RRECL

GOVERNMENT OF INDIA
MINISTRY OF POWER

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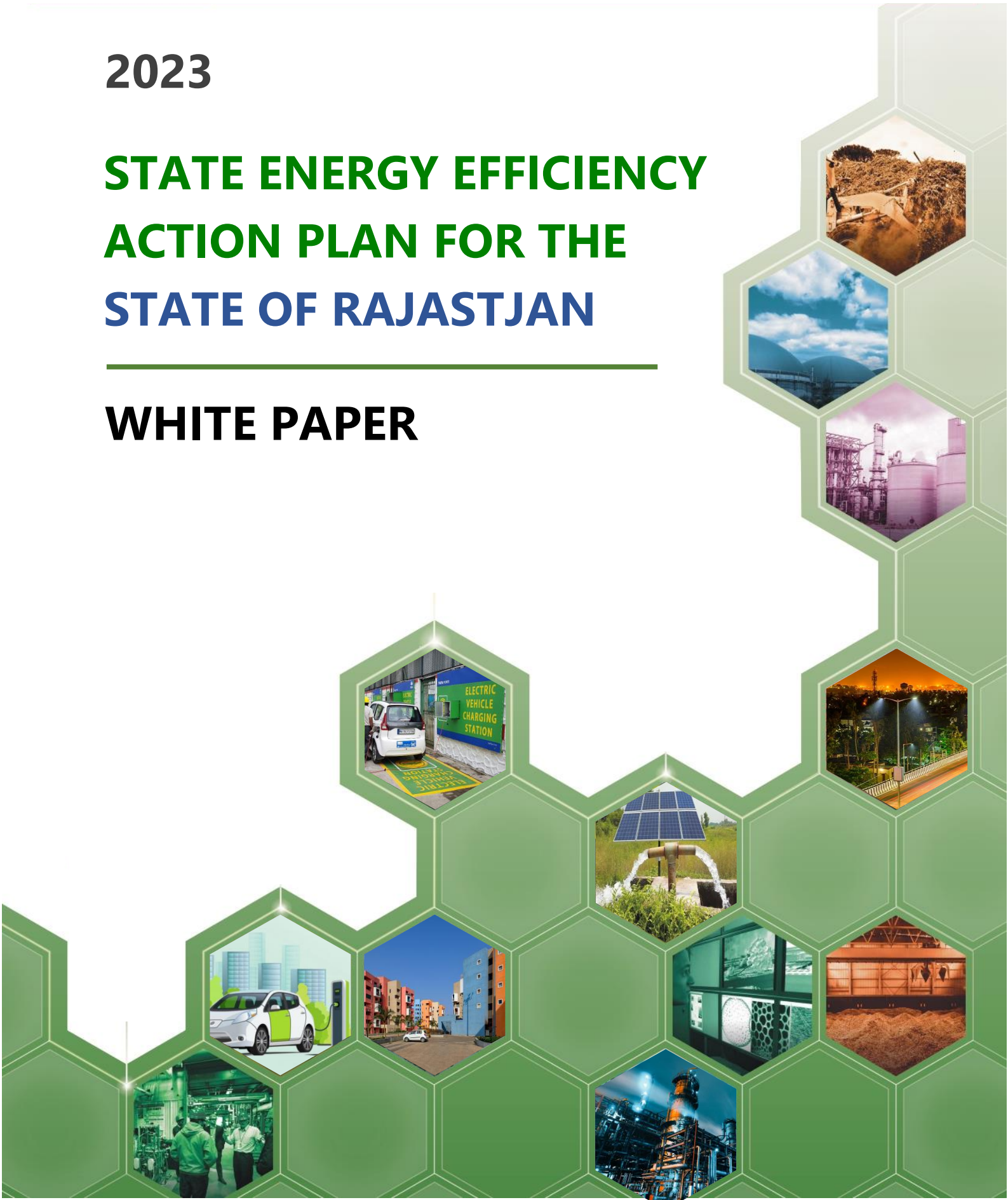
STATE ENERGY EFFICIENCY ACTION PLAN FOR THE STATE OF RAJASTJAN

