like policy, institutional capacity, and EE measure adoption. The remaining four (4) are programme-specific, assessing the implementation of state-level EE programmes. The maximum score in this sector is twenty-two (22), split between nine (9) for common and thirteen (13) for programme-specific indicators, respectively.

In SEEI 2023, eleven (11) states improved their scores in the building sector since the last edition, SEEI 2021-22. This improvement can be attributed to progress reported on common indicators and better availability of data pertinent to programme-specific indicators. Table 3-2 provides a comprehensive overview of the indicators in the building sector. Figure 3-4 represent the scores of the states in the building sector, across the two indicator categories: common and programme-specific, with states grouped together based on their TFEC. The states' progress in SEEI 2023 compared to SEEI 2021-22 is depicted in Figure 3-5.



Table 3-2: Building sector indicators

Sl. No.	Indicator	Max. Score	Scoring Criteria
Policy			
1	ECBC (2017) notification and adoption in by-laws	1.5	
	Has the State notified mandatory compliance with norms in ECBC 2017?		Notified = 1 Notification draft in cabinet = 0.5, else=0
	Has ECBC been amended for the state or adopted in bye-laws?		Amended for the state/ adopted in by-laws=0.5, else=0
	If the above are 'In progress' what is the current status?		
2	Measures taken towards notification of Eco Niwas Samhita (2021) in the state	1	
	Has the state taken any steps for notification of Eco Niwas Samhita 2021 (ECBC-R)?		Notified=1 Notification in draft stage=0.5 else=0
	If "Yes" what is the progress made in FY 2022-23?		
3	Mandatory use of Energy Efficient appliances in govt buildings	0.5	Yes=0.5, else=0
	Is there any policy/notification to mandate the use of energy efficient appliances in government buildings?		
Institutional Capacity			
4	Advisory, certification and enforcement capacity in state government	1.5	
	Does the state have an entity to develop capacity and provide technical expertise on EE in buildings for architects, engineers, building facility managers, city officials, and other stakeholders?	0.5	Entity to develop capacity & provide technical expertise = 0.5, else= 0
	Does the state have a government authority to certify and enforce compliance to ECBC?	0.5	Government authority to certify and enforce compliance to ECBC =0.5, else= 0
	What was the budget assigned and utilised for EE in the buildings sector?	0.5	Budget assigned and utilised for EE activities in building sector=0.5, else 0
Adoption of EE measures			
5	Adoption/penetration of ECBC in new construction	1.5	
	What is the percentage of latest ECBC compliant buildings in the total number of buildings approved for construction in the reporting period.	0.5	Percentage of latest ECBC compliant buildings approved for construction= 0.5, else=0
	What is the percentage of latest ECBC compliant buildings completed in the total number of buildings completed in the reporting period.	0.5	Percentage of latest ECBC compliant buildings completed= 0.5, else=0
	What is the progress in the construction of Super ECBC buildings in the state?	0.5	Status on super ECBC building construction= 0.5, else=0
6	Green building penetration in the state	1	
	How many certified green buildings are there in the State?		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
7	Energy efficiency in affordable housing	0.5	Yes=0.5, else=0
	Is energy efficiency included in the affordable housing at the state level?		
	Is there any scheme/policy/financial incentive for adopting energy efficiency measures in the affordable housing projects of the state?		
8	Measures for electric cooking in buildings	0.5	Yes=0.5, else=0
	Are there any steps taken for promoting Clean Cooking in buildings		

Sl. No.	Indicator	Max. Score	Scoring Criteria
9	Data disclosure of energy use in buildings Has the state taken any steps for data disclosure for benchmarking energy use in buildings?	0.5	Yes=0.5, else=0
10	NEERMAN Awards Has the state received any NEERMAN Awards for commercial buildings, residential buildings, or for the SDA?	0.5	Yes=0.5, else=0
State Programme			
11	Programmes for Government/Public Buildings Does the state have any programmes for energy efficiency in government buildings in FY 2022-23? What is the objective of the programme? What is the target set under the programme? What is the timeline? How much budget has been allocated & utilised to date Who is running the programme? What is the progress to date? What are the energy savings? How much emissions were avoided?	4	Objective of the programme=0.5 Target set under the programme=0.5 Timeline =0.5 Budget allocated & utilised to date =0.5 Entities running the programme=0.5 Progress to date =0.5 Energy savings (deemed or measured) = 0.5 Avoided emissions=0.5
12	Programmes for energy efficiency in Commercial Buildings Does the state have any programmes for energy efficiency in commercial buildings in FY 2022-23? What is the objective of the programme? What is the target set under the programme? What is the timeline? How much budget has been allocated & utilised to date? Who is running the programme? What is the progress to date? What are the energy savings? How much emissions were avoided?	4	Objective of the programme=0.5 Target set under the programme=0.5 Timeline =0.5 Budget allocated & utilised to date =0.5 Entities running the programme=0.5 Progress to date =0.5 Energy savings (deemed or measured) = 0.5 Avoided emissions=0.5
13	Programmes for energy efficiency in Residential Buildings Does the state have any programmes for energy efficiency in residential buildings? What is the objective of the programme? What is the target set under the programme? What is the timeline? How much budget has been allocated & utilised to date Who is running the programme? What is the progress to date? What are the energy savings? How much emissions were avoided?	4	Objective of the programme=0.5 Target set under the programme=0.5 Timeline =0.5 Budget allocated & utilised to date =0.5 Entities running the programme=0.5 Progress to date =0.5 Energy savings (deemed or measured) = 0.5 Avoided emissions=0.5

Sl. No.	Indicator	Max. Score	Scoring Criteria
14	Programmes for capacity-building in the buildings sector	1	
	Does the state have programmes for capacity-building for the building sector in FY 2022-23?		
	What is the objective and timeline of the programme? Who is running the programme?	0.5	Objective of the programme, Timeline, Entities running the programme=0.5
	What was the target audience under the programme? What was the number of beneficiaries under the programme?	0.5	Target audience, number of beneficiaries under the programme=0.5

Figure 3-4 shows the TFEC group-wise scores for the Buildings sector in SEEI 2023

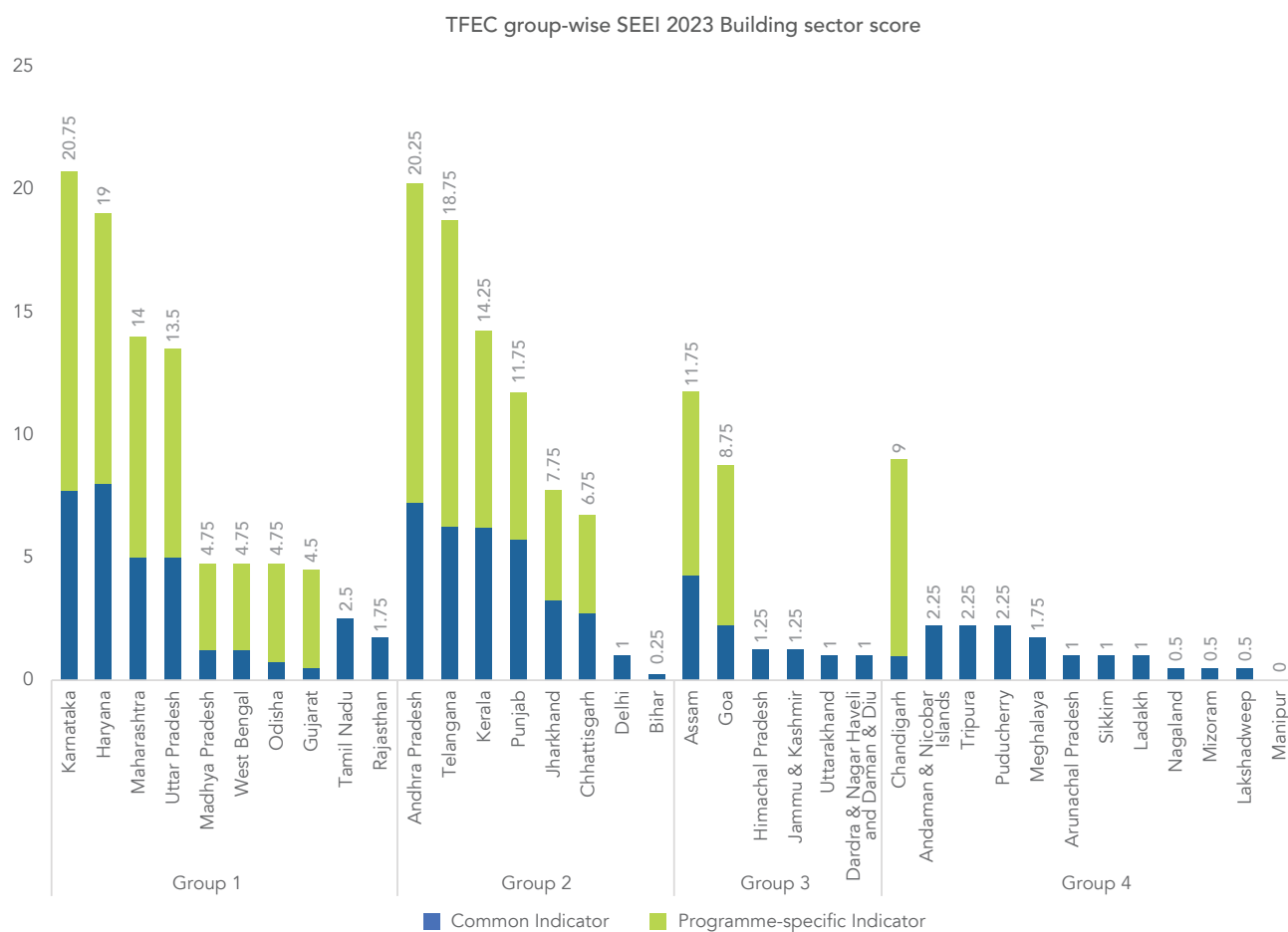


Figure 3-4: TFEC group-wise building sector state scores

Figure 3-5 illustrates the progress in the buildings sector for each state in the SEEI 2023 compared to SEEI 2021-22

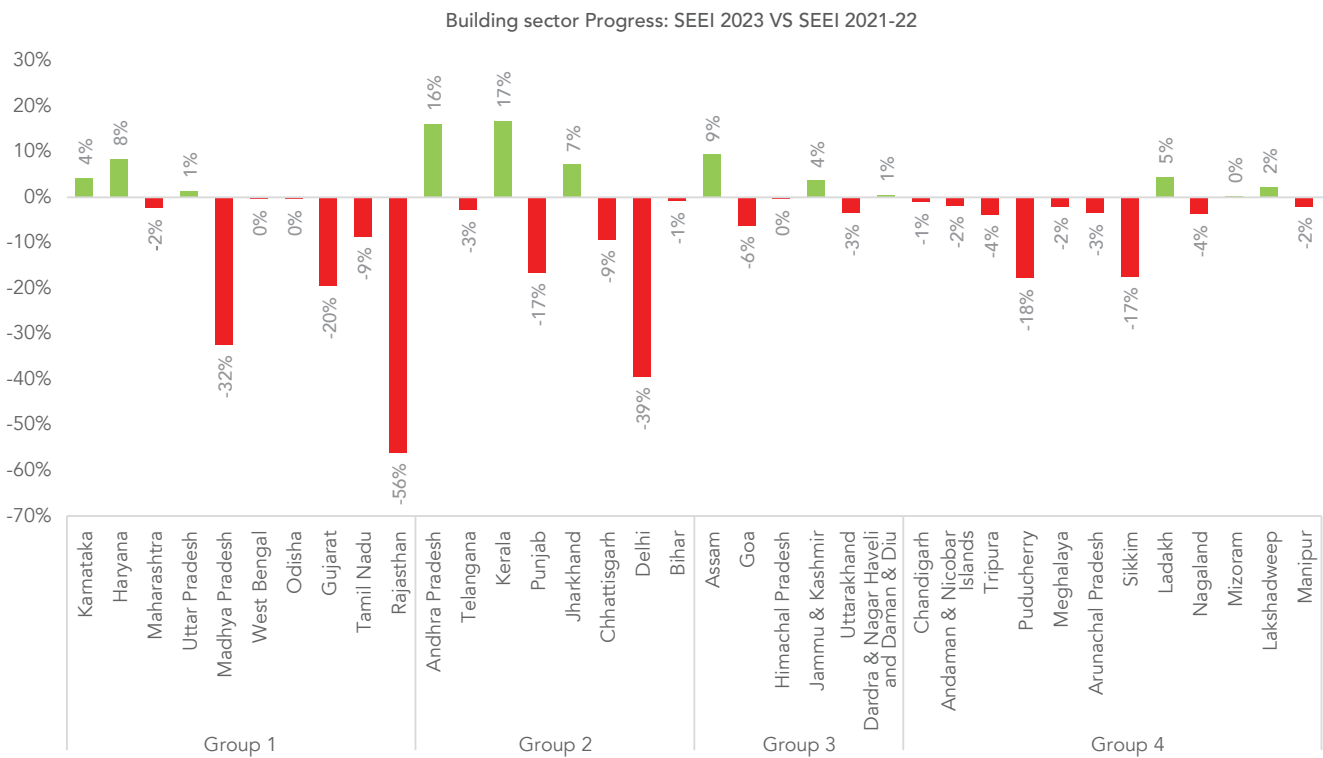


Figure 3-5: TREC group-wise building sector state progress – SEEI 2023 vs SEEI 2021-22



Karnataka is the top-performing state in the buildings sector

SEEI 2023 BUILDINGS SECTOR SCORE HIGHLIGHTS

Karnataka is the leading state in the buildings sector, attaining a commendable score of 20.75 out of a maximum total of 22. Other noteworthy performers in this sector include Andhra Pradesh, Haryana, and Telangana, scoring 20.25, 19.5, and 18.75, respectively. In SEEI 2023, nine (9) states and UTs reported significant improvements, ten (10) showed a decline and the rest showed no changes to marginal improvements or decline. Kerala has shown the most significant progress, with a remarkable 17% increase from its previous score, followed by Andhra Pradesh with 16%.

Common Indicators



Policy

In SEEI 2023, there has been modest advancement in policy-making regarding building energy codes. States have also reported on a new sub-indicator related to the implementation of policies or notifications that mandate the use of energy-efficient appliances in government buildings, as outlined in Table 3-3.



20 states and UTs have notified ECBC 2017 and 16 states and UTs have ECBC in local byelaws

- ECBC 2017 has been notified in two (2) additional states, taking the total number of states with ECBC 2017 notifications to twenty (20).
- Four (4) more states and UTs have adopted the ECBC in municipal bye-laws, making it a total number of sixteen (16) states to do so.
- Five (5) additional states have taken steps for the notification of Eco-Niwas Samhita 2021, bringing the total number of states to report such initiatives to seventeen (17).
- Eleven (11) states have reported policies or notifications mandating the use of EE appliances in government buildings.

Table 3-3: States and UTs with policy progress on Building EE

State/UT	States with notified ECBC 2017	States where ECBC 2017 draft is in Progress	States that have adopted ECBC in bye-laws of one or more cities	States that have taken any step for notification of Eco-Niwas Samhita 2021 ECBC-R	State with policy/ notification to mandate the use of EE appliances in government buildings.
Andaman & Nicobar Islands	✓	X	✓	X	X
Andhra Pradesh	✓	X	✓	✓	✓
Arunachal Pradesh	✓	X	X	✓	X
Assam	✓	X	✓*	✓	✓
Bihar	X	✓	X	X	X
Chandigarh	X	✓	X	X	X
Chhattisgarh	✓*	X	X	X	✓
Dadra & Nagar Haveli and Daman & Diu	X	✓	X	X	X
Delhi	X	✓	X	X	X
Goa	✓	X	X	X	X
Gujarat	X	✓	X	X	X
Haryana	✓	X	✓	✓	✓
Himachal Pradesh	✓	X	X	X	X
Jammu & Kashmir	X	✓	✓*	✓	X
Jharkhand	✓	X	✓*	✓	✓
Karnataka	✓	X	✓	✓	✓
Kerala	✓	X	✓	✓*	✓
Ladakh	X	✓	✓*	✓*	X
Lakshadweep	X	✓	X	X	X
Madhya Pradesh	✓	X	X	✓	X
Maharashtra	X	✓	X	✓*	✓
Manipur	X	✓	X	X	X
Meghalaya	X	✓	X	X	X
Mizoram	X	✓	X	X	X
Nagaland	X	✓	X	✓	X
Odisha	X	✓	✓	X	X
Puducherry	✓	X	X	✓*	X
Punjab	✓	X	✓	X	✓
Rajasthan	X	✓	✓	X	X
Sikkim	✓	X	✓	X	X
Tamil Nadu	✓*	X	X	✓*	X
Telangana	✓	X	✓	✓	✓
Tripura	✓	X	X	✓	✓
Uttar Pradesh	✓	X	✓	✓	X
Uttarakhand	X	✓	✓	X	X
West Bengal	✓	X	X	X	X

* - Newly reported states.

X - No data reported by states.

Note: States with no data reported across all fields have been excluded from the table.

→ Institutional Capacity

SEEI 2023 shows an improvement in institutional capacity with fifteen (15) states actively enhancing institutional capacity in EE within the buildings sector. Notably, two (2) additional states have established dedicated entities focused on building capacity and providing technical expertise in EE for buildings at the state level. Commonly, these entities are the Energy Efficient Buildings (EEB) Cells of the SDA.

Further, twelve (12) states reported having designated government authorities for certifying and ensuring adherence to the ECBC standards. However, it is notable that only five (5) states reported having an allocated state budget for EE activities in buildings. Comprehensive details on institutional capacity for EE in buildings across various states and UTs are shown in Table 3-4.

Table 3-4: States and UTs with institutional capacity for EE in the buildings sector

State/UT	Entity to develop capacity and provide technical expertise on EE in buildings for architects, engineers, building facility managers, city officials, and other stakeholders	Government authority to certify and enforce compliance with ECBC	State budget assigned to government authorities for EE activities
Andhra Pradesh	✓	✓	✓
Assam	✓	✓	X
Chhattisgarh	✓	✓	X
Goa	✓*	X	X
Haryana	✓	✓	✓
Karnataka	✓	✓	X
Kerala	✓	✓	✓
Maharashtra	✓	✓*	X
Meghalaya	✓	X	X
Odisha	✓	X	X
Puducherry	✓	X	X
Punjab	✓	✓	✓*
Rajasthan	✓	✓	X
Telangana	✓	✓	X
Tripura	X	✓	X
Uttar Pradesh	✓*	✓	X

* - Newly reported states.

X - No data reported by states.

Note: States with no data reported across all fields have been excluded from the table.

→ Adoption of EE Measures

SEEI 2023 evaluates the adoption of EE measures in states and UTs, using indicators such as the presence of certified green buildings, EE integration in affordable housing, electric cooking measures in buildings, energy use data disclosure, and achievements under the BEE's National Energy Efficiency Roadmap for Movement towards Affordable & Natural Habitat (NEERMAN) awards.

Seven (7) states reported the proportion of their latest ECBC-compliant buildings from the total approved for construction, with Punjab and Telangana notably achieving 100% in this regard. Furthermore, six (6) states reported the percentage of completed ECBC-compliant buildings, with Punjab again reaching 100%. In addition, seven (7) states have made

significant progress in constructing Super ECBC buildings. Table 3-5 presents an overview of states with ECBC adoption/penetration in new construction.

Table 3-5: States with adoption/penetration of ECBC in new construction

Indicator	Name of the States
States that have adopted ECBC compliance in new construction and reported details of such buildings in the state	<ol style="list-style-type: none"> 1. Andhra Pradesh 2. Haryana 3. Karnataka 4. Kerala 5. Punjab 6. Telangana 7. Uttar Pradesh
States that have reported progress in the construction of Super ECBC buildings	<ol style="list-style-type: none"> 1. Andhra Pradesh 2. Assam 3. Haryana 4. Karnataka 5. Maharashtra 6. Punjab 7. Uttar Pradesh

While an optimal measure of green building penetration would be the ratio of green building built-up area to the total built-up area in the state, in the absence of data on the state-wise built-up area, the indicator on green buildings has been normalised as the number of certified green buildings per million connected residential and commercial building consumers (i.e. electricity connections) in the state. Table 3-6 and Table 3-7 show the top five (5) states with the highest number of normalised and absolute certified green buildings, respectively.

Table 3-6: States with the highest number of normalised certified green buildings

Chandigarh	60
Haryana	45
Delhi	44
Maharashtra	36
Dadra & Nagar Haveli and Daman & Diu	26

Table 3-7: States with the highest number of certified green buildings

Maharashtra	1101
Karnataka	620
Tamil Nadu	512
Uttar Pradesh	405
Telangana	347

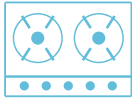
Six (6) states, namely, Andhra Pradesh, Haryana, Jharkhand, Karnataka, Kerala and Punjab have reported, implementing schemes, policies, and financial incentives for EE in affordable housing as detailed in Figure 3.6. These include providing EE appliances to beneficiaries, cool roof technology demonstrations and incorporation of sustainable habitat and energy efficient elements into the design of affordable houses.

Additionally, six (6) states have implemented measures for electric cooking in buildings to promote clean cooking practices as detailed in Figure 3.6.

- Andhra Pradesh has introduced electric cooking boilers in canteens at Tirumala and Tirupati.



6 states reported EE implementation in affordable housing



6 states implemented clean cooking projects

- 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.
- Karnataka is implementing clean cooking projects in Government hospitals, college canteens / hostels, Government canteens and the residential sector.
- Energy Management Centre (EMC) Kerala is implementing the Angan Jyoti project, to make Anganwadis energy-efficient by shifting from fossil fuel to electric cooking. This initiative is active in 424 Anganwadi centres across Trivandrum and Palakkad districts. Additionally, EMC is converting kitchens at A C Kannan Nair School into electric-based systems.
- Maharashtra Energy Development Agency (MEDA) has provided technical and financial assistance for the installation of a solar cooking system at Yashwantrao Chavan Academy of Development Administration (YASHADA).
- In Telangana, the Hare Krishna Movement Charitable Foundation (HKMCF) inaugurated a centralised kitchen for a Rs. 5 meal scheme, utilising electric rice cookers and steam boilers.

Moreover, four (4) states have initiated measures for data disclosure to benchmark energy use in buildings as detailed in Figure 3-6.

- Andhra Pradesh State Energy Conservation Mission (APSECM) and Haryana's EEB cell have conducted studies to determine a standard Energy Performance Index for various commercial building typologies based on climatic zones.
- Karnataka's EC/EE policy incorporates a segment on energy data disclosure, setting benchmarks for energy savings in commercial and domestic sectors.
- EMC Kerala has signed an MoU with World Resources Institute (WRI) India to benchmark energy use in government buildings and is actively conducting energy audits to collect the data.

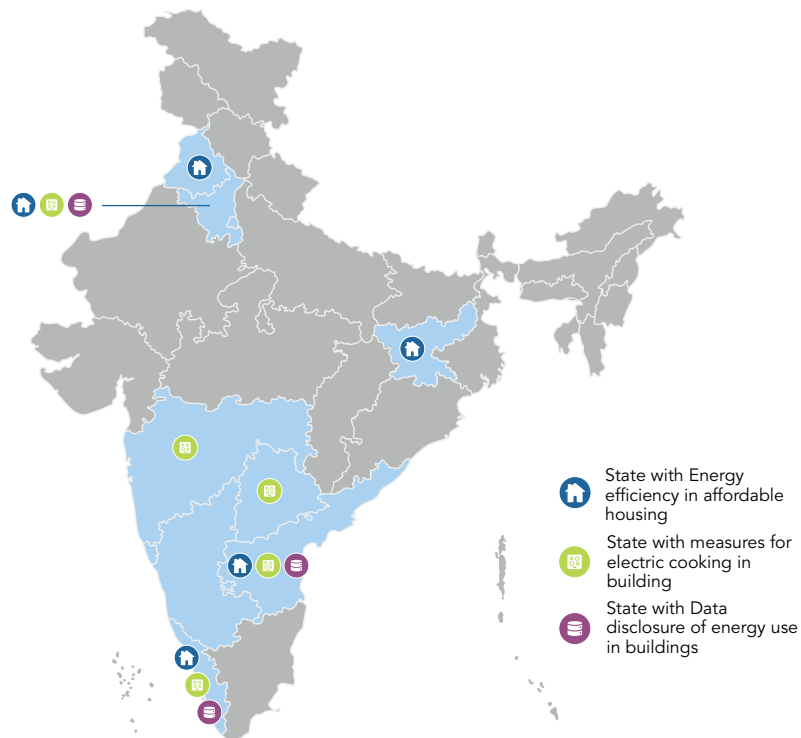


Figure 3-6: Map showing states with EE in affordable housing, electric cooking measures and building energy use data disclosure

BEE has instituted the NEERMAN Awards to commend outstanding building designs aligning with BEE's ECBCs. Awards are presented in two (2) categories: 'Commercial,' based on ECBC 2017 (Revised: April 2018), and 'Residential,' based on ENS 2018. In SEEI 2023, six (6) states have reported receiving NEERMAN awards, recognising their commendable efforts in EE in the buildings sector. Table 3-8 provides detailed lists of states and UTs with NEERMAN award recipients.

Table 3-8: States and UTs with NEERMAN awards

Indicator	Name of states and UTs
States that have received any NEERMAN Awards for commercial buildings, residential buildings, or for the SDA.	1. Andaman & Nicobar Islands 2. Haryana 3. Karnataka 4. Maharashtra 5. Tamil Nadu 6. Telangana

Programme- Specific Indicators

In SEEI 2023, a notable addition is the introduction of a new indicator focusing on programmes for capacity-building in the buildings sector. This brings the total number of programme-specific indicators to four (4). These indicators are designed to monitor and evaluate the execution of programmes and projects by SDAs and other state government entities. These can be undertaken either individually, through interdepartmental collaboration, in partnership with the BEE or industry associations, or through PPPs. The aim is to collectively work towards achieving EE in the buildings sector, marking a significant expansion in the evaluation framework. The states and UTs with such programmes in the building sector are depicted in Table 3-9.

Table 3-9: States and UTs with programmes for EE in the buildings sector

State/UT	Programmes for EE in Government/ Public Buildings	Programmes for EE in Commercial Buildings	Programmes for EE in Residential Buildings	Programmes for EE in Capacity-Buildings
Andhra Pradesh	✓	✓	✓	✓
Assam	✓	✓	✓	✓
Chandigarh	✓	✓	X	X
Chhattisgarh	✓	X	X	X
Goa	✓	✓	X	X
Gujarat	✓	X	X	X
Haryana	✓	✓	✓	✓
Jharkhand	✓	✓	✓	X
Karnataka	✓	✓	✓	✓
Kerala	✓	✓	✓	✓
Maharashtra	✓	✓	✓	✓
Madhya Pradesh	X	✓	X	X
Odisha	✓	X	X	X
Punjab	✓	✓	X	✓
Telangana	✓	✓	✓	✓
Uttar Pradesh	✓	✓	✓	✓
West Bengal	X	✓	X	X

X - No data reported by states.

Note: States with no data reported across all fields have been excluded from the table.

→ Programmes for EE in Government/Public Buildings

In SEEI 2023, fifteen (15) states, including Andhra Pradesh, Assam, Chandigarh, Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Odisha, Punjab, Telangana, and Uttar Pradesh, reported having EE programmes in public buildings.



15
states
reported EE
programmes in
government/
public buildings

- Ten (10) of these states, as presented in Table 3-10, implemented the BEEP for retrofitting existing fixtures with energy-efficient ones. The programme is executed through collaborations between EESL and various government entities, including NITI Aayog, the Public Works Department, Indian Railways, the Airport Authority of India, and state and central Public Sector Undertakings (PSUs). Under BEEP, 90 government/public buildings projects are either in progress, undergoing repairs and maintenance, or have been completed in FY 2022-23, resulting in energy savings of 2,808.904 MU and avoiding emissions of 0.238 MtCO₂.
- Assam has undertaken 6 demonstration projects in public buildings under the EEB Cell, to transparently assess the energy performance of commercial buildings and create awareness among builders and building owners.
- HAREDA implemented multiple programmes to encourage EE in government buildings. These include financial assistance for detailed energy audits, demonstration projects for building design and distribution / installation of energy-efficient appliances. These initiatives have resulted in energy savings of 1.367 MU and a reduction of 109,334.72 kg of CO₂ emissions.
- Jharkhand Renewable Energy Development Agency (JREDA) has undertaken investment grade energy audits for buildings for government buildings to assess the energy consumption of buildings and suggest reduction measures.
- MEDA implemented multiple programmes to encourage EE in government buildings. These include financial assistance for detailed energy audits and their implementation, demonstration projects for building design and distribution / installation of energy efficient appliances. This initiative has resulted in energy savings of 2.45 MU and a reduction of 1,988 tCO₂ emissions per year.
- Telangana's SDA in association with Municipal Administration & Urban Development (MA&UD), has ensured that all constructed government buildings across the state meet self-sustainability and EE criteria, in line with the Telangana Cool Roof Policy 2023. This is resulting in energy savings of 1.4 MU and the avoidance of 1,200 tCO₂ emissions annually.

Table 3-10: BEEP in public buildings reported in states and UTs

BEEP programme	Name of states and UTs
BEEP in government/public buildings	<ol style="list-style-type: none"> 1. Andhra Pradesh 2. Chandigarh 3. Chhattisgarh 4. Goa 5. Gujarat 6. Karnataka 7. Kerala 8. Odisha 9. Punjab 10. Uttar Pradesh

→ Programmes for EE in Commercial Buildings

In SEEI 2023, fourteen (14) states reported the implementation of EE programmes in commercial buildings. These states are Andhra Pradesh, Assam, Chandigarh, Goa, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Telangana, Uttar Pradesh, and West Bengal.

