Whitepaper on

State Energy Efficiency Action Plan

Kerala

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 Intended 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. Hence, 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 Kerala, SEEAP was developed under the guidelines of Bureau of Energy Efficiency, Ministry of Power, GOI, in consultation with the State Designated Agency viz. Energy Management Centre Kerala (EMC), knowledge partner Confederation of Indian Industry (CII) and inputs & suggestions from various government departments and sector experts were considered. The objective of the State Energy Efficiency Action Plan is to arrive at sector-specific approaches for energy efficiency for the state of Kerala.

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 Kerala'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 Kerala'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 and Fisheries are the identified focus sectors for Kerala.

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

Kerala has a well-developed transport sector that comprises various modes of transportation such as roadways, railways, waterways, and airways. The state has an extensive network of state highways, district roads, and village roads, which are maintained by the Kerala Public Works Department. The state-run Kerala State Road Transport Corporation (KSRTC) operates a fleet of buses that provide intercity and intracity transport services to the people. Apart from this, private operators also provide bus services in the state. The state of Kerala has an extensive network of backwaters and canals, which are used for transportation purposes. The Inland Waterways Authority of India has developed waterways in the state for cargo and passenger transportation. The major ports in Kerala are the Kochi Port and the Vizhinjam Port.

Strategy: Facilitating Electrification of Road Transport

This policy proposes converting 11 lakh vehicles in the state to electric vehicles by FY 2031 under moderate scenario and 17.5 lakh vehicles in the ambitious scenario.

Implementing Agency: DISCOMs, Transport Department, PSUs and private sector

Actionable Measures

- Developing Charging Infrastructure for Induction Charging on Greenfield Highway Projects
- Adoption of E-Buses to Other Cities.
- Adoption of Battery Swapping for 2 & 3 Wheelers.
- Awareness on Energy Efficiency Program for High Energy Lithium-Ion Traction Battery Packs and Systems.
- Supporting MSMEs for EV Development.
- Developing a comprehensive plan for establishing a network of hydrogen fueling stations, prioritizing strategic locations along transportation.

Implementation Methodology:

- Identification of target areas
- Selection of charging technologies
- Procurement and installation of charging stations
- Operations and maintenance
- Incentives to consumers
- Awareness campaigns
- Monitoring and evaluation

Strategy: Minimum renewable energy integration (60%) for EV charging stations

The adoption of electric vehicles (EVs) is growing rapidly in Kerala, and this trend is expected to continue. As more EVs hit the road, the demand for electricity will increase, which could strain the existing power grid. However, if EV charging stations are powered by solar energy, the additional demand can be met without putting additional pressure on the grid. Hence, implementing a policy mandating solar energy integration of at least 60% for EV charging stations can help Kerala meet the increasing demand for electricity from EVs, reduce its dependency on fossil fuels, and promote clean energy.

Implementing Agency: DISCOMs, Transport Department, PSUs and private sector

Actionable Measures

- Integration of EV Batteries for Renewable Energy Storage and Grid Balancing.
- Developing a smart charging system that enables bidirectional communication between the grid, charging infrastructure, and EVs.

Implementation Methodology:

a) Identification of target areas
b) Selection of charging technologies

Strategy: Ethanol Blending Programme

Under this strategy, it is proposed to ensure the mixing of ethanol in motor spirit (petrol) in a fixed ratio to offset a part of the energy consumed by petrol and bring about reduction in emissions. In the proposed strategy and in line with the country's target of 20% blending of ethanol blending in petrol by 2025, a 20% blending target is suggested in the moderate scenario and a 25% blending target is suggested in the ambitious scenario by 2031.

Implementing Agency: MoPNG, Transport Department, Oil Marketing Companies (OMCs), Dept of Industries

Actionable Measures

- Easing Storage, Movement, and Permit Norms for Industrial Fuel-Grade Ethanol.
- Interest Subsidy on Term Loans for Ethanol Production.
- Use of Biodiesel and CBG in State Transport Buses.
- Methanol for Marine Engine Application.

