विद्युत मंत्रालय
MINISTRY OF
POWER
सत्यमेव जयते

Whitepaper on

State Energy Efficiency Action Plan for Telangana

Prepared by

CONFEDERATION OF INDIAN INDUSTRY

Confederation of Indian Industry

Table of Contents

Background

India's rapid economic expansion and urbanization have paved the way for a huge increase in energy demand. As the nation continues to evolve and urban areas expand, the need for energy to power industries, transportation, and households has grown steadily. This burgeoning demand poses a complex challenge, as it requires a delicate balance between providing access to affordable and reliable energy for all while addressing environmental sustainability and energy security. In response to these challenges, India, in its updated Nationally Determined Contribution submitted during the 26th session of the Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) in Glasgow, United Kingdom in 2021, unveiled a strategic framework for climate action. This framework, symbolized by the "Panchamrit" (five nectar) elements, signifies India's resolute commitment to achieve net-zero emissions by 2070 and secure 50% of its energy from renewable sources by 2030.

It is imperative to recognize the pivotal role that States and Union Territories (UTs) play in effecting a transition to low-carbon development pathways. To facilitate this vital transition, the Bureau of Energy Efficiency, operating under the aegis of the Ministry of Power, Government of India, has embarked on the development of State Energy Efficiency Action Plan (SEEAP). These plans are tailored to meet the distinctive requirements of each state, ensuring that resource allocation aligns with the state's sustainable development objectives. The SEEAP project aims to contribute to India's national targets and provide a comprehensive roadmap for enhancing energy efficiency across the state and the country.

For Telangana, SEEAP was developed by the Confederation of Indian Industry (CII), under the guidelines of Bureau of Energy Efficiency, Ministry of Power, GOI, in consultation with the State Designated Agency viz. Telangana Renewable Energy Development Corporation Limited (TGREDCO) with inputs & suggestions from various government departments and sector experts.

Identification of the focus sectors

The objective of this plan is to ensure that resource allocation aligns seamlessly with the specific requirements of the state, thereby fostering progress towards achieving state-specific goals related to sustainable development. Identifying the focus sectors or areas assumes a pivotal role in this process, primarily because certain sectors within a state exhibit higher energy consumption, necessitating targeted interventions to enhance energy efficiency and promote sustainable practices.

The process of identifying focus sectors for Telangana's energy efficiency initiatives followed a comprehensive methodology. This involved several key steps, including analyzing the state's energy consumption patterns to identify sectors with significant energy use, emissions from different sectors, Gross State Value Addition (GSVA) analysis of the sectors contributing most to 's economy, while policy gap analysis helped identify challenges and areas requiring targeted interventions. Stakeholder input and feedback, including insights from government agencies, played a crucial role in shaping the

selection of focus sectors. Furthermore, alignment with the state government's vision and long-term development goals ensured that the chosen sectors were in accord with the state's strategic direction.

Based on the above parameters, Transport, Industry, Building, Agriculture are the identified focus sectors for Telangana.

Proposed Strategies with Implementation Methodology

This chapter discusses the proposed strategies outlined in the action plan for the identified focus sector along with their potential impact in terms of energy efficiency and emission reduction. These proposed strategies are stated below with actionable measures and implementation methodology.

1. Transport

Telangana has a considerable number of two-wheelers, followed by cars and commercial vehicles. As per the latest statistics, the state has over 1.5 crore registered vehicles, out of which 81% are two-wheelers, 14% are cars, and the remaining 5% are commercial vehicles. The most used fuel for vehicles in Telangana is petrol, followed by diesel and CNG (compressed natural gas). The state also has a few electric vehicle charging stations in major cities. One of the key initiatives taken by the Telangana government is the creation of an EV policy that provides a framework for the development of the EV ecosystem in the state. The policy includes measures such as tax exemptions, incentives for EV manufacturers and buyers, and the establishment of charging infrastructure.

In addition to these initiatives, the Telangana government has also launched several pilot projects to evaluate EV technology and infrastructure. For example, the state-run public transportation agency TSRTC has introduced a fleet of electric buses in various cities across the state. Similarly, the state government has partnered with private players to set up charging stations at strategic locations across the state.

Strategy #1: Facilitating Electrification of Road Transport

Electric vehicles are significantly more efficient than their petrol or diesel counterparts. While electric vehicles can convert around 60% of the electrical energy from the grid to power the wheels, petrol or diesel cars can only convert 17%-21% of the energy stored in the fuel to the wheels, resulting in a wastage of around 80%. Thus, electrification of road transport is an effective way to reduce energy consumption and emissions, particularly as the grid becomes greener with increased use of renewables.

Implementing Agency: Telangana Transport Department, Telangana Road Transport Corporation, DISCOMs, Telangana Renewable Energy Corporation Limited (EV cell), Department of Industries, Telangana Pollution Control Board, Municipal Corporations and Urban Development Authorities.

Actionable Measures

The following actionable measures set out a roadmap which provides a structured approach to achieving energy efficiency for this strategy, with specific action plans for each strategy from the current year to the short-term (2026) and long-term (2031) goals.

1. **Adoption of Battery Swapping for 2 & 3 Wheelers**

a) Identify ten model cities in Telangana for launching pilot battery swapping projects in collaboration with EV manufacturers and service providers.

b) Allocate funds for the setup of battery swapping stations, ensuring compliance with safety and technical standards.

c) Offer incentives such as reduced swapping fees or subscription-based packages to encourage widespread adoption of battery swapping for two- and three-wheelers.