- The BEEP programme is reported to operate in five (5) states as listed in Table 3-11. Five projects under BEEP have been ongoing in commercial buildings in FY 2022-23. These programmes, driven by partnerships between EESL and various commercial buildings such as state PSU offices, banks, Airport Authority of India and commercial offices, resulted in energy savings of 24.347 MU and emission reduction of 20,694.71 tCO₂.
- Andhra Pradesh implemented EE measures in hospitals and Extra High Tension (EHT) substation buildings to demonstrate the use of EE appliances and encourage their adoption. The target was to replace approximately 2090 fans, 2668 tube lights, and 270 numbers of 60 W bulbs within 9 months. The programme has been completed, resulting in deemed energy savings of 1.19 MU and the avoidance of 1011 tCO₂ emissions.
- Assam initiated a star rating programme for pre-existing commercial buildings with an energy consumption equal to or exceeding 100 kW or 120 kVA. The programme aims to develop a clear and transparent tool for assessing the energy performance of commercial buildings, while also raising awareness among builders and building owners about energy efficiency.
- Goa SDA reported the implementation of the Perform, Achieve, and Trade (PAT) scheme in commercial buildings (hotels). Three (3) hotels namely Taj Exotica Resort & Spa, W Goa Resort, and Goa Marriott Hotel have been identified for inclusion under PAT Cycle VI resulting in energy savings of 228.7 Mtoe.
- HAREDA implemented a Floor Area Ratio (FAR) incentive programme for green-certified commercial buildings to promote EE in design and construction. The target is set at 6 projects, resulting in energy savings of 0.83 MU and emissions reduction of 722.5 tCO₂.
- MEDA's Save Energy programme promotes energy audits as a key step for energy conservation. Through financial assistance it has supported 220 detailed energy audits, yielding 80.48 million units (MU) in savings and avoiding 65,993.6 tCO₂ emissions, and 210 walkthrough audits, saving 7.49 MU and avoiding 6,141.8 tCO₂.
- EMC Kerala has conducted energy audits and is providing technical expertise to improve the energy efficiency in commercial buildings.
- Telangana through its Cool Roof Policy 2023-28 has made cool roofing mandatory in all commercial buildings irrespective of the site area/ built-up area.
- Uttar Pradesh is enforcing the ECBC to ensure new buildings meet energy efficiency standards, reducing energy consumption and CO₂ emissions.



14
states
reported EE
programmes
in commercial
buildings

Table 3-11: BEEP in commercial buildings reported in states and UTs

BEEP programme	Name of states and UTs
BEEP in commercial buildings	<ol style="list-style-type: none"> 1. Chandigarh 2. Karnataka 3. Madhya Pradesh 4. Punjab 5. West Bengal

→ Programmes for EE in Residential Buildings



9
states
reported EE
programmes
in residential
buildings

In SEEI 2023, nine (9) states—Andhra Pradesh, Assam, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Telangana, and Uttar Pradesh reported implementing EE programmes in residential buildings.

- Andhra Pradesh State Energy Efficiency Development Corporation Limited (APSEEDCO) has collaborated with DISCOMS to launch a pilot project to encourage the use of appliances including brushless direct current (BLDC) fans, light-emitting diode (LED) bulbs and super-efficient Air Conditioners among domestic consumers. The project leverages the on-bill financing model and is expected to result in energy savings of 0.274 MU and avoid 234 tCO₂ emissions.
- Karnataka Renewable Energy Development Limited (KREDL) has undertaken a Model Village Campaign programme on EE in Dhundasi village, Haveri district. This initiative includes the distribution of 1380 LED bulbs, 690 LED tubes, 690 BLDC fans, 184 40W LED street lights, and 35 90W LED street lights.
- Kerala's Nava Keralam Project is advancing its goal of making 85 panchayats carbon neutral through the Home Energy Assessor program. This initiative implemented by EMC, focuses on conducting home energy assessments in residential buildings across these panchayats.
- MEDA, under the Save Energy Programme, is actively promoting energy audits as the initial step in identifying potential areas for energy conservation in the residential sector.
- Telangana's Cool Roof policy has made cool roof application mandatory for all residential buildings that have plot area of 600 square yards and above and optional for others. The efforts have resulted in deemed energy savings of 0.6 MU and the avoidance of 638 tCO₂e.
- Assam, Haryana, Jharkhand and Uttar Pradesh have reported implementing various programmes led by the EEB cell, emphasising residential star labelling, demonstrations, and ENS Compliance reports. The objective is to make buildings energy efficient and reduce energy consumption and CO₂ emissions for the benefit of occupants in homes, apartments and townships.

→ Programmes for Capacity-Buildings

In SEEI 2023, nine (9) states namely Andhra Pradesh, Assam, Haryana, Karnataka, Kerala, Maharashtra, Punjab, Telangana, and Uttar Pradesh reported conducting programmes for capacity-building in the building sector. The initiatives involve conducting various training programmes to promote EE in the building sector and reduce carbon emissions through EEB cells. The trainings focus on creating awareness about ECBC and ENS, covering technical aspects of codes, achieving compliance through energy simulation programmes, and providing intensive training for key government officials. These programmes have been designed for government officials from stakeholder departments, practising architects, engineers, building owners, designers, and developers. This reflects a proactive approach by these states to enhance institutional capacity and technical expertise in EE within the building sector.



BUILDINGS SPOTLIGHT

The Telangana Cool Roof Policy 2023 marks a significant initiative in urban environmental management, positioning Telangana as the first Indian state to formally endorse the adoption of cool roofs. A key aspect of this policy is its mandatory application to all government and commercial buildings to combat the urban heat island effect and heat stress. The policy requires these energy-efficient roofs, which reflect sunlight and reduce indoor heat, for residential buildings over 600 square yards, while smaller homes have the option. Compliance is essential for obtaining occupancy certificates. The government aims to cover significant areas in Hyderabad and state-wide by March 2024, with 14 buildings already implementing the policy. This step towards sustainable urban development promises energy savings and improved living conditions.



3.2 INDUSTRY

OVERVIEW

In the fiscal year 2021-2022, the industrial sector in India was the largest consumer of energy, accounting for 54% of the nation's total energy. According to projections from the India Energy Security Scenarios (IESS) model by NITI Aayog¹³, this sector holds the greatest potential for energy savings in the country by 2047. These savings can be achieved through the implementation of energy efficiency management strategies and the adoption of cutting-edge technologies. Such expansion in industrial production typically corresponds to an increase in energy consumption. This underscores the need for adopting sustainable and energy-efficient practices to effectively manage the rising demand.

The industry sector, representing the highest share of energy consumption, holds significant potential for energy savings. In SEEI 2023, the evaluation of EE initiatives in the industry sector is based on eight (8) indicators. Among these, five (5) are common indicators focusing on policy, institutional capacity, and the adoption of EE measures and the remaining three (3) are programme-specific indicators, designed to assess the performance of EE programmes implemented within the state. The maximum total score in this sector is 17, with 6 points allocated to the common indicators and 11 points to the programme-specific indicators.

Notably, in SEEI 2023, the overall scores of six (6) states have seen improvement in the industry sector compared to SEEI 2021-22.

Table 3-12 provides an overview of the indicators in the industry sector. Figure 3-7 represent the scores of the states in the industry sector, across the two indicator categories: common and programme-specific, with states grouped together based on their TFEC. The states' progress in SEEI 2023 compared to SEEI 2021-22 is depicted in Figure 3-8.



Table 3-12: Industry sector indicators

Sl. No.	Indicator	Max. Score	Scoring Criteria
Policy			
1	EE & EC provisions in Industry/Ministry of Micro, Small & Medium Enterprises (MSME) policy	1	
	Are there any provisions for EE in Industry/MSME policy in the state?		EE provisions in Industry/MSME policy =1, else=0
2	Mandatory Energy Audit (MEA) in Non-PAT industries/MSME.	1	
	Does the state have any policy/guidelines for carrying out Mandatory Energy Audits (MEA) in Non-PAT industries/MSMEs and submitting the report to the SDA?	0.5	Policy for carrying out MEA=0.5, else=0
	Does the state have any policy/scheme/financial incentive for implementing the recommendations of the MEAs in Non-PAT industries/MSMEs?	0.5	Policy for implementing EE measures of MEA=0.5, else=0
Institutional Capacity			
3	Advisory, certification and enforcement capacity in state government	1.5	
	Does the state have an entity to develop capacity and provide technical expertise on EE in industry for engineers, managers, industry owners, city officials, and other stakeholders? (Eg. Capacity-building /workshop/ training programme)	0.5	Entity to develop capacity & provide technical expertise = 0.5, else= 0
	Does the state have a Government authority to enforce EC/EE regulations or measures for industry?	0.5	Government authority to certify and enforce EE/EC regulations=0.5, else= 0
	What was the budget assigned and utilised for EE in the industry sector?	0.5	Budget assigned and utilised for EE activities in industry sector=0.5, else 0
Adoption of EE measures			
4	Energy conservation awards	2	
	How many industrial units have won energy conservation awards through state/national/industry association awards?		If total EC awards = 0, then 0 point (≥ 1 & < 10), then 0.5 point (≥ 10 & < 20), then 1 point (≥ 20 & < 30), then 1.5 points > 30 , then 2 points
5	Measures for electrification of end-use in industry	0.5	Yes=0.5, else=0
	Are there any steps taken for electrification of end-use energy in industries (e.g industrial heating)		
State Programme			
6	Programmes for energy efficiency in large industries	4	
	Does the state have programmes for energy efficiency in large industries in FY 2022-23?		
	What is the objective of the programme?	0.5	Objective of the programme=0.5
	What is the target set under the programme?	0.5	Target set under the programme=0.5
	What is the timeline?	0.5	Timeline =0.5
	How much budget has been allocated & utilised to date	0.5	Budget allocated & utilised to date =0.5
	Who is running the programme? (e.g. SDA, state dept., industry association, PPP etc.)	0.5	Entities running the programme=0.5
	What is the progress to date?	0.5	Progress to date =0.5
	What are the energy savings? (deemed or measured)	0.5	Energy savings (deemed or measured)= 0.5
	How much emissions were avoided? (based on energy savings)	0.5	Avoided emissions=0.5

Sl. No.	Indicator	Max. Score	Scoring Criteria
7	Programmes for energy efficiency in MSME industries	6	
	Does the state have programmes for energy efficiency in MSME industries in FY 2022-23?		
	What is the objective of the programme?	0.5	Objective of the programme=0.5
	What is the target set under the programme?	1	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 to date =1
	Who is running the programme? (list all, e.g. SDA, state dept., industry association, PPP etc.)	0.5	Entities running the programme=0.5
	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)	0.5	Avoided emissions=0.5
8	Programmes for capacity-building in industry sector	1	
	Does the state have programmes for capacity-building for energy efficiency industries in FY 2022-23?		
	What is the objective and timeline of the programme? Who is running the programme?	0.5	Objective of the programme, Timeline, Entities running the programme=0.5
	What was the target audience under the programme? What was the number of beneficiaries under the programme?	0.5	Target audience, number of beneficiaries under the programme =0.5

Figure 3-7 shows the TFEC group-wise scores for the Industry sector in SEEI 2023.

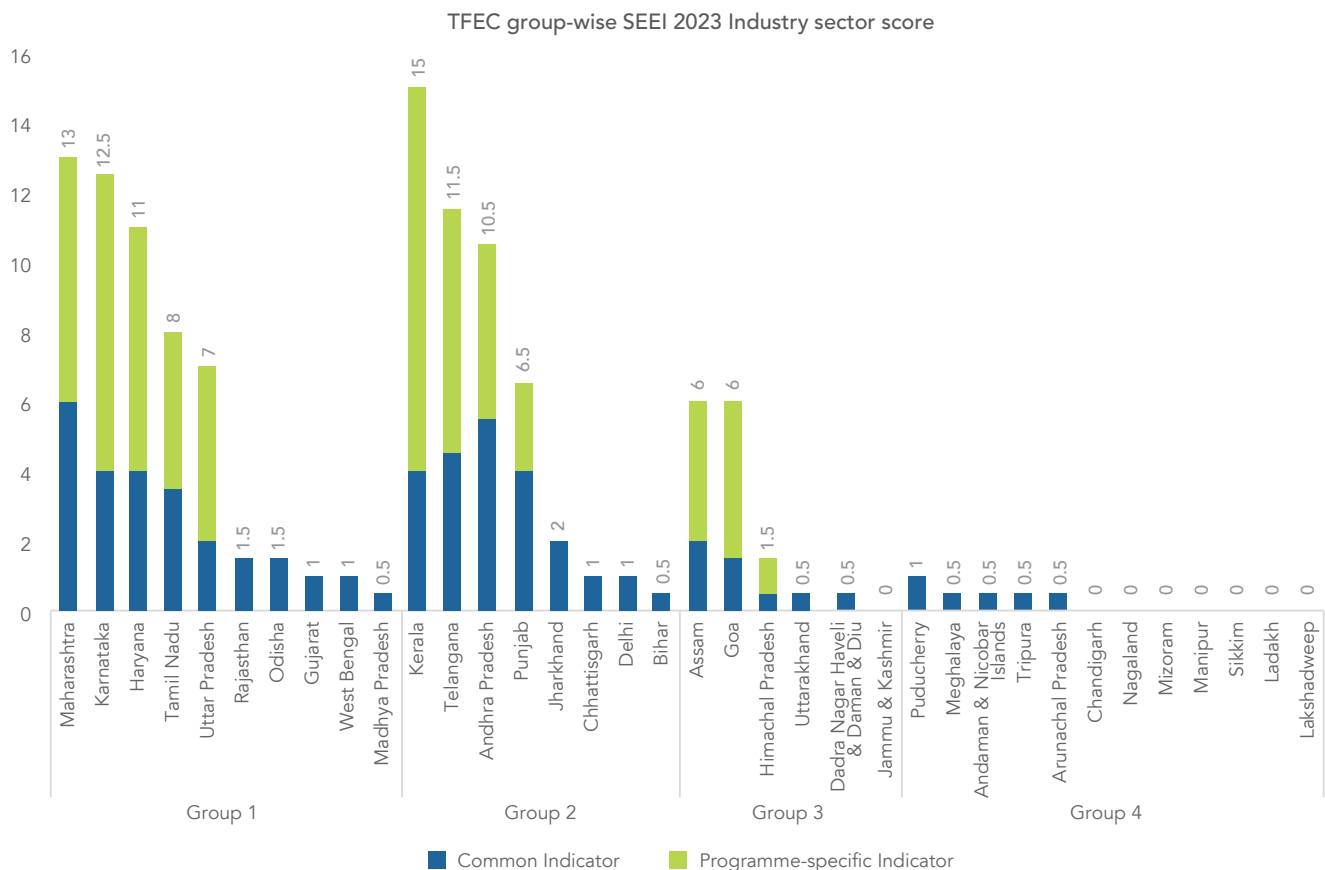


Figure 3-7: TFEC group-wise industry sector state scores

Figure 3-8 illustrates the progress in the industry sector for each state in the SEEI 2023 compared to SEEI 2021-22.

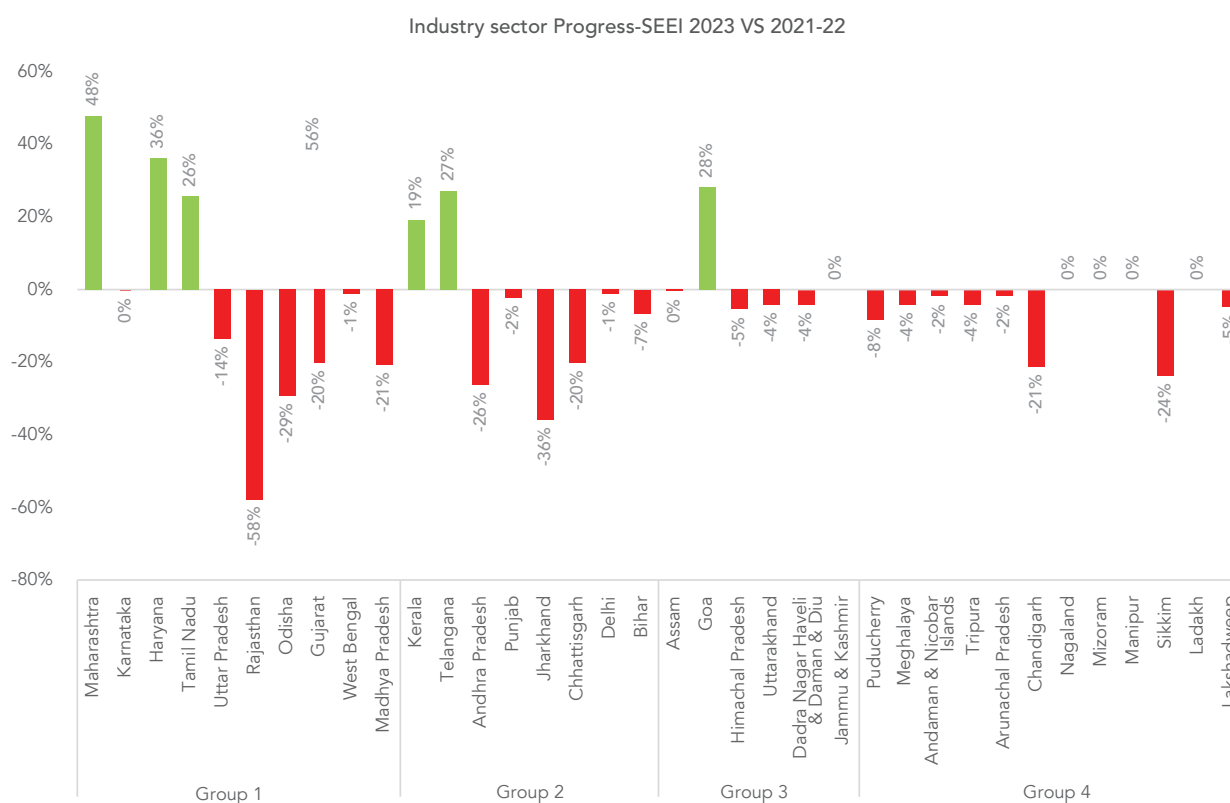


Figure 3-8: TFEC group-wise industry sector state progress – SEEI 2023 vs SEEI 2021-22

SEEI 2022-23 INDUSTRY SECTOR SCORE HIGHLIGHTS

Kerala is the leading state in the industry sector, with a score of 15 out of 17 in SEEI 2023. The other top-performing states in the sector are Maharashtra and Karnataka with impressive scores of 13 and 12.5 respectively. Six (6) states have shown significant improvements with Maharashtra leading the progress by 48%. Ten (10) states and UTs reported a steep decline while others showed no changes to marginal decline.



Kerala is the leading state in the industry sector

Common Indicators

Policy

Two (2) new policy indicators in the industry sector have been added in this edition of SEEI. Six (6) states namely Andhra Pradesh, Assam, Haryana, Kerala, Maharashtra and Punjab reported adopting policies for Mandatory Energy Audits (MEA) in Non-PAT industries/MSMEs and submitting the report to SDA. Further, nine (9) states namely Andhra Pradesh, Goa, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Tamil Nadu, and Telangana have provisions for EE in their Industry/MSME policies. Some of these provisions are detailed below.

- Andhra Pradesh’s Industrial Development Policy emphasises sustainability and technological progress. including more efficient appliances. The state has initiated mandatory Investment Grade Energy Audits (IGEA) for industries with contract demand of 1,000 KVA and above once every 3 years.
- Goa has introduced amendments to the ‘Goa State Incentives & Umbrella Schemes’ to attract investment for EE in industry sector.



9 states and UTs have EE provisions in Industry or MSME policy

- Haryana notified the “Revised Energy Conservation Scheme” for MSMEs to include incentives in the form of reimbursement of the cost of conducting energy audits and equipment subsidies
- Jharkhand’s Export Policy 2023 has provisions for green production & management for export houses, which includes upto 75% reimbursement on the cost of energy audits.
- Karnataka has notified the Energy Conservation and Energy Efficiency policy for the period 2022-27. The policy includes provisions for the industry sector, such as subsidies for energy auditing in Small and Medium Enterprises (SMEs) and non-PAT industries. Additionally, financial incentives such as soft loans and tax rebates are provided for EE retrofitting.
- Kerala has notified Energy Conservation Directions which mandates the industries to carry out energy audit, implement energy efficiency measures, have an energy policy and appoint an official as registered energy manager. Additionally, the EMC has established the Kerala State Energy Conservation Fund, offering loans to industries for the implementation of energy efficiency and energy generation projects.
- Maharashtra implemented the Save Energy programme for MSMEs, providing financial assistance for conducting energy audits in the state.
- Tamil Nadu has the Promotion of Energy Audit and Conservation of Energy (PEACE) scheme in place for promoting Energy efficiency in MSME units.
- Telangana has a dedicated scheme to support Technology and Quality Upgradation Support to MSMEs. This includes financial support and capacity-building for MSMEs to implement energy-efficient technologies and obtain product certifications, with subsidies up to 75% and various funding caps for different initiatives.

Table 3-13 depicts the states and UTs with the key policy indicators for the industry sector.

Table 3-13: States and UTs with policies for EE in the industry sector

Policy indicator	Name of states and UTs
States that have provisions of EE in Industry/MSME policy	<ol style="list-style-type: none"> 1. Andhra Pradesh 2. Goa 3. Haryana 4. Jharkhand 5. Karnataka 6. Kerala 7. Maharashtra 8. Tamil Nadu 9. Telangana
States that have policy/guidelines for carrying out Mandatory Energy Audits (MEA) in Non-PAT industries/MSMEs and submit the report to SDA	<ol style="list-style-type: none"> 1. Andhra Pradesh 2. Assam 3. Haryana 4. Kerala 5. Maharashtra 6. Punjab
States that have any policy/scheme/financial incentive for implementing the recommendations of the MEAs in non-PAT industries/MSMEs	<ol style="list-style-type: none"> 1. Andhra Pradesh 2. Haryana 3. Karnataka 4. Kerala 5. Maharashtra 6. Punjab

→ Institutional Capacity

There have been positive developments in institutional capacity of energy efficiency in the industry sector with fourteen (14) states and UTs namely Andhra Pradesh, Assam, Bihar, Haryana, Karnataka, Kerala, Maharashtra, Meghalaya, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh reporting the presence of an entity dedicated to developing capacity and providing technical expertise in the sector. In most cases, the PAT Cell of the SDA, or the SDA itself, is dedicated on enhancing the skills and capabilities of stakeholders at the state level and providing technical expertise on EE.

Thirty (30) states and UTs reported having a designated government authority to enforce EC/EE regulations or measures for the industry sector.

Most states reported the appointment of an adjudicating officer (AO) in their respective State Electricity Regulatory Commission (SERC)/Joint Electricity Regulatory Commission (JERC). KREDL is tasked with implementing and enforcing the Energy Conservation Act in Karnataka, focusing on capacity-building and technical expertise for various stakeholders. Additionally, a PAT cell, established by FICCI, assists industries with energy efficiency. The state government has also set up a State High-Level Committee (SHLC), to enforce energy efficiency measures across various sectors, including industry.

Six (6) states namely Andhra Pradesh, Karnataka, Kerala, Maharashtra, Punjab and Telangana have reported allocating a dedicated state budget to government authorities for EE activities in the industrial sector.

Table 3-14 outlines the states and UTs with institutional capacity for EE in the industry sector:

Table 3-14: States and UTs with institutional capacity for EE in the industry sector

State/UT	Entity to develop capacity and provide technical expertise on EE in industry for engineers, managers, business owners, city officials, and other stakeholders	Government authority to enforce EC/EE regulations or measures for industry	State budget assigned to government authorities for EE activities
Andaman & Nicobar Islands	X	✓	X
Andhra Pradesh	✓	✓	✓
Arunachal Pradesh	X	✓	X
Assam	✓	✓	X
Bihar	✓	✓	X
Chandigarh	X	✓	X
Chhattisgarh	X	✓	X
Dadra & Nagar Haveli and Daman & Diu	X	✓	X
Delhi	X	✓	X
Goa	X	✓	X
Gujarat	X	✓	X
Haryana	✓	✓	X
Himachal Pradesh	X	✓	X
Jharkhand	X	✓	X
Karnataka	✓	✓	✓
Kerala	✓	✓	✓
Lakshadweep	X	✓	X
Maharashtra	✓	✓	✓
Madhya Pradesh	X	✓	X

State/UT	Entity to develop capacity and provide technical expertise on EE in industry for engineers, managers, business owners, city officials, and other stakeholders	Government authority to enforce EC/EE regulations or measures for industry	State budget assigned to government authorities for EE activities
Meghalaya	✓	✓	X
Odisha	✓	✓	X
Puducherry	X	✓	X
Punjab	✓	✓	✓*
Rajasthan	✓	✓	X
Tamil Nadu	✓*	✓*	X
Telangana	✓	✓	✓*
Tripura	X	✓	X
Uttar Pradesh	✓	✓	X
Uttarakhand	X	✓	X
West Bengal	X	✓	X

*Newly reported states.

X: No data reported by states.

Note: States with no data reported across all fields have been excluded from the table

→ Adoption of EE measures



6 states provide financial incentives for implementing Mandatory Energy Audits recommendations in non-PAT industries and MSMEs

In SEEI 2023, industrial units from twenty-three (23) states and union territories received energy conservation accolades via state, national, or industry association awards in recognition of their commendable efforts to lower energy usage while sustaining production levels. For the SEEI, the following were tracked: state energy conservation awards, CII awards, and the National Energy Conservation Award (NECA).

In Maharashtra, a total of 48 industrial units were recognised with energy conservation awards, marking the highest count in any state. In the 17th edition of Maharashtra's state-level awards, the industry sector was notably acknowledged with 23 awards. Furthermore, the 24th National Award for Energy Management in 2023 saw several industries from Maharashtra receiving accolades, highlighting their achievements in energy management.

Figure 3-9 shows the states and UTs with energy conservation awards for industrial units through state, national, and industry association awards.

No of industrial units in the states/UTs that have won EC awards at state/national/industry association

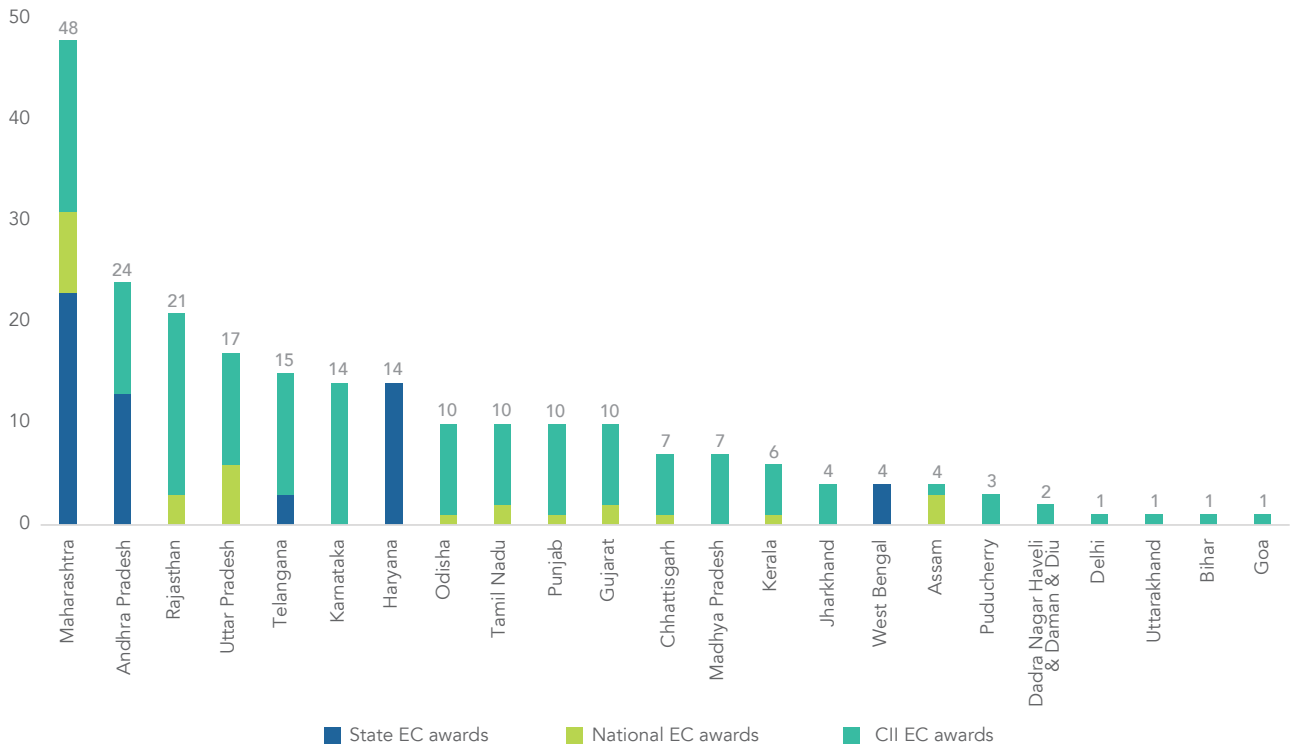


Figure 3-9: State and UTs with EC awards for industrial units

In SEEI 2023, a new indicator was introduced under the adoption of EE measures to assess the steps taken for the electrification of end-use energy in industries. Five (5) states reported implementing such measures, which included industries replacing hot water systems' thermal boilers with electric ones and transitioning to adoption of heat pumps for hot water applications. The introduction of manual for thermal power plants focusing on the best practices for converting end-use energy processes in these plants to electric systems, aiming for greater efficiency has also been reported. These measures have collectively led to substantial annual energy savings and marked a progressive shift towards more energy-efficient practices in industrial energy consumption. Table No. 3-15 indicates the states which have measures for electrification of end-use energy in industries:

Table 3-15: States and UTs with measures for electrification of end-use in industries

Indicator	Name of states and UTs
State that has measures for electrification of end-use energy in industries (e.g. - industrial heating)	<ol style="list-style-type: none"> 1. Andhra Pradesh 2. Haryana 3. Maharashtra 4. Punjab 5. Telangana

Programme-Specific Indicators

In SEEI 2023, there are three (3) programme-specific indicators 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. The states and UTs with such programmes in the industry sector are detailed in Table 3-16.