Implementation Methodology:

- Policy and regulatory framework
- Production of Ethanol
- Procurement and Storage
- Blending of ethanol
- Distribution and Marketing
- Awareness Campaigns
- Monitoring and verification

Strategy: Personal Rapid Transit (PRT) in Tier-2 & Tier-3 Cities

Implementing a policy on Personal Rapid Transit (PRT) in Tier-2 & Tier-3 Cities can significantly contribute to energy efficiency in Kerala. PRT systems consist of small, driverless electric vehicles that run on dedicated tracks, which eliminates the need for large-scale infrastructure and minimizes energy consumption. This is particularly important for cities like Kozhikode and Trivandrum, which have high population densities and suffer from traffic congestion and poor air quality.

Implementing Agency: Transport Department, Urban Affairs Department, Department of Town & Country Planning, Private Sector Partners, Dept. of Industries

Actionable Measures

- Public awareness campaigns to inform residents about the new transit options.
- Feasibility studies and site selection for PRT systems in Kozhikode and Trivandrum. Exploring funding sources and potential public-private partnerships.
- Regulatory framework for the establishment of PRT infrastructure, including the construction of dedicated PRT lanes, stations, and maintenance facilities within Kozhikode and Trivandrum, safety standards.

Implementation Methodology:

- Identification of target areas
- Selection of charging technologies

Strategy: Inland Waterways Development

Inland waterways transportation is a highly energy-efficient mode of transport as it requires less fuel than road transport. The Inland Waterways Development policy for Kerala aims to harness the state's unique geography to provide an eco-friendly, efficient, and sustainable transportation system.

Implementing Agency: Coastal Shipping and Inland Navigation Department (CSIND), Kerala Shipping and Inland Navigation Corporation Ltd. (KSINC), Kerala Waterways and Infrastructures Ltd. (KWIL)

Actionable Measures

- Tax breaks and exemptions on key areas such as vessel purchases, fuel consumption, and infrastructure development related to inland waterway transport,
- Establish safety regulations that govern vessel design, construction, and maintenance to ensure safe operations on inland waterways.
- Require mandatory certification and training for crew members operating vessels on inland waterways.
- Set emissions standards for vessels and engines used in inland waterway transport to minimize air pollution.
- Develop traffic management guidelines to avoid congestion and ensure efficient use of waterways.

Implementation Methodology:

- Establish a regulatory authority responsible for monitoring compliance with safety and environmental regulations.
- Technology Assessment.
- Enforce penalties for non-compliance with regulations.

2. Industry

Kerala's industrial sector is a significant contributor to the state's economy and overall energy consumption, encompassing a wide range of industries such as manufacturing, agro-processing, and technology. Kerala has enforced the Perform, Achieve, and Trade (PAT) program for Designated Consumers (DC) in order to enhance energy efficiency in industries. Unlike many other states, Kerala mandates energy audits not only for PAT industries but also for non-PAT industries. To further incentivize energy efficiency measures, the state provides subsidies for these energy audits. Moreover, the Kerala Finance Corporation extends soft loans to support energy efficiency projects in the industrial sector. To further encourage its energy efficiency efforts, Kerala could explore the implementation of specific energy efficiency projects and the monitoring of energy intensity in select MSME clusters. Moreover, setting formal energy-saving targets for the industrial sector would provide a clear roadmap for sustainable development, aligning with the state's commitment to fostering a greener and more energy-efficient industrial landscape.

Strategy: Identify, Implement and Verify (IIV) scheme

Kerala's mandated energy audits for all HT/ EHT consumers can be expanded further like a state level PAT scheme by introducing energy reduction targets for HT/ EHT consumers. An Identify, Implement and Verify (IIV) scheme can be introduced and penalties should be given to those who fail to comply.

Implementing Agency: Department of Industries, Kerala State Electricity Regulatory Commission (KSERC), Kerala State Industrial Development Corporation (KSIDC), Energy Management Centre, Kerala (EMC)

Actionable Measures

- Green Incentives for Better Performing Industries Adoption of E-Buses to Other Cities.
- Transition from Furnace Oil (FO) to LNG for Industrial Boilers
- Subsidies for industries that invest in biomass-based absorption chillers and evaporative cooling technologies.

Implementation Methodology:

- Identification of sector-specific benchmarks and energy reduction targets.
- Development of reporting and verification procedures.
- Implementation of energy reduction targets and initiation of energy-saving measures by HT and EHT consumers.
- Ongoing monitoring and verification of energy consumption data.
- Full-scale implementation of the "IIV Scheme" with penalties for non-compliant consumers.