2. **Electric Rickshaw Adoption Programme**

a) Though the state provides 100% exemption of road tax & registration fee for first 20,000 Electric 3 Wheelers purchased & registered within Telangana, there are only 300 e-rickshaws in the state as of 2022. Launch targeted awareness campaigns and implement skill development programs maintenance and repair of electric vehicles.

b) Partner with regional cooperative banks and microfinance institutions to conduct financial literacy programs specifically designed for e-rickshaw drivers. Form a dedicated financial assistance scheme under the Telangana Cooperative Society to facilitate favourable loan options.

c) Organize e-rickshaw demonstration programs at key industrial zones and marketplaces. Engage with local EV manufacturers, for on-site test-drive events and technical support.

3. **Smart Parking Solutions**

a) Integrate smart parking solutions with EV charging infrastructure in urban centres, from Maharashtra's "Park and Charge" initiative, optimizing parking spaces to serve as EV charging hubs.

4. **Pantographs for EV Charging:**

a) Incorporate pantograph charging infrastructure into the design of greenfield highway projects, prioritizing key transportation corridors in Telangana.

b) Collaborate with private charging infrastructure providers for the seamless implementation of pantograph charging stations, ensuring effective coverage across the state.

5. **Scrap Policy**

a) Introduce a "Cash for Clunkers" program, like Delhi's initiative, offering incentives for replacing old, polluting vehicles with electric ones. Implement this policy to accelerate the transition to cleaner and more sustainable transportation options in Telangana.

6. **Green Hydrogen Programme- Transport**

a) Establish a Green Hydrogen Fund, specific to Telangana, providing low-interest loans and grants for domestic hydrogen fuel cell technology manufacturing.

b) Offer priority sector lending with favourable interest rates to companies engaged in hydrogen fuel cell production within the state.

c) Develop a comprehensive plan for establishing a network of hydrogen fuelling stations, prioritizing strategic locations along transportation routes within the state.

Implementation Methodology:

1. Create a regulatory framework for safety standards, emissions, and quality control for electric vehicles.
2. Identify priority areas for charging station deployment, considering factors like traffic volume, distance, etc.
3. Work with the Department of Industries to attract EV manufacturers to set up operations in Telangana.
4. Provide training for drivers and mechanics in electric vehicle maintenance.
5. Partner with existing electric two-wheeler and three-wheeler manufacturers and startups to pilot battery swapping and leasing programs.
6. Develop safety and quality standards for battery swapping services.
7. Design and launch an extensive awareness campaign to promote the benefits of electric vehicles.
8. Establish key performance indicators (KPIs) to measure the progress of electrification efforts.

Strategy #2: Adequate Public Transport

Public transport in Telangana is provided by various modes including buses, metro rail, and suburban rail. The major public transport operator in the state is the Telangana Road Transport Corporation (TGRTC), which operates a fleet of over 10,000 buses across the state. Public transport plays a key role in reducing greenhouse gas emissions by providing an alternative to private vehicle use. However, public transport vehicles also emit pollutants that can affect air quality and public health.

To meet the growing demand for public transportation, the city needs to increase the number of buses significantly. The government needs to invest in new buses, improve the frequency of buses, and provide better infrastructure for public transportation, such as bus shelters and dedicated bus lanes.

Implementing Agency: State Department of Transport, Telangana Road Transport Corporation, State Pollution Control Board, Urban Development Authorities and Municipal Corporations

Actionable Measures

1. **Assessment and Planning Phase:** Conduct a comprehensive assessment of the current public transport bus fleet's energy consumption, identifying energy-intensive routes.
2. **Fleet Modernization Phase:** Gradually replace older, less energy-efficient buses with newer models that comply with energy conservation standards and adopting hybrid or electric buses where feasible.
3. **Fuel Management Phase:** Implement measures to ensure optimal fuel usage, such as fuel-efficient driving practices, fuel quality monitoring, and exploring the use of cleaner alternative fuels.
4. **Infrastructure Development Phase:** Establish necessary infrastructure, such as charging or refuelling stations for electric, hybrid, or alternative fuel buses.
5. **Monitoring and Evaluation Phase:** Regularly evaluating the policy's progress through key performance indicators (KPIs) such as energy consumption reduction, emissions reduction, and cost-effectiveness.

Implementation Methodology:

1. Form a renewable energy integration task force comprising experts, government officials, and industry representatives.
2. Establish schemes like feed-in tariffs, tax incentives, grants, and low-interest loans to encourage investment.
3. Provide streamlined permit processes for solar installations at charging stations.
4. Establish partnerships with battery manufacturers and suppliers to ensure a steady supply of storage solutions.
5. Allocate a budget for grid modernization and smart grid infrastructure development.
6. Pilot grid modernization projects in select areas before scaling up statewide.

Strategy #3: Promotion of Ethanol Blending

Promotion of ethanol blending of fuels can have a significant impact on the economy and environment of Telangana. By blending ethanol with petrol, the state can reduce its dependence on imported crude oil and promote the use of cleaner fuels. According to the Ministry of Petroleum and Natural Gas, India's ethanol blending program has resulted in a reduction of 7.9 million tonnes of CO2 emissions in 2020-21. Moreover, Telangana is an agricultural state with a surplus production of sugarcane, which is a key feedstock for ethanol production. The state can leverage its agricultural resources to promote the production of ethanol and create new job opportunities. In fact, the central government has set a target of achieving 20% ethanol blending in petrol and 5% in diesel by 2025, which will create an additional demand of 1,000 crore litres of ethanol.