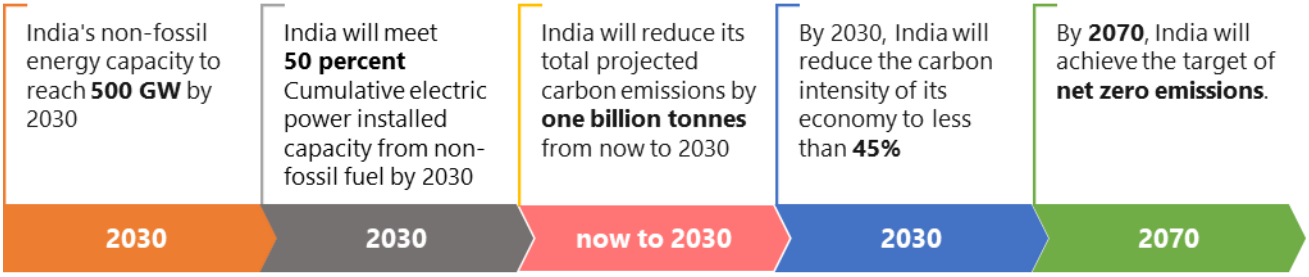
WHITE PAPER



Background

The increasing demand for energy puts a strain on the country's resources and has negative environmental impacts. Therefore, it is necessary to separate the country's economic growth from its energy demand. This objective is also reflected in India's Intended Nationally Determined Contribution submitted before the Paris Climate Conference, where the government emphasized energy conservation as a crucial mitigation strategy.

During the 26th session of the Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2021, the Government of India presented India's climate action plan, which included five essential elements known as Panchamrit. These elements include the target of achieving net zero emissions by 2070 and obtaining 50% of the country's energy from renewable resources by 2030.



The main focus of this project was to develop strategies aimed at improving the energy efficiency of energy-intensive sectors within the state. This action plan aligns with the Nationally Determined Contributions (NDCs), also known as Panchamrit. For Rajasthan, the action plan identifies key sectors and evaluates the potential for energy conservation and efficiency improvements in the region.

The State Energy Efficiency Action Plan sets both short-term goals to be achieved by FY 2026 and long-term goals to be achieved by FY 2031, with the objective of achieving significant energy efficiency improvements by 2031. The implementation of the proposed action plan is expected to result in estimated energy savings of 1.90 million tonnes of oil equivalent (Mtoe) in a moderate scenario and 2.85 Mtoe in an ambitious scenario by FY 2031 for the State of Rajasthan.

Identification of the focus sectors

In order to facilitate the transition towards low-carbon development pathways, each state or union territory (UT) plays a crucial role. The Bureau of Energy Efficiency, under the guidance of the Ministry of Power in consultation with State Designated Agency, various stakeholders from different sector of the state and knowledge partner ASSOCHAM has developed state-specific energy efficiency action plan to ensure that resource allocation aligns with the state's requirements and aids in achieving state-specific goals related to sustainable development.

Identifying the focus sectors or areas is important because certain sectors within a state tend to consume a significant portion of energy. To determine the focus sectors for Rajasthan, a comprehensive study was conducted, taking into account various parameters such as energy consumption patterns, emissions, Gross State Value Addition (GSVA), gap analysis in respective sectors, potential for energy efficiency and emission reduction, planned efforts by the state in prioritized sectors, State Designated Agency (Rajasthan Renewable Energy Corporation Limited – RRECL), and inputs from stakeholders.

Based on the Total Final Energy Consumption (TFEC) in the state and its sectoral distribution, the following sectors have been identified as the focus sectors for devising energy efficiency strategies in Rajasthan referring the fiscal year 2020 as a base year. Industry, Building, Transport, and Agriculture are the identified focus sector for the state.


Industries


Buildings


Transport


Agriculture

By targeting these focus sectors and implementing energy efficiency measures, the state aims to optimize energy consumption, reduce emissions, and contribute to sustainable development goals.

Proposed Strategies with Implementation Methodology

The chapter discuss 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 their actionable items and implementation methodology.

1. Industry Sector

The state is endowed with abundant physical resources, rich mineral wealth world-renowned handicrafts, handloom, and outstanding skills. These provides opportunities for manufacturing, beneficiation, processing activities and services in the MSME sector. The major industries cities are Ajmer, Alwar, Bhilwara, Chittorgarh, Jaipur, Jodhpur, Kota, Neemrana and Udaipur etc.

As of March 2021, the state has approximately 274 Large Industries and 9,50,617 registered MSMEs employing around 44.5 Lakh people. The prominent sectors based in their scale, investment, employment and share in energy consumption are namely Cement, Textile and Handloom, Chlor-Alkali, Fertilizer, Thermal Power Plants, Brick Kilns, Limestone, Plaster of Paris, Oil Mills, Hand Tools and Foundry.