Strategy: Energy Efficiency Intervention in Energy Intensive MSME Clusters

The adoption of energy audits within the MSME sector is relatively lower, indicating substantial room for improvement. Offering incentives to MSMEs for conducting energy audits could significantly enhance the uptake of energy-efficient technologies in this sector. Initially, priority can be given to MSME clusters where the potential for sampling and replication is more substantial. Notable MSME clusters in Kerala include the Dairy cluster, the Seafood cluster in Kochi, the Rice Mill cluster in Kalady, and the Plywood cluster in Perumbavoor.

Implementing Agency: Department of Industries, Kerala State Industrial Development Corporation (KSIDC), Kerala Financial Corporation (KFC), Energy Management Centre, Kerala (EMC)

Actionable Measures

- Energy Audit Subsidy Scheme (EASS)Transition from Furnace Oil (FO) to LNG for Industrial Boilers
- Organize workshops focused on technology interventions for energy conservation in food processing units, manufacturing and other MSME sectors.

- Provide technical assistance to help MSMEs transition to efficient motors, upgrade their technology in boilers, and implement other Energy Conservation Measures (ECMs).
- Promotion of Green Rating of Industries
- Implement demonstration projects showcasing the latest Energy Efficiency Technologies within SME clusters to encourage MSMEs to adopt these innovations.
- Conduct periodic standardized energy audits for MSMEs based on their load and reimburse the cost of these energy audits up to a maximum cap.
- Organize capacity building and technical training programs that offer BEE Energy Auditor Courses.
- Issue directives for the implementation of ISO 50001, Energy Management Systems, in organizations.

Implementation Methodology:

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

3. Building

With Kerala's rapidly growing population and urbanization trends, there has been a substantial increase in the construction of residential and commercial buildings in the state.

In FY21-22, around 53% of the total electricity consumed by the state was attributed to domestic buildings. The commercial building sector accounted for a 20% share. This underscores the need for enhancing energy efficiency in residential as well as commercial buildings to reduce energy consumption and promote sustainable living.

Strategy: Implementation of Eco Niwas Samitha

In the recent amendment to the Energy Conservation (EC) Act in 2022, a unified code called the "Energy Conservation and Sustainable Building Code" (ECSBC) has been introduced. This new code will include both commercial and residential buildings. Until the implementation of ECSBC in State/UT, the existing Energy Conservation Building Code (ECBC) and Eco-Niwas Samhita (ENS) will be referred to as ECSBC.

Eco Niwas Samithi (ENS) is a program launched by the Ministry of Power to promote energy efficiency in residential buildings. By promoting energy-efficient practices in residential buildings, ENS can help reduce the demand for energy and promote the use of renewable energy sources.

Implementing Agency: Bureau of Energy Efficiency, Department of Town and Country Planning, Kerala State – Housing Board

Actionable Items

- Promotion of energy efficiency among residential consumers through personalized Home Energy Reports (HERs) and an integrated web portal.
- Pilot projects for Super ECBC buildings as case studies (initial 20 buildings).
- Setting up of effective enforcement plan with ULBs and SDA as monitoring agency.
- Development and maintenance of ECSBC compliance portal, directory of energy efficient materials and technologies.

Implementing Methodology:

- Establishing guidelines
- Awareness and training programs
- Code adoption
- Compliance and enforcement
- Performance evaluation
- Incentives and recognition

Strategy: Deepening of Standard & Labelling Programme

With the growth in the number of refrigeration and air conditioning (RAC) units in Kerala state due to urbanization, there is a need to accelerate the ambition of MEPS and expand the scope of the S&L program. This will help to drive the adoption of energy-efficient RAC units and reduce the energy consumption and carbon footprint of the state. Additionally, the S&L program can help to create awareness among consumers about the benefits of energy-efficient appliances and incentivize manufacturers to innovate and develop more efficient products.

Implementing Agency: Bureau of Energy Efficiency (BEE), Energy Management Centre (EMC), Kerala State Electricity Regulatory Commission

Actionable Items

- Introduce financial incentives, such as rebates or tax credits, for the purchase and installation of energy-efficient cooling systems.
- Regularly update the Public Works Department (PWD) Schedule of Rates (SoR) to incorporate the latest energy-efficient materials and technologies.
- Provide subsidies and financial incentives to consumers and businesses for the installation of heat pumps for space cooling and hot water supply.