Table 3-16: States and UTs with programmes for EE in the industry sector

State/UT	Programmes for EE in large industries	Programmes for EE in MSMEs	Programmes for EE in Capacity-Buildings
Andhra Pradesh	✓	X	✓
Assam	✓	X	✓
Goa	✓	X	✓
Haryana	✓	✓	✓
Himachal Pradesh	X	X	✓
Karnataka	✓	✓	✓
Kerala	✓	✓	✓
Maharashtra	✓	✓	✓
Punjab	✓	✓	✓
Tamil Nadu	X	✓	X
Telangana	✓	✓	✓
Uttar Pradesh	✓	X	✓

X - No data reported by states.

Note: States with no data reported across all fields have been excluded from Table



10
states
reported EE
programmes
in large
industries

→ Programmes for EE in large industries

In SEEI 2023, ten (10) states reported the implementation of EE programmes specifically targeted at large industries.

- BEE's PAT programme is reported in eight (8) states namely Andhra Pradesh, Assam, Goa, Karnataka, Maharashtra, Punjab, Telangana, and Uttar Pradesh. PAT is a regulatory instrument to reduce specific energy consumption in energy-intensive industries, with an associated market-based mechanism to enhance the cost-effectiveness through certification of excess energy saving which can be traded.
- In Haryana, HAREDA implemented the Energy audit scheme, Capital subsidy scheme, and Interest-free loan scheme. The energy audit covered 10 units under subsidy and 100 units without subsidy, along with the Energy Audit of 5 MSME clusters over a one-year timeline. It is reported that energy savings amounted to 143 MU, with avoided emissions of about 12 ktCO₂.
- The government of Kerala mandates energy audits for HT and EHT consumers. EMC offers subsidies for industry energy audits and organises the Kerala State Energy Conservation Awards to promote energy efficiency in the industry sector.



7
states reported
implementing
EE programmes
in MSMEs

→ Programmes for EE in MSMEs

In SEEI 2023, seven (7) states reported the implementation of EE programmes specifically targeting MSMEs.

- In Haryana, HAREDA implemented an energy audit scheme to identify energy efficiency measures by providing financial incentives for conducting an energy audit and implementation of EC measures. It is reported that energy savings amounted to 114.18 MU, with avoided emissions of 0.097 MtCO₂.
- In Karnataka, KREDL, in collaboration with BEE, conducts energy audits and prepares energy-saving plans for MSME clusters. It is reported that energy audit has been undertaken in 15 clusters and 3 energy management centres in MSME units have been established.
- In Kerala, EMC collaborated with energy auditors to conduct an energy audit in 4 MSME clusters the deemed energy savings from which is estimated to be 0.43 MU/annum, with avoided emissions of 368 tCO₂/annum.

- In Maharashtra, under the MSME Promotion Policy, EE project focused on identified clusters after a comprehensive energy audit was promoted. To encourage MSMEs (standalone incentives), quality competitiveness, environmental measures, R&D, and energy/water conservation are provided.
- In Punjab, Punjab Energy Development Agency (PEDA) conducts annual energy audits in key MSME clusters like foundry and steel mills.
- The Promotion of Energy Audit and Conservation of Energy (PEACE) scheme in Tamil Nadu incentivises MSMEs to carry out energy audits and implement energy conservation recommendations.
- The Government of Telangana offers financial incentives to MSMEs for the implementation of energy efficiency measures, as well as technology and quality upgrades, through a compendium of schemes designed for MSMEs.

➔ Programmes for Capacity-Buildings

In SEEI 2023, eleven (11) states namely Andhra Pradesh, Assam, Goa, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Punjab, Telangana and Uttar Pradesh, reported having capacity-building programmes in the Industry sector.

- SDA of Andhra Pradesh, Assam, Haryana, Karnataka, Punjab, Telangana, and Uttar Pradesh in collaboration with BEE, organised Investment Bazars and capacity-building workshops in the state to raise awareness on diverse energy-efficient technologies, and various financing schemes related to energy efficiency for DCs, MSMEs, Financing Institutions (FI), banks and other stakeholders.
- In Goa, capacity-building initiatives included print advertisements and information dissemination as part of the Swayampurna Goa programme.
- In Himachal Pradesh, the PAT cell of SDA conducted webinars covering PAT schemes, diverse energy-efficient technologies, various financial schemes related to energy efficiency.
- EMC Kerala has organised capacity-building programmes for professionals, managerial staffs and workers related to industry sector.
- In Maharashtra, through Micro and Small Enterprises- Cluster Development Programme (MSE-CDP), the state government conducted capacity-building for MSME covering promotion of green and sustainable manufacturing technology and setting up of common facility centre in the industrial area to boost up the process and products.

INDUSTRY SPOTLIGHT

EMC Kerala is leading a targeted initiative to enhance energy efficiency within selected MSME clusters. This programme involves comprehensive energy audits across all units within these clusters, identifying opportunities for energy conservation and efficiency improvements. Key sectors such as furniture manufacturing, rubber processing, plastics, and agricultural implement production are the focus, given their significant energy usage and economic importance. In addition to the audits, the programme prioritises the implementation of practical energy-saving measures in select industries.

The initiative includes a robust capacity-building component. Through educational and training activities, MSMEs are empowered with the knowledge and skills necessary for ongoing energy efficiency management. This educational aspect ensures long-term sustainability of the programme benefits, fostering a culture of energy awareness and efficiency.



3.3 MUNICIPAL SERVICES

OVERVIEW

Municipal services in India, a critical component of urban infrastructure, encompass a range of energy-intensive activities including sewage treatment, water pumping, and street lighting. Given that approximately 30% of the Indian population resides in urban areas, a figure that is steadily increasing due to rural-to-urban migration, the imperative for energy efficiency in these services is paramount. By bolstering EE measures in urban centres, there is a significant opportunity to enhance citizens' access to essential utilities such as heating, cooling, water, and electricity. Implementing energy-efficient practices in municipal systems can lead to substantial water and energy savings, thereby reducing operational costs and enhancing the quality of services. Furthermore, these practices contribute to environmental sustainability and can aid in mitigating the urban heat island effect, prevalent in many Indian cities.

There are five (5) indicators in the SEEI 2023 to assess EE progress in the municipal services sector, with a focus on street lighting and water/sewerage systems. This includes two (2) common indicators covering policy and adoption of EE measures and three (3) programme-specific indicators. The maximum score in this sector is eleven (11) of which a score of two (2) is allotted for the common indicators and nine (9) for programme-specific indicators



Overall, the scores of fourteen (14) states have increased in SEEI 2023, compared to SEEI 2021-22.

Table 3-17 provides an overview of the indicators in the municipal services sector. Figure 3-10 represents the scores of the states in the municipal services sector, across the two indicator categories: common and programme- specific, with states grouped together based on their TFEC. The states' progress in SEEI 2023 compared to SEEI 2021-22 is depicted in Figure 3-11.

Table 3-17: Municipal services sector indicators

Sl. No.	Indicator	Max. Score	Scoring Criteria
Institutional Capacity			
1	Advisory, certification, and enforcement capacity in state government	1.5	
	Does the state have an entity to develop capacity and provide technical expertise on EE in municipal services for engineers, city officials, and other stakeholders?		Entity to develop capacity & provide technical expertise = 0.5, else= 0
	Does the state have a Government authority to enforce EC/EE regulations or measures for municipalities?		Government authority to certify and enforce EE/EC regulations=0.5, else= 0
	What was the budget assigned and utilised for EE in the municipal sector?		Budget assigned and utilised for EE activities in municipal sector=0.5, else=0
Adoption of EE measures			
2	Use of EE pumps/motors in water and sewerage systems	0.5	
	Has the state taken any steps to promote the use of EE pumps/motors in municipal water and sewerage systems?		Yes=0.5, else=0
State Programme			
3	Programmes for energy-efficient street lighting	4	
	Does the state have programmes for energy-efficient street lighting in FY 2022-23?		
	What is the objective of the programme?	0.5	Objective of the programme=0.5
	What is the target set under the programme?	0.5	Target set under the programme=0.5
	What is the timeline?	0.5	Timeline =0.5
	How much budget has been allocated & utilised to date	0.5	Budget allocated & utilised to date =0.5
	Who is running the programme? (e.g. SDA, state dept., municipality, industry association, PPP etc.)	0.5	Entities running the programme=0.5
	What is the progress to date?	0.5	Progress to date =0.5
	What are the energy savings? (deemed or measured)	0.5	Energy savings (deemed or measured) = 0.5
	How much emissions were avoided? (based on energy savings)	0.5	Avoided emissions=0.5

Sl. No.	Indicator	Max. Score	Scoring Criteria
4	Programmes for energy-efficient water/sewerage	4	
	Does the state have a programmes for energy-efficient water/sewerage in FY 2022-23?		
	What is the objective of the programme?	0.5	Objective of the programme=0.5
	What is the target set under the programme?	0.5	Target set under the programme=0.5
	What is the timeline?	0.5	Timeline =0.5
	How much budget has been allocated & utilised to date	0.5	Budget allocated & utilised to date =0.5
	Who is running the programme? (e.g. SDA, state dept., municipality, industry association, PPP etc.)	0.5	Entities running the programme=0.5
	What is the progress to date?	0.5	Progress to date =0.5
	What are the energy savings? (deemed or measured)	0.5	Energy savings (deemed or measured) = 0.5
	How much emissions were avoided? (based on energy savings)	0.5	Avoided emissions=0.5
5	Programmes for capacity-building in the municipal services sector	1	
	Does the state have a programmes for capacity-building for energy efficiency in municipal services in FY 2022-23?		
	What is the objective and timeline of the programme? Who is running the programme? (e.g. SDA, state dept., industry association, PPP etc.)	0.5	Objective of the programme, Timeline, Entities running the programme=0.5
	What was the target audience under the programme? What was the number of beneficiaries under the programme?	0.5	Target audience, number of beneficiaries under the programme=0.5

Figure 3-10 shows the TFEC group-wise scores for the municipal services sector in SEEI 2023.

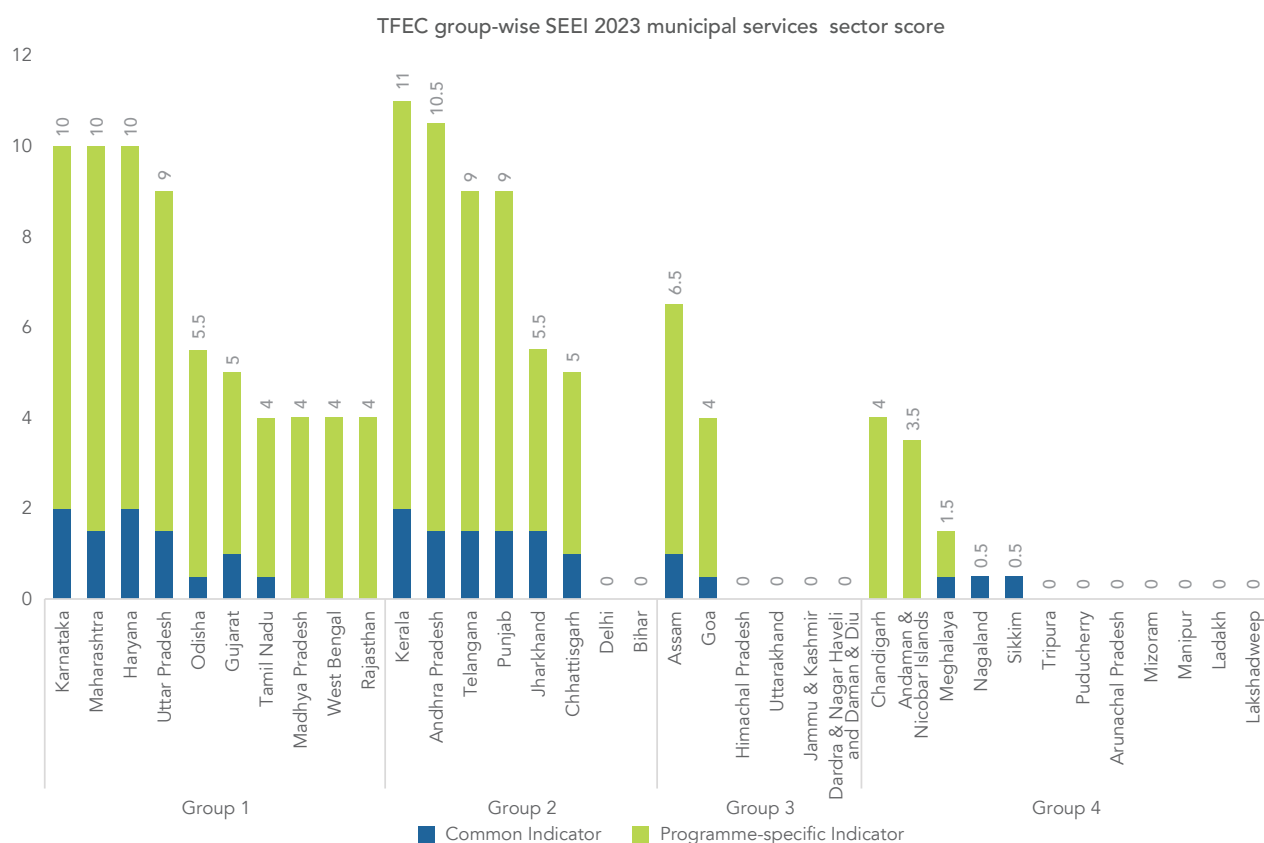


Figure 3-10: TFEC group-wise municipal services sector state scores

Figure 3-11 illustrates the progress of the municipal services sector for each state in the SEEI 2023 in comparison to SEEI 2021-22.

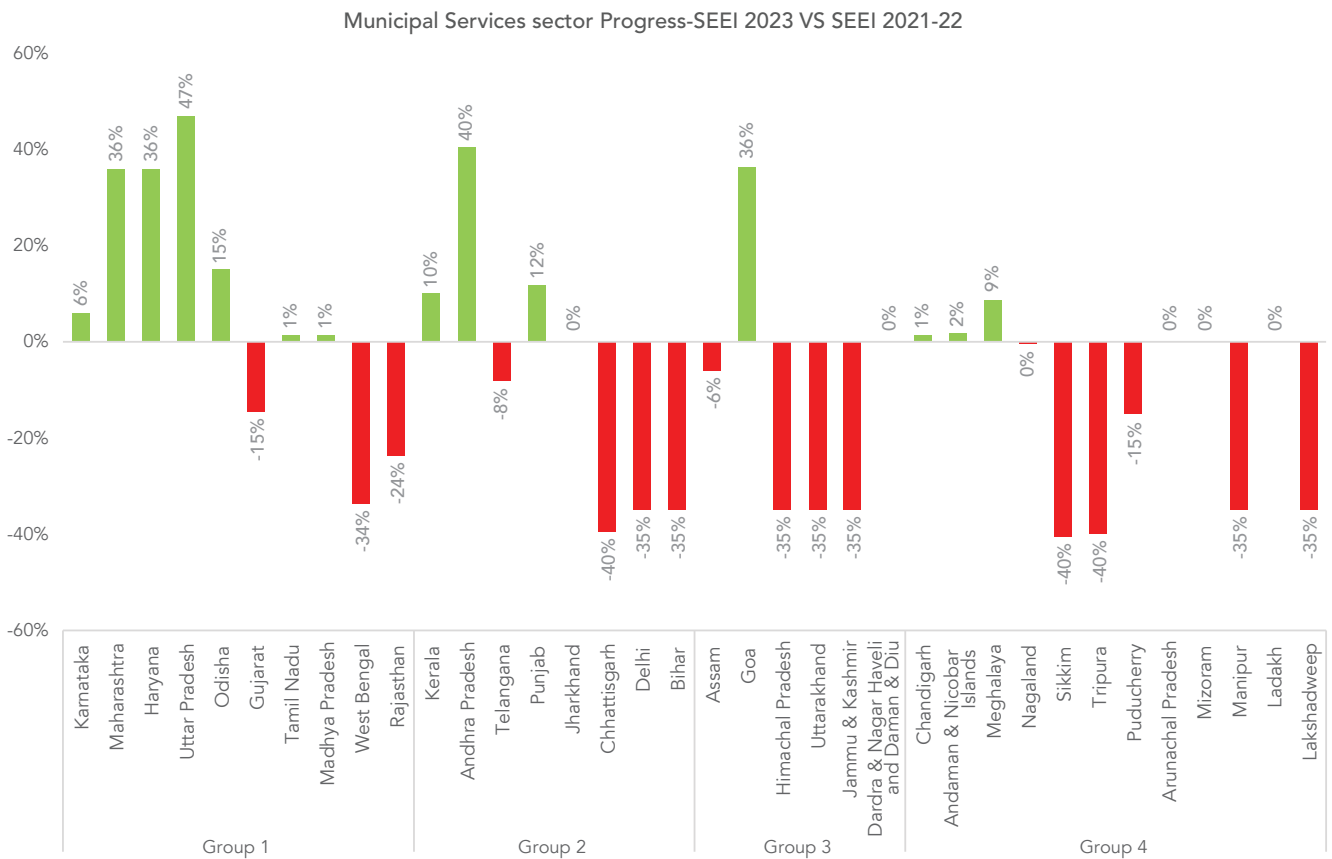


Figure 3-11: TFEC group-wise municipal services sector state progress and UTs – SEEI 2023 vs SEEI 2021-22

SEEI 2023 MUNICIPAL SERVICES SECTOR SCORE HIGHLIGHTS

Kerala is the top-performing state in the municipal services sector with a perfect score of 11. Andhra Pradesh follows closely, securing a score of 10.5, while Haryana, Karnataka, and Maharashtra have each attained a score of 10. Fourteen (14) states and UTs have shown improvement with Uttar Pradesh and Andhra Pradesh reflecting maximum improvements of 47% and 40% respectively. Sixteen (16) states and UTs reported a decline and the rest reported no changes.

Common Indicators

→ Institutional Capacity

Fourteen (14) states namely Andhra Pradesh, Assam, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Punjab, Telangana, Uttar Pradesh reported having an entity to develop capacity and provide technical expertise on EE in municipal services for engineers, city officials, and other stakeholders at the state level.

- In Andhra Pradesh, Assam, Chhattisgarh, Haryana, Jharkhand, Kerala, Maharashtra, Meghalaya, Nagaland, Punjab, Telangana, and Uttar Pradesh, the respective SDAs are the entities to develop capacity and provide technical expertise on EE in municipal services for engineers, city officials, and other stakeholders.
- In Gujarat, Gujarat Urban Development Company Limited conducted various EE programmes for the municipal bodies in the state.



Kerala is the top-performing state in the municipal services sector

- In Karnataka, the Urban Development Departments (UDD), Directorate of Municipal Administration, Belagavi Smart City Limited, and Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC) are the entities to develop capacity and provide technical expertise.

Twelve (12) states shared pertinent details about the governmental entity responsible for enforcing energy conservation and efficiency regulations or initiatives within the municipal services sector.

- EC/EE regulations and measures for municipalities are enforced by the SDAs of ten (10) states: Andhra Pradesh, Chhattisgarh, Haryana, Jharkhand, Kerala, Maharashtra, Punjab, Rajasthan, Telangana and Uttar Pradesh
- In Gujarat, Gujarat Urban Development Company Limited has been designated as the nodal agency for Municipal Energy Efficiency Programme (MEEP).
- The government of Karnataka has established a State High-Level Committee, led by the Additional Chief Secretary of the Energy Department, to spearhead and implement energy efficiency measures across diverse sectors, including municipal services.

Only three (3) states namely Haryana, Karnataka, and Kerala, provided details about the allocation of state budget to the authorities mentioned above for EE activities in the municipal services sector. Table 3-18 shows the states and UTs with institutional capacity for EE in municipal services

Table 3-18: States and UTs with institutional capacity for EE in the municipal services sector

State/UT	Entity to develop capacity and provide technical expertise	Government authority to enforce EC/EE regulations	Budget assigned to state government authorities
Andhra Pradesh	✓	✓	X
Assam	✓	✓	X
Chhattisgarh	✓	✓	X
Gujarat	✓	✓	X
Haryana	✓	✓	✓
Jharkhand	✓	✓	X
Karnataka	✓	✓	✓
Kerala	✓	✓	✓
Maharashtra	✓	✓	X
Meghalaya	✓	X	X
Nagaland	✓	X	X
Punjab	✓	✓	X
Telangana	✓	✓	X
Uttar Pradesh	✓	✓	X

X-No data reported by states.

Note: States with no data reported across all fields have been excluded from the table

→ Adoption of EE measures

Twelve (12) states, namely Andhra Pradesh, Goa, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Odisha, Punjab, Sikkim, Telangana, and Uttar Pradesh reported taking steps to promote the use of EE pump and motors in municipal water and sewerage systems.

- Andhra Pradesh conducted investment grade energy audits, capacity-building programmes, and demonstration projects for the replacement of old pumps to promote the use of EE pumps/motors.
- Jharkhand has initiated an urban water supply improvement project to complement ongoing efforts of the government of Jharkhand for water supply infrastructure and service improvement and institutional reforms under various national flagship programmes
- In Karnataka, the state government has mandated the use of BEE 4/5 star-rated energy-efficient pump sets for drinking water supply across cities, towns, and Gram Panchayats.
- Odisha has implemented smart water management for IOT-based real-time monitoring of water supply quantity and quality.
- The Punjab state government has made provision of funds for promoting the use of pumps/ municipal water and sewerage in the state budget for FY 2023-24.
- Telangana SDA with Hyderabad Metropolitan Water Supply & Sewerage Board (HMWS&SB) has adopted various measures like solar rooftops on source reservoirs or pumps, power factor improvements, and contact maxim demand alterations of pumps.
- Goa, Maharashtra, Haryana, Kerala, Sikkim and Uttar Pradesh have reported pump replacement programmes to promote the use of EE pumps/motors in municipal water and sewerage systems.

Table 3-19 shows the states and UTs with initiatives to promote the use of EE pumps/motors in municipal water and sewerage systems.

Table 3-19: States with adoption of EE measure in the municipal services sector

Indicator	States
States that have initiatives to promote the use of EE pumps/motors in municipal water and sewerage systems	<ol style="list-style-type: none"> 1. Andhra Pradesh 2. Goa 3. Haryana 4. Jharkhand 5. Karnataka 6. Kerala 7. Maharashtra 8. Odisha 9. Punjab 10. Sikkim 11. Telangana 12. Uttar Pradesh

Programme-Specific Indicator

SEEI 2023 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, programmes using three (3) programme-specific indicators. Table 3-20 depicts the states and UTs with programmes under the municipal services sector.



12
states
reported
initiatives
to promote
EE pumps
and motors
in municipal
water and
sewerage
systems

Table 3-20: States and UTs with programmes for EE in the municipal services sector

State/UT	Programmes for energy efficient street lighting	Programmes for energy efficient water / sewerage system	Programmes for Capacity-Building
Andaman & Nicobar Islands	✓	X	X
Andhra Pradesh	✓	✓	✓
Assam	✓	✓	✓
Chandigarh	✓	X	X
Chhattisgarh	✓	X	X
Goa	✓	X	✓
Gujarat	✓	X	X
Haryana	✓	✓	X
Jharkhand	✓	✓	✓
Karnataka	✓	✓	✓
Kerala	✓	✓	✓
Madhya Pradesh	✓	X	X
Maharashtra	✓	✓	✓
Meghalaya	X	X	✓
Odisha	✓	✓	X
Punjab	✓	✓	✓
Rajasthan	✓	X	X
Tamil Nadu	✓	X	X
Telangana	✓	✓	✓
Uttar Pradesh	✓	✓	✓
West Bengal	✓	X	X

X-No data reported by states.

Note: States with no data reported across all fields have been excluded from table

➔ Programmes for EE street lighting

In SEEI 2023, twenty (20) states have EE programmes in street lighting. Among them, eleven (11) states are implementing the Street Lighting National Programme (SLNP) and/or Atal Jyoti Yojana (AJAY) Programme. The SLNP aims to replace conventional street lights with LEDs to abate energy and maintenance costs for municipalities. Conversely, AJAY, a sub-scheme of the Ministry of New and Renewable Energy's (MNRE) off-grid and decentralised solar application scheme, installs solar LED lights in rural, semi-urban, and urban areas, enhancing access to electric lighting.



- EESL collaborates with the UDDs, Urban Local Bodies (ULBs), and Municipal Corporations (MCs) for these initiatives. States with SLNP include Andaman & Nicobar Islands, Andhra Pradesh, Chandigarh, Chhattisgarh, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, and West Bengal, totaling 363 projects nationwide. In FY 2023, these efforts resulted in cumulative energy savings of 759.3 million units (MU) and a reduction of 645,424 tCO₂ emissions.
- Additionally, nine (8) states conducted other programmes. These states are Assam, Goa, Karnataka, Haryana, Jharkhand, Odisha, Tamil Nadu, Telangana, and Uttar Pradesh. Most of these programmes aim to replace conventional lighting with energy-efficient LED lamps. In Karnataka's ULBs, the LED-CCMS project focuses on retrofitting street lights with energy-efficient LEDs and installing a Centralised Control and Monitoring System (CCMS) under a public-private partnership model. This project includes operation and maintenance for a duration of seven years.

- Odisha has programmes such as smart LED streetlight missions with the objective of increasing public safety and convenience along with saving energy with reduced power costs by building greenfield LED streetlights and retrofitting existing LED streetlights.

→ Programmes for EE water/sewerage

Eleven (11) states namely Andhra Pradesh, Assam, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Odisha, Punjab, Telangana, and Uttar Pradesh have reported having EE programmes in water/sewerage systems.

- Assam has a state green budget with major sectors such as water and urban human settlements with the mission of promoting energy efficiency in the residential and commercial sectors, and management of municipal solid waste.
- EMC, in association with Kerala Water Authority, is implementing steps to enhance the energy efficiency of pumping stations. Additionally, activities are underway under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) for the EE water/sewage pumping system.
- Odisha has programmes for urban water supply that use IoT-based monitoring.
- Punjab has groundwater extraction, and conservation guidelines with an emphasis on improving efficiency.
- Jharkhand has urban water supply improvement projects that aim to sustainably manage water resources to maximise economic and social benefits for people, while preserving the ecological integrity of its rivers and surrounding areas.
- Haryana has conducted energy audits of six (6) pump stations.
- Telangana is conducting capacity-building programmes focused on energy efficiency for the employees of the Hyderabad Metropolitan Water Supply and Sewerage Board (HMWS&SB). These programmes are part of the Municipal Demand Side Management (MuDSM) initiative.
- Maharashtra, Andhra Pradesh, Uttar Pradesh, and Karnataka have schemes and programmes of for replacing old/inefficient pumps and motors with energy efficient sets.



11
states
reported EE
programmes
in water/
sewerage
systems

→ Programmes for Capacity-Building

In SEEI 2023, eleven (11) states namely Andhra Pradesh, Assam, Goa, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Punjab, Telangana, and Uttar Pradesh reported having EE programmes in capacity-building in the municipal services sector.

- Andhra Pradesh implemented 14 one-day capacity-building programmes for municipal officials from 28 ULBs, focusing on MuDSM.
- Goa hosted specialised training on topics like supply monitoring using IoT, software applications in water supply, and geo-tagging of assets, including solar-based rural water supply under the Jal Jeevan Mission for municipal officials.
- In Kerala, the Kerala Water Authority (KWA) is conducting capacity-building programmes under the AMRUT mission.
- Maharashtra, Punjab, and Telangana have facilitated awareness programmes under the BEE's MuDSM initiatives.
- Assam, Jharkhand, Karnataka, Meghalaya, and Uttar Pradesh have organised various programmes for officials from municipal corporation departments, enhancing their skills and knowledge in efficient urban management and sustainable practices.



