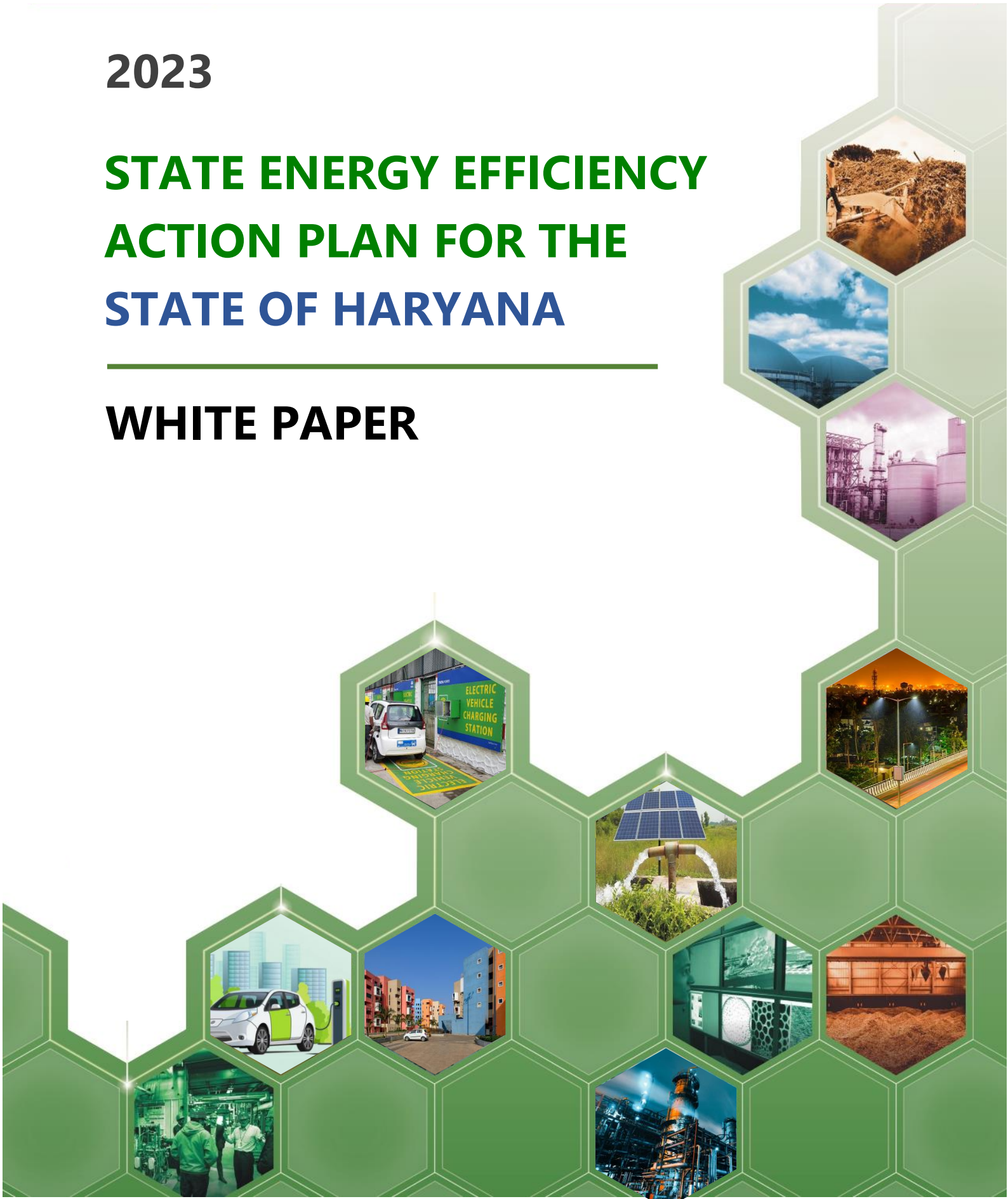
GOVERNMENT OF INDIA
MINISTRY OF POWER

सत्यमेव जयते

2023

STATE ENERGY EFFICIENCY ACTION PLAN FOR THE STATE OF HARYANA

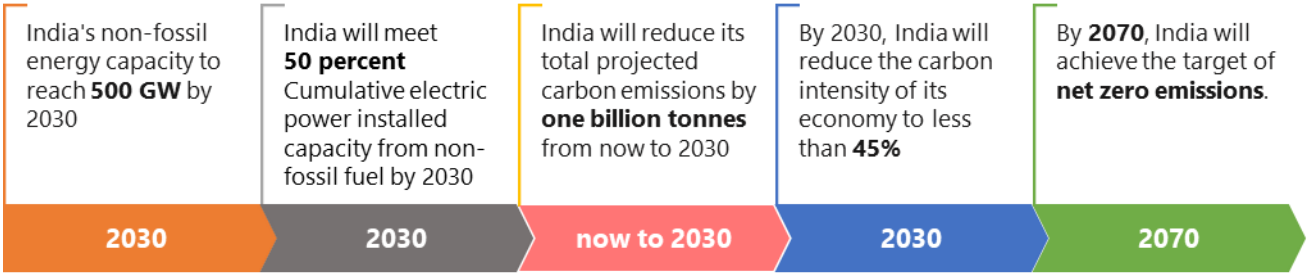
WHITE PAPER



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 Haryana, 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 2030. The implementation of the proposed action plan is expected to result in estimated energy savings of 1.9 million tonnes of oil equivalent (Mtoe) in a moderate scenario and 3.6 Mtoe in an ambitious scenario for Haryana.