Implementing Agency: Ministry of Petroleum & Natural Gas, Transport Department, Department of Industries

Actionable Measures

1. Establishing Ethanol Production Infrastructure: Telangana can take initiatives to set up ethanol production infrastructure such as distilleries and ethanol blending units. This can involve attracting private investments or establishing state-owned facilities to produce ethanol from various feedstocks like sugarcane, molasses, agricultural residues, and other suitable sources.
2. The state government can mandate and incentivize ethanol blending in transportation fuels. This involves ensuring that a certain percentage of ethanol is blended with petrol and diesel.
3. The state can create awareness campaigns to educate fuel retailers and consumers about the benefits of ethanol blending, such as reduced greenhouse gas emissions and improved air quality.
4. The state government can provide subsidies, technical assistance, and guidance to farmers to grow high-yielding and energy-rich crops like sugarcane, sweet sorghum, corn, or any other feedstock suitable for ethanol production.
5. State can ease storage, movement, and permit norms for industrial fuel-grade ethanol.
6. Incentive to setup new distilleries to produce ethanol and to install any method approved by CPCB, Capital subsidy (technical civil works, plant and machinery).

Implementation Methodology:

1. Develop a framework for ethanol procurement agreements between the state government and ethanol producers.
2. Invite competitive bidding from ethanol producers and select suppliers based on price, quality, and capacity.
3. Invest in the development and expansion of storage facilities, pipelines, and transportation infrastructure.
4. Draft and pass regulations to govern ethanol production, quality, and blending standards for the state.

2. Industry

Telangana is a rapidly growing state in India, with a diverse industrial base. The state is in the central part of India and has a strategic location advantage, with easy access to major ports and airports. The industry sector in Telangana is dominated by sectors such as Information Technology (IT), Pharmaceuticals, Textiles, and Automobiles. The state has a well-developed industrial infrastructure, including industrial parks, special economic zones (SEZs), and industrial clusters.

The pharmaceutical industry is another important sector especially in the state's capital city, with several national and international pharmaceutical companies operating in the state. Hyderabad is known for its world-class research and development facilities and is a major exporter of pharmaceutical products. The textiles sector is also significant in Telangana, with many textile mills and garment manufacturing units. The state is known for its handloom and power loom industry, which produces a variety of textiles such as cotton, silk, and woollen fabrics.

The automobile industry in Telangana is rapidly growing, with several global automobile and automobile parts having manufacturing units in the state. In addition to these major sectors, Telangana has a growing food processing industry, with a focus on value addition and export-oriented production. The state is also promoting renewable energy and has set a target to achieve 25% of its total power consumption from renewable sources by 2025.

Ceramics (mineral products), pharmaceutical, food, textiles, etc are the major fuel consuming industries as per the Annual Survey of Industries 19-20 report. The MSME sector is a significant contributor to the Gross Domestic Product (GDP) of Telangana. As per the Annual Report 2020-21 of the Ministry of Micro, Small and Medium Enterprises, Government of India, the contribution of MSMEs to the GDP of Telangana was around 31.6% in the fiscal year 2019-20.

Strategy #1: Deepening of BEE's PAT Scheme

The deepening of the PAT scheme can help Telangana achieve its energy efficiency and emission reduction targets by incentivizing industries to adopt energy-efficient practices and technologies. Deepening of PAT scheme involves identification of new DCs in existing sectors. Telangana, being one of the leading industrialized states in India, can benefit significantly from the deepening of the PAT scheme. The deepening of the PAT scheme can help Telangana achieve its energy efficiency and

emission reduction targets by incentivizing industries to adopt energy efficient practices and technologies. This can not only contribute to meeting the state's climate change goals but also lead to cost savings for the industries involved. Therefore, the deepening of the PAT scheme can be an effective tool for sustainable industrial development in Telangana.

Implementing Agency: Bureau of Energy Efficiency, Department of Industries, Telangana Renewable Energy Development Corporation

Actionable Measures

1. Promote the adoption of high-efficiency electric motors and variable speed drives to enhance industrial energy efficiency. Mandate that all new electric motors sold in the state must conform to IE class 3 or above efficiency standards. Encourage industries to use variable frequency drives (VFDs) along with high-efficiency motors.
2. Phase out inefficient motors and minimize energy consumption in industries by providing financial incentives, such as subsidies or rebates, to industries that replace older, less efficient motors with IE class 3 or above motors and VFDs.
3. Encourage industries to adopt Energy Management Systems (EnMS) for continuous energy monitoring, management, and optimization.
4. Encourage the use of Energy Service Companies (ESCOs) and performance contracts, where ESCOs provide energy-efficient solutions and are compensated based on energy savings achieved.
5. Advocate for green procurement practices in both public and private sectors, prioritizing products with low carbon footprints. Establish labelling and certification programs that indicate the environmental impact of products. This helps consumers make informed choices and encourages industries to produce eco-friendly items.
6. Provide incentives for businesses that supply low-carbon products to government agencies and other organizations.
7. Implement electric heating technologies, such as induction heating and resistance heating, in industrial processes. For example, replacing conventional steelmaking processes with electric arc furnaces powered by clean electricity from renewable sources.
8. Implement biomass gasification and co-firing technologies in thermal power plants and industrial boilers. For example, Punjab introduced a new Public-Private Partnership (PPP) model to streamline biomass supply chain logistics.
9. Collaborate with industries to facilitate the transition from FO to cleaner and more efficient liquefied natural gas (LNG) for industrial boilers by offering technical assistance, financial incentives, and guidance on fuel switch planning.