MUNICIPAL SERVICES SPOTLIGHT

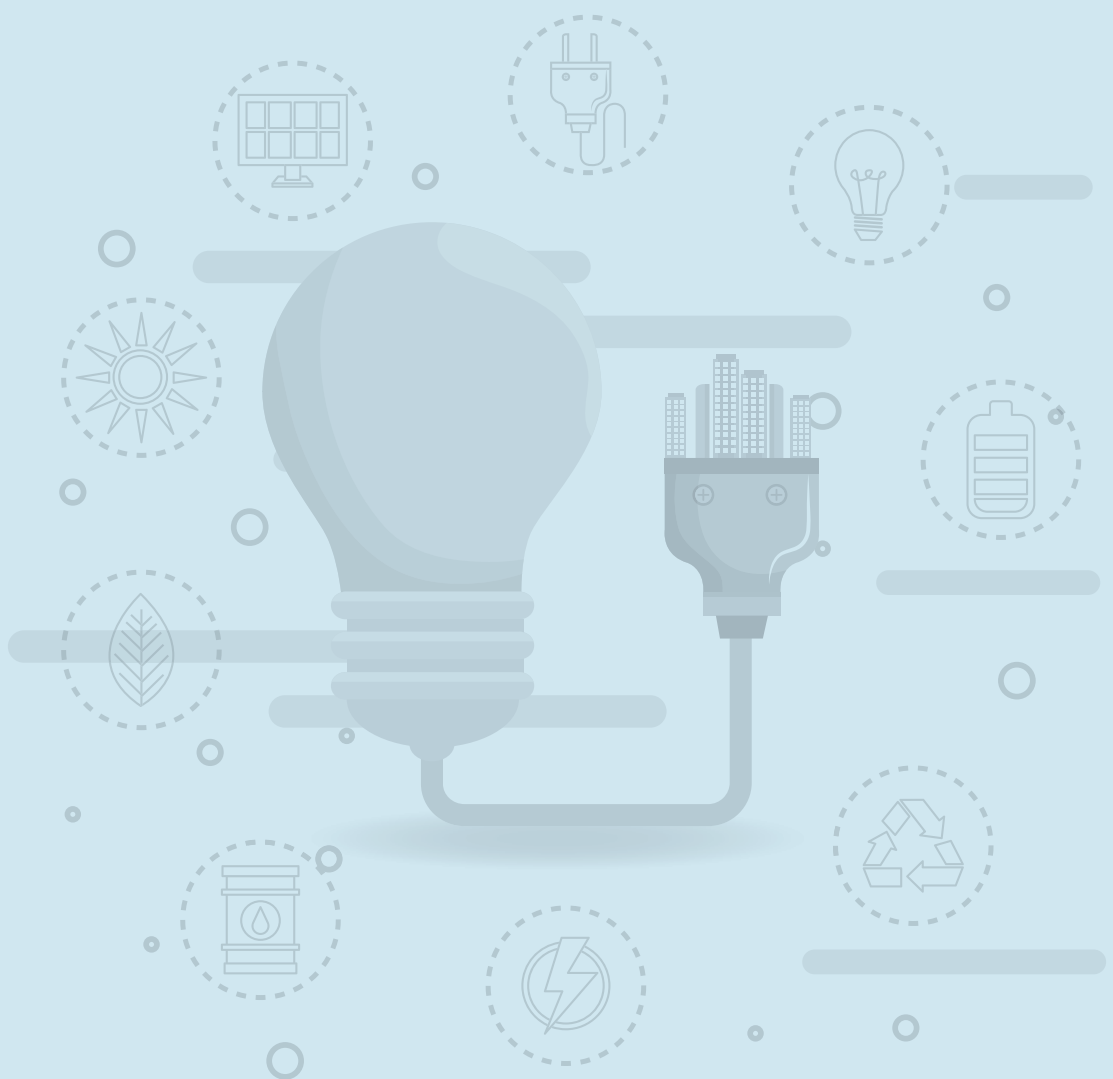
- The Guwahati Municipal Corporation currently faces a significant financial challenge, with an annual electricity bill for street lighting amounting to Rs. 6 Crores. Given these constraints, the corporation is unable to bear additional expenses for expanding street lighting in the city's inner lanes and by-lanes. To address this issue and enhance the city's image and security without increasing financial burdens, the 'Project Jyoti – Own Your Street Light' initiative was launched.

Recognising that adequate street lighting is a fundamental requirement for urban areas, yet many parts of Assam's towns and cities lack this essential service, the government plans to install 15,000 energy-efficient LED lights across all ULBs in Assam. This project aims to improve citizen convenience and safety, leveraging energy-efficient technologies to manage costs effectively. For more details, visit the GMC website at <https://gmc.assam.gov.in/portlets/street-lights>.

- Odisha's urban piped water supply and drink-from-tap mission aims to ensure 100% piped water connectivity for its entire urban population of 70 lakh. This ambitious initiative is designed to provide high-quality water equitably and sustainably through smart water management. A pioneering aspect of this mission is the use of IoT-based real-time monitoring to oversee both the quantity and quality of the water supply, a first-of-its-kind endeavor at a city level in India.

The state's efforts in enhancing urban water supply have garnered considerable acclaim, both nationally and globally. Notably, the Drink from Tap mission earned the prestigious Global Water Award in Spain, 2022. Furthermore, the Water Corporation of Odisha (WATCO) received the "Indian Water Works Association Award" at the 55th Annual Convention of IWWA in 2023. Additionally, the Housing & Urban Development (H&UD) Department was recognised with the 18th CSI e-Governance Award for its Smart Water Management System, which ensures drink-from-tap quality water.





3.4 TRANSPORT

OVERVIEW

The transport sector in India accounts for 18% of overall energy consumption, the third-highest (after industry and buildings) and is one of the rapidly growing emissions sectors in the country. The Ministry of Petroleum and Natural Gas reports a consistent rise in demand for petroleum products, particularly diesel and gasoline, reflecting increased consumption in various transport modes¹⁴.

India has made notable strides in fostering sustainable and energy-efficient road transport. The Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, initiated by the Ministry of Heavy Industries and Public Enterprises, incentivises the adoption of electric and hybrid vehicles, contributing to a reduced reliance on conventional fuels. Additionally, fuel efficiency standards for vehicles, state electric mobility policies, adoption of biofuels, installation of EV charging infrastructure and capacity-building programmes by various states reflect India's commitment to promoting energy-efficient practices within its transportation systems.

In SEEI 2023, there are eleven (11) indicators to evaluate energy-efficiency initiatives in the transport sector. Out of these indicators, eight (8) are common indicators spanning policy, institutional capacity, adoption of EE measures, and energy savings, and three (3) are programme-specific indicators. The maximum score in this sector is 16. Out of 16, the maximum score for the common and programme-specific indicators are seven (7) and nine (9) respectively.

The SEEI 2023 scores for the transport sector highlight variations in performance across states, providing a foundation for targeted interventions to improve energy efficiency in the sector. The summary of the indicators in the transport sector is provided in Table 3-21.



Figure 3-12 represent the scores of the states in the transport sector, across the two indicator categories: common and programme- specific, with states grouped together based on their TFEC. The states' progress in SEEI 2023 compared to SEEI 2021-22 is depicted in Figure 3-13.

Table 3-21: Transport sector indicators

No.	Indicator	Max Score	Scoring Criteria
Policy			
1	State transport policy or guidelines to advocate fuel efficiency	0.5	
	Does the State have transport policy/guidelines to advocate fuel efficiency?		Yes=0.5, else=0
2	State electric mobility policy	1	
	Does the state have an electric mobility policy?		Notified EV policy=1, Notification in draft stage=0.5, else=0
Institutional Capacity			
3	Advisory, certification and enforcement capacity in state government	1.5	
	Does the state have an entity to develop capacity and provide technical expertise on EE in transport for city officials, engineers, transport planners, fleet operators, and other stakeholders?		Entity to develop capacity & provide technical expertise = 0.5, else= 0
	Does the state have a government authority to enforce EC/ EE regulations or measures for transport?		Government authority to certify and enforce EE/EC regulations=0.5, else= 0
	What was the budget assigned and utilised for EE in the transport sector?		Budget assigned and utilised for EE activities in transport sector=0.5, else 0
Adoption of EE measures			
4	Adoption of electric vehicles for government use	0.5	Adoption of electric vehicles for government use Scoring criteria: Yes=0.5, else=0
	Does the state have a policy for procuring electric vehicles for government use?		
	How many electric vehicles have been procured for government use?		
5	Penetration of hybrid and electric passenger vehicles	1.5	<5%=0.5; 5%-10%=1; >10%=1.5
	What is the penetration of hybrid and electric vehicles in transport in FY 2022-23?		
6	Availability of charging infrastructure for electric mobility	1	
	Has the state taken any initiative (incentives, schemes, policy) excluding the EV policy, to increase the availability of charging infrastructure for all types of electric vehicles?		State initiative for EV charging infrastructure= 0.5, else=0
	Please provide the number of charging stations installed in the state		Number of charging infrastructure: 0.5, else=0
7	Adoption of biofuels in the state	0.5	
	What is the proportion of ethanol-blended fuel in petrol/ diesel sales in the state?		Data provided=0.5, else=0
Energy savings			
8	Fuel efficiency of SRTC fleet	0.5	
	What is the fuel efficiency achieved by SRTC's in the state in terms of km/litre ?		Data provided=0.5, else=0

No.	Indicator	Max Score	Scoring Criteria
State Programme			
9	Programmes for energy-efficient public transport	4	
	Does the state have a programmes for EVs in public transport in FY 2022-23?		
	What is the objective of the programme?		Objective of the programme=0.5
	What is the target set under the programme?		Target set under the programme=0.5
	What is the timeline?		Timeline =0.5
	How much budget has been allocated & utilised to date		Budget allocated & utilised to date =0.5
	Who is running the programme? (stakeholders & departments engaged in the programme)		Entities running the programme=0.5
	What is the progress to date?		Progress to date =0.5
	What are the energy savings? (deemed or measured)		Energy savings (deemed or measured)= 0.5
	How much emissions were avoided? (based on energy savings)		Avoided emissions=0.5
10	Programmes for energy-efficient private transport	4	
	Does the state have programmes for energy-efficient private transport in FY 2022-23?		
	What is the objective of the programme?		Objective of the programme=0.5
	What is the target set under the programme?		Target set under the programme=0.5
	What is the timeline?		Timeline =0.5
	How much budget has been allocated & utilised to date		Budget allocated & utilised to date =0.5
	Who is running the programme? (stakeholders & departments engaged in the programme)		Entities running the programme=0.5
	What is the progress to date?		Progress to date =0.5
	What are the energy savings? (Deemed or measured)		Energy savings (deemed or measured) = 0.5
	How much emissions were avoided? (Based on energy savings)		Avoided emissions=0.5
11	Programmes for capacity-building in transport sector	1	
	Does the state have programmes for capacity-building for energy efficiency in transport in FY 2022-23?		
	What is the objective and timeline of the programme? Who is running the programme? (e.g. SDA, state dept., industry association, PPP etc.)		Objective of the programme, Timeline, Entities running the programme=0.5
	What was the target audience under the programme? What was the number of beneficiaries under the programme?		Target audience, number of beneficiaries under the programme=0.5

Figure 3-12 shows the TFEC group-wise scores for the transport sector in SEEI 2023

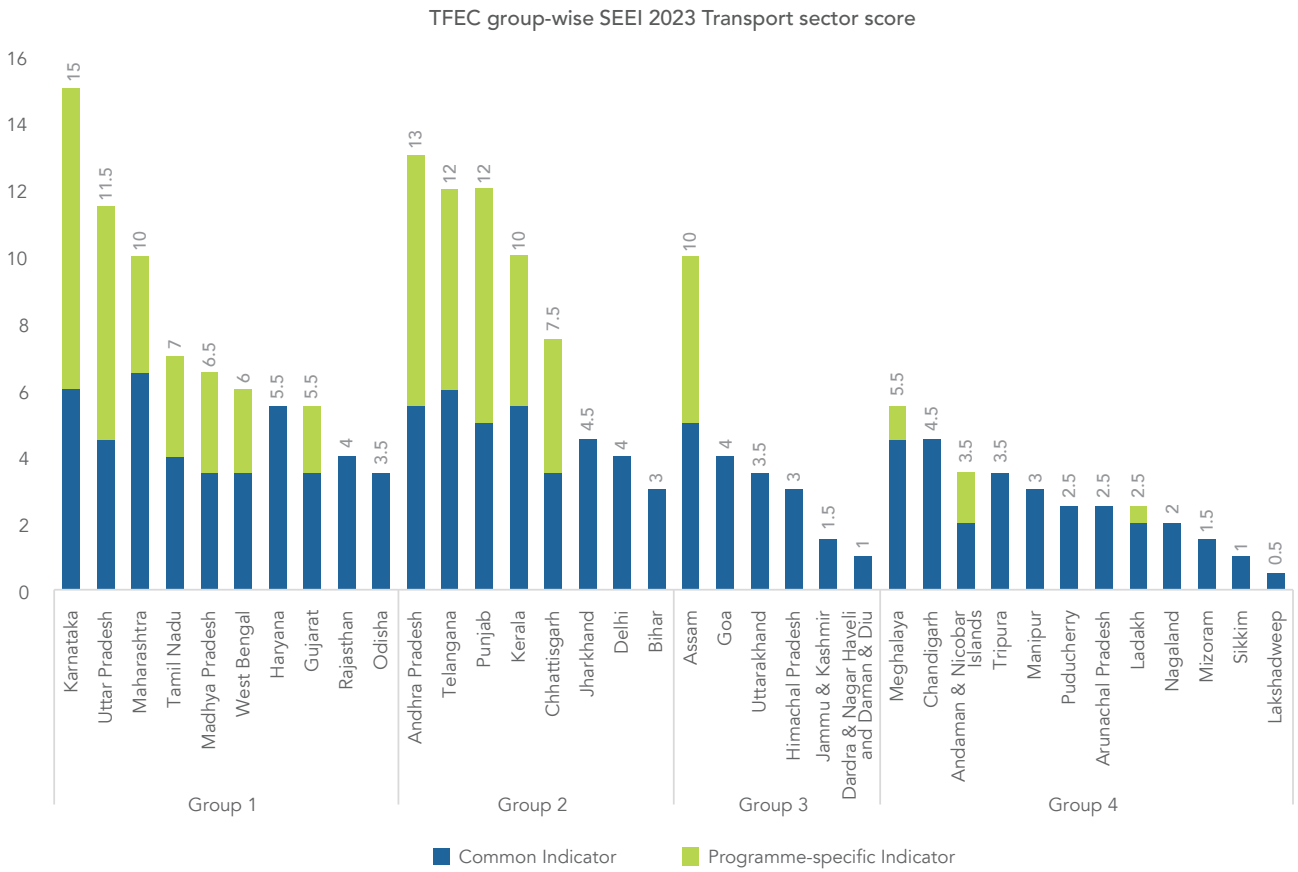


Figure 3-12: TFEC group-wise transport sector state scores

Figure 3-13 illustrates the progress of the transport sector for each state in the SEEI for the year 2023 in comparison to SEEI 2021-22.

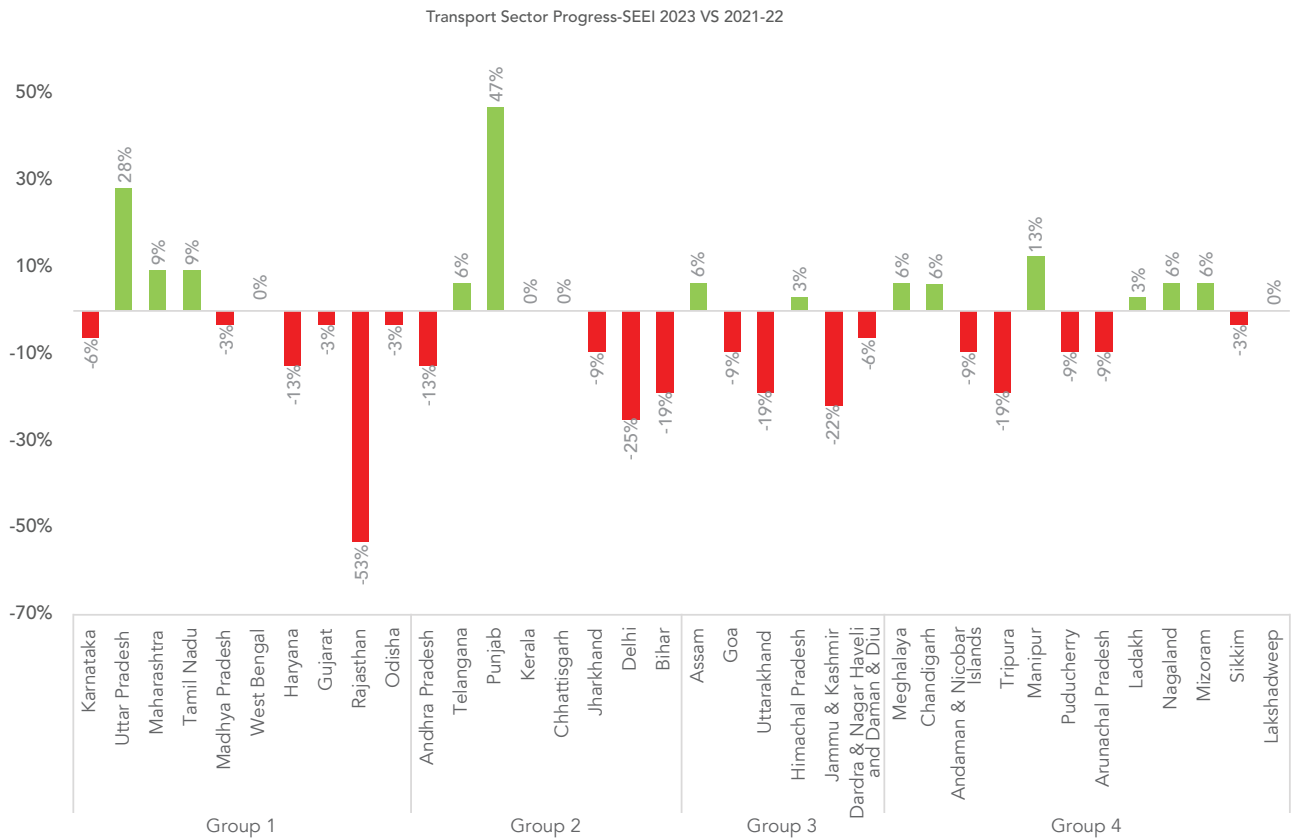


Figure 3-13: TFEC group-wise transport sector state progress – SEEI 2023 vs SEEI 2021-22



Karnataka is the top-performing state in the transport sector

SEEI 2023 TRANSPORT SECTOR SCORE HIGHLIGHTS

Karnataka is the top-performing state in the transport sector with a score of 15 out of the total score of 16, demonstrating remarkable progress this year. The other top-performing states include Andhra Pradesh with a score of 13, and Punjab and Telangana with a score of 12. Punjab and Uttar Pradesh are the most improved states in the sector in SEEI 2023 showcasing a rapid progress of 47% and 28% respectively. Compared to SEEI 2021-22, thirteen (13) states and UTs marked improvement, nineteen (19) reported a decline, while the rest showed no changes.

Common Indicators



Policy

The states and UTs have performed well in this indicator category. In SEEI 2023, twelve (12) states reported to have established transport policies advocating fuel efficiency. Furthermore, twenty-five (25) states have reported having a notified state electric mobility policy, showcasing a growing commitment to adopting cleaner and more sustainable transportation options. Three (3) states namely, Andaman and Nicobar Islands, Arunachal Pradesh, and Bihar have a draft electric mobility policy reflecting a proactive approach to embracing electric vehicles. The overview of the states and UTs with policies for EE in transport is listed in table no 3-22.



25 states & UTs have a notified EV policy while 12 states reported policies advocating fuel efficiency

Table 3-22: States and UTs with policies for EE in transport sector

State/UT	States and UTs with Transport Policy or Guidelines to Advocate Fuel Efficiency	States and UTs with a notified Electric Mobility Policy
Andaman & Nicobar Islands	X	✓
Andhra Pradesh	✓	✓
Arunachal Pradesh	X	✓
Assam	✓	✓
Bihar	X	✓
Chandigarh	X	✓
Chhattisgarh	X	✓
Delhi	✓	✓
Goa	X	✓
Gujarat	X	✓
Haryana	✓	✓
Himachal Pradesh	X	✓
Jharkhand	✓	✓
Karnataka	✓	✓
Kerala	✓	✓
Madhya Pradesh	✓	✓
Maharashtra	✓	✓
Manipur	X	✓
Meghalaya	✓	✓
Odisha	X	✓
Punjab	X	✓
Rajasthan	✓	✓
Tamil Nadu	X	✓
Telangana	✓	✓

State/UT	States and UTs with Transport Policy or Guidelines to Advocate Fuel Efficiency	States and UTs with a notified Electric Mobility Policy
Tripura	X	✓
Uttar Pradesh	X	✓
Uttarakhand	X	✓
West Bengal	X	✓

X: No data reported by states.

Note 1: Yellow boxes signify draft policies

Note 2: States with no data reported across all fields have been excluded from the table

→ Institutional Capacity

Fifteen (15) states namely, Andhra Pradesh, Arunachal Pradesh, Assam, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Nagaland, Puducherry, Punjab, Rajasthan, and Telangana have established entities responsible for developing capacity and providing technical expertise.

- NREDCAP (New and Renewable Energy Development Corporation Ltd.) in Andhra Pradesh is appointed as the State nodal agency to promote the adoption of new technologies in the transport sector, particularly Electric Vehicles (EVs) and Battery-Operated Vehicles (BOVs). The agency oversees effective implementation of government schemes and programmes.
- In Maharashtra, MEDA) promotes energy-efficiency and renewable energy efforts in the transport sector. Similarly, in Haryana and Telangana, state renewable energy departments have taken leading roles in establishing public EV charging infrastructure and they also oversee other energy-efficiency efforts.
- In Kerala, EMC coordinates and implements initiatives related to EE in the transport sector.
- In Assam, Punjab, and Meghalaya state transport corporations have taken steps to accelerate the adoption of electric vehicles in road transportation.
- In Karnataka, Bangalore Electricity Supply Company Limited (BESCOM) contributes to the promotion of electric vehicles. The establishment of the Smart Grid and EV Cell highlights Karnataka's commitment to streamlining processes related to Charging Infrastructure for EVs and the implementation of advanced metering infrastructure.

Twenty-five (25) states and UTs have a government authority to enforce EC/EE regulations for transport, which is a steep progress from the seven (7) states in SEEI 2021-22. In most cases, the respective transport department or the SDA is the enforcing authority. However, only four (4) states, Karnataka, Maharashtra, Telangana and Uttar Pradesh have reported having assigned state budgets for EE activities in the transport sector. Table 3-23 shows the institutional capacity across the states and UTs for EE in transport.

Table 3-23: States and UTs with institutional capacity for EE in transport sector

State/UT	Entity to develop capacity and provide technical expertise	Government authority to enforce EC/EE regulations	Budget assigned to state government authorities
Andaman & Nicobar Islands	X	✓	X
Andhra Pradesh	✓	✓	X
Arunachal Pradesh	✓	X	X
Assam	✓	✓	X
Bihar	X	✓	X
Chandigarh	X	✓	X
Chhattisgarh	X	✓	X
Goa	X	✓	X
Gujarat	X	✓	X
Haryana	✓	✓	X
Himachal Pradesh	✓	X	X
Jharkhand	X	✓	X
Karnataka	✓	✓	✓
Kerala	✓	✓	X
Madhya Pradesh	X	✓	X
Maharashtra	✓	✓	✓
Manipur	X	✓	X
Meghalaya	✓	✓	X
Mizoram	✓	X	X
Nagaland	✓	X	X
Odisha	X	✓	X
Puducherry	✓	X	X
Punjab	✓	✓	X
Rajasthan	✓	✓	X
Tamil Nadu	X	✓	X
Telangana	✓	✓	✓
Tripura	X	✓	X
Uttar Pradesh	X	✓	✓
Uttarakhand	X	✓	X
West Bengal	X	✓	X

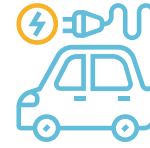
X: No data reported by states.

Note: States with no data reported across all fields have been excluded from the table

→ Adoption of EE Measures

Twelve (12) states namely Andhra Pradesh, Haryana, Jharkhand, Karnataka, Kerala, Lakshadweep, Maharashtra, Meghalaya, Punjab, Telangana, Uttar Pradesh and West Bengal have reported policies on EV procurement for government use. Table 3-24 showcases the states and UTs, that have reported the number of EVs in government use. Additionally, several states cited procuring e-buses for the public in their EV policies.

- In Andhra Pradesh, the government encourages employees to adopt electric two-wheelers with an Equated Monthly Instalment (EMI) option, following the electric mobility policy. The aim is to electrify the entire government vehicle fleet, including the Andhra Pradesh State Road Transport Corporation (APSRTC) buses by 2024, facilitated by the New and Renewable Energy Development Corporation of Andhra Pradesh Ltd (NREDCAP).
- Haryana aims to convert all government vehicles, including those belonging to corporations, boards, and ambulances, to electric vehicles in two stages. The objective is to have 50% of these vehicles transitioned by 2026, with the rest of the state's vehicles making the switch by 2030.
- In Jharkhand, the state government launched a scheme offering a 100% interest subsidy for employees purchasing two-wheelers or four-wheelers. Additionally, there is an emphasis on replacing 15-year-old government-owned or leased vehicles with electric ones.
- Karnataka under its EV policy directed all government departments to ensure that 50% of their total vehicles are electric vehicles. Similarly, Uttar Pradesh under its state EV policy, aims for a complete transition of vehicles used for official purposes to electric vehicles by the year 2030. Telangana EV Policy also promotes the adoption of electric vehicles at the institutional level, particularly within government entities.
- In terms of EV bus procurement, notable examples include Chandigarh, where 80 electric buses (e-buses) have been operational for a decade under the FAME India scheme phase-II. Maharashtra State EV Policy 2021 includes a provision to convert 15% of the existing bus fleet into e-buses and Telangana is planning to procure 840 e-buses within a span of two years under its EV policy initiatives.



Delhi has the highest hybrid and electric vehicle penetration in the fiscal year 2022-23

Table 3-24: States with EV reported for government use

State/UT	Number of EVs in government use
Andhra Pradesh	296
Kerala	126
Chandigarh	93
Punjab	40
West Bengal	25

Seven (7) states namely Andhra Pradesh, Haryana, Jharkhand, Kerala, Maharashtra, Punjab and Telangana have started rolling out charging infrastructure for all types of electric vehicles in the state.

The states in each group have experienced positive changes from 2022 in the proportion of hybrid passenger and electric vehicles, reflecting an overall increasing trend in the adoption of eco-friendly transportation options. The proportion of hybrid and electric vehicles among passenger vehicles registered state in the reporting period (FY 2022-23) has been calculated from the VAHAN dashboard. Lakshadweep has been excluded due to a lack of data available in the VAHAN dashboard. Figure 3-14 depicts the penetration of hybrid and electric

passenger vehicles in each state, grouping states based on their TFEC. Delhi stands out with a remarkably high penetration rate of 13.52%, indicating a strong inclination towards hybrid and electric vehicles in the national capital.

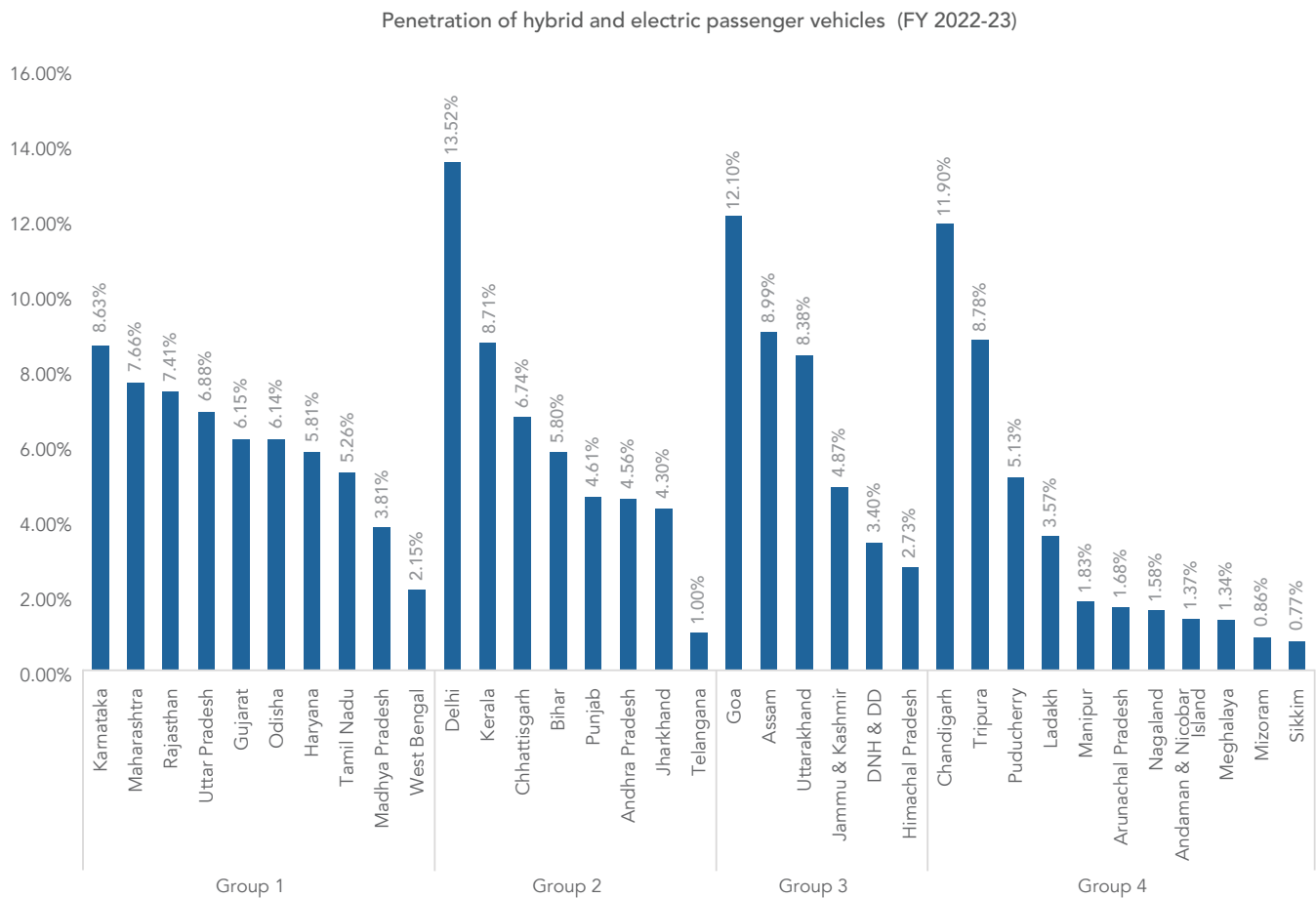


Figure 3-14: Percentage penetration of hybrid and electric passenger vehicles in states and UTs (FY 2022-23)

Table 3-25: Group-wise highest proportion of hybrid and electric passenger vehicle in the state

Group	State/UT	Proportion of hybrid and electric vehicles
Group 1	Karnataka	8.63%
Group 2	Delhi	13.52%
Group 3	Goa	12.10%
Group 4	Chandigarh	11.90%

To facilitate low-carbon development in the transport sector, India has placed a distinct emphasis on augmenting the use of biofuels, particularly ethanol blending in petrol. Twenty-one (21) states reported high blending rates of 10% and above this year with Karnataka leading the group at 10.71%. Figure 3-15 shows the proportion of ethanol blending in petrol for each state, categorising states based on their TFEC.

