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YOJANA MAGAZINE ANALYSIS

(February 2025)

(Part 2/4)

TOPICS TO BE COVERED

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- PM KUSUM: EMPOWERING FARMERS WITH SOLAR ENERGY
- ENERGY SECURITY IN INDIA

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- INDIAN CARBON MARKETS
- SMART CITIES MISSION & ROLE OF ENERGY EFFICIENCY

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- SCOPE & OPPORTUNITIES FOR RENEWABLE ENERGY IN RURAL INDIA
- GREEN HYDROGEN

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- BIOFUELS AS A PROMISING SUBSTITUTE FOR HIGH CARBON ENERGY SOURCE
- PRAGATI: DRIVING INDIA'S DEVELOPMENT WITH PURPOSE

INDIAN CARBON MARKETS: KEY DEVELOPMENTS & FRAMEWORK FOR ACHIEVING CLIMATE GOALS

- India has made substantial progress in decoupling its economic growth from greenhouse gas (GHG) emissions.
- As of **December 2023**, India's **3rd National Communication (TNC)** submitted to the **United Nations Framework Convention on Climate Change (UNFCCC)** reveals significant reductions in emission intensity relative to Gross Domestic Product (GDP), showcasing the country's commitment to climate action and its targets under the **Paris Agreement**.

GHG EMISSION INTENSITY REDUCTION

India has been successfully reducing its emission intensity over different periods, as highlighted in the table below:

Period	GHG Inventory Year	Reduction in Emission Intensity w.r.t. 2005 levels
2005-2010	**2010**	12%

2005-2014	**2014**	21%
2005-2016	**2016**	24%
2005-2019	**2019**	33%

These reductions reflect India's ongoing efforts to balance economic growth with sustainability, in line with global climate targets.

CARBON CREDIT TRADING SCHEME

- To facilitate further reduction in GHG emissions, India has created a regulatory framework for a carbon market under the **Energy Conservation (Amendment) Act, 2022**.
- This framework enables the establishment of a **Carbon Credit Trading Scheme (CCTS)**, which was formally notified by the **Central Government** in **June 2023** and updated in **December 2023**.

Objectives of CCTS

- **Decarbonize the economy**: By pricing GHG emissions through carbon credit trading.

- **Meet climate goals**: Align with India's **Nationally Determined Contributions (NDCs)** under the **Paris Agreement**.

MECHANISMS UNDER CCTS

The **CCTS** is designed to incentivize emission reductions through two mechanisms:

1. **Compliance Mechanism**: Obligated entities must meet GHG reduction targets. Entities exceeding these targets earn **Carbon Credit Certificates**, which can be traded.
2. **Offset Mechanism**: Non-obligated entities can register projects that reduce, remove, or avoid GHG emissions, earning **Carbon Credit Certificates** for their efforts.

KEY FEATURES

- **Regulatory Oversight**: The scheme is managed by the **Bureau of Energy Efficiency (BEE)** in consultation with the **Central Government**.
- **Contribution to National Climate Goals**: Supports the achievement of India's climate commitments under the **UNFCCC**.

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TRANSITION FROM PERFORM ACHIEVE TRADE TO CCTS

- **Introduction**: Launched in 2012 to improve energy efficiency in energy-intensive industries.
- **Objective**: Reduce energy consumption and CO_2 emissions in sectors like Aluminium, Cement, and Steel by setting energy reduction targets for Designated Consumers (DCs).
- **ESCerts**: Companies exceeding targets are issued Energy Saving Certificates (ESCerts), which can be traded or used for future targets.

TRANSITION TO CCTS

- **Rationale**: Transition to Compliance Carbon Trading Scheme (CCTS) aligns with India's carbon market framework and climate goals.
- **Affected Sectors**: Aluminium, Cement, Steel, Paper, Chlor-Alkali, Fertilizer, Refinery, Petrochemical, and Textile.
- **Objective**: Align with national climate goals and avoid target duplication across regulatory frameworks.