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 Haryana, 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 (Haryana Renewable Development Agency - HAREDA, 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 Haryana referring the fiscal year 2020 as a base year. Industries, Transport, Buildings, and Agriculture are the identified focus sector for the state.


Industries


Transport


Buildings


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

Haryana has emerged as a preferred investment destination for national and international investors. The state is a vibrant and fast growing, attracting investors for profitable investments. It is enjoying the advantages of various aspects such as proximity to the NCR region, good law and order condition, quality infrastructure, skilled manpower, conductive policy environment etc. The major industries in Haryana are Agro-based, food processing and allied industry, Automobile and automotive components, Footwear and accessories, Handloom & textile and Health and healthcare. The manufacturing MSME spectrum in the state comprises both state of the art medium enterprises (majorly located in Panipat, Faridabad and Gurugram) as well as a large number of traditional micro and small enterprises (majorly located in Panchkula, Ambala, Karnal, Rohtak, etc). As per the Directorate of Micro, Small & Medium Enterprises, there are a total of 56 MSME clusters in 21 districts of State of Haryana. 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 as Rice Mills, Dairy, Food Processing etc.

Implementing Agency: Bureau of Energy Efficiency (BEE); HAREDA (SDA); Department of Industries

Actionable Items:

a. Partial Risk Guarantee program to encourage implementation of latest energy efficient technologies in the sectors.
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.
e. Awareness and Capacity Building Workshops for Clean Energy Technologies in MSMEs

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 consist of MSMEs in identified prominent sectors such as Foundry & Forging, Food Processing 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 in order to enable SMEs to meet their energy saving targets.

Implementing Agency: Department of Industries; BEE; HAREDA

Actionable Items:

a. Carrying out of energy and resource mapping studies MSME cluster.
b. Implementation of demonstration projects on energy efficient technologies in SME cluster.
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. Issuance of directives for implementation of ISO 50001, Energy Management System in organisations on load basis.
f. Technical assistance for transition from inefficient (installed before 2010) boiler to Energy Efficient boilers, use of steam traps, heat recovery systems and use of EE motors with different drive and other ECMs.
g. Technical assistance for upgrading the Furnaces for energy savings, use of recuperator for waste heat recovery from hot flue gases of furnace and insulation of furnace.
h. Sector-specific policy development for financial assistance on implementation of ECMs suggested in energy audit.
i. Phase wise plan to implement DSM scheme for replacement of existing inefficient (non-star rated) pumps through DISCOMS.

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 the mentioned strategies in the industry sector, it is estimated that approximately 0.0011 Mtoe energy savings can be saved under the moderate scenario and 0.0022 Mtoe under the ambitious scenario.

2. Transport Sector

Due to emerging of Haryana as one of the most vital business centers in India, the government of Haryana has invested a lot in recent years to provide proper transportation facilities to the people. The number of registered motor vehicles has shown a persistent increase over the year. As per the data available from the Department of Transport an average increment of 8.4% is observed in 2019 when compared with the base year 2015. Further, there has been a steady increase in private vehicles under the four wheelers and two-wheeler category, which exhibits a potential of positive electrical vehicle transition in Haryana. The following are the suggested strategies for the transportation 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 Haryana EV Policy of 2019. The highest EV conversion rate is proposed for 2-wheelers because of it having the highest share in registered vehicles and taking into consideration the availability and affordability of 2-Wheeler electric vehicles.

Implementing Agency: Directorate State Transport Haryana, DISCOMs, PSUs and private sector.

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).

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.

Implementing Agency: State Transport Department & Individual Government Departments

Actionable Items:

a. Financial Assistance on Biofuel production plants

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 the above-mentioned strategies, it is estimated that significant energy savings can be achieved. Under the moderate scenario, approximately 0.07 Mtoe can be saved, while the ambitious scenario has the potential to save around 0.09 Mtoe. These savings indicate the reduced energy consumption resulting from the transition to electric vehicles, contributing to a more sustainable and efficient transportation sector.