Proportion of ethanol blended in petrol in the states and UTs

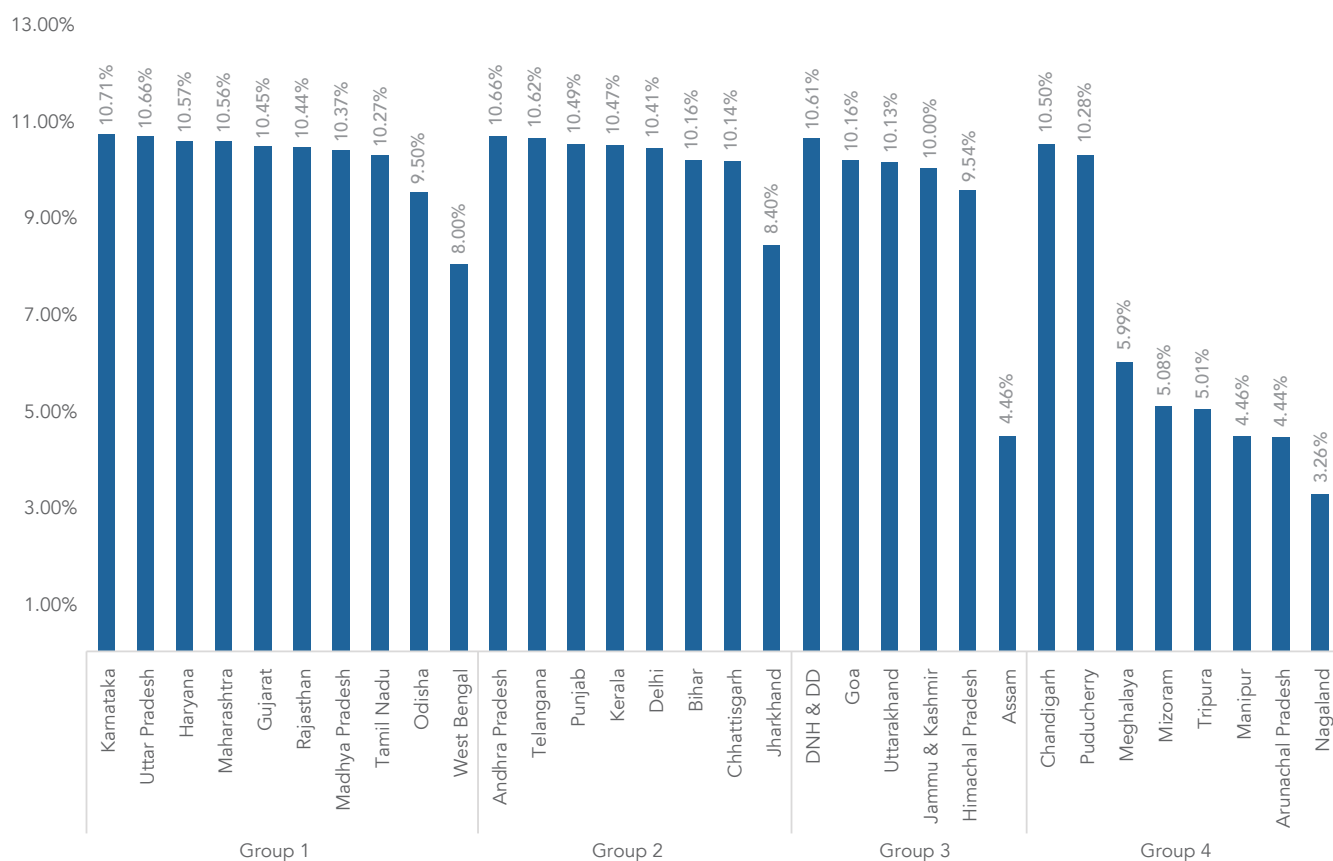


Figure 3-15: Group-wise state proportion of ethanol blended in petrol across the state and UTs

Energy Savings

Seven (7) states, namely Andhra Pradesh, Assam, Karnataka, Punjab, Maharashtra, Tamil Nadu and Telangana have reported the fuel efficiency achieved by their SRTCs in 2023. Table 3-26 lists the states and fuel efficiency achieved by SRTCs in kilometre (km)/litre (L).

Table 3-26: Fuel efficiency of SRTCs reported by states

State	Fuel efficiency (km/L)
Andhra Pradesh	5.22
Assam	3.79
Karnataka	4.86
Punjab	4.52
Maharashtra	4.57
Tamil Nadu	5.29
Telangana	5.16

Programme-Specific Indicator

In SEEI 2023, there are three (3) programme-specific indicators to track and assess the implementation of programmes/projects by the SDAs and other state government entities, individually, through interdepartmental collaboration, in conjunction with BEE or industry associations, or in PPPs to achieve EE in the transport sector. Table 3-27 shows the states and UTs with programmes for EE in public transport, private transport and capacity-building in the transport sector.

Table 3-27: States and UTs with programmes for EE in transport sector

State/UT	Programmes for EE in Public transport	Programmes for EE in Private transport	Programmes for Capacity-Building
Andaman & Nicobar Islands	X	✓	X
Andhra Pradesh	✓	✓	✓
Assam	✓	✓	✓
Chhattisgarh	X	✓	X
Gujarat	X	✓	X
Karnataka	✓	✓	✓
Kerala	✓	✓	✓
Madhya Pradesh	X	✓	X
Maharashtra	✓	✓	✓
Meghalaya	X	X	✓
Punjab	✓	✓	X
Tamil Nadu	X	✓	X
Telangana	✓	✓	✓
Uttar Pradesh	✓	✓	X
West Bengal	X	✓	X

X: No data reported by states.

Note: States with no data reported across all fields have been excluded from the table

→ Programmes for EE in Public Transport

In SEEI 2023, eight (8) states namely Andhra Pradesh, Assam, Karnataka, Kerala, Maharashtra, Punjab, Telangana and Uttar Pradesh have reported programmes for EE in Public Transport.



8 states reported programmes for EE in Public Transport

- The Andhra Pradesh state government has established a goal to deploy solar charging stations for EV buses. As part of this initiative, rooftop solar plants, each with a capacity of 100 KW, have been installed at bus stations in Kakinada, Chittoor, Madanapalle, and Nandyal.
- Assam State Transport Corporation (ASTC) has undertaken a project called “Swachh Kamakhya- Clean & Green Technology” to replace fossil fuel buses with e-buses.
- The Karnataka state’s transport department is working towards achieving 100% electric public transport by 2030. Currently, 390 e-buses are operated by BMTC.
- In Telangana, TSRTC (Telangana State Road Transport Corporation) is leading an electric bus procurement programme with the goal of acquiring 840 e-buses by the end of March 2024.
- In Kerala, KSRTC (Kerala State Road Transport Corporation) plans to transition its entire fleet of buses to electric buses by 2025. Currently, the Kerala state government in association with KSRTC has procured 60 e-buses under the purview of the Smart City Project.
- The Maharashtra state government plans to increase EVs in public transportation, targeting 25% electrification in six urban centres (Mumbai, Pune, Nagpur, Aurangabad, Amravati, and Nashik) by 2025. The state EV policy includes exemptions for all EVs from road tax and registration fees, with a goal to electrify a quarter of the urban fleet by 2025.
- In Punjab, the state government, in collaboration with the Department of Transport, PEDDA, and Punjab State Power Corporation Limited (PSPCL), offers incentives for the

adoption of EVs. Furthermore under its goals for public transport the state includes a target of 50% e-buses by 2030.

- The Uttar Pradesh government aims to achieve a 100% transition to electric EVs in selected cities by 2030. The targets include transitioning 17 cities by 2025 and achieving 100% electric government vehicles by 2030.

➔ Programmes for Private Transport

In SEEI 2023, fourteen (14) states namely Andaman and Nicobar Islands, Andhra Pradesh, Assam, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Telangana, Uttar Pradesh and West Bengal have an e-mobility programme for private transport.

- Ten (10) states namely Andaman & Nicobar Islands, Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Tamil Nadu, Uttar Pradesh, and West Bengal have EV cars on lease programme run jointly by EESL and the state departments/PSUs. The programme, aiming to replace conventional cars with EVs has, so far, resulted in a total cumulative savings in fuel consumption of 6.9 M-litres and avoided emissions of 0.02 million tonnes of CO₂.
- In Maharashtra, the state transport department is actively implementing the EV Policy 2021 to boost the adoption of Battery Electric Vehicles (BEVs). The goal is to have BEVs constitute 10% of new vehicle registrations by 2025. Notably, the programme has yielded positive outcomes with energy savings of 0.21 million litres and avoidance of 555.95 metric tonnes of CO₂ emissions.
- In Punjab, the State Transport Policy, managed by the Transport Department, PEDA, PSPCL and DISCOM aims to enhance energy efficiency in private transport. The programme targets 80% of 2-wheelers and 4-wheelers, 40% of 3-wheelers, and 30% of buses by 2030. Notably, the initiative has already achieved substantial outcomes, with 1,547.71 TOE in energy savings and the avoidance of 1,505.4 tonnes of CO₂ emissions.
- The Gyan Deepika scheme of the Government of Assam involves providing e-scooters to girl students with exceptional academic performance as part of its implementation.



14 states & UTs reported for private transport

➔ Programmes for Capacity-Building

In SEEI 2023, seven (7) states namely, Andhra Pradesh, Assam, Karnataka, Kerala, Maharashtra, Meghalaya and Telangana have reported programmes for capacity-building. Capacity-building efforts include training among officials as well as increasing awareness among the larger public about environmental benefits of switching to cleaner modes of transport.

- In Andhra Pradesh, APSECM conducted a 'Go electric' campaign and in Assam, an e-mobility workshop for acceleration and adoption of e-vehicles was scheduled in Nov 2023 in association with BEE.
- In Assam, SDA in association with BEE has conducted a regional workshop cum EV exhibition on "Accelerated Adoption of Electric Mobility in India".
- In Karnataka, BESCOM organised EV Abhiyan 2022 and EV Expo. EV Jagruthi portal was also launched in July, 2022.
- EMC, in collaboration with the CII Kochi, hosted the 'Kerala Smart Mobility Summit' conference and exhibition on October 19th and 20th, 2022, in Kochi. The technical sessions delved into various subjects, including solution models aligned with Kerala's policies, support for innovative solutions, and new-age business models. The

conference also included sessions on topics such as effective collaboration between the government, infrastructure developers, and technology providers.

- In Maharashtra, as part of the 'Go electric' outreach programme MEDA hosted an electric vehicle expo at the KISAN Exhibition from December 14th to 18th, 2022, to boost public understanding of electric mobility among the larger public. Furthermore, an EV accelerator cell has been established in the state.
- In Meghalaya, SDA in partnership with the Meghalaya Transport Department, conducted a workshop for 51 participants, including officials from the transport department and automobile dealers across the state.
- The Telangana SDA (Telangana State Renewable Energy Development Corporation Limited), TSREDCO and ASCI conducted a seminar to create awareness on EVs and EV charging infrastructure for the general public, real estate stakeholders, and students under the "Go Electric" campaign. Under this initiative, discussions were also held with auto unions/associations, focusing on the distinctions between internal combustion engine (ICE) and electric battery vehicles. The conversation covered aspects like operational costs, maintenance costs, subsidies, capital costs, etc.



TRANSPORT SECTOR SPOTLIGHT

- Karnataka has launched the Smart Grid and Electric Vehicle Cell to enhance processes for charging infrastructure for electric vehicles and advanced metering infrastructure. An EV accelerator cell has also been established in the state of Maharashtra.
- Telangana State is currently at the forefront of a programme aimed at procuring 840 e-buses within a span of two years. At present, 150 buses from this initiative are already operational, resulting in an annual conservation of 793,000 litres of diesel and the avoidance of 95 metric tonnes of CO₂ emissions.



3.5 AGRICULTURE

OVERVIEW

As a traditionally agrarian country, the agricultural sector plays a significant role in the India's economy, contributing 20% to the GDP. The sector is widely called the backbone of the Indian economy and accounted for around 15% of the total electricity consumed in India in FY 2021-22¹⁵. Central to this sector's efficiency is effective practices for optimising crop yields and reducing energy consumption. This presents an opportunity for states to drive the adoption of modern, energy-efficient technologies via policy measures and financial incentives. Implementing EE practices and policies in agriculture is vital for lowering energy costs for farmers, increasing profitability, and enhancing the sector's sustainability.

SEEI 2023 comprises six (6) indicators to evaluate energy-efficiency initiatives in the agriculture sector. Out of these, four (4) are common indicators spanning policy, institutional capacity and adoption of EE measures, and two (2) are programme-specific indicators. The maximum score in this sector is eight (8), split between three (3) and five (5) for the common and programme-specific indicators respectively.

Table 3-28 summarises agricultural sector indicators, figure 3-16 represent the scores of the states in the agriculture sector, across the two indicator categories: common and programme-specific, with states grouped together based on their TFEC. The states' progress in SEEI 2023 compared to SEEI 2021-22 is depicted in Figure 3-17.



Table 3–28: Agriculture sector indicators

No.	Indicator	Max Score	Scoring Criteria
Policy			
1	Policy for encouraging EE and climate-friendly cold chain infrastructure development in the state	0.5	
	Does the State have guidelines/regulations to incorporate EE/EC measures in the development of integrated cold chain infrastructure?		Yes=0.5, else=0
	If 'Yes', mention if any progress has been made in the form of workshops, pilots, etc.		
2	Policy for integrated water and energy savings in the agriculture sector in the state	0.5	
	Does the State have a policy for integrated water and energy savings in the agriculture sector?		Yes=0.5, else=0
	If 'Yes', mention if any progress has been made in the form of workshops, pilots, etc.		
Institutional Capacity			
3	Advisory capacity in the state government	1.5	
	Does the state have an entity to develop capacity and provide technical expertise on EC/EE in agriculture for farmers, producer organisations, government officials, or other stakeholders in the value chain?		Entity to develop capacity & provide technical expertise = 0.5, else= 0;
	Does the state have a government authority to enforce EC/EE regulations or measures for agriculture?		Government authority to certify and enforce EE/EC regulations=0.5, else= 0
	What was the budget assigned and utilised for EE in the agriculture sector?		Budget assigned and utilised for EE activities in the municipal sector=0.5, else 0.
Adoption of EE measures			
4	Use of EE pumps for new connections	0.5	
	Has the state taken any steps to promote the use of EE pumps for new connections?		Yes=0.5, else=0
State Programme			
5	Programmes for energy efficiency in agriculture	4	
	Does the state have programmes for EE in agriculture in FY 2022-23?		
	What is the objective of the programme?		Objective of the programme=0.5
	What is the target set under the programme?		Target set under the programme=0.5
	What is the timeline?		Timeline =0.5
	How much budget has been allocated & utilised to date		Budget allocated & utilised to date =0.5
	Who is running the programme?		Entities running the programme=0.5
	What is the progress to date?		Progress to date =0.5
	What are the energy savings?		Energy savings (deemed or measured) = 0.5
	How much emissions were avoided?		Avoided emissions=0.5

No.	Indicator	Max Score	Scoring Criteria
6	Programmes for capacity-building in the agriculture sector	1	
	Does the state have programmes for capacity-building for energy efficiency in agriculture in FY 2022-23?		
	What is the objective and timeline of the programme? Who is running the programme?		Objective of the programme, Timeline, Entities running the programme=0.5
	What was the target audience under the programme? What was the number of beneficiaries under the programme?		Target audience, number of beneficiaries under the programme=0.5

Figure 3-12 shows the TFEC group-wise scores for the agriculture sector in SEEI 2023

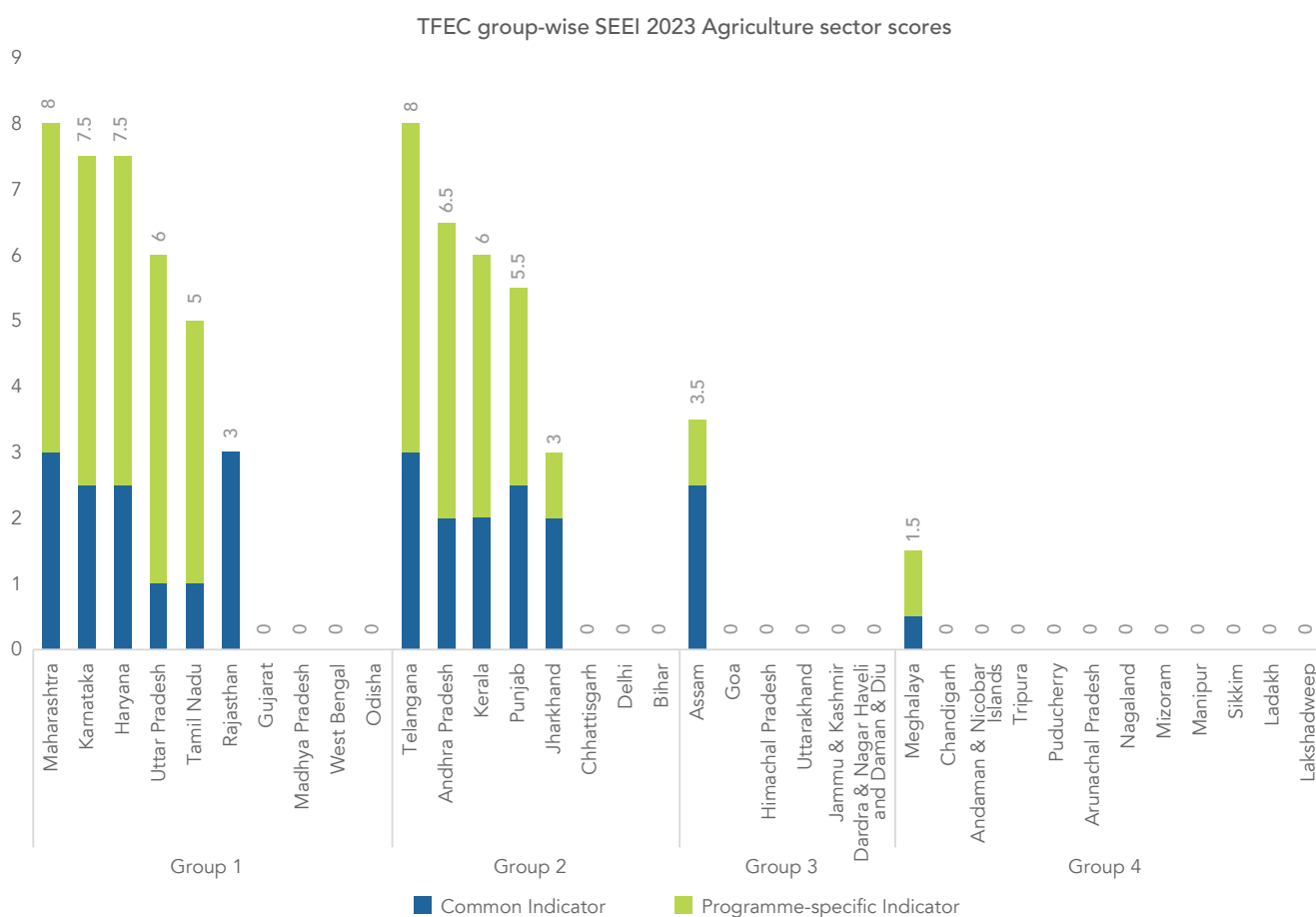


Figure 3-16: TFEC group-wise agriculture sector state scores

Figure 3-17 illustrates the progress of the agriculture sector for each state in the SEEI for the year 2023 in comparison to SEEI 2021-22.

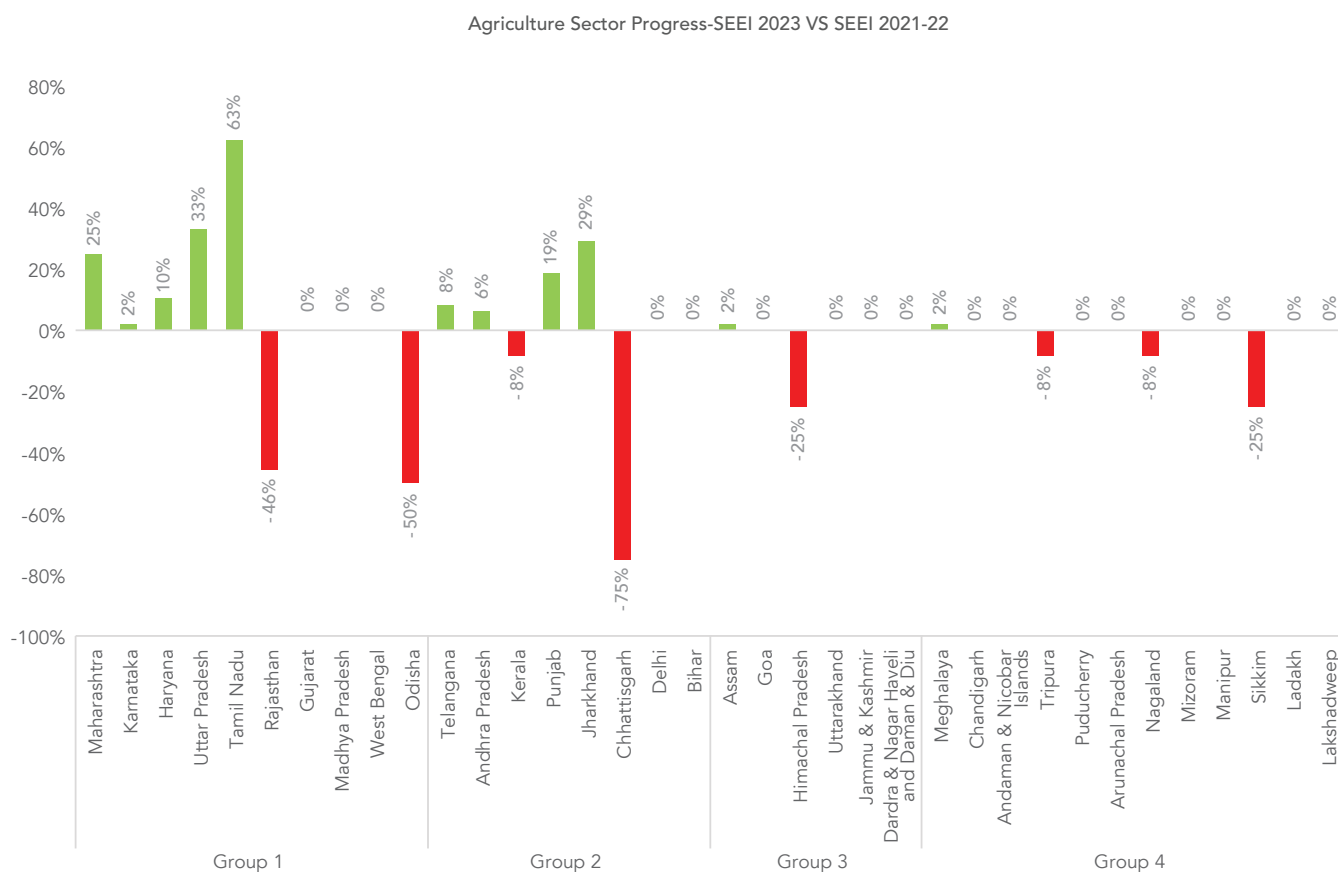


Figure 3-17: TFEC group-wise agriculture sector state progress – SEEI 2023 vs SEEI 2021-22

SEEI 2023 AGRICULTURE SECTOR SCORE HIGHLIGHTS

Maharashtra and Telangana are the top performers in the agriculture sector with a perfect score of 8 out of 8. Other top-performing states are Karnataka and Haryana which have an impressive score of 7.5. In SEEI 2023, eleven (11) states and UTs improved their scores in the agriculture sector, seventeen (17) reported no changes while eight (8) reported a decline in scores. The most improved state, Tamil Nadu, has increased its score by 63%.



Maharashtra and Telangana are the top performers in the agriculture sector

Common Indicators

→ Policy

States and UTs have shown limited progress in this indicator category, with only four (4) states reporting policies to promote EE and climate-friendly cold chain infrastructure. For effective development of energy efficient cold chains, inclusive policy measures coupled with government-backed investment and financing are essential.

Regarding the policy for integrated water and energy savings in the agriculture sector in the state, ten (10) states provided relevant information. This is the same number of states as reported in SEEI 2021-22.



4 states have a policy for encouraging EE and climate-friendly cold chain infrastructure

Table 3-29: States and UTs with policies for EE in the agriculture sector

Indicator	State
States that have a policy for encouraging EE and climate-friendly cold chain infrastructure development	1. Assam 2. Maharashtra 3. Rajasthan 4. Telangana
States that have policy support for integrated water and energy savings in the agriculture sector	1. Andhra Pradesh 2. Assam 3. Haryana 4. Karnataka 5. Maharashtra 6. Meghalaya 7. Punjab 8. Rajasthan 9. Tamil Nadu 10. Telangana

→ Institutional Capacity

Fifteen (15) states have reported having designated entities for developing capacity and offering technical expertise in EE for agriculture. This support is extended to farmers, producer organisations, government officials, and other stakeholders across the agriculture value chain. The presence of a government authority to enforce EC/EE regulations or measures in agriculture is reported in ten (10) states. Further, eight (8) states reported allocating dedicated budgets for developing capacity to implement EE measures in agriculture, increasing from five (5) states in SEEI 2021-22.

Table 3-30: States and UTs with institutional capacity for EE in the agriculture sector

State	Entity to develop capacity and provide technical expertise	Government authority to enforce EC/EE regulations	Budget assigned to state government authorities
Andhra Pradesh	✓	✓	X
Assam	✓	✓	X
Chhattisgarh	✓	X	X
Haryana	✓	✓	✓
Jharkhand	✓	✓	✓
Karnataka	✓	✓	✓
Kerala	✓	✓	✓
Maharashtra	✓	✓	✓
Meghalaya	✓	X	X
Nagaland	✓	X	X
Punjab	✓	✓	✓
Rajasthan	✓	✓	✓
Tamil Nadu	✓	X	X
Telangana	✓	✓	✓
Uttar Pradesh	✓	X	X

X: No data reported by states.

Note: States with no data reported across all fields have been excluded from the table.

→ Adoption of EE measures

In SEEI 2023, eleven (11) states, namely Andhra Pradesh, Assam, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Punjab, Rajasthan, Telangana, and Uttar Pradesh, have reported taking steps to encourage the adoption of EE pumps for new connections.

- APSECM conducted training and awareness programmes on energy and water conservation practices to promote EE pumps and other energy efficiency activities.
- Assam, Haryana and Jharkhand have established guidelines for the supply, installation and commissioning of Solar Water Pumping systems to increase uptake.
- Karnataka, Kerala and Punjab have mandated the use of BEE star-labelled pump sets when establishing new connections. In Maharashtra, Agriculture Demand Side Management (AgDSM) programme, Mukhyamantri Saur Krushi Pump Yojana and PM KUSUM Yojana have been implemented to replace inefficient pumps with energy-efficient models and solar pumps. The deployment of solar energy pumps under KUSUM Ujana in Rajasthan reflects the state's commitment to harnessing renewable energy for agricultural activities. Telangana and Uttar Pradesh have replaced old inefficient pump sets with BEE star rated pump sets to save energy.

Programme-Specific Indicator

In SEEI 2023, two (2) programme-specific indicators have been included to track and assess the implementation of programmes/projects undertaken by SDA and other state entities individually, through inter departmental collaboration or in conjunction with BEE, or PPPs to achieve EE in the agriculture sector. Table 3-31 shows the states and UTs with programmes on EE and capacity-building in the agriculture sector

Table 3-31: States and UTs with programmes for EE in the agriculture sector:

State	Programmes for EE in Agriculture	Programmes for Capacity-Building
Andhra Pradesh	✓	✓
Assam	X	✓
Haryana	✓	✓
Jharkhand	X	✓
Karnataka	✓	✓
Kerala	✓	✓
Maharashtra	✓	✓
Meghalaya	X	✓
Punjab	✓	✓
Tamil Nadu	✓	X
Telangana	✓	✓
Uttar Pradesh	✓	✓

X - No data reported by states.

Note: States with no data reported across all fields have been excluded from the table

→ Programmes for EE in agriculture



9 states reported EE programmes in agriculture

In SEEI 2023, nine (9) states namely Andhra Pradesh, Haryana, Karnataka, Kerala, Punjab, Maharashtra, Tamil Nadu, Telangana, and Uttar Pradesh reported EE programmes in agriculture:

- Andhra Pradesh is implementing drip and sprinkler irrigation systems under the RKVY RAFTAAR – PDMC scheme focusing on horticulture. The programme, managed by the Department of Horticulture through the Andhra Pradesh Micro Irrigation Project (APMIP) and DISCOMs, has resulted in energy savings of 54 MU and avoided approximately 0.12 MtCO₂ emissions.
- In Haryana, the AgDSM programme promotes the use of BEE star-rated pumps and Solar Water Pumping Systems (SWPS). The initiative, set to continue until 2025, has resulted in notable energy savings of 80,501.44 tonnes and a reduction in CO₂ emissions by 64,401 tonnes. Managed by KREDL in collaboration with the MoP, The KUSUM Scheme in Karnataka supports farmers in installing solar agriculture pumpsets with a targeted energy savings of 3,261 million units and a reduction of 2,948 tonnes of CO₂ emissions.
- EMC Kerala and the Agriculture Department are executing a programme to enhance EE in agriculture by replacing inefficient Petti Para Dewatering Systems with energy-efficient vertical axial flow pumps. The programme has resulted in energy savings of 5.846 MU and avoided 4384 MtCO₂ emissions.
- In Punjab, the ongoing 'Pani Bachao Paise Kamao' programme, led by PEDDA and the Agriculture Department, incentivises farmers for optimising power and ground water use in pumps through a direct benefit transfer mechanism.
- In Maharashtra, the AgDSM programme has been implemented to replace inefficient pumps with energy-efficient models and solar pumps. This initiative achieved annual energy savings of 4,568,199.4 kWh and avoided emissions equivalent to 3,608,877.526 tCO₂.
- In Tamil Nadu, a scheme for solar-powered pump sets, administered by Tamil Nadu SDA and the State Agriculture Department, has enhanced EC and EE in agriculture resulting in energy savings of 2.54 crore units.
- Telangana is replacing old and inefficient pumps with newer and more efficient models with the aim of achieving 30% energy savings in existing motors. The initiative has resulted in annual energy savings of 134,940 units and avoided emissions equivalent to 1.32 tonnes.
- In Uttar Pradesh, the M&V agricultural pumping systems programme, led by Uttar Pradesh Power Corporation Limited, aims to reduce electricity consumption in water pumping. The programme has resulted in energy savings of 2.196 MU and avoided emissions equivalent to 1.756 MtCO₂.