- Demand aggregation model to incentivize the use of star-rated appliances in domestic settings by offering bulk purchase discounts.
- Scrap to Energy Efficient Appliances (SEA) Policy, encouraging the responsible disposal of old appliances.
- Expand the range of energy-efficient products available on the Save Energy Mart platform, including cooling systems, lighting, and other energy-saving solutions.

Implementing Methodology:

- Identification of inefficient appliances
- Selection and procurement of energy efficient appliances
- Distribution and installation of the appliances
- Disposal of the old appliances
- Monitoring and Evaluation

Strategy: Promotion of Green Building Rating

The Kerala Government is actively endorsing the construction of eco-friendly buildings and has introduced various incentives for this purpose. The Local Self Government Department has granted approvals for substantial advantages, including potential reductions of up to 50% in one-time building tax, up to 1% in stamp duty, and up to 20% in property tax for projects that achieve green building certifications, such as those issued by the Indian Green Building Council (IGBC).

To further advance the adoption of green and net-zero building practices in the commercial building sector, it is essential to promote Green Building Rating. These interventions will contribute significantly to the state's goal of reducing energy consumption and fostering a more sustainable built environment.

Implementing Agency: Certification Body, Energy Management Centre (EMC), Department of Country and Town Planning

Actionable Items

- Develop and maintain an Energy Conservation Building Code (ECBC) compliance portal.
- Initiate pilot projects to showcase the 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.
- Identify and select iconic government buildings for transformation into Net-Zero energy buildings.
- Enforce a mandatory minimum set point of 24°C for air conditioners in all government buildings.
- Mandatory cool roofing for all the government, government-owned, non-residential and commercial buildings irrespective of site area/built up area.

Implementing Methodology:

- Identification for the eligible buildings
- Awareness Campaigns
- Compliance and Enforcement
- Incentives and recognition
- Performance evaluation

4. Agriculture

The agriculture sector in Kerala is an important part of the state's economy, providing employment to a significant portion of the population and contributing to the overall GDP.

The sector is dominated by small-scale farmers who cultivate a variety of crops, including coconut, rubber, tea, coffee, spices, and cashew. The state is also known for its horticulture, with fruits like banana, mango, pineapple, and jackfruit being grown in large quantities.

In recent years, there has been a growing focus on energy efficiency in the agriculture sector in Kerala. The state has implemented several initiatives to promote renewable energy in the sector, such as solar-powered irrigation systems, biogas plants, and biomass-based power generation.

Strategy: Transition of conventional diesel pumps to solar powered pumps

Transitioning from diesel and electrical pumps to solar-powered pumps can significantly help in energy conservation in Kerala. The adoption of solar-powered pumps in the state is still in its nascent stage, but there is significant potential for growth and expansion in the coming years.

Implementing Agency: Bureau of Energy Efficiency (BEE), Kerala State Electricity Board Limited, Anert-Agency for New and Renewable Energy Research and Technology, Energy Management Centre (EMC)

Actionable Items

- Greater outreach to relevant stakeholders for effective implementation of PM KUSUM Yojana.
- Capacity building of Panchayat/Block level officials about the program.

Implementing Methodology:

- Access feasibility
- Awareness and training programs
- Financial incentives and support
- Vendor selection and procurement
- Installation and commissioning
- Monitoring and mechanism
- Evaluation and impact assessment

Strategy: 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. In the moderate scenario, by FY 2031, 50% of the inefficient electric-powered pumps are proposed to be replaced with BEE 5 Star rated pumps and 70% in the ambitious scenario.

Implementing Agency: Bureau of Energy Efficiency (BEE), Kerala State Electricity Board Limited, Energy Management Centre (EMC), EESL

Actionable Items

- Launch awareness campaigns targeting farmers to inform them about the benefits of energy-efficient pumps and smart control panels.
- Development of a phase-wise plan to implement Demand Side Management (DSM) scheme for replacing existing inefficient pumps through Energy Service Companies (ESCOs).
- Provide guidance on the installation and integration of smart control panels.
- Collaborate with financial institutions to offer low-interest loans designed for farmers to facilitate pump replacements.
- Create specialized loan packages with favorable terms to encourage participation in the program.
- Offer incentives such as additional subsidies or rebates for early adopters who comply with the mandate.