Strategy #2: Widening of BEE's PAT Scheme

By bringing more industries under the PAT scheme, the state can ensure that a larger number of energy-intensive industries are actively working towards improving their energy efficiency. This can help reduce the overall energy consumption of the state and reduce its carbon footprint. Sectors such as pharmaceutical, food, rubber, plastic, and ceramics is underpinned by the state's prominent standing

in these industries. The inclusion of these sectors in the PAT scheme will align with Telangana's commitment to optimizing energy consumption, improving energy efficiency, and fostering sustainable industrial growth.

Implementing Agency: Bureau of Energy Efficiency, Department of Industries, Telangana Renewable Energy Development Corporation

Actionable Measures

1) High-Efficiency Electric Motor Replacement Program:

a) Conduct an industrial motor efficiency survey across key sectors in Telangana, collaborating with the Telangana State Industrial Infrastructure Corporation (TSIIC) and industrial associations.
b) Develop and disseminate technical guidelines for industries outlining the specifications and benefits of high-efficiency electric motors.
c) Initiate awareness campaigns highlighting the cost savings and operational advantages associated with motor efficiency improvements.
d) Launch a subsidized high-efficiency motor replacement program, providing financial incentives for industries in partnership with the Telangana Renewable Energy Development Corporation (TGREDCO).
e) Conduct training sessions for industrial engineers on motor selection, installation, and maintenance.
f) Integrate smart technologies for continuous monitoring and optimization of motor performance.
g) Strengthen partnerships with manufacturers to ensure a steady supply of high-efficiency motors.
h) Phase out inefficient motors and minimize energy consumption in industries by providing financial incentives, such as subsidies or rebates, to industries that replace older, less efficient motors with IE class 3 or above motors and VFDs.
i) Mandate that all new electric motors sold in the state must conform to IE class 3 or above efficiency standards.
j) Integrate smart technologies for continuous monitoring and optimization of motor performance.

2) Energy Management Systems (EnMS)

a) Develop awareness programs and training sessions on the benefits of implementing EnMS.
b) Develop a comprehensive EnMS training program for industrial energy managers, incorporating case studies from successful implementations in the state.
c) Encourage industries to adopt EnMS through financial incentives and recognition programs.
d) Mandate EnMS training for key personnel in large industries, with support from Telangana Pollution Control Board (TGPCB).
e) Enforce mandatory EnMS implementation in large energy-intensive industries.
f) Establish a certification process for industries achieving significant energy savings through EnMS.
g) Collaborate with educational institutions to integrate energy management into industrial training programs.

3) Performance Contracts and ESCOs:

a) Conduct workshops and awareness programs for industries to familiarize them with the benefits and mechanisms of performance contracting and ESCOs.
b) Develop standardized templates for performance contracts.
c) Identify potential ESCOs and create a directory for industries in collaboration with the BEE.
d) Pilot performance contracts in select industries, incorporating key performance indicators related to energy efficiency and emission reduction.
e) Offer financial incentives for industries engaging with ESCOs.
f) Evaluate the performance contracting framework based on pilot outcomes.
g) Establish a regulatory framework supporting the widespread adoption of performance contracts.
h) Create a certification process for ESCOs to ensure quality services.
i) Develop a revolving fund to provide financial support for industries entering performance contracts.

4) Green Procurement Practices:

a) Develop and disseminate comprehensive green procurement guidelines endorsed by the Telangana State Industrial Policy Framework.
b) Conduct training programs for procurement officers in collaboration with the Telangana State Industrial and Commerce Department.
c) Integrate green procurement criteria into government procurement policies through collaboration with the Telangana eProcurement Corporation Limited.
d) Incentivize industries adopting green procurement practices through tax benefits or subsidies.
e) Monitor and report the adoption of green procurement in key industries.
f) Establish partnerships with industry associations to promote green supply chains.
g) Mandate green procurement for government agencies and large industries.
h) Collaborate with certification bodies to validate and promote green products.
i) Conduct regular audits to ensure compliance with green procurement standards.

5) Electrification of Heat:

a) Conduct a comprehensive feasibility study, in collaboration with the TGGENCO and TGREDCO, to identify industries suitable for the electrification of heat.
b) Develop and disseminate technical guidelines for industries, emphasizing the integration of renewable energy sources in electrification.
c) Implement pilot projects for the electrification of heat in selected industries, incorporating performance benchmarks aligned with the Telangana State Industrial Policy.
d) Provide financial incentives, facilitated by the Telangana State Industrial and Commerce Department, for industries transitioning to electric heat.
e) Establish partnerships with technology providers for the deployment of efficient electric heating systems.

f) Scale up electrification of heat across industries, integrating advanced technologies and artificial intelligence for system optimization.
g) Mandate the integration of renewable energy sources into the electrification process through amendments to the Telangana Electricity Regulatory Commission's (TGERC) regulations.
h) Develop a phased roadmap, in collaboration with the TGPCB, for the gradual phasing out of traditional heating methods in favour of electrification.