→ Programmes for Capacity-Building

In SEEI 2023, eleven (11) states namely Andhra Pradesh, Assam, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Punjab, Telangana and Uttar Pradesh reported the organisation of capacity-building programmes in the agriculture sector.

- In Andhra Pradesh, APSECM conducts a 6-month capacity-building programme for agriculture, targeting equipment technicians and farmers. The programme successfully motivated 420 technicians and 1900 farmers towards EE.

- Assam conducts training and awareness programmes for farmers on energy conservation, emphasising the affordable use of EE pump sets and operational practices.
- Under its MuDSM programme, Haryana conducts capacity-building campaigns for youth, farmers, and existing self-help groups on energy conservation in villages.
- The Jharkhand SDA conducts the capacity-building programme to support local farmers in installing standalone solar agriculture pump sets.
- Karnataka's capacity-building programme by Krishi Vignana Kendra (KVKs) aims to raise awareness about energy-efficient pump-sets and water conservation among farmers. Through 18 training sessions, 2,441 participants have been trained.
- EMC, Kerala through KVKs and NGOs is undertaking a capacity-building programme for farmers, plumbers and equipment technicians to enhance knowledge about energy-efficient farming, energy efficient pumps and pumping practices.
- In Punjab, the agriculture department, PEDDA, and PSPCL, raise awareness on EE in agriculture through training programmes organised by KVKs. The initiative targets various stakeholders, including departments, the general public, farmers, and pump-set manufacturers.
- In Maharashtra, the DSM awareness programme for farmers encourages the installation of 4-star rated pump sets for energy conservation. So far, around 140 farmers have attended the AgDSM awareness programme.
- Meghalaya's capacity-building programme, led by the district administration with collaboration from KVK, Block offices, and the agriculture department, provides training on EE and water conservation to farmers and officials from various government departments.
- In Telangana, 100 training programmes for farmers were conducted, focusing on EE pumps and the usage of IoT systems.
- The Uttar Pradesh SDA led AGDSM training programme aims to educate farmers and pump technicians on using energy-efficient appliances to reduce energy consumption in the agriculture sector.



11 states reported capacity-building initiatives for EE in the agriculture sector

AGRICULTURE SECTOR SPOTLIGHT

The Government of Andhra Pradesh is effectively implementing the Drip and Sprinkler Irrigation systems under the RKVY RAFTAAR – PDMC scheme. The primary objectives of this project spearheaded by The Department of Horticulture, through the Andhra Pradesh Micro Irrigation Project (APMIP) are to enhance water use and fertilizer efficiency, boost crop productivity and farmer income, and contribute to energy conservation in the agriculture sector. This initiative has successfully covered 14.34 lakh hectares under micro irrigation resulting in significant resource savings, including 215 TMC of water and 22,270 lakh kWh of power.



3.6 DISCOM

OVERVIEW

The Indian power sector's shift towards clean energy marks a critical transformation, with DISCOMs playing a key role in this transition. As India pursues a low-carbon and climate-resilient future, the efficiency of DISCOMs becomes paramount. However, DISCOMs in India grapple with the dual challenge of improving operational efficiency and financial sustainability.

The DISCOMs face significant challenges with high Aggregate Technical & Commercial (AT&C) and Transmission & Distribution (T&D) losses. The Indian government, through initiatives like the Revamped Distribution Sector Scheme (RDSS), aims to reduce these losses, particularly targeting to bring AT&C losses down to 12-15% by the end of 2024-25¹⁶. Additionally, DISCOMs must be prepared for the increasing energy demand and technological advancements in the sector. The integration of renewable sources, electric vehicles and energy storage technologies requires DISCOMs to adapt to maintain efficiency and reliability. This involves upgrading the grid and adopting smart technologies to manage the load effectively.

There are seven (7) indicators in the SEEI 2023 to assess EE progress in the DISCOM sector, which includes five (5) common indicators covering policy and adoption of EE measures and two (2) programme-specific indicators. The maximum score in this sector is eleven (11) split between six (6) and five (5) for the common indicators and programme-specific ones respectively.

Table 3-32 provides an overview of the indicators in the DISCOM sector. Figure 3-18 represent the scores of the states in the agriculture sector, across the two indicator categories: common and programme-specific, with states grouped together based on their TFEC. The states' progress in SEEI 2023 compared to SEEI 2021-22 is depicted in Figure 3-19.

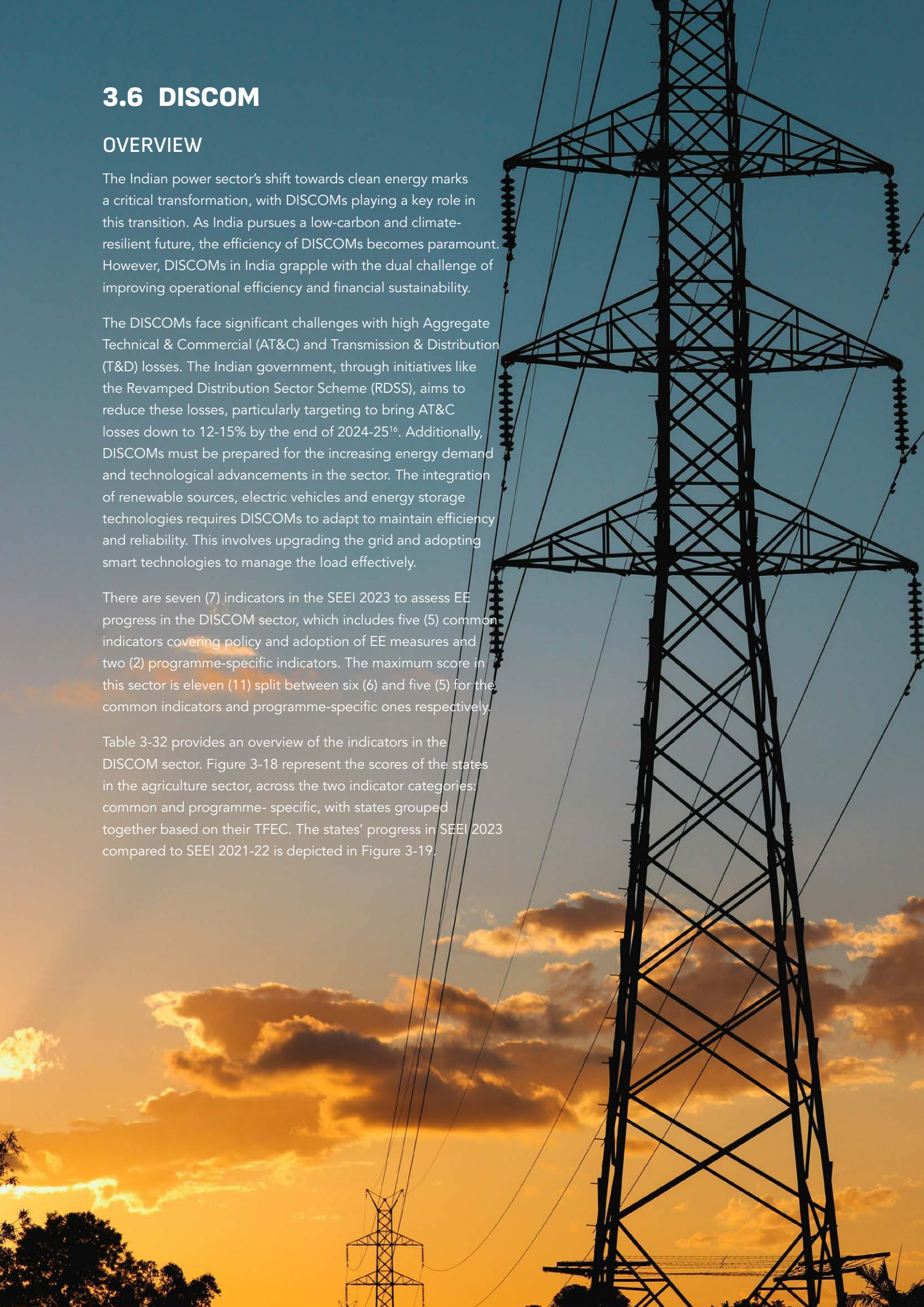


Table 3–32: DISCOM sector indicators

No.	Indicator	Max Score	Scoring Criteria
Policy			
1	Transmission and Distribution (T&D) losses	1	If actual <=10%: 1 point; >10 &<=15%: 0.75 point; >15 &<=20%: 0.5 point; >20%: 0 point
	Target and actual T&D losses in percentage of all DISCOMs in the state (technical only) for FY 2022-23		
2	Time-of-Day(ToD)/Time-of-Use(ToU) tariff	0.5	For industrial/commercial ToD tariff=0.25, else=0; For domestic ToD tariff= 0.25, else=0
	Have DISCOMs in the state implemented ToD/ToU tariff for the following consumers (Domestic/Commercial/ Industrial)		
3	Bureau of Energy Efficiency (Manner and Intervals for Conduct of Energy Audit (Accounting) in Electricity Distribution Companies) Regulations, 2021	1.5	Number and name of the DISCOMs in the state- 0.5 DISCOM/DISCOMs have submitted the annual energy audit report- 0.5; else- 0 DISCOM/DISCOMs have submitted periodic (quarterly) accounting reports- 0.5; else- 0
	Provide the number and name of DISCOMs in the state		
	Have the DISCOM/DISCOMs in the state submitted the annual energy audit report and all periodic (quarterly) accounting reports for FY 2022-23?		
4	Revamped Distribution Sector Scheme (RDSS)	1	Steps taken=0.5, else=0 Yes=0.5, else=0
	What steps have been taken by the state to reduce the ACS-ARR gap to zero by FY 2024-25?		
	What is the ACS-ARR gap for the FY 2021-22 & 2022-23		
Adoption of EE measures			
5	Metering	2	Percentage of consumers with smart metering=0.5, else=0 Smart meter data analysed & used for consumer awareness, to enhance DISCOM operational efficiency etc.=0.5, else=0 Percentage of metering completed in the feeder and DT level=0.5, else=0 Status on agriculture feeder segregation=0.5, else=0
	What is the proportion of % of consumers with smart meters?		
	Is the smart meter data analysed or used for consumer awareness, to enhance DISCOM operational efficiency, etc		
	What is the proportion of system metering at the Feeder and Distribution Transformer (DT) level completed?		
What is the status of agriculture feeder segregation?			
State Programme			
6	Programmes for DSM	4	Objective of the programme=0.5 Target set under the programme=0.5 Timeline =0.5 Budget allocated & utilised to date =0.5 Entities running the programme=0.5 Progress to date =0.5 Energy savings (deemed or measured) = 0.5 Avoided emissions=0.5
	Does the state have programmes for DSM in FY 2022-23?		
	What is the objective of the programme?)		
	What is the target set under the programme?		
	What is the timeline?		
	How much budget has been allocated & utilised to date		
	Who is running the programme? (stakeholders & departments engaged in the programme)		
	What is the progress to date?		
	What are the energy savings? (Deemed or measured)		
	How much emissions were avoided? (based on energy savings)		

No.	Indicator	Max Score	Scoring Criteria
7	Programmes for capacity-building in DISCOMs	1	
	Does the state have programmes for capacity-building for energy efficiency in DISCOM in FY 2022-23?		
	What is the objective and timeline of the programme? Who is running the programme? (e.g. SDA, state dept., municipal bodies, PPP, etc.)		The objective of the programme, Timeline, Entities running the programme=0.5
	What was the target audience under the programme? What was the number of beneficiaries under the programme?		Target audience, number of beneficiaries under the programme=0.5

Figure 3-18 shows the TFEC group-wise scores for the DISCOM sector in SEEI 2023.

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

Figure 3-19 shows the progress of the DISCOM sector for each state in the SEEI for the year 2023 in comparison to SEEI 2021-22.

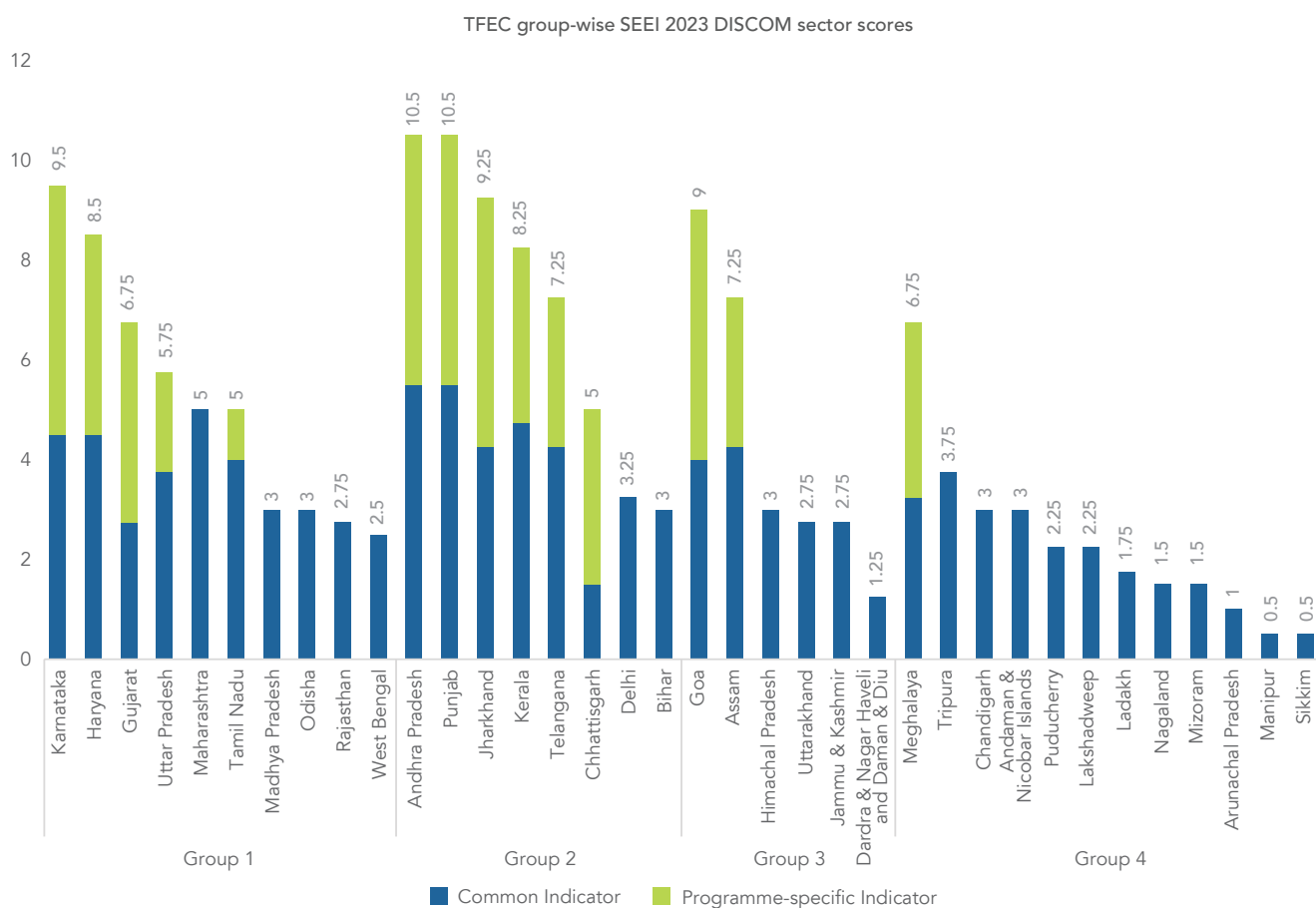
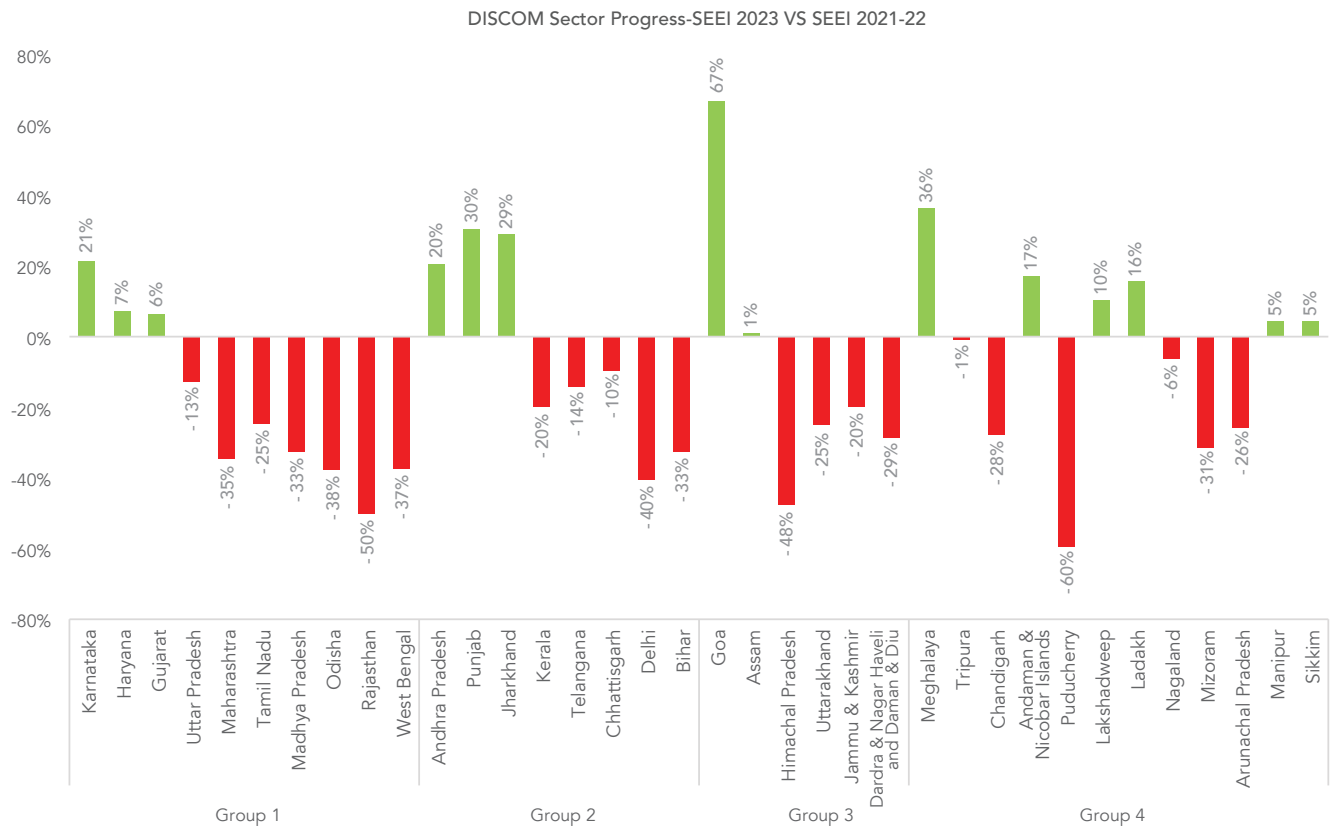


Figure 3-19: TFEC group-wise DISCOM sector state progress – SEEI 2023 vs SEEI 2021-22

SEEI 2023 DISCOM SECTOR SCORE HIGHLIGHTS

Andhra Pradesh and Punjab lead the DISCOM sector with a score of 10.5 out of a maximum



score of 11. Other top-performing states include Karnataka, Jharkhand, and Goa. In SEEI 2023, fourteen (14)

states and UTs have shown improvement in their DISCOM sector scores while twenty-two (22) showed a decline when compared to SEEI 2021-22. Goa has emerged as the most improved state among all, with a remarkable increase of 67% followed by Meghalaya (36%) and Punjab (30%).



Andhra Pradesh and Punjab are the top performers in the DISCOM sector

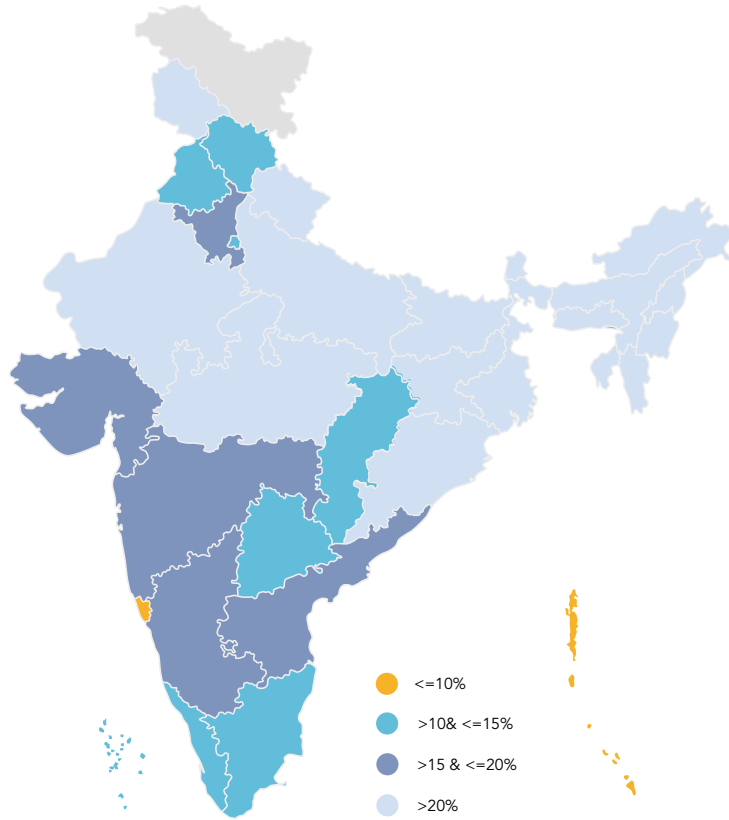
Common Indicators

Policy

→ The states and UTs showed notable performance in the DISCOM sector, especially in the area of T&D losses. T&D losses are a vital indicator for evaluating the operational effectiveness of DISCOMs. On a national scale, the T&D loss for India stood at 19.27% during the fiscal year 2021-22. Analysing state-wise performance, 17 states reported T&D losses exceeding 20%. In comparison, T&D losses in 7 states ranged between 15% and 20%, and in 9 states, they are reported to be between 10% and 15%. Remarkably, only 3 states — Daman & Diu, Goa, and the Andaman & Nicobar Islands — achieved T&D losses below 10%. The T&D losses of 28 states and UTs declined in 2021-22 over 2020-21.

Based on BEE's data, the T&D losses of states and UTs for the fiscal year 2021-22 are depicted in Figure 3-20.

Figure 3-20: T&D loss in states and UTs



26 states & UTs included Time-of-Day (ToD) tariffs for commercial and industrial consumers and 10 have it for residential consumers

Time-of-Day (ToD) and Time-of-Use (ToU) tariffs are integral demand side management strategies in the tariff systems of DISCOMs. ToD tariffs adjust electricity rates throughout the day to reflect the varying costs of energy during peak and off-peak hours. This approach encourages consumers to shift their electricity usage away from high-demand periods, thereby easing grid strain. ToU pricing takes this a step further by dynamically adjusting rates based on broader factors such as time of day, season, and real-time energy supply and demand. This model promotes the use of electricity when it is most affordable and abundant, often coinciding with high renewable energy output.

Both ToD and ToU tariffs aim to optimise grid efficiency, reduce peak-time energy generation costs, and encourage sustainable energy consumption. They support the integration of renewable energy by aligning demand with periods of higher renewable production.

A significant number of states, totalling twenty-six (26), have incorporated Time-of-Day (ToD) and Time-of-Use (ToU) tariffs within their tariff structures for commercial or industrial consumers. However, the adoption of these tariffs for domestic consumers is more limited; ten (10) states, namely Andhra Pradesh, Delhi, Kerala, Madhya Pradesh, Odisha, Tamil Nadu, and West Bengal, have implemented these innovative pricing models for residential users. Table 3-33 provides a comprehensive list of the states with ToD/ToU tariffs.

Table 3-33: States and UTs with implementation of ToD/ToU

State/UT	ToD/ToU for commercial/ industrial consumers	ToD/ToU for Domestic consumers
Andhra Pradesh	✓	✓
Assam	✓	X
Bihar	✓	✓
Chandigarh	✓	X
Goa	✓	✓
Gujarat	✓	X
Haryana	✓	✓
Himachal Pradesh	✓	X
Jammu & Kashmir	✓	X
Jharkhand	✓	X
Karnataka	✓	✓
Kerala	✓	✓
Ladakh	✓	X
Madhya Pradesh	✓	✓
Maharashtra	✓	✓
Meghalaya	✓	X
Odisha	✓	✓
Puducherry	✓	X
Punjab	✓	X
Rajasthan	✓	X
Tamil Nadu	✓	X
Telangana	✓	X
Tripura	✓	X
Uttar Pradesh	✓	X
Uttarakhand	✓	X
West Bengal	✓	✓

X: No data reported by states.

Note: States with no data reported across all fields have been excluded from the table

DISCOMs under the BEE's Conduct of Energy Audit (Accounting) in Electricity Distribution Companies) Regulations 2021 mandates to perform and report quarterly energy accounting and an independent annual energy audit, across all consumer categories. DISCOMs from thirty (30) states have successfully submitted their quarterly energy accounting reports for the fiscal year 2022-23 while, those from sixteen (16) states have submitted their annual energy audit reports to BEE for the same period. This reporting is crucial as it ensures transparency and accountability in DISCOMs, enabling better monitoring and management of resources. Table 3-34 provides a detailed overview, presenting a state-wise breakdown of both the quarterly accounting and annual energy audit report submissions, highlighting the compliance and diligence of states.

Table 3-34: State and UT wise status of energy audit and accounting report to BEE

State/UT	Quarterly Accounting Report	Annual Energy Audit Report
Andaman & Nicobar Islands	✓	X
Andhra Pradesh	✓	✓
Assam	✓	✓
Bihar	✓	✓
Chandigarh	✓	X

State/UT	Quarterly Accounting Report	Annual Energy Audit Report
Chhattisgarh	✓	X
Delhi	✓	✓
Goa	✓	X
Gujarat	✓	X
Haryana	✓	X
Himachal Pradesh	✓	X
Jammu and Kashmir	✓	✓
Jharkhand	✓	X
Karnataka	✓	✓
Kerala	✓	✓
Lakshadweep	✓	X
Ladakh	✓	X
Madhya Pradesh	✓	✓
Maharashtra	✓	✓
Manipur	✓	X
Mizoram	✓	X
Odisha	✓	✓
Punjab	✓	✓
Rajasthan	✓	✓
Tamil Nadu	✓	X
Telangana	✓	✓
Tripura	✓	✓
Uttar Pradesh	✓	✓
Uttarakhand	✓	✓
West Bengal	✓	X

X - No data reported by states.

Note: States with no data reported across all fields have been excluded from the table.

In SEEI 2023, nine (9) states namely Andhra Pradesh, Assam, Goa, Haryana, Jharkhand, Maharashtra, Meghalaya, Punjab and Tripura reported the ACS-ARR gap for the FY 2021-22 & 2022-23. Further, steps taken to reduce the ACS-ARR (Average Cost of Supply - Average Realisable Revenue) gap to zero by FY 2024-2025 were submitted by nine (9) states namely Andhra Pradesh, Assam, Goa, Karnataka, Kerala, Jharkhand, Punjab, Meghalaya and Tripura. The initiatives, in line with the RDSS scheme include a focus on infrastructure development, loss reduction, modernisation, and smart metering.

Some highlights of these measures are depicted below

- In Andhra Pradesh, Andhra Pradesh Eastern Power Distribution Company Limited (APEPDCL) is augmenting its network with prepaid smart metering and infrastructure improvements. Andhra Pradesh Central Power Distribution Company Limited (APCPDCL) is investing in operational efficiency, with a focus on subsidy management and cost reduction in power procurement. The strategy of Andhra Pradesh Southern Power Distribution Company Limited. (APSPDCL) includes managing cost variations and decreasing losses while also streamlining tariff subsidy processes.
- Assam Power Distribution Company Limited (APDCL) has undertaken system augmentation and upgradation, and implemented Information Technology (IT)/ Operational Technology (OT) to reduce the ACS-ARR gap under the RDSS scheme.
- Goa's approach includes adopting prepaid smart metering, undertaking loss reduction efforts, and modernizing its distribution transformers.

- In Karnataka, Mangalore Electricity Supply Company Limited(MESCOM) is actively engaging in tariff applications with KERC, ensuring timely government subsidies, and maintaining financial discipline by controlling expenses.
- Meghalaya's focus is on loss-reducing infrastructure works and smart metering through enhanced deployment of HVDS, IT/OT applications and extension of HT lines.
- Kerala has undertaken the upgradation of infrastructure with an array of measures, including conductor replacements, feeder segregation, and transformer enhancements.

→ Adoption of EE Measures

Smart meters provide real-time access to information on consumer's energy usage throughout the day. This data empowers customers to make informed decisions on their energy consumption proactively, while also aiding DISCOMs in effective peak load management and ensuring grid stability.