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ENERGY EFFICIENCY & CLIMATE GOALS

- **Renewable Energy**: 200 GW of installed renewable energy capacity (46% of total capacity).
- **Energy Intensity**: Target to reduce energy intensity by 45% by 2030 (vs. 2005 levels).
- **Net-Zero**: Commitment to net-zero emissions by 2070.

PAT SCHEME MECHANISM

- **Design and Implementation**: Led by Bureau of Energy Efficiency (BEE), sets energy-saving targets for DCs.
- **ESCerts Trading**: DCs exceeding targets earn ESCerts, which can be traded or used by others to meet their obligations.
- **Impact**: Significant energy savings, CO_2 reduction, and adoption of energy-efficient technologies.

PAT Cycle and Implementation:

- 3-Year Cycle: DCs implement energy-saving measures to meet targets.

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- Energy Efficiency Measures: Include efficient equipment, process optimization, and renewable energy use.
- Results: Notable energy savings and CO_2 reductions in participating sectors.

MEASUREMENT REPORTING & VERIFICATION FRAMEWORK

- The **MRV framework** is central to ensuring the accuracy, transparency, and credibility of the **CCTS**.
- Developed by the **Bureau of Energy Efficiency (BEE)**, the MRV framework outlines the procedure for setting targets, **monitoring emissions**, **reporting results**, and **verifying emissions data**.

Key Elements of the MRV Framework

- **Target Setting**: Defining the emission intensity reduction targets for obligated entities.
- **Monitoring**: Ongoing assessment of emission levels to ensure compliance.
- **Reporting & Verification**: Annual verification of emissions data to ensure credibility.
- **Issuance and Trading of Carbon Certificates**: Entities can trade certificates earned from reducing their GHG emissions.

The MRV framework was finalized in **July 2024**, after extensive consultations with stakeholders, and is essential to ensuring the **credibility** of the **CCTS**.

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CARBON VERIFICATION AGENCY

- To ensure the integrity of the carbon market, the **Bureau of Energy Efficiency (BEE)** will **accredit Carbon Verification Agencies (CVAs)**.
- These agencies will verify the GHG emissions data provided by obligated and non-obligated entities.

Accreditation Process

- **Eligibility Criteria**: The BEE has developed specific eligibility criteria for the accreditation of CVAs, ensuring that they meet the necessary standards for verifying carbon credits.

CONCLUSION

India's **Carbon Credit Trading Scheme (CCTS)** represents a pivotal step in the country's efforts to reduce **greenhouse gas emissions** and meet its **climate commitments** under the **Paris Agreement**. By establishing a robust regulatory framework for carbon credit trading, India aims to decarbonize its economy while encouraging sustainable growth.

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SMART CITIES MISSION

- The **Smart Cities Mission (SCM)** is a transformative initiative launched to improve the quality of life in India's urban centers by providing **smart, sustainable solutions**.
- Focused on creating cities that are economically vibrant, inclusive, and environmentally friendly, the mission addresses urban challenges through **advanced infrastructure**, **innovative governance**, and **social development**.
- Launched by **Prime Minister Shri Narendra Modi** on **25th June 2015**, SCM set out with the goal of revitalizing 100 cities to be models of modern urban living.
- As of **December 2024**, the mission has achieved significant milestones, with **91% of projects completed**, reflecting its success in improving urban spaces across the country.

APPROACH OF THE MISSION

The **Smart Cities Mission** is implemented through two main strategies:

- **Area-Based Development (ABD)**:
    - Each of the 100 cities has chosen a defined area for targeted interventions.

- These **ABD areas** are developed through **citizen participation** and serve as **replicable models** for other parts of the city.

- **Pan-City Projects**:
  - These are **technology-driven solutions** aimed at improving the city-wide infrastructure and services.
  - They focus on using technologies like **IoT**, **AI**, and **Data Analytics** to enhance **governance** and improve **citizen services**.