6) Biomass Gasification and Co-firing:

a) Conduct a detailed biomass resource assessment in collaboration with the Telangana Forest Development Corporation Limited and local agricultural departments.
b) Identify industries suitable for biomass gasification and co-firing through collaboration with the TSIIC and TGREDCO.
c) Collaborate with research institutions to assess the technical feasibility and environmental impact of biomass utilization.
d) Implement pilot projects for biomass gasification and co-firing in collaboration with recognized technology providers.
e) Provide financial incentives and subsidies for industries adopting biomass co-firing, facilitated by the Telangana Industrial Policy Framework.
f) Develop a robust biomass supply chain and logistics infrastructure, adhering to Telangana State Industrial Standards. For example, Punjab introduced a new Public-Private Partnership (PPP) model to streamline biomass supply chain logistics.
g) Scale up biomass gasification and co-firing initiatives across industries, incorporating advanced biomass handling and conversion technologies.
h) Establish partnerships with farmers and local communities for sustainable biomass production, supported by the Telangana State Agriculture Department.
i) Develop and enforce guidelines and standards, in collaboration with the TGPCB, for the efficient and sustainable utilization of biomass in industrial processes.

7) Transition from Furnace Oil (FO) to LNG for Industrial Boilers:

a) Conduct a comprehensive survey of industries currently utilizing furnace oil for boilers.
b) Assess the technical feasibility of transitioning to liquefied natural gas (LNG) for various industries.
c) Engage with LNG suppliers to ensure a reliable and cost-effective supply chain.
d) Implement a phased transition plan for industries to shift from FO to LNG, incorporating financial incentives, facilitated by the Telangana State Industrial Policy Framework.
e) Monitor and assess the economic and environmental benefits of the transition through collaboration with the State Environmental Impact Assessment Authority.
f) Establish partnerships with technology providers to optimize the combustion efficiency of LNG in industrial boilers.
g) Complete the transition of all eligible industries from FO to LNG, enforced through the Telangana Pollution Control Board.

h) Institutionalize a regulatory framework mandating the use of LNG in industrial boilers through Department of Boilers Government of Telangana.
i) Explore opportunities for the integration of renewable energy sources, guided by the Telangana Renewable Energy Policy, in LNG-based heating systems.

8) Waste Heat Recovery Program (WHRP)

a) Identify industries with significant waste heat recovery potential such as cement, glass, chemicals and ceramics through collaboration with the TGREDCO and the Telangana Industrial Infrastructure Corporation.
b) Conduct comprehensive feasibility studies, involving recognized technology providers, to assess the technical and economic viability of waste heat recovery in these industries.
c) Collaborate with the Telangana Pollution Control Board to establish emission standards that encourage waste heat recovery initiatives.
d) Implement pilot WHRP projects in selected industries, incorporating financial incentives and subsidies, facilitated by the Telangana Industrial Policy Framework.
e) Develop standardized guidelines for waste heat recovery, aligned with Telangana State Industrial Standards.
f) Establish partnerships with technology providers and financial institutions to support industries adopting waste heat recovery systems.
g) Scale up waste heat recovery initiatives across industries, incorporating advanced technologies and machine learning for continuous optimization.
h) Establish a certification process for industries achieving significant energy savings through WHRP, supported by the Telangana Industrial Policy.
i) Integrate waste heat recovery into the regulatory framework for industrial energy efficiency, with continuous updates based on technological advancements and industry feedback.

Implementation Methodology:

1. Identify and classify large/MSMEs based on their energy consumption patterns, industrial sectors, and locations.
2. Conduct baseline energy audits for MSMEs to assess their current energy consumption, identify inefficiencies, and understand energy-saving opportunities.
3. Continuously monitor and evaluate the impact of energy efficiency measures, using key performance indicators to track energy savings and carbon emissions reduction.
4. Require MSMEs to provide regular reports on their energy consumption and energy-saving initiatives.
5. Periodically review the program's effectiveness, making improvements based on lessons learned and industry advancements.

Strategy #3: Promotion of Green Rating for Industries

A green rating system for industries which provides a standardized methodology to measure and benchmark the environmental performance of industries across different sectors can serve as a valuable tool for industries and the state to assess, improve, and promote environmental sustainability. It facilitates the adoption of energy-efficient practices, encourages resource conservation, and aligns with the state's energy and environmental goals, ultimately leading to reduced energy consumption, improved environmental performance.

Implementing Agency: Department of Industries, PCB, Telangana Renewable Energy Corporation Limited

Actionable Measures

1. Implementing a green rating system that evaluates and promotes sustainable practices in the industrial sector.
2. Providing incentives and recognizing industries that adopt environmentally friendly practices.
3. State can foster a culture of sustainability and promote the adoption of greener technologies and practices.

3. Residential & Commercial Buildings

The building sector in Telangana is booming, with both residential and commercial construction seeing significant growth in recent years. The residential building sector in Telangana has been growing steadily due to several factors such as increased urbanization, rising incomes, and a growing middle class. The demand for affordable housing has also been on the rise in the state similarly commercial building sector in Telangana has also been growing, particularly in Hyderabad, which has emerged as a major business hub in India. The state government has been actively promoting Hyderabad as a destination for investment, which has led to an influx of businesses and corporations in the city. As a result, there has been a growing demand for commercial real estate in the state. The state government has also implemented several policies to promote the growth of the commercial sector, including a single-window clearance system for obtaining approvals for commercial projects. The IT sector has been a major contributor to the growth of the commercial sector in Telangana. Overall, the building sector in Telangana is expected to continue growing in the coming years hence there is a significant scope for energy efficiency.