The update on the adoption of smart meters for utility consumers has been provided by twenty-six states (26). Additionally, eleven states (11) are reported to be utilising smart meter data for consumer awareness. Thirty-three (33) states reported metering status at the feeder and DT levels. Further, ten (10) states made progress in segregating agricultural feeders. These multitude of measures across the states and UTs indicate a growing focus on modernising and improving the efficiency of power distribution networks.

Table 3-35: States and UTs with adoption of EE measures in DISCOMs

State/UT	States with smart metering	States that have analysed smart meter data	States with metering completed in the feeder and DT level	States with agriculture feeder segregation
Andaman & Nicobar Islands	✓	X	✓	X
Andhra Pradesh	✓	✓	✓	✓
Arunachal Pradesh	X	X	✓	X
Assam	✓	✓	✓	X
Bihar	✓	X	✓	X
Chhattisgarh	X	X	✓	X
Chandigarh	✓	X	✓	X
Delhi	✓	X	✓	X
Goa	X	X	✓	X
Gujarat	✓	X	✓	X
Himachal Pradesh	✓	X	✓	X
Haryana	✓	✓	✓	✓
Jammu and Kashmir	✓	X	✓	X
Jharkhand	✓	✓	✓	✓
Karnataka	✓	X	✓	✓
Kerala	✓	✓	✓	X
Ladakh	X	X	✓	X
Lakshadweep	X	X	✓	X
Maharashtra	✓	✓	✓	✓
Meghalaya	✓	✓	✓	✓
Madhya Pradesh	✓	X	✓	X
Nagaland	✓	X	✓	X
Mizoram	X	X	✓	X
Odisha	✓	X	✓	X

State/UT	States with smart metering	States that have analysed smart meter data	States with metering completed in the feeder and DT level	States with agriculture feeder segregation
Puducherry	✓	X	✓	X
Punjab	✓	✓	✓	✓
Rajasthan	✓	X	✓	X
Tamil Nadu	✓	✓	✓	✓
Telangana	✓	✓	✓	✓
Tripura	✓	X	✓	X
Uttar Pradesh	✓	✓	✓	✓
Uttarakhand	✓	X	✓	X
West Bengal	X	X	✓	X

X - No data reported by states.

Note: States with no data reported across all fields have been excluded from the table.

Programme-Specific Indicator

In the SEEI 2023, two new programme-specific indicators have been introduced to assess the programmes undertaken by SDAs and other state entities to achieve EE within the DISCOM sector. These indicators focus on evaluating the advancement of demand-side management (DSM) programmes and the capacity-building measures for energy efficiency in DISCOMs.

Table 3-36: States and UTs with programmes for EE in DISCOM sector

State	Programmes for DSM	Programmes for Capacity-Building
Andhra Pradesh	✓	✓
Assam	✓	✓
Chhattisgarh	✓	X
Goa	✓	✓
Gujarat	✓	X
Haryana	✓	X
Jharkhand	✓	✓
Karnataka	✓	✓
Kerala	✓	✓
Meghalaya	✓	✓
Punjab	✓	✓
Tamil Nadu	✓	X
Telangana	✓	✓
Uttar Pradesh	✓	✓

X - No data reported by states.

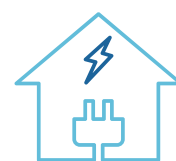
Note: States with no data reported across all fields have been excluded from the table.

→ Programmes for DSM

DSM encompasses initiatives and technologies adopted by utilities beyond the energy meter to encourage consumer to optimise energy use. The benefits of DSM are two-fold: it allows consumers to lower electricity bills through informed decision on energy usage control, and helps DISCOMs to manage peak demand, grid stability and defer investments in generation, transmission, and distribution infrastructure. DSM has been gaining prominence over the last few years becoming a key component of numerous central and state EE promotion missions.

In SEEI 2023, fourteen (14) states, namely Andhra Pradesh, Assam, Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Meghalaya, Punjab, Tamil Nadu, Telangana, and Uttar Pradesh, reported programmes on DSM.

- Four (4) states namely Andhra Pradesh, Chhattisgarh, Gujarat, and Punjab have reported undertaking the Unnat Jyoti by Affordable LEDs for All (UJALA) scheme in association with EESL. Under the scheme, LED bulbs, tube lights, and EE fans are being provided at subsidised costs to domestic consumers for the replacement of conventional and inefficient variants. These projects resulted in total energy savings of 47,277.9 MU and avoided emissions of 401.9 MtCO₂ in FY 2022-23.
- In Andhra Pradesh, the state DISCOMs implemented various DSM activities, including the AgDSM project, Energy Efficient LED Tube Light (EETL) programme, Domestic Efficient Fans Programme (DEFP), charging infrastructure for EVs, and installation of 5-star rated distribution transformer to manage the peak demand and reduce the energy consumption. These projects resulted in energy savings of 81.56 MU and avoided emissions of 0.07 MtCO₂.
- In Assam, APDCL has promoted DSM initiatives by retailing EE fans through the UJALA Scheme. In 2022-23, a total of 75 energy-efficient fans were sold. The Electricity Department in Goa undertook a programme with an aim to reduce the T&D losses through the replacement of old conductors with new cables/conductors in both HT and LT networks, Distribution Transformer Center (DTC) augmentation works, the replacement of old DTCs with energy-efficient ones, and the substitution of conventional lights with energy-efficient LED lamps. These projects resulted in energy savings of 47.14 MU and avoided emissions of 0.042 MtCO₂.
- HESCOM (Hubli Electricity Supply Company) in Karnataka is actively implementing DSM action plans, incorporating EC and DSM measures to address power shortages. In collaboration with EESL, approximately 25 million units of energy-efficient appliances have been successfully distributed through HESCOM. These initiatives have led to substantial energy savings, totaling 301.1 MU and have effectively prevented the emission of 0.28 MtCO₂.
- Under the “Urja Kerala Mission” Kerala State Electricity Board (KSEB) in association with EMC Kerala has undertaken the “Filament Free Kerala” project to replace the entire filament lamps with energy efficient LED lamps in the state. A monitoring committee and an implementation committee have been constituted to implement the project. 1.25 crore LED lamps have been distributed across the state.
- In Meghalaya, DISCOM has undertaken DSM measures by replacing outdated, energy-inefficient refrigerators, geysers, energy-efficient fans, and lights with more efficient alternatives. Additionally, the implementation includes the installation of solar-powered LED lights throughout the state.
- The DISCOMs of Haryana, Jharkhand, Tamil Nadu, Telangana, and Uttar Pradesh have undertaken various DSM measures like distribution of LED lights in exchange for incandescent bulbs and installation of energy efficient appliances like BLDC fan, IE3 motors, super-efficient ACs, distribution transformers etc.



**14 states
reported
details
on state-
level DSM
programmes**

➔ Programmes for Capacity-Building

In the SEEI 2023 report, ten (10) states including Andhra Pradesh, Assam, Goa, Jharkhand, Karnataka, Kerala, Meghalaya, Punjab, Telangana, and Uttar Pradesh reported implementing capacity-building programmes in the DISCOM sector. Table 3.39 outlines the state's efforts in capacity-building.

These initiatives focus on upskilling the DISCOMs' personnel with evolving energy policies, regulations, safety standards, and environmental norms, which are crucial for effective and sustainable power distribution management. Some highlights of these programmes are elucidated below:



**10 states
reported
capacity-
building
initiatives
for EE in
DISCOMs**

- In Andhra Pradesh, APSECM, in collaboration with APEPDCL, has successfully conducted six programmes in the APEPDCL area, focusing on training DISCOM officials and raising awareness among farmers.
- Assam's APDCL has established a dedicated training institute to enhance the skills of its employees.
- In Karnataka, KREDL organised capacity-building workshops and trained 243 participants from BESCO, CESC, HESCO, and MESCOM on energy efficiency in DISCOMs.
- Telangana conducted capacity-building programmes focused on DSM activities for TSSPDCL and TSNPDCL.
- Both Jharkhand and Kerala have concentrated on capacity-building around the DSM Action Plan.
- Meghalaya has engaged in webinars and training programmes for DISCOMs, spearheaded by the SDA.
- Uttar Pradesh New and Renewable Development Agency, (UPNEDA), the Uttar Pradesh SDA has been conducting various capacity-building programmes for DISCOM officials over seven years, including recent one-day programmes for MVVNL, DVVNL, and PuVVNL.



DISCOM SECTOR SPOTLIGHT

The DISCOMs of Andhra Pradesh are employing a bouquet of strategies to reduce the ACS-ARR gap in line with the RDSS scheme:

- APEPDCL is implementing prepaid smart metering at various levels and integrating existing infrastructure, alongside distribution infrastructure works.
- APCPDCL aims to improve operational efficiency by ensuring regular realisation of agricultural subsidies in DBT mode, reducing power purchase costs, and implementing strong actions against defaulters, particularly government consumers.
- APSPDCL focuses on recovering cost variations approved by APERC, reducing technical and commercial losses, minimizing R&M expenses, and enhancing other income sources. They also emphasize the prompt receipt of tariff subsidies from the state government to achieve this target.



3.7 CROSS SECTOR

OVERVIEW

In the SEEI 2023, the cross-sector category comprises fourteen (14) common indicators with a maximum score of fifteen (15). These indicators cover a range of areas including SEEAPs, EE and EC Policy, R&D in EE, utilisation of BEE funds, dedicated state budgets, SECF, State-Level Steering Committee for Energy Transition, state energy conservation awards, energy intensity, and procurement of non-fossil fuel-based power, among others.

Table 3-37 provides an overview of the cross-sector indicators. Figure 3-21 represent the scores of the states in the agriculture sector, across the two indicator categories: common and programme-specific, with states grouped together based on their TFEC. The states' progress in SEEI 2023 compared to SEEI 2021-22 is depicted in Figure 3-22.



Table 3-37: Cross-sector indicators

No.	Indicator	Max Score	Scoring Criteria
Policy			
1	State Energy Efficiency Action Plan (SEEAP)	2	
	Has the State Energy Efficiency Action Plan been finalised or approved?		SEEAP finalised= 1 SEEAP in draft stage=0.5, else=0
	If not, what is the status?		
	What are the state and sector-level targets set under the SEEAP?		Targets for energy efficiency/energy savings at the sector level =0.5, else=0
2	Energy Efficiency (EE) & Energy Conservation (EC) Policy	1	EE/EC policy notified=1 In draft stage=0.5 else=0
	Does the state have a notified EE & EC policy?		
3	Promotion of Innovation and R&D in Energy Efficiency	0.5	Yes=0.5 else=0
	Does the state have any policy, programme or financial instrument for the promotion of innovation and R&D in energy-efficiency?		
Finance			
4	BEE's fund utilisation	1	
	What is the percentage of utilisation of the funds allocated by the BEE for the annual action plans for FY 2022-23?		< 60% : 0 point; 60% <= & < 80% : 0.5 point; 80% <= & < 100% : 1 point.
5	Dedicated state budget	2	
	As per 15A of the EC Act (Amendment) 2022, has the SDA prepared its budget showing estimated receipts & expenditures and forwarded the same to the State Government to be included in the state annual budget?		Action Plan prepared as per EC Act (Amendment) 2022 and submitted to state govt=1, else=0
	If yes, has the State govt approved the budget & included the same in the annual state budget?		State govt. approved the budget and included in the annual state budget=1, else=0
6	Establishment and utilisation of SECF	1	
	Has the state allocated matching funds for SECF?		Matching fund allocated by state to SECF = 0.5, else=0
	Has the SECF been utilised in RIF mode by the SDA for energy efficiency adoption in the state in FY 2022-23?		SECF utilised by SDA in RIF mode for EE adoption = 0.5, else 0
Institutional Capacity			
7	Timely submission of monthly progress report to BEE	1	
	Does the SDA submit a monthly progress report to BEE on time?		1st-5th of next month : 1 point; 5th-10th of next month : 0.5 point; After 10th of next month : 0 point;
	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	1	
	Is the state-level Steering Committee headed by the Chief Secretary for Energy Transition formed in the state?		State-level Steering Committee headed by Chief Secretary for energy transition formed in state =0.5, else=0
	If yes, Is there any meeting of the SLSC for Energy Transition held in FY 2022-23?		Any meeting of the SLSC for Energy Transition held= 0.5, else=0

No.	Indicator	Max Score	Scoring Criteria
9	Collaboration and reporting	1.5	
	Does the SDA report the status of its ongoing / planned/achieved energy efficiency activities to the respective Energy / Power Departments and DOE FCC?		Formal reporting of SDA to Energy / power dept/ DoEFCC = 0.5, else=0
	Is there any collaboration between the SDA and the state departments to promote adoption of energy efficiency in different sectors?		Collaboration on EE between SDA & state depts = 0.5, else=0
	Is there any collaboration of the SDA with the private sector/ industry association/ CSO/ academic institutions/ ESCOs to promote energy efficiency in different sectors?		Collaboration on EE between SDA & private sector/ industry association/ CSO/ academic institutions/ ESCOs= 0.5, else=0
Adoption of EE measures			
10	Activities undertaken by the SDA Inspecting Officer	0.5	
	What activities have been undertaken by the SDA inspecting officer in the period under consideration (FY 2022-23)?		Yes=0.5, else=0
11	Collection of end-use energy data	1	
	Is there any practice for the periodic collection of energy consumption data at the SDA?		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?		End use energy data used for EE adoption = 0.5, else=0
12	State Energy Conservation Awards	0.5	
	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 or Industrial categories such as MSMEs etc or any other sector?		Yes=0.5, else=0
	If any, please list out the details of such awards.		
Energy Saving			
13	Energy Intensity	1.5	
	What is the energy intensity (TFEC in toe per unit Gross State Domestic Product (GSDP)) of the state for FY 2020-21?		States scored for each TFEC group = $\frac{\text{Range}(\text{Max}-\text{Min})}{3}$ 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 $(\text{Min} + (\text{Max}-\text{Min})/3)$ in each TFEC group; 1 point for state scores = $(\text{Min} + (\text{Max}-\text{Min})/3)$ to $(\text{Min} + 2(\text{Max}-\text{Min})/3)$ in each TFEC group; 0.5 point for state scores = $\text{Min} + (2(\text{Max}-\text{Min})/3)$ to Max in each TFEC group. 2)
14	Non-fossil fuel-based power procurement	0.5	
	What is the percentage change in non-fossil fuel-based power procurement in FY 2022-23 from FY 2021-22? Please provide both percentages		Data provided = 0.5, else 0

Figure 3-21 shows the T FEC group-wise scores for cross-sector in SEEI 2023

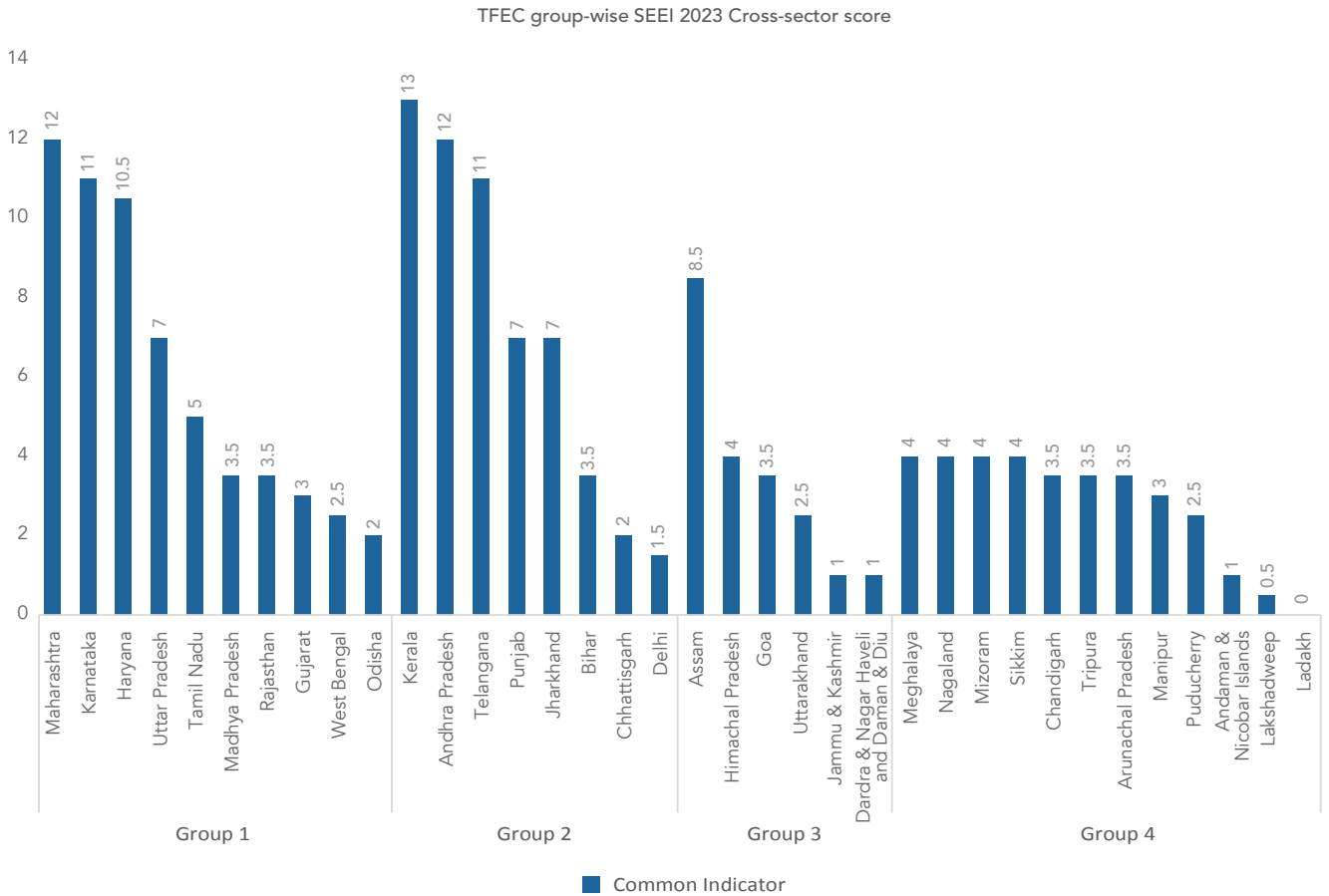


Figure 3-21: T FEC group-wise cross-sector state scores

Figure 3-22 shows the progress of cross-sector for each state in the SEEI for the year 2023 in comparison to SEEI 2021-22.

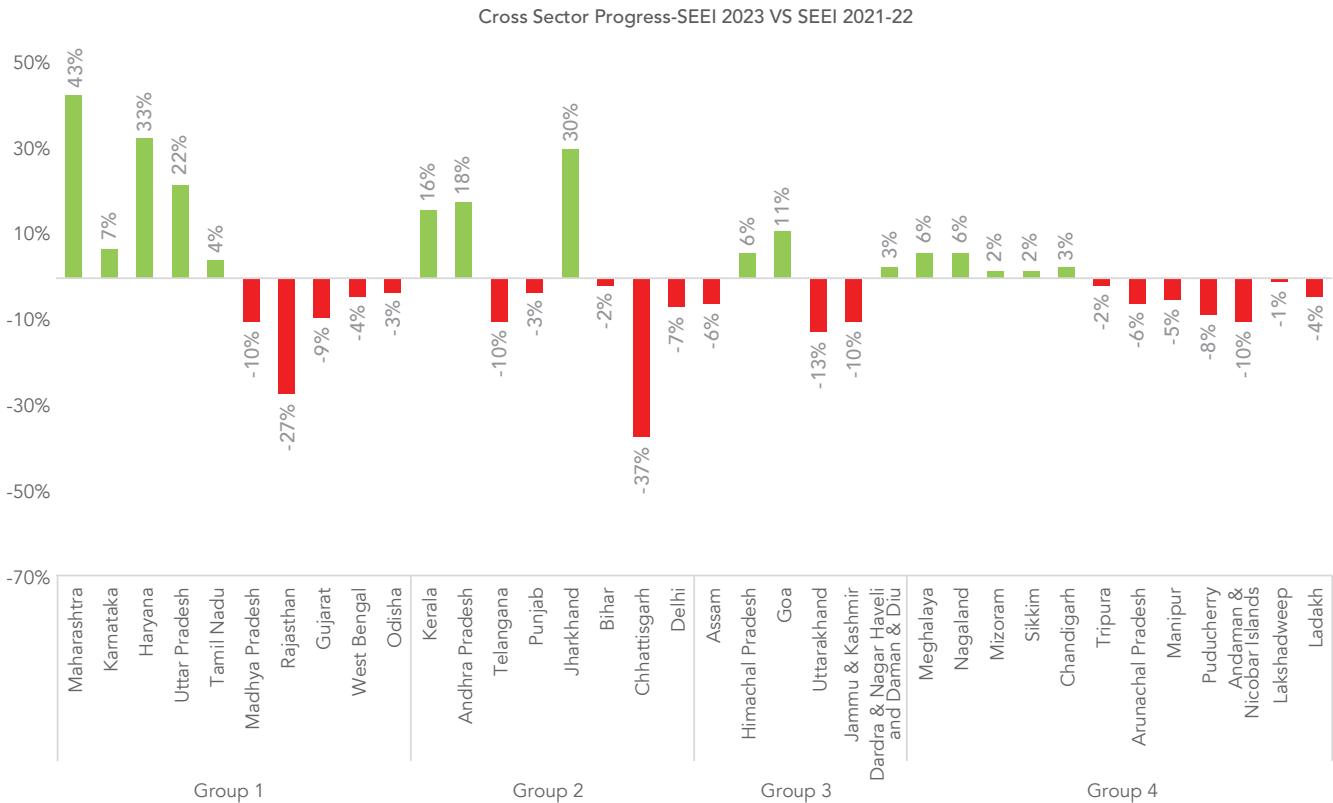


Figure 3-22: T FEC group-wise cross-sector state progress – SEEI 2023 vs SEEI 2021-22



Kerala stands out as the top-performing state in the cross-sector

SEEI 2023 CROSS-SECTOR SCORE HIGHLIGHTS

Kerala stands out as the top-performing state in the cross-sector category by achieving a score of 13 out of the maximum total of 15. Maharashtra and Andhra Pradesh follow closely, securing an impressive 12, while Karnataka and Telangana each attained a commendable score of 11. In SEEI 2023, 16 states and UTs have demonstrated improvements in their scores in cross-sector and 20 states and UTs reported a decline from SEEI 2021-22. Maharashtra has shown the most significant progress (43%), closely followed by Haryana (33%) and Jharkhand (30%).

Common Indicators



Policy

Promising advancements in the formulation of SEEAPs, have been witnessed with the SEEAPs of eight (8) states namely Assam, Chandigarh, Himachal Pradesh, Jharkhand, Kerala, Meghalaya, Telangana, and Uttar Pradesh successfully finalised. Additionally, in five (5) other states namely Andhra Pradesh, Haryana, Karnataka, Maharashtra, and Punjab, SEEAPs are in draft stage.

Out of these thirteen (13) states and UTs, barring Chandigarh, twelve (12) states, namely Andhra Pradesh, Assam, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Punjab, Telangana and Uttar Pradesh, have set EE/energy savings targets at the state and sector levels in their SEEAPs.

Dedicated EE/EC policy at the state -level is gaining importance with three (3) states, namely Haryana, Karnataka and Maharashtra have notified policies and three (3) others namely Andhra Pradesh, Kerala and Telangana in the draft stage.

For promoting innovation and R&D in EE, eight (8) states reported having a state policy, programme, or financial instrument in SEEI 2023, which is a rise from five (5) states in SEEI 2021-22.

- APSEEDCO and Andhra University College of Engineering have entered into a MoU to collaborate on creating a methodology for enhancing the efficiency of submersible water pumps. This partnership involves the design of a compact drive and efficient control system, and the development of a prototype demonstrating EE motor drive technology.
- The Assam Science Technology and Environment Council has launched the 'Innovation, Technology Generation & Awareness' scheme to foster awareness about technology generation and development among state-level innovators. It provides crucial financial and technical support to encourage and facilitate innovative technological advancements in the region.
- HAREDA extends financial assistance through the State Level Energy Conservation Awards to support innovation, new technologies and R&D projects, focused on EC and EE.
- In Karnataka, the SDA has initiated the establishment of a Renewable Energy Research Chair in the state, incorporating aspects of RE, EE and EC.
- In Kerala, the Energy Management Institute has been constituted under EMC to design, coordinate and deliver various courses on Energy Management, Energy Audit and skill development programmes, and promotion of R&D.



8 states & UTs are reported to have finalised their SEEAPs

- Under Maharashtra's Draft State EC Policy 2023, EE projects in various sectors, including industries, buildings, and ULBs, will receive benefits to promote innovation and R&D in EE.
- PEDDA has signed an MoU with IIT Ropar for the development of a Center of Excellence dedicated to the development of EV charging stations. This initiative involves a collaborative effort among 12 esteemed colleges, aiming to advance the EV infrastructure.
- To promote and demonstrate research and development projects in Telangana, the SDA has appointed M/s Nanosol Energy Private Limited as a knowledge partner. This collaboration is focused on the development, supply, and demonstration of a Hydrogen Generator (PEM Water Electrolyser) with a capacity of 3 litres per hour, showcasing a commitment to advancing hydrogen energy technologies in the state.



To support innovation and research in EE, 8 states now have a policy, programme, or financial instrument, showing an increase from 5 in SEEI 2021-22

Table 3-38 provides an overview of the states with reported progress under cross-sector policy indicators.

Table 3-38: States with reported progress under cross-sector policy indicators

State/UT	States and UTs with a finalised or draft SEEAP	States with EE/energy savings targets at the state and sector levels under SEEAP	States with a notified EE & EC Policy	States with measures for promotion of innovation and R&D in EE
Andhra Pradesh	✓	✓	✓	✓
Assam	✓	✓	X	✓
Chandigarh	✓	X	X	X
Haryana	✓	✓	✓	✓
Himachal Pradesh	✓	✓	X	X
Jharkhand	✓	✓	X	X
Karnataka	✓	✓	✓	✓
Kerala	✓	✓	✓	✓
Maharashtra	✓	✓	✓	✓
Meghalaya	✓	✓	X	X
Punjab	✓	✓	X	✓
Telangana	✓	✓	✓	✓
Uttar Pradesh	✓	✓	X	X

X: No data reported by states.

Note 1: States with no data reported across all fields have been excluded from the table

Note 2: Yellow boxes signify draft policies

→ **Finance**

BEE provides financial assistance to SDAs to coordinate, regulate, and enforce efficient use of energy and its conservation at the state level under their respective annual action plans. In FY 2022-23, only five (5) states namely Kerala, Mizoram, Nagaland, Sikkim, and Telangana are reported to have effectively utilised between 80% to 100% of BEE funds. Further, four (4) states namely Andhra Pradesh, Assam, Madhya Pradesh, and Uttarakhand utilised between 60% to 80% of BEE funds. The utilisation of funds in the remaining twenty-seven (27) states and UTs are reportedly less than 60%. Figure 3-23 depicts an overview of states and UTs with utilisation of funds allocated by BEE for the annual action plans of FY 2022-23.

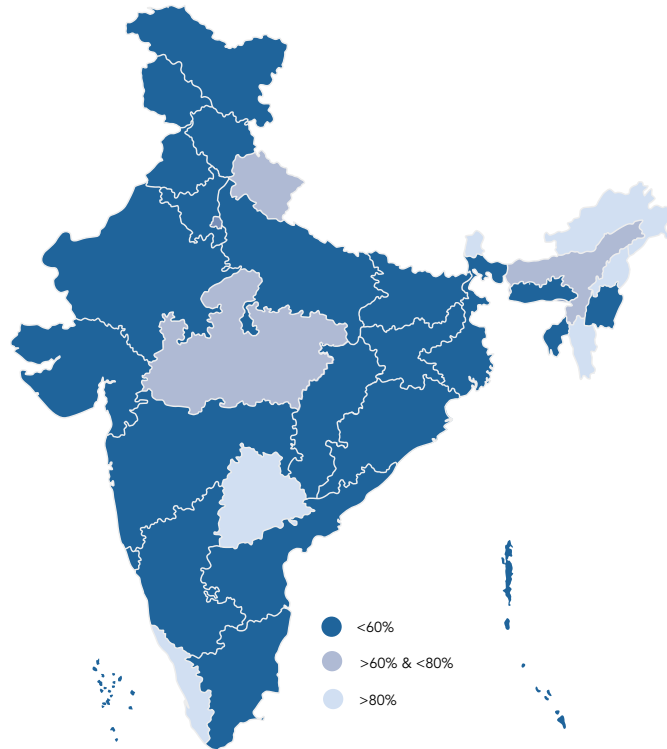


Figure 3-23: Utilisation of BEE's funds for FY 2022-23 by states and UTs

As per EC Act (Amendment) 2022, the SDAs are mandated to prepare their budget showing estimated receipts and expenditures and forward the same to the state government to be included in the state annual budget. In FY 2022-23, the SDAs of only five (5) states, namely Jharkhand, Karnataka, Kerala, Maharashtra, and Telangana are reported to conduct this activity. Further, seven (7) states namely Andhra Pradesh, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra and Tamil Nadu reportedly have assigned a dedicated budget for the SDAs to undertake EE/EC activities.

