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EE&REM
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STATE ENERGY EFFICIENCY ACTION PLAN

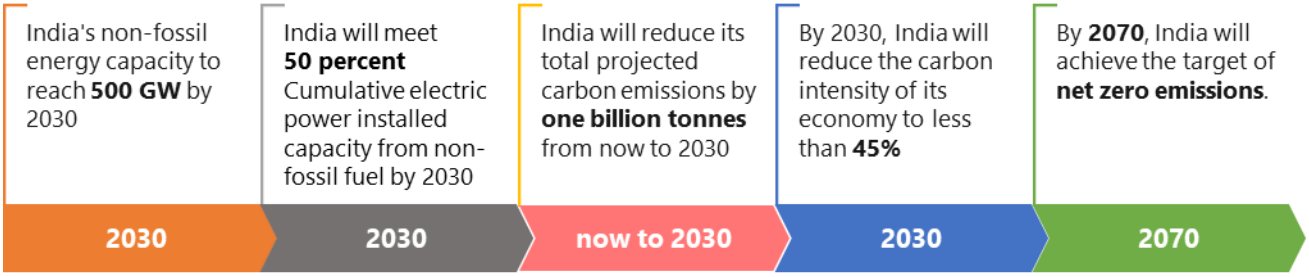
DELHI

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 NCT of Delhi, 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 0.589 million tonnes of oil equivalent (Mtoe) in a moderate scenario and 1.004 Mtoe in an ambitious scenario by FY 2031.

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 NCT of Delhi, 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 (EE&REM Centre), and inputs from stakeholders.

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

Buildings

Transport

Industries

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. Buildings Sector

In Delhi, 98% of the population lives in urban areas, with 77.6% of the 46.1 lakh houses used for residential purposes. The Delhi Development Authority (DDA) has integrated the Energy Conservation Building Code (ECBC) 2007 into the Unified Building Byelaws (UBBL) 2016, but compliance with the ECBC-2017 is pending. The Bureau of Energy Efficiency (BEE) introduced the Eco-Niwas Samhita (ENS) for residential buildings to improve energy efficiency, and the Energy Conservation (Amendment) Act, 2022 has introduced the Energy Conservation and Sustainable Building Code (ECSBC) for both commercial and residential buildings. The suggested strategies for the building sectors are:

Effective Implementation of ECSBC

Delhi is adopting the Energy Conservation Building Code (ECBC) for commercial buildings and the Eco-Niwas Samhita (ENS) for residential buildings. However, the recent Energy Conservation Act Amendment 2022 introduces the unified Energy Conservation and Sustainable Building Code (ECSBC), which will cover both types of buildings. Until ECSBC is implemented, ECBC and ENS will be treated as ECSBC. The strategy includes increasing the adoption of ECSBC-compliant buildings to save energy. Projections of electricity consumption in the commercial building sector through FY 2031 are being used to estimate potential energy savings.

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

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 5 star-rated) appliances:

The Standards & Labelling (S&L) Programme of Bureau of Energy Efficiency (BEE) has seen a successful implementation across the country, leading to significant savings in energy through mandatory and voluntary use of energy efficient electrical appliances by consumers in a wide range of applications.

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 UT to replace all existing inefficient appliances (lower than 5 Star Rated) with BEE 5-star rated appliances.
c. Phase-wise plan for replacement of existing inefficient appliances (lower than 5 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

Mandatory 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 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.

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 **0.1797 Mtoe** in energy savings can be achieved under the moderate scenario. Under the ambitious scenario, the estimated energy savings increase to approximately **0.3559 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.

2. Transport Sector

In Delhi, four-wheelers account for 25% of registered vehicles. The Delhi EV Policy aims to transition a significant portion of vehicles to electric. The city is rapidly adopting EVs, with government departments and private operators increasingly purchasing them. DMRC and DTC have added 100 and 1600 electric buses, respectively. To support this shift, robust EV charging infrastructure is being developed by BYPL, BRPL and TPDDL in their respective areas. From FY 2018 to FY 2021, the number of registered vehicles grew at an average annual rate of 4.87%, projected to continue through FY 2030. The following is the strategy proposed for Transport Sector:

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

The transition to Electric Vehicles (EVs) across all segments of vehicles will be instrumental in decarbonization of the sector and in bringing significant savings in fossil-fuel based energy consumption. In this strategy, it is proposed to convert new vehicles registered in the state till FY 2031 to electric vehicles along two different scenario trajectories, namely moderate scenario and ambitious scenario. 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.