The existing PAT DCs in the state of Rajasthan are Cement, Fertilizer, Textile and Chlor-Alkali.

The proposed strategies for the industrial sector are:

Deeping and Widening of Perform, Achieve and Trade (PAT) Scheme

In this strategy, it is suggested that the state should enhance coverage of energy consumption in PAT industries (DCs) by Deeping and Widening of the PAT scheme in the state.

In this it would imply notifying more industries as designated consumers under the current PAT sectors by lowering the threshold limit for eligibility (TOE/annum), as well as the inclusion of new sectors such Dairy, Petro-Chemical Industries, Hand Tools and Foundry.

Actionable Items:

a. Partial Risk guarantee program to encourage implementation of latest energy efficient technologies in the sectors (Over and above existing schemes with state contribution)
b. Capacity building of energy managers and auditors in PAT DCs and probable sectors for compliance with scheme and new technologies.

c. Mandatory standardized energy audits in every three years for all units that have energy consumption below PAT threshold, in all notified PAT sectors, excluding MSMEs.
d. Development of mechanisms for B2B interaction with global technology suppliers.

Implementation Methodology:

a. Identification of potential sectors
b. Setting energy targets
c. Implementation of energy efficiency measures
d. Monitoring and verification
e. Trading of energy saving certificates

Energy Efficiency Interventions for MSME Clusters

The strategy is proposed for the Small and Medium Enterprises (SME) sector, which consists of MSMEs in identified prominent sectors such as Bricks, Hand Tools, Plaster of Paris, Limestones, Textiles, Oil Mills etc. A PAT-like scheme is proposed under this strategy for the unorganized and small industries sectors, which would not meet the threshold energy consumption under the conventional PAT scheme. The strategy would involve the implementation of energy efficient technologies and new & innovative decarbonization technologies in the market to enable SMEs to meet their energy saving targets.

Actionable Items:

a. Carrying out of energy and resource mapping studies MSME clusters.
b. Implementation of demonstration projects on energy efficient technologies in SME clusters.
c. Workshop on technology interventions for energy conservations in MSMEs
d. Periodic standardized energy audits for MSMEs on load basis and reimbursement of energy audit cost with maximum cap.
e. Insurance of directives for implementation of ISO 50001, energy management system in organisations on load basis.
f. Sector-specific policy development for financial assistance on implementation of ECMs suggested in energy audit.
g. Phase wise plan to implement DSM scheme for replacement of existing inefficient (non-star rated) pumps through DISCOMS.
h. Competitive Incentivization for MSME sectors.

Implementation Methodology:

a. Identification of energy intensive MSME clusters
b. Conduct energy audits in the selected clusters
c. Implementation of energy efficient interventions
d. Monitoring and verification

Considering the implementation of both the strategies in the industry sector, it is estimated that approximately 0.09 Mtoe energy savings can be saved under the moderate scenario and 0.22 Mtoe under the ambitious scenario.

2. Buildings Sector

Rajasthan is an emerging and rapid urbanizing state. This sector is an energy guzzler though it consists of residential and commercial buildings. The commercial sector plays a vital role in urbanization, but it accounts

only 28.3% of the total electricity consumption for the state of Rajasthan. RRECL has prepared and notified the Energy Conservation Building Code for the state. Furthermore, Bureau of Energy Efficiency, GoI has launched Eco-Niwas Samhita (ENS) for residential buildings and residential part of mixed land used projects build on plot area ≥ 500 square meters in 2018. In the first phase minimum standards for the building envelope were launched to limit heat gain or heat loss of the residential building comprising adequate day lighting potential and ventilation. BEE, GoI developed Eco-Niwas Samhita part–II for setting up minimum standards for the Electromechanical Equipment for efficient use of energy in residential buildings. The provisions of ENS must be incorporated in Unified Building Byelaws (UBBL). The suggested strategies for the building sectors are:

Effective Implementation of ECSBC

The State of Rajasthan has already amended the Energy Conservation Building Code (ECBC) for commercial buildings, the state is in the process of adopting Eco-Niwas Samhita (ENS) for residential buildings. However, in a recent EC Act Amendment 2022, unified code "Energy Conservation and Sustainable Building Code" (ECSBC) was introduced which will cover both commercial and residential buildings. Till the implementation of ECSBC in states, ECBC and ENS will work in place of ECSBC. Effective implementation of Energy Conservation and Sustainable Building Code (ECSBC) by increasing the penetration of ECBC and ENS compliant buildings in the state is proposed for upcoming commercial and domestic buildings in the state as a strategy for energy savings in the buildings sector.