Strategy #1: Implementation of ENS

Eco Niwas Samithi (ENS) is a program launched by the Ministry of Power to promote energy efficiency in residential buildings. The importance of ENS for energy efficiency lies in its potential to reduce energy consumption and greenhouse gas emissions, which are major contributors to climate change. By promoting energy-efficient practices in residential buildings, ENS can help reduce the demand for energy and promote the use of renewable energy sources. This, in turn, can help in achieving the country's goal of reducing its carbon footprint and mitigating the impact of climate change.

Implementing Agency: Bureau of Energy Efficiency, Department of Town and Country Planning, Telangana State – Housing Corporation, Telangana Renewable Energy Corporation Limited

Actionable measures

1. **Pilot Project for ENS Case Studies:** Allocate funds for pilot projects that can serve as case studies for the successful implementation of ENS in diverse types of residential buildings. Collaborate with developers, architects, and energy experts to create showcase projects that demonstrate the practicality and benefits of ENS.
2. **Mandatory Labelling for New Construction:** Draft legislation to mandate BEE's Energy Efficiency Labelling for all new residential construction projects. Ensure that builders and developers comply with energy efficiency standards and obtain the appropriate label before occupancy permits are granted. Telangana can consider a threshold of 500 m2 and all residential buildings with a built-up area exceeding this threshold would be subject to mandatory labelling.
3. **Local Government Demonstration Projects**: Encourage local government departments to undertake energy efficiency upgrades in their residential buildings as demonstration projects. Share the success stories and cost savings to inspire homeowners to follow suit.
4. **Consumer Education Initiatives:** Develop and distribute educational materials and online resources about BEE's ENS and Energy Efficiency Labelling programme and its benefits in the local language. Create a user-friendly online platform where homeowners can calculate potential savings and access information about energy-efficient products and services.
5. **Awareness Campaigns:** Conduct regular workshops and training sessions in collaboration with local authorities and educational institutions. Offer these workshops to builders, architects, and homeowners to educate them on energy-efficient building practices and the significance of BEE's Energy Efficiency Labelling.
6. **Behavioural Change Campaigns:** Conduct awareness campaigns and programs to educate consumers about energy efficiency, energy-saving practices, and behavioural changes that lead to energy conservation.
7. **Incentives and Rewards:** Provide incentives and rewards to encourage active participation and achievement of energy-saving targets.

Implementing Methodology:

1. Establish a program for residential energy audits and assessments, either government-led or in partnership with certified energy auditors.
2. Collaborate with financial institutions to provide low-interest loans for energy-efficient upgrades.
3. Develop and regularly update a directory of energy-efficient materials and technologies, ensuring it remains a valuable resource for stakeholders.

Strategy #2: Deepening of Standard & Labelling Programme

The Bureau of Energy Efficiency (BEE) in India has implemented a standard and labelling program to promote the use of energy-efficient appliances. Under this program, old and inefficient appliances are encouraged to be replaced with new ones that meet the minimum energy performance standards (MEPS) set by the BEE. The labels help consumers make informed choices, thereby reducing energy consumption and costs. In the context of domestic buildings, the S&L Programme can significantly reduce energy consumption by promoting the use of energy-efficient appliances, lighting, and building materials. This, in turn, will help in mitigating greenhouse gas emissions, reducing energy bills for consumers, and promoting sustainable development.

Implementing Agency: Bureau of Energy Efficiency, Telangana Electricity Regulatory Commission, Telangana Renewable Energy Corporation Limited

Actionable measures

1. **Bulk-purchase initiatives for superfan technologies:**
   The scheme can be implemented by partnering with manufacturers of BLDC fans and offering bulk purchase orders at discounted rates. The scheme can also be extended to government offices, public institutions, and commercial buildings. This will encourage manufacturers to produce more energy-efficient fans and drive down the prices of energy efficient fans further. To ensure the success of the scheme, the state designated agency (SDA) can collaborate with the Bureau of Energy Efficiency (BEE) to create awareness among the public about the benefits of energy-efficient fans and the importance of purchasing energy-efficient products. The SDA can also work with local distribution companies to ensure that energy-efficient fans are available and easily accessible to consumers.
2. **Promote Energy-Efficient and Low-GWP Refrigerant-Based Cooling:**
   a) Launch awareness campaigns highlighting the benefits of energy-efficient and lowGWP refrigerant-based cooling systems for public and private stakeholders.
   b) Introduce financial incentives, such as rebates or tax credits, for the purchase and installation of energy-efficient cooling systems.
   c) Enforce regulatory measures that mandate the use of low-GWP refrigerants in cooling systems to reduce environmental impact.
3. **Energy-Efficient Public Procurement:**
   a) Establishing a certification process for service technicians to ensure proper installation and maintenance of cooling systems.
   b) Regularly update the Public Works Department (PWD) Schedule of Rates (SoR) to incorporate the latest energy-efficient materials and technologies in procurement projects.
4. **Promotion of Heat Pumps:**
   a) Provide subsidies and financial incentives to consumers and businesses for the installation of heat pumps for space cooling and hot water supply.
   b) Collaborate with manufacturers to promote research and development in heat pump technology and offer market-based incentives for adopting this technology.

5. **Mandatory Use of 4-Star Rated Appliances:**
   a) Enforce regulations requiring the use of 4-star rated appliances in all commercial and government buildings to reduce energy consumption and greenhouse gas emissions.
   b) Establish a monitoring and enforcement mechanism to ensure compliance with the mandatory rating requirements.