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. Installation of solar panels on rooftops or carports

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: Transport Department & Individual Government Departments

Actionable Items:

- Financial Assistance on Biofuel production plants. (Capital Subsidy for MSMEs)

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 **0.355 Mtoe** can be saved, while the ambitious scenario has the potential to save around **0.534** 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. Industry Sector

The Delhi State Industrial Infrastructure Development Corporation (DSIIDC) oversees the development and maintenance of industrial estates in Delhi. The city has 1,78,079 registered MSMEs, comprising 1,56,843 micro enterprises, 18,715 small enterprises, and 2,521 medium enterprises. Delhi is home to 29 approved industrial areas and four flatted factory complexes. Major industries include textiles, basic metals and alloys, and metal products and machinery. The Delhi government supports the growth of environmentally friendly MSMEs, contributing significantly to production, exports, and employment, and playing a vital role in the national economy's development. The proposed strategies for the industrial sector are:

Energy Efficiency Interventions for MSME Clusters

The strategy is proposed for the Small and Medium Enterprises (SME) sector industries which consist of MSMEs in identified prominent sectors such as Textiles, Metal Alloy and Machinery Parts clusters for moderate scenario and in addition to moderate scenario Paper, Rubber Plastic, Leather Products and food products in ambitious scenario. 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. Workshops on technology interventions for energy conservations in MSMEs.
b. Carrying out energy and resource-mapping studies in MSME clusters.
c. Demonstration projects on latest Energy Efficiency Technologies in SME clusters.
d. Periodic standardized energy audits for MSMEs on load basis and reimbursement of energy audit cost with maximum cap.
e. Sector-specific policy development for financial assistance on implementation of ECMs suggested in energy audit.
f. Issuance of directives for implementation of ISO 50001, Energy Management System in organizations on load basis
g. Phase wise plan to implement DSM scheme for replacement of existing inefficient (non-star rated) pumps through DISCOMS.
h. Installation of solar panels on rooftops.

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 **0.055 Mtoe** energy savings can be saved under the moderate scenario and **0.114 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, the State Designated Agency (EE&REM Centre), and ASSOCHAM in consultation with Bureau of Energy Efficiency has developed a comprehensive State Energy Efficiency Action Plan for the NCT of Delhi. This plan recognizes the necessity, potential, and opportunities for energy efficiency. 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 UT's total final energy consumption (TFEC) based on energy consumption and economic growth, it is estimated that Delhi's TFEC will reach 22.42 Mtoe by FY 2031.

In light of this projection, the action plan identifies Buildings, Industry, and Transport 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 0.589 Mtoe in total energy consumption by FY 2031. In the ambitious scenario, the reduction is projected to 1.004 Mtoe. Additionally, this plan aims to generate awareness at a mass level and create a market potential of approximately Rs. 1,848 Crore in the energy efficiency sector. Furthermore, it is anticipated to contribute to a reduction of 1.844 $MtCO_2e$ in the moderate scenario and 3.142 $MtCO_2e$ in the ambitious scenario in terms of CO_2 emissions by FY 2031.

Table 1: *Energy Savings Summary and Investment Potential*

Sector	Energy Saving Potential (Mtoe) - FY2031		Emissions Reduction ($MtCO_2$) - FY2031		Investment Potential (INR Crore)
	Moderate	Ambitious	Moderate	Ambitious	
	Mtoe	Mtoe	$MtCO_2e$	$MtCO_2e$	
Buildings	0.180	0.356	0.562	1.114	655
Transport	0.355	0.534	1.111	1.673	983
Industries	0.055	0.114	0.171	0.356	209
Total	**0.589**	**1.004**	**1.844**	**3.142**	**1,848**