Actionable Items:

a. Setting up of effective enforcement plan with ULBs and SDA as monitoring agencies
b. Development and maintenance of ECSBC compliance portal, directory of energy efficient materials/technologies.
c. Market outreach for ECBC compliant products, Radio Jingles, social media Awareness
d. Pilot Projects for Super ECBC buildings as case studies (initial 20 buildings)
e. Home energy auditor training, compliance structure and incentive on energy savings for first few residential projects.
f. Periodic upgradation of PWD schedule of rates (SOR) to incorporate latest energy efficient materials and technologies.
g. Inclusion of curriculum on energy efficiency in buildings, in universities and schools
h. Installation of solar PV systems on the buildings having connected load of 100 kW or above.
i. Incentives on Green Building Certified and ECBC+/SuperECBC Building.

Implementing Methodology:

a. Establishing guidelines
b. Awareness and training programs
c. Code adoption
d. Compliance and enforcement
e. Performance evaluation
f. Incentives and recognition.

Replacement Program for inefficient (below than 3 star-rated) appliances:

The strategy has been proposed for the complete buildings sector, covering both commercial and domestic buildings. The electricity consumption pattern varies greatly between urban and rural areas. This is due to the variation in type and number of appliances being used by urban and rural residents.

Actionable Items:

a. Development of state-specific implementation models and identification of relevant agencies.
b. Issuance of directive to government offices and buildings in the state to replace all existing inefficient appliances (lower than 3 Star Rated) with BEE 5-star rated appliances.
c. Cost of energy efficiency upgradation in yearly budgets by government department.
d. Workshops & Campaigns on behavioural change interventions for energy conservation.

Implementation Methodology:

a. Identification of inefficient appliances
b. Selection and procurement of energy efficient appliances
c. Distribution and installation of the appliances
d. Disposal of the old appliances
e. Monitoring and Evaluation

Promotion of BEE Star Rating or Shunya Rating for Government Buildings

The Star Rating and Shunya Rating of buildings is currently at a voluntary stage which is used as a benchmarking system for buildings in order to classify them in terms of 'Star-Rating' & 'Shunya Rating' on the basis of their energy performance. It is proposed that to promote Star Rating & Shunya Rating in all government & commercial buildings and conduct an assessment for their energy performance along with the ECBC Compliance process.

Actionable Items:

a. Issuance of directives to all government departments to conduct energy audits and target to achieve BEE Star Rating for their buildings.
b. Periodic energy audits for buildings to maintain the star rating of buildings.
c. Capacity Building of Architects & Building Professionals and Developers.
d. Market Outreach for Star & Shunya Rating by Social Media Awareness.
e. Mandatory minimum set point of 24 degrees for air conditioners in all government buildings.
f. Transformation of iconic government buildings to Net-Zero energy buildings.

Implementation Methodology:

a. Identification for the eligible buildings
b. Awareness Campaigns
c. Compliance and Enforcement
d. Incentives and recognition
e. Performance evaluation

By implementing all the strategies in the buildings sector, it is estimated that approximately 0.12 Mtoe in energy savings can be achieved under the moderate scenario. Under the ambitious scenario, the estimated energy savings increase to approximately 0.15 Mtoe. These savings signify the potential reduction in energy

consumption and improved energy efficiency resulting from the implementation of energy conservation measures and the promotion of sustainable building practices.

3. Transport Sector

The Government of Rajasthan is committed to decarbonising the transport sector and they have taken a number of measures towards this direction. The Govt of Rajasthan has laid down various goals in two cities i.e., Jaipur and Ajmer-Pushkar. The approximate number of vehicles registered as of 2021 are 1,69,30,395 out of which 8,195 are electric vehicles.

The following is the strategy proposed for Transport Sector:

Infrastructure Development for EV charging stations and Incentives to Consumers for quick transition to EVs

This strategy suggests a plan to convert newly registered vehicles in the state to electric vehicles until the fiscal year 2031. The conversion targets are based on two different scenario trajectories: the moderate scenario and the ambitious scenario. These targets align with the guidelines outlined in the Rajasthan EV Policy of 2022. The highest EV conversion rate is proposed for 3-Wheelers and the lowest conversion rate is proposed for heavy vehicles.