Implementing Methodology:

1. Set up an online platform or physical exchange centers where consumers can register and participate. Selection and procurement of energy efficient appliances.
2. Collaborate with retail associations to encourage participation in the replacement program.
3. Design and launch the appliance exchange scheme, specifying the eligibility criteria for participating consumers.

Strategy #3: Promotion of Green Building Ratings in Residential and Commercial Sector

Green buildings rating in India incorporates various features such as energy-efficient lighting, heating, ventilation, and air conditioning systems, and use renewable energy sources such as solar and wind power. The Telangana state government has introduced several policies and initiatives to promote the construction of green buildings in the state. In 2016, the government launched the Telangana State Energy Conservation Building Code (TSECBC), which mandates that all new buildings and major renovations in the state comply with energy efficiency standards. Additionally, the state government has introduced various incentives for developers and builders who construct green buildings, including reduced property tax rates and faster approvals for building plans.

Several notable green building projects have been completed in Telangana in recent years, including the Hyderabad Metro Rail Project, which incorporates energy-efficient lighting and HVAC systems, and the Telangana State Industrial Infrastructure Corporation (TSIIC) Tower, which features a solar panel array and rainwater harvesting systems.

Implementing Agency: Certification Body, Telangana Renewable Energy Corporation Limited, Department of Country and Town Planning

Actionable measures

1. Develop and maintain an Energy Conservation Building Code (ECBC) compliance portal. This portal can serve as a resource for builders, architects, and contractors to access information on energy-efficient and green materials and technologies.
2. Conduct market outreach campaigns to promote ECBC-compliant products. Utilize various communication channels such as radio jingles, social media, and awareness programs to educate the public about the benefits of energy efficiency.

3. Initiate pilot projects to showcase the of benefits of Net Zero (Energy) Rating. Select an initial set of 20 buildings as case studies to demonstrate the feasibility and advantages of higher energy efficiency standards.
4. Establish training programs for home energy auditors. Create a compliance structure that rewards residential projects for energy savings achieved through energy-efficient measures, such as insulation and lighting upgrades.
5. Issue directives to all government departments to conduct comprehensive energy audits of their buildings. Set specific targets for achieving BEE (Bureau of Energy Efficiency) Star Ratings for government-owned buildings.
6. Develop training and capacity-building programs for architects, building professionals, and developers focused on energy-efficient building design and construction practices.
7. Identify and select iconic government buildings for transformation into Net-Zero energy buildings. Implement energy-efficient retrofits, renewable energy integration, and smart technologies to showcase the possibilities of sustainable construction and operation.
8. Enforce a mandatory minimum set point of 24°C for air conditioners in all government buildings.
9. District Cooling Systems (DCS) are centralized cooling systems that provide efficient and sustainable cooling to multiple buildings and facilities.

Implementing Methodology:

1. Design training programs and capacity-building initiatives to empower professionals and workers with the skills and knowledge needed for green building construction.
2. Collaborate with academic institutions, industry experts, and vocational training centers to
3. Promote recognized green building certification programs (IGBC etc.).
4. Encourage builders to seek green building certification by offering subsidies or rebates for certification fees.
5. Recognize and celebrate green building achievements through awards and recognition programs.

4. Agriculture

The state of Telangana has a significant agricultural sector, with many farmers dependent on irrigation to cultivate crops. However, the use of electric pumps for irrigation has resulted in significant pollution and rising energy costs for farmers.

Strategy #1: Transition of electrical pumps to solar powered pumps

The use of energy-efficient pumps can result in significant energy savings. In Telangana, the agricultural sector consumes about 36% of the total electricity generated in the state in FY 2020, and pumps account for 80% of this energy consumption. Therefore, there is a significant opportunity for energy savings by improving pump efficiency. A policy on solar pumps for the agriculture sector in Telangana can help promote sustainable irrigation practices and reduce the dependence on conventional energy sources.

Implementing Agency: Bureau of Energy Efficiency (BEE), Department of Agriculture, Telangana Renewable Energy Corporation Limited, DISCOMs.

Actionable measures

1. Greater outreach to relevant stakeholders for effective implementation of PM KUSUM Yojana.
2. Launch a subsidy program modelled after Gujarat's "Suryashakti Kisan Yojana," which provides farmers with a 60% subsidy on solar pump installations. This program can significantly reduce the financial burden on farmers in Telangana.
3. Establish a comprehensive training program for installers and technicians. This training should encompass installation, operation, and maintenance of solar pump systems.
4. Engage local agricultural extension officers and village panchayats, following Maharashtra's "Mukhyamantri Saur Krishi Pump Yojana," to facilitate grassroots-level awareness and information sharing.
5. Promote the creation of solar pump procurement cooperatives which allows farmers to collectively purchase high-quality solar pumps.
6. Capacity building of Panchayat/Block level officials about the program.

Implementing Methodology:

1. Conduct a feasibility study to identify areas to determine suitable locations for the establishment of solar agriculture feeders.
2. Collaborate with cooperative banks and rural banks to provide specialized loan schemes with low-interest rates.

Strategy #2: Replacement of inefficient pumps with BEE 5 Star Rated Pumps along with smart control panel.

This strategy will focus on the agriculture sector targeting inefficient agricultural pumps. It will cover the replacement of existing inefficient pumps with BEE 5-star rated pumps and smart control panels in agricultural fields and related irrigation systems.

