

SURAT EMISSION TRADING SCHEME: ENVIRONMENT

NEWS: Can pollution markets work? Study evaluates Gujarat's cap-and-trade experiment

WHAT'S IN THE NEWS?

The Surat Emission Trading Scheme is the world's first market-based mechanism for particulate matter emissions, showing a 20–30% reduction in pollution and high compliance. It marks a transformative shift in India's approach to air quality regulation through data-driven and cost-effective methods.

Context: Surat Emission Trading Scheme (ETS) Yields Dual Benefits

- A recent study has confirmed that the **Surat ETS**, launched in Gujarat in 2019, has successfully delivered both **environmental and economic benefits**.
- This initiative has been globally recognized as the **world's first market-based emissions trading scheme focused on particulate matter (PM)** and **India's first pollution trading program**.

About Surat ETS – A Cap-and-Trade Model for Pollution Control

- The ETS operates on a **cap-and-trade principle**, where the **total allowable PM emissions are capped**, and emission permits are **traded among industrial units**.
- This system was developed jointly by the **Gujarat Pollution Control Board (GPCB)** and the **Energy Policy Institute at the University of Chicago**.
- The goal is to incentivize industries to **innovate in pollution control** and **reduce emissions efficiently** without compromising economic productivity.

How the Scheme Works

- **CEMS (Continuous Emission Monitoring Systems)** were made mandatory for **318 coal-using industrial units** in Surat.
- These systems enabled **real-time monitoring of PM emissions**, replacing the older model of **spot inspections** that were infrequent and reactive.
- GPCB established a **monthly emissions cap of 170 tonnes**, based on cumulative data collected from the industries via CEMS.
- **Permit Distribution Mechanism:**
 - **80% of permits were distributed for free**, in proportion to each unit's potential emissions (such as boiler capacity).
 - **20% were auctioned weekly**, allowing industries to buy additional permits based on their operational needs.
- Firms that **exceeded emissions without enough permits** faced **financial penalties**, ensuring accountability and compliance.

Key Achievements of the Surat ETS

Parameter	Impact
Pollution Reduction	20–30% decrease in PM emissions
Cost Efficiency	Over 10% drop in pollution control costs
Compliance	99% adherence to environmental regulations

- These results establish that **market-based regulation** can offer a **cost-effective and scalable solution** to environmental problems in India.

Significance of the Programme

- **Global Innovation:** First-ever cap-and-trade system for **particulate matter**, positioning India as a **pioneer in climate policy innovation**.
- **Evidence-Based Regulation:** The use of **real-time CEMS data** allowed regulators to **make informed policy decisions**, adjust emission caps dynamically, and **identify non-compliant units** immediately.
- **Scalability Potential:** Given its success, similar trading schemes can be implemented in:
 - Other Indian cities facing severe air pollution
 - Other pollutants such as **nitrogen oxides (NO_x)** and **sulphur dioxide (SO₂)**

What is Particulate Matter (PM)?

- Particulate matter consists of **microscopic solid particles or liquid droplets** suspended in the air, which can be inhaled and pose health risks.
- Classification based on size:
 - **PM₁₀**: Coarse particles, ≤ 10 micrometres (μm)
 - **PM_{2.5}**: Fine particles, ≤ 2.5 μm
 - **PM_{0.3}**: Quasi-ultrafine particles, < 0.3 μm
 - **PM_{0.1}**: Ultrafine particles, ≤ 0.1 μm
- The **smaller the particle**, the deeper it can penetrate into the lungs and bloodstream, increasing its toxicity and health impact.

Sources of Particulate Matter

- **Natural Sources:**
 - **Dust storms**
 - **Forest fires**
 - **Volcanic eruptions**
- **Anthropogenic (Human-Made) Sources:**
 - **Vehicle exhaust** (especially diesel engines)
 - **Industrial emissions** from coal, thermal plants, and manufacturing units
 - **Construction activities**, road dust
 - **Biomass and fossil fuel burning** (e.g., household cooking, power generation)

Health Impacts of Particulate Matter

- **Respiratory System:**
 - Chronic illnesses like **asthma, bronchitis, and COPD**
 - Worsening of existing respiratory conditions
- **Cardiovascular System:**
 - **Hypertension, irregular heartbeat**, and increased risk of **heart attacks**
 - Long-term exposure linked to **atherosclerosis and stroke**
- **Neurological Effects:**
 - Linked to **cognitive decline in adults**
 - **Neurodevelopmental disorders** in children due to prenatal or early-life exposure
- **Premature Mortality:**
 - Air pollution, especially fine particulate matter, is a leading cause of **early deaths**, particularly from lung and heart diseases.

Conclusion and Way Forward

- The Surat ETS has demonstrated that **environmental regulation through market mechanisms** can be both effective and economical.
- With real-time monitoring and an auction-based permit system, the program can serve as a **template for other Indian regions** and pollutants.

- **Scaling up the model**, integrating **technological innovation**, and ensuring **stakeholder participation** are crucial for replicating success.
- Additionally, India must focus on:
 - **Expanding CEMS infrastructure**
 - **Investing in pollution monitoring and modelling capacity**
 - **Creating a national framework** for pollution trading based on Surat's learnings

Source: <https://www.downtoearth.org.in/climate-change/can-pollution-markets-work-study-evaluates-gujarats-cap-and-trade-experiment>