Actionable Items:

a. Establishment of regulatory mechanism to develop EV charging infrastructure.
b. Pilot projects on battery swapping stations.
c. Pilot projects on hydrogen fuel cell vehicles (HCVs).
d. Pilot projects on renewable based charging infrastructure
e. Training of skill laboured for maintenance of charging infrastructure.
f. Incentives on the development of charging infrastructure by the private sectors in the state.
g. Disposal of Electric vehicles batteries
h. Scrapping model and Tax exemption on motor vehicles

Implementation Methodology:

a. Identification of target areas.
b. Selection of charging technologies.
c. Procurement and installation of charging stations.
d. Operations and maintenance.
e. Incentives to consumers.
f. Awareness campaign.
g. Monitoring and evaluation.

Ethanol Blending Program

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 2031, a 10% blending target is suggested in the moderate scenario and a 20% blending target is suggested in the ambitious scenario.

Actionable Items:

a. Financial Assistance on Biofuel production plants (Capital Subsidy for MSME)
b. Capacity Building for the investors
c. Monitoring mechanism for the supply of feedback and production of ethanol
d. Support for the research and development programs

Implementation Methodology:

a. Policy and regulatory framework
b. Production of Ethanol
c. Procurement and Storage
d. Blending of ethanol
e. Distribution and Marketing
f. Awareness Campaigns
g. Monitoring and verification

Promotion of Standard and Labelling program of Tyres for fuel efficiency in Vehicles

In this strategy the Bureau of Energy Efficiency has implemented a standard and labelling program for tyres to promote fuel efficiency in vehicles. It can be an effective way to encourage the adoption of more fuel-efficient tyres by consumers.

Actionable Items:

a. Awareness Campaigns
b. Capacity Building of Tyre Manufactures and Vehicles OEMs

By implementing all these above-mentioned strategies, it is estimated that significant energy savings can be achieved. Under the moderate scenario, approximately 0.90 Mtoe can be saved, while the ambitious scenario has the potential to save around 1.72 Mtoe. These savings indicate the reduced energy consumption resulting from the transition to electric vehicles, contributing to a more sustainable and efficient transportation sector.

4. Agriculture Sector

Rajasthan economy is predominantly considered as an economy since agriculture is the primary source of employment & livelihood of the people of Rajasthan. Approximately 60,000 standalone solar pumps have been installed by the Government of Rajasthan as on FY 2022-23. The state also aims to install a total of 1.40 lakh solar pumps in upcoming years by year 2025. Further, as per the Rajasthan Agricultural Statistical at a Glance for the year 2021-22, the total number of electrical and diesel pumps in the state are 18,87,746 in which electrical pumps have a share of about 75% and the remaining 25% are diesel pumps.

Following are the strategies proposed for the agriculture sector:

Transition of conventional diesel pumps to solar powered pumps

By FY2024, the Agriculture sector intends to implement a strategy that involves shifting from traditional diesel pumps to solar-powered pumps. This approach aligns with the nation's objective of replacing diesel with renewable energy sources within the agricultural domain, ultimately aiming to eliminate diesel usage entirely by FY2024. This transition is imperative to decrease the sector's reliance on fossil fuels and embrace a more sustainable and ecologically conscious energy alternative.

Actionable Items:

a. Modification in financial incentives model of PM-Kusum.
b. Promotion of suitable capacity solar based Ag-pumps in the Rajasthan State specially in desert districts
c. Greater outreach to relevant stakeholders
d. Capacity building of Panchayat/Block level officials

Implementation Methodology:

a. Access feasibility
b. Awareness and training programs
c. Financial incentives and support
d. Vendor selection and procurement
e. Installation and commissioning
f. Monitoring and mechanism
g. Evaluation and impact assessment

Considering the implementation of the mentioned strategies in the agriculture sector, it is estimated that approximately 0.11 Mtoe energy savings can be saved under the moderate scenario and 0.14 Mtoe under the ambitious scenario by FY2031.

Financing Mechanism

In the context of energy efficiency, a financial mechanism is a system put in place to provide financing for the implementation of energy efficiency measures. These mechanisms can include loans, grants, subsidies, tax incentives, and other financial tools that provide financial support for energy efficiency measures.