The SECF has been established under section 16 (1) of the EC Act 2001 to promote EE and EC within the state. In this context, the MoP approved a "Contribution to State Energy Conservation Fund of BEE" scheme during the XI plan, with the SDA leading as the implementing agency. In SEEI 2023, twenty-seven (27) states and UTs reported contributing matching funds to the SECF. However, only two (2) SDAs have reported utilising the SECF for EE adoption in the state during the FY 2022-23. Table 3-39 illustrates the list of states and UTs that have reported progress in the establishment and utilisation of SECF



33 states & UTs have established SECFs, of 27 have allocated matching funds, only Andhra Pradesh and Kerala reported SECF utilisation in RIF mode

Table 3-39: States and UTs with progress in establishment and utilisation of SECF

State/UT	States and UTs that have notified SEFC Rules	States and UTs that have allocated matching funds for SECF	States and UTs that have utilised the SECF in Revolving Investment Fund (RIF) mode efficiency adoption in the state
Andaman & Nicobar Island	✓	X	X
Andhra Pradesh	✓	✓	✓
Arunachal Pradesh	✓	✓	X
Assam	✓	✓	X
Bihar	✓	✓	X
Chhattisgarh	✓	✓	X
Dadra & Nagar Haveli and Daman & Diu	✓	X	X
Delhi	✓	X	X
Goa	✓	✓	X
Gujarat	✓	✓	X
Haryana	✓	✓	X
Himachal Pradesh	✓	✓	X
Jharkhand	✓	✓	X
Jammu & Kashmir	✓	X	X
Karnataka	✓	✓	X
Kerala	✓	✓	✓
Lakshadweep	✓	X	X
Madhya Pradesh	✓	✓	X
Maharashtra	✓	✓	X
Manipur	✓	✓	X
Mizoram	✓	✓	X
Nagaland	✓	✓	X
Odisha	✓	✓	X
Puducherry	✓	✓	X
Punjab	✓	✓	X
Rajasthan	✓	✓	X
Sikkim	✓	✓	X
Tamil Nadu	✓	✓	X
Telangana	✓	✓	X
Tripura	✓	✓	X
Uttar Pradesh	✓	✓	X
Uttarakhand	✓	✓	X
West Bengal	✓	X	X

X: No data reported by states.

Note: States with no data reported across all fields have been excluded from the table.

→ Institutional Capacity



A State-Level Steering Committee for energy transition has been set up in 21 states & UTs

The states and UTs have made adequate progress in developing the institutional capacity for cross-sectoral initiatives.

The SDAs are required to submit a monthly progress report to BEE on the EE/EC activities undertaken in the state and UT. As per BEE's data, twenty-three (23) SDAs consistently submitted these reports between the 1st and 5th day of the following month in FY 2022-23. Table 3-40 shows the timeliness of monthly progress reports submission to BEE.

Table 3-40: Timeliness of monthly progress report submission to BEE by states and UTs

State/UT	Timeliness
Andaman & Nicobar Islands	50%
Andhra Pradesh	100%
Arunachal Pradesh	100%
Assam	50%
Bihar	100%
Chandigarh	100%
Chhattisgarh	100%
Dadra & Nagar Haveli and Daman & Diu	100%
Delhi	0%
Goa	100%
Gujarat	50%
Haryana	100%
Himachal Pradesh	100%
Jammu & Kashmir	0%
Jharkhand	100%
Karnataka	100%
Kerala	100%
Ladakh	0%
Lakshadweep	0%
Madhya Pradesh	100%
Maharashtra	50%
Manipur	50%
Meghalaya	100%
Mizoram	100%
Nagaland	100%
Odisha	50%
Puducherry	100%
Punjab	50%
Rajasthan	100%
Sikkim	100%
Tamil Nadu	100%
Telangana	50%
Tripura	100%
Uttar Pradesh	100%
Uttarakhand	50%
West Bengal	100%

Further, in SEEI 2023, the State-Level Steering Committee for energy transition, headed by the Chief Secretary of the state, as instructed by MOP has been formed in Twenty-one (21) states which marks an increase from sixteen (16) states in SEEI 2021-22. However, only three (3) states, namely Andhra Pradesh, Kerala and Telangana, furnished details of any meeting of the SLSC in FY 2022-23.

Nine (9) SDAs, namely Andhra Pradesh, Assam, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Telangana and Uttar Pradesh, reported periodic communication with the respective Energy/Power Departments and DoEFCC on the status of their ongoing/planned/achieved EE activities.

Meanwhile, nine (9) states, namely Andhra Pradesh, Assam, Jharkhand, Karnataka, Kerala, Maharashtra, Punjab, Telangana and Uttar Pradesh, reported collaboration with other state departments to promote EE adoption in different sectors.

- In Andhra Pradesh, EC cells have been created in all the state government head of department offices, district offices, and corporation/society offices. The EC cells act as a nodal agency to coordinate with the SDA on EC/EE measures.
- The SDAs of the remaining states have collaborated with their state government departments to conduct capacity-building programmes, workshops, and training programmes.

Eight (8) states also reported collaboration with private sector entities to promote EE in different sectors.

- In Andhra Pradesh, the SDA, has collaborated with M/s. SkIoT, which is a start-up company incubated at iTIC Foundation IIT Hyderabad, to promote EE in the MSME sector.
- The Assam SDA has partnered with EESL to implement EE in 100 Government Schools under the SPEED Programme.
- In Jharkhand, State Coordination Officers actively promote EE across different sectors.
- In Karnataka, KREDL regularly communicates with private stakeholders from various sectors to promote EC and EE activities. Examples include collaboration with private educational institutes, media for public awareness programmes, and private building stakeholders such as architects, engineers, and builders to promote ECBC compliance.
- EMC, Kerala has collaborated with NGOs and industrial associations such as WRI, FICCI, CII, HT EHT Association Kerala and SEEM, to advance EE initiatives.
- In Maharashtra, MoUs have been signed between EESL and MEDA to promote EE initiatives across buildings, transport and appliances sectors.
- In Telangana, an MoU has been signed between TSREDCO and the Administrative Staff College of India (ASCI) to implement EC programmes and activities.
- Uttar Pradesh collaborates with private organisations like ISHRAE to promote the adoption of EE in different sectors.

Table No. 3-41 indicates the cross-sectoral institutional capacity across the states and UTs



8 states collaborated with private sector entities to foster energy efficiency initiatives

Table 3-41: State-wise cross-sectoral institutional capacity for EE

State/UT	State level steering committee headed by the Chief Secretary for energy transition formed	Meeting of the SLSC for energy transition held in FY 2022-23	Periodic communication of the status of ongoing/planned EE activities to energy/power departments and DoEFCC	Collaboration between the SDA and the state departments to promote the adoption of EE	Collaboration of the SDA with the private sector/ industry association/ CSO/ academic institutions/ ESCOs to promote EE
Andaman & Nicobar Island	✓	X	X	X	X
Andhra Pradesh	✓	✓	✓	✓	✓
Arunachal Pradesh	✓	X	X	X	X
Assam	✓	X	✓	✓	✓
Bihar	✓	X	X	X	X
Chandigarh	✓	X	X	X	X
Haryana	✓	X	✓	X	X
Jammu & Kashmir	✓	X	X	X	X
Jharkhand	X	X	✓	✓	✓
Karnataka	✓	X	✓	✓	✓
Kerala	✓	✓	✓	✓	✓
Madhya Pradesh	✓	X	X	X	X
Maharashtra	X	X	✓	✓	✓
Odisha	✓	X	X	X	X
Puducherry	✓	X	X	X	X
Punjab	✓	X	X	✓	X
Rajasthan	✓	X	X	X	X
Sikkim	✓	X	X	X	X
Tamil Nadu	✓	X	X	X	X
Telangana	✓	✓	✓	✓	✓
Tripura	✓	X	X	X	X
Uttar Pradesh	✓	X	✓	✓	✓
Uttarakhand	✓	X	X	X	X

X: No data reported by states.

Note: States with no data reported across all fields have been excluded from the table

➔ Adoption of EE Measures

SEEI 2023 evaluates the states and UTs on adopting EE measures in cross-sector domains based on activities undertaken by the SDA Inspecting Officer (IO), use of standard practices on end-use energy data collection, and institutionalisation of state-level energy conservation awards.

Information on activities carried out by the SDA IO, appointed under section 17 of the EC Act 2001 to enforce provisions within the state, was provided by only eight (8) states namely Andhra Pradesh, Assam, Chandigarh, Haryana, Kerala, Maharashtra, Punjab, and Telangana. These activities encompassed tasks such as visiting electrical shops to identify non-compliant or inefficient LED bulbs in certain states and conducting site visits, requesting documentation, and issuing show cause notices to non-compliant Designated Consumers (DCs), among others.

The SDAs in seven (7) states Andhra Pradesh, Goa, Haryana, Karnataka, Maharashtra, Punjab and Telangana have reported having standard practices to collect end-use energy data.

- The SDAs of Andhra Pradesh, Goa, Haryana have collected energy consumption data of energy intensive industries from their respective DISCOMs for PAT widening and deepening.
- Under Karnataka’s EC/EE policy, key departments in the top five energy-consuming sectors must report their energy usage and savings. This data is used to create an annual action plan for EC and EE, which is then executed by KREDL.
- In Maharashtra, MEDA conducted energy audits through Save Energy programme to tap the energy conservation potential.
- In Punjab, PEDDA collects data from energy intensive sectors to formulate an impact assessment report to devise strategies and inform policy-making related to EE.
- In Telangana, TSREDCO has established unit offices in each district to collect end-user energy data. This data is used to implement various EE programmes.

Seven (7) states, namely Andhra Pradesh, Haryana, Kerala, Maharashtra, Punjab, Telangana and Uttar Pradesh, reported state-level energy conservation awards in SEEI 2023. The SDAs or other state organisations give awards to recognise outstanding performers in buildings categories such as offices, hotels, or hospitals or industrial categories such as MSMEs, among other sectors.

Figure 3-24 highlights the states that have taken measures in the aforementioned indicator category.

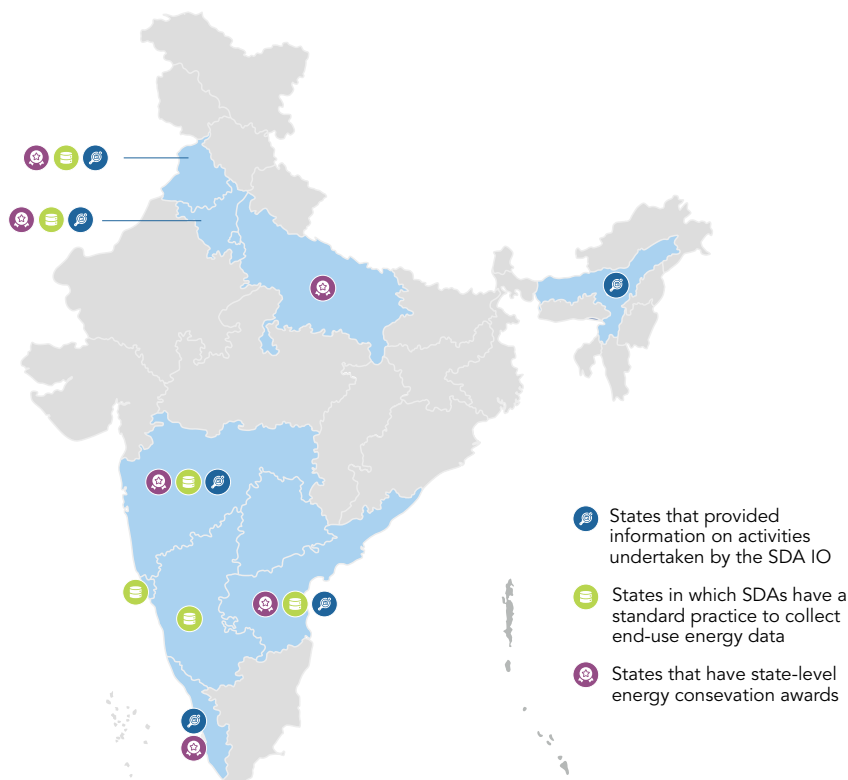


Figure 3-24: Map showing states with adoption of cross-sectoral EE measures



Only 7 states reported having standard practices to collect end-use energy data

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 3-25 depicts each state's energy intensity, grouping states based on their TFEC.

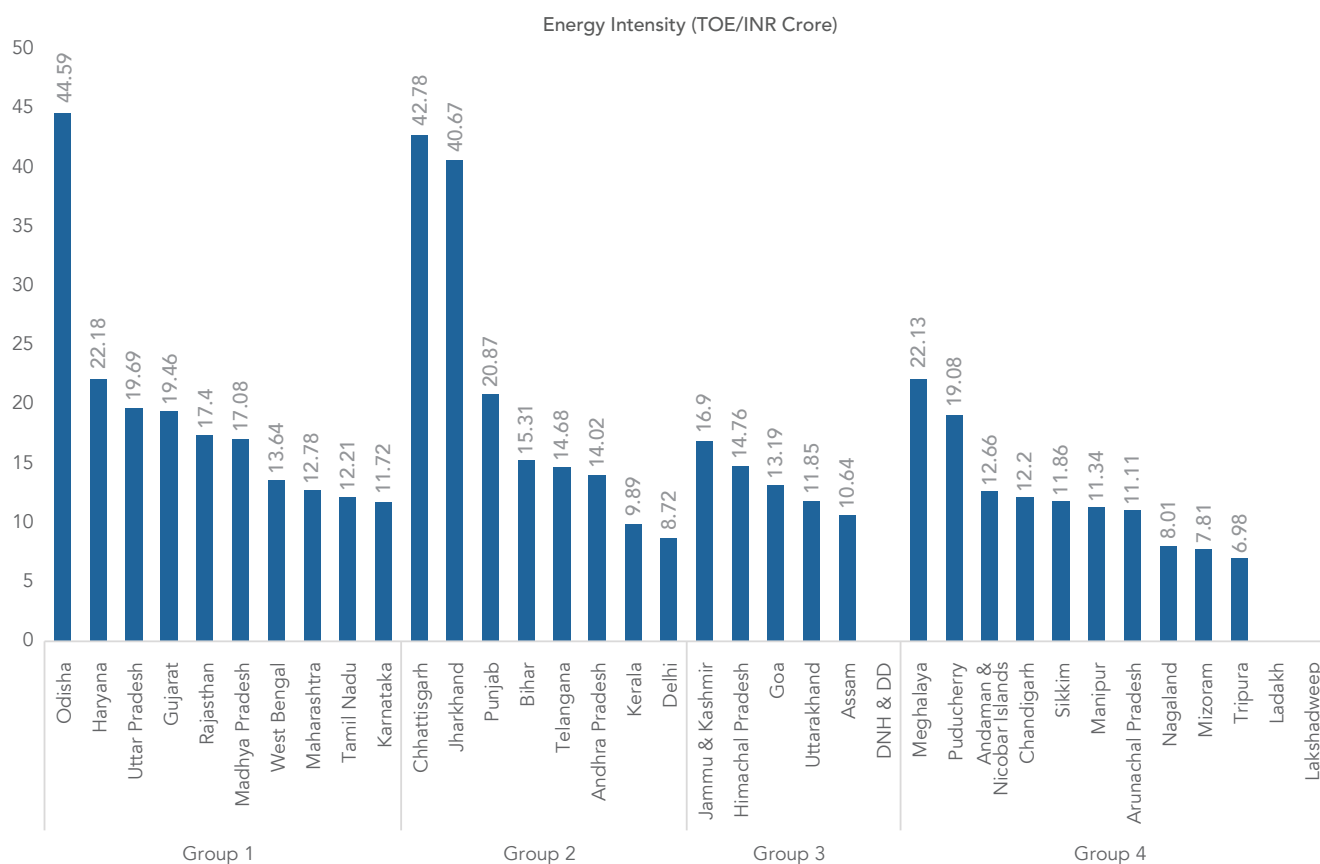


Figure 3-25: TFEC group-wise energy intensity of states and UTs

As can be seen in the graph, Odisha from Group 1 is the state with the highest energy intensity at 44.59 toe/INR crore and Tripura from Group 4 has the lowest at 6.95 toe/INR crore. Chhattisgarh, Tripura, Meghalaya, Punjab and Haryana, also have relatively high energy intensity levels. However, this energy intensity is linked to the structure of the state/UT in terms of commercial, industrial and domestic share in the GSDP.

Only seven (7) states have reported non-fossil fuel-based power procurement namely, Andhra Pradesh, Assam, Goa, Haryana, Karnataka, Maharashtra and Tamil Nadu. Table 3-42 shows the percentage change in non-fossil fuel-based power procurement for the states.

Table 3-42: States with reported non-fossil fuel-based power procurement

State	Percentage of non-fossil fuel-based power procurement
Andhra Pradesh	22.90%
Assam	32.00%
Goa	15.43%
Haryana	41.88%
Karnataka	30.55%
Maharashtra	21.18%
Tamil Nadu	26.15%



CROSS SECTOR SPOTLIGHT

The 'Karnataka Energy Conservation and Energy Efficiency Policy 2022-2027' is India's only active state-level policy in this field, aiming to enhance energy efficiency and ensure energy security in Karnataka. Targeting 744 million units (MU) of energy saving across five key sectors, it equates to the output of a 100 MW solar plant over five years or closing a 1 GW coal plant for 2.5 months. With specific targets for each sector and a substantial budget, the policy encompasses energy efficiency measures, financial mechanisms, and institutional capacity-building. The policy, executed by KREDL, outlines specific roles for various stakeholders and establishes a high-level committee for oversight. It outlines a comprehensive framework for evaluation, monitoring, verification, governance, and enforcement, and explores funding sources and business models for energy conservation initiatives.





**Standardize data
collection, measurement
and monitoring**

**Synergise efforts
for state energy
transition**



**Cultivate an enabling
ecosystem to unlock the
potential of ESCOs**

**Ensure sustained funding
for EE projects through
Revolving Investment
Funds**



4. RECOMMENDATIONS

Building on the exceptional participation from SEEI 2021-22, this year's SEEI 2023 again witnessed full engagement from all 36 SDAs, covering the 28 states and 8 UTs. However, the extent of data reporting varied among states. Notably, in SEEI 2023, the increase in states in the front-runner category is accompanied by a surge in states in the aspirants category, compared to the last index. This underscores an imperative need for most states to enhance the comprehensiveness of their reporting. It also presents a valuable opportunity for states to learn and adopt best practices from those consistently showing strong performance and marked improvement.

States have shown notable progress in developing EE policies and regulations, with a shift towards creating state energy efficiency action plans. Some states are even advancing towards specific state-level EE policies. Nonetheless, the availability of outcome-based data remains a challenge for SDAs, with much of the information being sourced from secondary entities like CII, EESL, and GRIHA. Despite these hurdles, most SDAs have demonstrated a strong commitment to gathering pertinent data, which is crucial for the integrity of the SEEI. A number of SDAs took proactive steps in initiating data collection early in the year, with several showcasing exceptional performance in both the quality of their reporting and the scale of their advancements in energy efficiency.

Drawing on the findings of SEEI 2023, a set of recommendations are outlined to guide states towards enhanced adoption of energy efficiency practices. The recommendations encompass various aspects such as comprehensive energy data management, integrating gender equality and social inclusion in energy policies, leveraging the State Energy Conservation Fund, promoting energy efficiency through ESCOs, and utilising the forthcoming carbon market effectively. Additionally, the implementation of SEEAP is emphasised, highlighting the need for strategic policies, targeted interventions, and robust monitoring frameworks to ensure successful outcomes. Collectively these initiatives aim to create a sustainable, energy-efficient future, aligning state efforts with national and global climate goals.

1. ADVANCING COMPREHENSIVE ENERGY DATA MANAGEMENT AT THE SUBNATIONAL LEVEL

To ensure India's energy efficiency strategies are effective and sustainable, prioritising data collection, measurement, and monitoring at the state and local levels is paramount. By systematically collecting and analysing data on energy usage patterns, states and local bodies can identify specific areas of high consumption, inefficiencies, and potential for energy savings. This data-driven approach enables the formulation of tailored energy conservation strategies and the implementation of effective energy efficiency programmes. Furthermore, regular monitoring ensures that these strategies are adaptive and responsive to changing energy dynamics and consumption patterns. This requires a robust framework encompassing key recommendations for implementing this crucial focus:

- Building a robust data infrastructure: standardise data collection, invest in state-level energy databases, and promote collaboration.
- Empowering local action: Equip local governments to collect and analyse data, and develop region-specific plans based on insights.
- Measuring and monitoring progress: Track impact through clear metrics, utilise real-time monitoring, and adopt policies based on data.
- Leveraging technology: Explore smart grids, data analytics, and AI to optimise energy management and predict demand.
- Fostering transparency and accountability: Make data accessible, hold officials accountable, and communicate progress to the public.

2. EFFECTIVE IMPLEMENTATION OF THE STATE ENERGY EFFICIENCY ACTION PLANS

Recognising the critical role of states in achieving the NDC, BEE initiated the development of SEEAPs for each state. As the formulation of SEEAPs are nearing completion, it is imperative for states to diligently translate the outlined strategies into tangible actions.

Effective implementation necessitates strategic policy packages and impact-oriented programmes, tailored to the key sectors, ensuring alignment with the energy savings targets specified in the SEEAP. These interventions should be led by specific, measurable, achievable, relevant, and time-bound (SMART) goals, incorporating defined milestones. A comprehensive investment analysis, including financial commitments and potential return on investments, is imperative for the success of each programme. Additionally, comprehensive metrics to assess the impact of interventions in terms of potential energy consumption reduction, cost savings, monetary savings, emission reduction, and jobs created must be established. While investments act as catalysts for the industry's growth, understanding their translation into resultant jobs is crucial for cultivating confidence, addressing the workforce's required skill shifts and offsetting job losses in traditional sectors with new opportunities. A systemic communication strategy to convey the goals, expected impacts and progress must be deployed for different stakeholder groups to accelerate support required for implementation.

The SDA may consider forming working groups, comprising representatives from pertinent state departments, industry, and civil society organisations for each sector to facilitate the leveraging of resources and technical expertise.

Further, effective implementations of interventions at the ground level necessitates developing a robust monitoring and evaluation framework, which is crucial. A transparent monitoring mechanism to evaluate the progress of programmes against the performance metrics will help states to identify the areas of concern and course-correct if needed. The State Energy Efficiency Index provides a foundational framework for regular monitoring of progress impacts across various programmes. To mainstream energy data capture and enable transparency in reporting, online portals hosted by the SDA in collaboration with the state government-affiliated entity may be instituted for different strategic programmes.

3. SYNERGISE EFFORTS FOR STATE ENERGY TRANSITION

The formation of India's State Level Steering Committee (SLSC) on Energy Transition, led by the Chief Secretary with members from various departments, exemplifies sub-national leadership in energy transition¹⁷. This committee, initiated by the Union Ministry of Power, targets state-specific actions in renewables, energy efficiency, biomass, and green hydrogen. As reported in SEEI 2023, several states and UTs have established their SLSCs. The SLSC aims to align its strategies with state-level climate and energy goals, recognising the interdependence of renewables, energy efficiency, biomass, and green hydrogen in driving sustainable economic growth and energy transition. This integration enhances the viability of each component, contributing to a more efficient and sustainable energy-driven future.

Systemic collaboration among the state departments, under the aegis of the specific Department Secretary of the SLSC, including the SDAs and State Renewable Energy Agencies, must be fostered to leverage knowledge, data and resources and establish complementary strategies. Syndicated research, joint programmes and collaborative workshops among the departments must be promoted to orchestrate a unified and more impactful approach towards sustainable development in alignment with the larger state goals. Further, the SLSC members must actively address and resolve any concerns that may arise among departments. Firm mechanisms to create and maintain a shared pool of data among the state depts must be instituted by the SLSC to periodically assess and identify areas of synergy, potential conflicts, or gaps and adapt strategies accordingly to maintain coherence.

Regular stakeholder engagement will be crucial to gather insights and feedback to coordinate efforts on the energy transition strategies. To embody transparency and inspire stakeholders' confidence, SLSC may implement regular reporting of energy savings resulting from the transition measures accessible through a single publicly available online portal or dashboard.

In a nutshell, the SLSC must harness the synergies among different tracks and work in tandem to unlock the full potential of all technologies and advance an interconnected approach towards a sustainable energy future.

4. LEVERAGING THE STATE ENERGY CONSERVATION FUND IN THE REVOLVING INVESTMENT MODE

Harnessing the potential of the SECF¹⁸ through the RIF mechanism can be an accelerator for energy efficiency projects. By earmarking a portion of SECF funds for a revolving pool, a sustainable engine for project implementation is created. This continuous reinvestment, exemplified by Thailand's successful Energy Efficiency Revolving Fund (EERF), fuels market transformation and accelerates energy efficiency initiatives. Among Indian states, Kerala serves as a shining example, pioneering the RIF model through its SECF managed by the Energy Management Centre (EMC).

Adapting the RIF model holds immense promise for Indian states seeking to maximise the impact of their SECFs. Indian states could establish a State Energy Conservation Fund - Revolving Investment Fund (SECF-RIF), which could initially be capitalised through state government allocations, possibly derived from taxes on energy-intensive sectors. Operating on a revolving fund principle, the SECF-RIF would ensure its sustainability and growth by

reinvesting repayments from financed projects into new EE initiatives. The fund would boost commercial lending for EE by providing low-interest loans to financial institutions, which would, in turn, finance EE projects for both businesses and consumers. To effectively manage this process effectively, Indian states should form partnerships with a select group of banks, similar to the Thai model. These banks would handle loan assessments, disbursements, and risk management, supported by technical assistance from state energy departments. This approach aims to foster a sustainable funding mechanism for promoting energy efficiency.

5. ENABLING THE ADOPTION OF ENERGY EFFICIENCY THROUGH ESCOS IN STATES

India's vast energy efficiency market, estimated at INR 1,50,000 crore, holds immense potential. Yet, only 5% of this has been realised by ESCOs. While EESL has laid the foundation, particularly in equipment-oriented solutions like LED lighting, the overall market lags behind its global counterparts. These comprehensive energy management providers offer turnkey services packages ranging from audits and financing to project execution. By actively harnessing the underutilised potential of ESCOs, Indian states can unlock a positive cycle of investment and cumulative benefits in the EE sector.

The ESCO market in India, which extends to the state level, faces several policy-related and financial hurdles, including limited credit access, lack of awareness and trust, performance risk concerns, and the nascent stage of Energy Savings Performance Contracts (ESPC) development. To unlock the full potential of ESCOs, a supportive regulatory framework and an enabling environment are crucial. This involves protecting ESCO interests, aggregating demand, developing a comprehensive policy framework, standardising contracts, and cultivating a favourable financial landscape.

The growth of ESCOs not only promises to create new job and business opportunities, aligning with state employment goals, but also supports the optimisation of energy use in critical sectors like Micro, Small, and Medium Enterprises (MSMEs) and buildings. Conducive policy support by states for ESCOs can stimulate the much-needed, sizeable private sector investments in the energy sector. By partnering with ESCOs, the state governments, can leverage expertise, resources, and innovative financing models.

6. INTEGRATING GENDER EQUALITY AND SOCIAL INCLUSION (GESI) IN STATE-LEVEL ENERGY EFFICIENCY POLICIES AND PROGRAMMES

The effectiveness of energy efficiency policies and programmes in India is fundamentally linked to inclusivity. Ensuring equitable access to clean and affordable energy requires a deliberate shift towards strategies that consider the diverse needs and challenges faced by different genders and social groups. This is where the Gender Equality and Social Inclusion (GESI) framework emerges as a critical tool for maximising the impact of energy initiatives.

By understanding the specific energy needs and challenges faced by women, marginalised communities, and other vulnerable groups, policymakers can design targeted interventions that are more effective and impactful. For instance, creating tailored programmes that offer incentives for energy audits in women-led enterprises can uncover unique opportunities for energy savings and empowerment. Additionally, focusing on clean cooking solutions addresses a critical need in many underserved communities, directly impacting women's health. Another key area is the integration of energy efficiency measures in affordable

housing projects. This not only improves living conditions but also reduces long-term energy costs for low-income households. Simplifying access to finance for energy-efficient technologies can be particularly transformative, enabling marginalised communities to invest in sustainable solutions. Building capacity within government agencies, implementing bodies, and civil society organisations to understand and implement GESI principles in energy efficiency planning and execution is essential for long-term success. Training programmes, knowledge-sharing platforms, and peer-to-peer learning initiatives can play a crucial role in fostering GESI competencies. Policies and programmes promoting equal opportunities and benefits for all, enable communities to break the cycle of poverty, achieve greater social mobility, develop climate resilience and contribute towards economic growth.

7. LEVERAGE THE CARBON MARKET FOR ENERGY EFFICIENCY

In a decisive step towards its net-zero commitments, the Ministry of Power, Government of India notified the Carbon Credit Trading Scheme (CCTS), 2023 in June 2023, with an aim to establish a consolidated domestic carbon market in the country¹⁹. A December 2023 amendment expanded the scheme, allowing non-obligated entities to generate Carbon Credits through GHG emission reduction, removal, or avoidance, a shift from their previous role limited to purchasing credits. The CCTS serves as a key driver for energy efficiency, and states are encouraged to benefit from the market mechanism by actively promoting such projects. By prioritising energy-efficient technologies in public procurement, state government departments and entities can lead by example, inspiring the private sector and boosting demand for clean technologies.

Further, it is imperative to raise awareness and understanding among stakeholders regarding the intrinsic link between energy efficiency and carbon market. This will encourage individuals and businesses to make informed choices that support both the goals. Sharing best practices and success stories pertaining to energy efficiency within the carbon market can act as catalyst for broader adoption of similar measures.

The states should undertake strategic training and capacity-building initiatives to foster the skillsets of the market participants in assessing, implementing, and reporting on energy efficiency projects, with an emphasis on cost savings, environmental impact, and the potential for additional revenue through carbon credits. Coupled with this, introducing tailored financial incentives or subsidies specifically targeted at energy efficiency projects within the carbon market framework can potentially alleviate cost barriers. States may focus on SMEs as a target sector, offering specialised assistance, encompassing technical guidance, financial support, and streamlined processes to navigate the market.

Moreover, it is essential for states to champion the development of supportive policies and frameworks that foster collaborative environments among governments, businesses, and financial institutions to drive the collective advancement energy efficiency initiatives within the carbon market. By employing these strategies, energy efficiency can become an encouraged and prominent aspect of the carbon market, contributing to reduced emissions and greater sustainability.

5. ANNEXURE

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