ADDITIONAL FEATURES OF THE MISSION

- Creation of a **Special Purpose Vehicle (SPV)** structure for project implementation.
- Encouragement of **multiple funding sources** for projects.
- Engagement of **citizens** in decision-making and **competitive federalism**.

KEY ACHIEVEMENTS OF SMART CITIES MISSION

Progress on Projects

- **7,380 out of 8,075 projects** have been completed.
- **Investment**: A total of **₹1,47,704 crore** has been invested across all cities.

- The completion of these projects demonstrates the mission's success in **shaping urban landscapes** for the better.

INITIATIVES & MILESTONES

- **Integrated Command and Control Centres (ICCC)**:
    - **100 cities** have operational ICCCs, which serve as **data hubs** to help improve city management.
    - ICCCs played a crucial role during the **COVID-19 pandemic**, serving as **war rooms** and managing urban operations like **transport**, **water supply**, and **waste management**.
- **Public Safety and Security**:
    - Over **84,000 CCTV surveillance cameras** have been installed to monitor **public safety**.
    - **Emergency call boxes** and **public address systems** have been set up, while systems for traffic enforcement, like **automatic number plate recognition**, have been deployed.

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- **Water Supply**:
    - Over **17,026 kilometers** of water supply systems are being monitored through **SCADA**, reducing **non-revenue water** and leakage.
- **Solid Waste Management**:
    - **66 cities** are now leveraging technology to manage solid waste, improving **efficiency** and **route management**.
    - Approximately **9,194 vehicles** are **RFID-enabled**, optimizing waste collection.
- **Mobility**:
    - **1,740 kilometers** of **smart roads** have been built or improved, alongside the development of **713 kilometers** of **cycle tracks**.
    - An **Intelligent Transport Management System (ITMS)** has been implemented to streamline traffic operations and reduce travel time.
- **Education and Health**:
    - **9,433 smart classrooms** and **41 digital libraries** have been set up to improve access to quality education.
    - The mission also developed **172 e-health centers** and installed **152 health ATMs**, ensuring accessible healthcare services.

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ADAPTING TO EMERGING NEEDS & OVERCOMING CHALLENGES

In response to **emerging challenges**, the Smart Cities Mission has launched several initiatives, such as:

- **'Cycles4Change'**: Encourages cities to promote **cycling** as a sustainable mode of transport.
- **'Streets4People'**: Focuses on creating **safe, inclusive public spaces** for pedestrians and cyclists.
- **'Placemaking Marathons'** and **'Nurturing Neighbourhoods Challenge'**: These initiatives focus on enhancing public spaces for **vulnerable groups**.
- **'Transport 4All'** and **'EatSmart Cities'**: These initiatives aim to improve **public transport** and promote **food hygiene** in cities.

STRATEGIES FOR SMART CITIES MISSION

The mission employs a three-pronged approach to urban transformation:

- **Retrofitting**: Modifying existing urban areas with smart technologies to improve infrastructure and services.

- **Redevelopment**: Revitalizing urban areas that are outdated or underdeveloped.
- **Greenfield Projects**: Creating new urban spaces from scratch, equipped with smart solutions and sustainable infrastructure.

Each city's proposal integrates **one area-based model** (retrofitting, redevelopment, or greenfield) along with **Pan-city projects** to ensure that all residents benefit from the mission's outcomes.

For cities in the **North Eastern** and **Himalayan regions**, the development area requirements are **reduced by half**, recognizing the unique needs and challenges of these areas.

CONCLUSION

The **Smart Cities Mission** has made impressive strides in transforming urban living across India. With **91% of projects completed**, the mission is enhancing **infrastructure**, **mobility**, **public safety**, and **healthcare** through **technology-driven solutions**. Key initiatives such as **'Cycles4Change'** and **'Streets4People'** show the mission's adaptability to emerging challenges and its focus on creating **sustainable, inclusive urban spaces**. As the mission continues to progress, it will serve as a model for cities worldwide striving for smarter, more livable environments.