To achieve the targets and the cost savings, the state must implement various energy efficiency policies, schemes, and programmes, so to support the funding, the Bureau of Energy Efficiency has introduced various financing mechanism which the states can consider for the implementation.

The Bureau of Energy Efficiency has started a programme named 'The National Mission for Enhanced Energy Efficiency (NMEEE)' under the National Action Plan on Climate Change.

Energy Efficiency Financing Platform:
The Bureau of Energy Efficiency has started this financing initiative under the National Mission for Enhanced Energy Efficiency, the initiative aims to provide a platform to interact with Financial Institutions and project developers for implementation of energy efficiency projects.

Framework for Energy Economic Development:

The financing initiative was taken to ease the financing of energy efficiency projects through different fiscal instruments, the aim is to provide ease to stakeholders by implementation of schemes such as Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE), Venture Capital Fund for Energy Efficiency (VCFEE).

PRGFEE – Partial Risk Guarantee Fund for Energy Efficiency - "Addressing the credit risks and barriers to structuring the transactions Engaging financial institutions and building their capacity to finance EE projects on a commercially sustainable basis, it has a guarantee Period of Up to a maximum of 5 years. The Government of India has approved about INR 312 crores for PRGFEE.

VCFEE – Venture Capital Fund for Energy Efficiency - The VCFEE provides risk capital support to EE investments in new technologies, goods, and services. The Government of India has approved about INR 210 crores for PRGFEE.

Revolving Funds: Revolving funds are a financial tool that can be used to support sustainable development projects in various sectors, including agriculture, small business, and community infrastructure. These funds are given at a low-interest rate and are intended to support these sectors. The repayment of these loans is used to replenish the fund, enabling it to provide more loans to new borrowers.

Green Bonds: Green bonds are a type of financial instrument that are specifically designed to finance projects and initiatives with environmental benefits. They are typically issued by governments, municipalities, corporations, or other entities to raise capital for projects that promote sustainability, renewable energy, energy efficiency, climate change mitigation and other environmentally friendly initiatives.

Soft Loans: Soft loans, also known as concessionary loans or subsidized loans, are loans that are provided on more favourable terms compared to standard commercial loans. These loans typically have lower interest rates, longer repayment periods, and more flexible terms and conditions. Soft loans are often offered by governments, international financial institutions, or development agencies to support specific objectives such as economic development, social welfare, or sustainability.

Summary

Through extensive research and collaboration with various stakeholders, the Rajasthan Renewable Energy Corporation Limited (RRECL), and ASSOCHAM in consultation with Bureau of Energy Efficiency has developed a comprehensive State Energy Efficiency Action Plan for the State of Rajasthan. This plan recognizes the necessity, potential, and opportunities for energy efficiency within the state. The action plan outlines a detailed roadmap for implementing these strategies, while also emphasizing the importance of monitoring their implementation through involvement from multiple stakeholders.

By projecting the state's total final energy consumption (TFEC) based on energy consumption and economic growth, it is estimated that Rajasthan's TFEC will reach 50.34 Mtoe by FY 2031.

In light of this projection, the action plan identifies Industry, Buildings, Transport, and 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 1.90 Mtoe in total energy consumption by FY 2031. In the ambitious scenario, the reduction is projected to 2.85 Mtoe. Additionally, this plan aims to generate awareness at a mass level and create a market potential of approximately Rs. 5,227 Crore in the energy efficiency sector. Furthermore, it is anticipated to contribute to a reduction of 5.93 $MtCO_2e$ in the moderate scenario and 8.93 $MtCO_2e$ in the ambitious scenario in terms of CO_2 emissions by FY 2031.

Table 1: *Energy Savings Summary and Investment Potential*

Sectors	Energy Consumption & Emission Reduction - FY2031				
	Moderate	**Ambitious**	**Moderate**	**Ambitious**	**Investment Potential (INR Crores)**
	Mtoe Reduction	Mtoe Reduction	$MtCO_2$ Reduction	$MtCO_2$ Reduction	
Industry	0.09	0.22	0.27	0.68	401
Buildings	0.12	0.15	0.36	0.47	279
Transport	1.57	2.33	4.92	7.28	4,282
Agriculture	0.11	0.14	0.34	0.45	266
Total	**1.90**	**2.85**	**5.93**	**8.93**	**5,227**