Implementing Methodology:

- 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.
- Gradually introduce mandatory compliance for the replacement of inefficient pumps with BEE 5 Star Rated Pumps and smart control panels for specific agricultural applications.
- Establish a network of technical experts to assist farmers in selecting the right pump sizes and types according to their specific irrigation needs.

5. Fisheries

The fisheries sector is a significant contributor to the state's economy, providing livelihoods to over one million people. Marine fisheries are the dominant sector of Kerala's fisheries, accounting for about 85% of the total fish production in the state. The major fishing centers in Kerala are Thiruvananthapuram, Kollam, Alappuzha, Kochi, Thrissur, Kozhikode, Kannur, and Kasaragod. The marine fisheries are dominated by traditional, small-scale fishing operations using non-motorized boats, while the inland fisheries are largely based on freshwater aquaculture. Inland fisheries in Kerala are carried out in rivers, lakes, reservoirs, and ponds. The state has a vast network of water bodies that support freshwater fish.

However, the fisheries sector in Kerala faces several challenges, including overfishing, habitat destruction, and unsustainable fishing practices. In addition, the sector is also highly energy-intensive, with significant energy consumption involved in activities such as fishing, processing, transportation, and storage.

Strategy: Energy efficiency across value chain of fisheries

Improving energy efficiency across all value chains in the fisheries sector can lead to significant environmental and economic benefits, including reduced greenhouse gas emissions, decreased energy consumption, and cost savings for fishers and processors. In the processing and packaging stages, energy is mainly consumed for cooling, freezing, and drying of fish products. The transportation and distribution of fish and fish products also require significant energy input, mainly in the form of fuel for vehicles and refrigeration systems. Overall, improving energy efficiency across all value chains in the fisheries sector in the state can bring numerous benefits, including reduced greenhouse gas emissions, cost savings for fishers and processors, and increased competitiveness in the global market.

Implementing Agency: Department of Fisheries, EMC

Actionable Items

- Provide skill development programs to fishermen and fishery workers, educating them on energy-efficient practices, equipment usage, and maintenance.
- Promote energy-efficient transportation methods for the first and last mile, including the adoption of electric vehicles (EVs).
- Encourage the use of PCM technology in coolers and freezers to improve energy efficiency in cold storage and transportation.
- Promote the adoption of energy-efficient aerators in aquaculture and fish farming.
- Support the installation of solar PV systems for fishery and cold storage facilities to reduce energy consumption.
- Encourage the use of efficient ammonia or CO2 brine systems in cold storage.
- Promote the use of evaporative condensers for cooling to improve efficiency.
- Advocate for low-charge ammonia refrigeration systems to reduce environmental impact.
- Implement mobile chilling solutions for reefer trucks to maintain the cold chain efficiently.
- Support the use of PCM materials for reefer transport to reduce energy consumption during transportation.
- Promote the use of variable frequency drive solutions for refrigeration systems to optimize energy usage.
- Encourage the adoption of electronic level control for refrigeration systems.
- Implement Internet of Things (IoT) technology for better control and monitoring of refrigeration systems.
- Provide subsidies to encourage fishermen and fishery enterprises to adopt solar-powered boats, refrigeration systems, and other equipment.
- Promote the upgrading of traditional fishing vessels with efficient and eco-friendly engines.

- Advocate for the installation of fuel-efficient engines to reduce fuel consumption by up to 30% and decrease emissions.

Implementing Methodology:

- Energy audit and assessment
- Financial analysis
- Incentives and support
- Vendor selection and procurement
- Awareness and training
- Monitoring and performance
- Maintenance and support

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:

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.

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).'

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.

VCFEE (Venture Capital Fund for Energy Efficiency): VCFEE offers risk capital support for energy efficiency investments in new technologies, products, and services. The Government of India has approved around INR 210 crores to bolster VCFEE.

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.

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.

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 Kerala 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.

In light of this projection, the action plan identifies Transport, Industry, Building, Agriculture & Fisheries 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 1.92 Mtoe in total energy consumption by FY 2031. In the ambitious scenario, the reduction is projected to be 2.97 Mtoe. Additionally, this plan aims to generate awareness at a mass level and create a market potential of approximately Rs. 5,354 crores in the energy efficiency sector. Furthermore, it is anticipated to contribute to a reduction of 6 $MtCO_2$ in the moderate scenario and 9 $MtCO_2$ in the ambitious scenario in terms of CO_2 emissions by FY 2031.