Implementing Agency: Bureau of Energy Efficiency (BEE), Department of Agriculture, Telangana Renewable Energy Corporation Limited, Telangana State Electricity Regulatory Commission, DISCOMs.

Actionable measures

1. Launch awareness campaigns targeting farmers to inform them about the benefits of energy-efficient pumps and smart control panels.
2. Development of a phase-wise plan to implement Demand Side Management (DSM) scheme for replacing existing inefficient pumps through Energy Service Companies (ESCOs).
3. Provide guidance on the installation and integration of smart control panels.
4. Collaborate with financial institutions to offer low-interest loans designed for farmers to facilitate pump replacements.
5. Create specialized loan packages with favorable terms to encourage participation in the program.

6. Offer incentives such as additional subsidies or rebates for early adopters who comply with the mandate.

Implementing Methodology:

1. Conduct a thorough survey to identify inefficient agricultural pumps and their distribution across the state. Categorize pumps based on their energy efficiency and operational condition.
2. Gradually introduce mandatory compliance for the replacement of inefficient pumps with BEE 5 Star Rated Pumps and smart control panels for specific agricultural applications.
3. Establish a network of technical experts to assist farmers in selecting the right pump sizes and types according to their specific irrigation needs.

Financing Mechanism

Financial mechanisms are structured systems put in place to facilitate the funding and implementation of energy-efficient measures in buildings and industries. These mechanisms encompass a range of financial tools, including loans, grants, subsidies, tax incentives, and other instruments, aimed at providing essential financial support for energy efficiency initiatives.

To achieve energy efficiency targets and significant cost savings, states must implement a diverse set of energy efficiency policies and programs. To secure the necessary funding for these initiatives, the Bureau of Energy Efficiency (BEE) has introduced several financial mechanisms that states can leverage for implementation. A notable program under the National Action Plan on Climate Change is the 'National Mission for Enhanced Energy Efficiency (NMEEE). Within this framework, the following financial mechanisms have been initiated:

1. **Energy Efficiency Financing Platform:** Under the National Mission for Enhanced Energy Efficiency, this platform facilitates interactions between financial institutions and project developers. It serves as a crucial interface for the effective execution of energy efficiency projects, streamlining the flow of financial resources.
2. **Framework for Energy Economic Development**: This framework is designed to simplify the financing of energy efficiency projects through diverse fiscal instruments. It enhances stakeholder convenience by implementing schemes such as the 'Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE)' and the 'Venture Capital Fund for Energy Efficiency (VCFEE).
3. **PRGFEE (Partial Risk Guarantee Fund for Energy Efficiency):** PRGFEE addresses credit risks and transaction structuring barriers. It engages financial institutions and strengthens their capacity to finance energy efficiency projects on a commercially sustainable basis. The guarantee period extends up to a maximum of 5 years, with the Government of India allocating approximately INR 312 crores for PRGFEE.
4. **VCFEE (Venture Capital Fund for Energy Efficiency):** VCFEE offers risk capital support for energy efficiency investments in modern technologies, products, and services. The Government of India has approved around INR 210 crores to bolster VCFEE.

5. **Revolving Funds:** These financial tools are designed to support sustainable development projects across various sectors, such as agriculture, small businesses, and community infrastructure. Revolving funds offer loans at favorable interest rates and are intended to support these sectors. Repayments from these loans replenish the fund, ensuring a continuous cycle of financing for new borrowers.
6. **Green Bonds**: Green bonds are financial instruments specifically crafted to fund projects and initiatives with environmental benefits. They are typically issued by governments, municipalities, corporations, or other entities to raise capital for endeavors that promote sustainability, renewable energy, energy efficiency, climate change mitigation, and other environmentally friendly goals.
7. **Soft Loans:** Also known as concessionary or subsidized loans, soft loans are financial instruments provided under more favorable terms compared to standard commercial loans. These loans typically feature lower interest rates, longer repayment periods, and flexible terms. Governments, international financial institutions, or development agencies often offer soft loans to support specific objectives such as economic development, social welfare, or sustainability.

Summary

The "State Energy Efficiency Action Plan" report for Telangana provides a roadmap for the state to achieve its energy efficiency goals. It outlines opportunities for energy savings and greenhouse gas emissions reductions across multiple sectors, including industry, buildings, transportation, and agriculture. The proposed strategies are designed to help the state allocate resources to meet its targets in line with the NDCs. To successfully implement the action plan, it is essential to create a task force or working group comprising representatives from government, industry, NGOs, energy experts, and other stakeholders. This group should establish priorities, timelines, and progress monitoring. Adequate funding, including grants, loans, and public-private partnerships, must also be secured to support the plan. Additionally, innovative financing mechanisms, such as energy efficiency bonds, can be used to attract private investment in energy efficiency projects.

Considering this projection, the action plan identifies Transport, Industry, Building, & Agriculture as the key focus sectors. It further analyses sector-specific strategies to achieve energy savings. In the moderate scenario, the implementation of this plan is expected to result in a reduction of 3.9 Mtoe in total energy consumption by FY 2031. In the ambitious scenario, the reduction is projected to be 5.5 Mtoe. Additionally, this plan aims to generate awareness at a mass level and create a market potential of approximately Rs. 10,102 crores in the energy efficiency sector. Furthermore, it is anticipated to contribute to a reduction of 12.1 $MtCO_2$ in the moderate scenario and 17.2 $MtCO_2$ in the ambitious scenario in terms of CO_2 emissions by FY 2031.