3. Buildings Sector

As per the population projection report by Ministry of Health and Family Welfare, Haryana is estimated to have a population of 2.5 Crore by FY2030 out of which 41.37% (1.2 Crore) of the population will reside in the urban areas. Haryana Renewable Development Agency (HAREDA) has prepared and notified the Energy Conservation Building Code (ECBC) for the state. Despite the significant urbanization in Haryana, the commercial sector, which is a key component of the urban landscape, accounts for only 35% of the total electricity consumption in the buildings sector. The suggested strategies for the building sectors are:

Effective Implementation of ECSBC

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 encompass both commercial and residential buildings. Until the implementation of ECSBC in states, the existing Energy Conservation Building Code (ECBC) and Eco-Niwas Samhita for Buildings (ENS) will be referred to as ECSBC. To achieve energy savings in the building sector, it is proposed to effectively implement the Energy Conservation and Sustainable Building Code (ECSBC) by increasing the number of ECBC and ENS compliant buildings in the state.

Implementing Agency: Bureau of Energy Efficiency; HAREDA; Haryana Shehri Vikas Pradhikaran

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 to incorporate latest energy efficient materials and technologies.
g. Incorporating Embodied Energy Concept in ECSBC Implementation
h. Inclusion of curriculum on energy efficiency in building, in universities and schools

Implementing Agency:

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.

Implementing Agency: DISCOMs; ESCOs; HAREDA

Actionable Items:

a. Development of state-specific implementation models and identification of relevant agencies
b. Issuance of directive to government office and building in the state to replace all existing inefficient appliances with BEE 5-star rated appliance.
c. Phase-wise plan for replacement of existing inefficient appliances (lower than 3 Star Rated) with BEE 5-star rated appliances in all buildings, through DSM schemes.
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 and Shunya Rating of 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.

Implementing Agency: Bureau of Energy Efficiency; HAREDA; Haryana Shehri Vikas Pradhikaran

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 commercial buildings on load basis and incentives on achieving specific level of star rating for buildings.
c. Capacity Building of Architects & Building Professionals and Developers
d. Market Outreach for Star & Shunya Rating by Radio Jingles, 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
g. Appointment of resource for energy simulation

Implementation Methodology:

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

By implementing the aforementioned strategies in the buildings sector, it is estimated that approximately 0.0018 Mtoe in energy savings can be achieved under the moderate scenario. Under the ambitious scenario, the estimated energy savings increase to approximately 0.0026 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.

4. Agriculture Sector

Haryana is one of the finest Indian states in terms of Agriculture performance. The state is a major producer of food grains in the country, accounting for about 12% of national wheat production and about 3% of the national rice production. Nearly two thirds of the state population still depend on this sector for their livelihood. In terms of area, agriculture has already reached a saturation level and almost all the available cultivable land in the State is under plough. Thus, there is hardly any scope to bring more areas under cultivation. The state witnessed all the 11 Argo Climatic Zones of the country. The state also contributes about 40% to India's total organic farming. 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.

Implementing Agency: State Agriculture Department & Irrigation Department, HAREDA

Actionable Items:

a. Greater outreach to relevant stakeholders
b. 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

Replacement of inefficient (non-star rated) pumps with BEE 5 Star Rated Pumps along with smart control panel

This strategy aims to reduce energy consumption and increase the efficiency of the pumps used in irrigation. The implementation period for this strategy is long term, until FY2031. During this period, two scenarios have been proposed. The first scenario is the moderate scenario, which aims to replace 50% of the inefficient electric-powered pumps with BEE Star rated pumps by FY2031. This scenario aims to achieve significant energy savings and improve the efficiency of pumps used in irrigation.

Implementing Agency: Department of Agriculture; HAREDA

Actionable Items:

Development of a phase-wise plan to implement Demand Side Management (DSM) scheme for replacing existing inefficient pumps through Energy Service Companies (ESCOs).

Implementation Methodology:

a. Energy audit and assessment
b. Identification of suitable pumps
c. Financial analysis
d. Incentives and support
e. Vendor selection and procurement
f. Installation and commissioning
g. Awareness and training
h. Monitoring and performance
i. Maintenance and support
j. Reporting and impact assessments

Considering the implementation of the mentioned strategies in the agriculture sector, it is estimated that approximately 0.07 Mtoe energy savings can be saved under the moderate scenario and 0.09 Mtoe under the ambitious scenario.

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 and the Haryana Renewable Energy Development Agency (HAREDA), ASSOCHAM in consultation with Bureau of Energy Efficiency has developed a comprehensive State Energy Efficiency Action Plan for the State of Haryana. 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 Haryana's TFEC will reach 59.17 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 1.9 Mtoe in total energy consumption by FY 2031. In the ambitious scenario, the reduction is projected to 3.6 Mtoe. Additionally, this plan aims to generate awareness at a mass level and create a market potential of approximately Rs. 6,610 Crore in the energy efficiency sector. Furthermore, it is anticipated to contribute to a reduction of 5.9 $MtCO_2$ in the moderate scenario and 11.2 $MtCO_2$ in the ambitious scenario in terms of CO_2 emissions by FY 2031.