INDIAN SCHOOL OF PUBLIC POLICY

CASE STUDY & RESEARCH CENTRE

Policy Brief

THE CRISIS OF AIR POLLUTION IN DELHI

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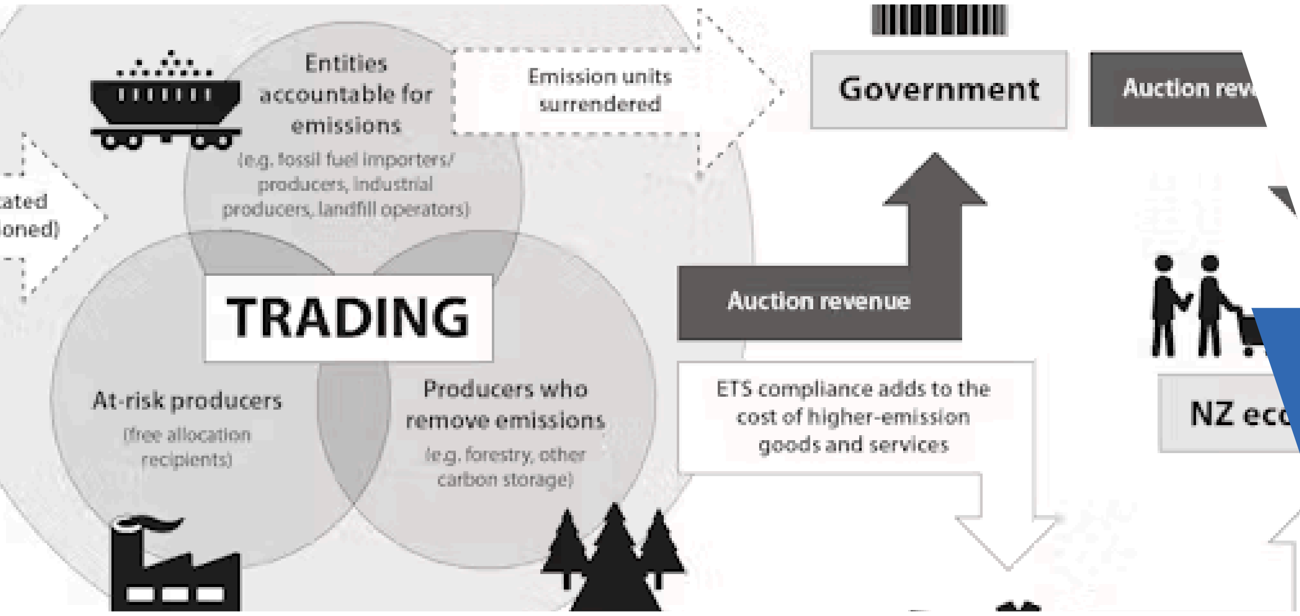


Key Findings

01 Vehicular emissions, industrial activity, construction, road dust, biomass and waste burning, and fossil-fuel dependence interact with unfavourable winter weather conditions to create severe pollution episodes.

02 Emergency interventions such as GRAP and Odd-Even may address short-term pollution spikes, but need to be complemented by sustained, year-round preventive measures.

03 Effective pollution control requires stronger enforcement, better monitoring, and improved coordination across multiple institutions and neighbouring states.

04 Restricting private vehicles alone is unlikely to work; reliable public transport and better urban planning are needed to make cleaner choices viable.

05 Emissions Trading Schemes can reduce industrial pollution cost-effectively, provided they are supported by credible monitoring, clear emission caps, and strong regulatory oversight.

06 Delhi's air pollution crisis requires coordinated action across Samaaj, Sarkaar and Bazaar, combining regulation, market incentives, infrastructure, and behavioural change.

Introduction

Air pollution in Delhi has emerged as one of the most severe urban environmental and public health crises in India, particularly during the winter months when pollution levels shoot up. The problem is not just seasonal, nor is it driven by a single source. It results from the interaction of multiple local and regional emission sources. Winter meteorological conditions further trap pollutants close to the ground, intensifying pollution episodes.

By late 2025, India’s air quality presented a deeply uneven picture. While several cities in southern, northeastern, and coastal regions continued to experience air quality ranging from “Good” to “Moderate,” much of the Indo-Gangetic plain remained trapped under persistent pollution. Cities across Uttar Pradesh, Haryana, Rajasthan, and Bihar regularly recorded “Poor” and “Very Poor” air quality during the winter months as low wind speeds, temperature inversions, and high emissions combined trapped pollutants near the surface. However, Delhi remained an outlier even within this polluted landscape. In around the same time period, Delhi’s annual average PM2.5 was 91.5(mu g/m^3\)- nearly double the safe limits, with average Air Quality Index (AQI) values peaking during winter. While the year saw quite a high number of 'Good' to 'Satisfactory' days, the winter months resulted in a severe spike, with December averaging an AQI of 389. Although air pollution remained a national concern, Delhi continued to face a uniquely severe and persistent crisis, with pollution levels far exceeding those observed in most other Indian cities.

In Indian cities, most of the year, the average concentration of particulate matter exceeds the standards set by the Central Pollution Control Board. Air pollution in Delhi is driven by multiple interconnected emission sources, and making decisions on mitigation and control requires an understanding of these sources.i In a metropolitan city like Delhi, air pollution is so severe due to the extremely high levels of local pollutants that are released into the atmosphere from vehicular pollution, industrial pollution, construction activities, road dust, and biomass burning. Stubble burning is no longer seen as the only major contributor. The NCR experiences rapid urbanisation, high energy demand, increasing construction activity, heavy traffic, solid fossil fuel dependence, and inadequate waste management systems.

An Analysis of the Root Causes of Air Pollution

Vehicular emissions can be traced to certain structural issues like weak public transport infrastructure that is incapable of absorbing the requirements of the public, rising income levels leading to more car-ownership, inadequate emissions control of vehicles- to name a few. Industries and power plants emit a hazardous amount of pollutants in the air owing to their dependence on cheap and solid fossil fuels. The combustion of fossil fuels to power manufacturing and processing, combined with the chemical by-products of raw material extraction are one of the root causes of industrial air pollution. Road dust that is generated increases levels of both PM2.5 and PM10 simultaneously. Most of the air pollution happens during the product and structural phase of construction activities. During these two stages, the majority of activities revolve around excavation, earthwork, roadwork, foundation and framework, brickwork, cement and concrete work, and vehicular movement.

Among all of these, excavation, earthwork and roadwork, and vehicle movement happen to be the most pollutant-intensive. The concentration of PM2.5 increases by around 1.8x compared to the other activities. In many developing regions and lowincome households, solid biomass is the primary fuel for domestic energy needs like cooking and heating. This is usually because of a lack of access to cleaner fuel alternatives. Burning household or municipal garbage is another ongoing contributor to urban air pollution. This can be caused by inadequate municipal waste collection and lack of recycling infrastructure in rapidly expanding urban centers. Incomplete combustion causes the release of several key pollutants like particulate matter, carbon monoxide, and other volatile organic compounds.

Other causes that intensify the pollution crisis may include pollution mitigation being reactive rather than preventive, and public behaviour and a general apathy towards air pollution because it becomes normalised as an unavoidable problem. Urban growth and economic development, especially in Delhi and the NCR, have relied on car-centric development as opposed to transit-oriented development, solid fuel based energy, construction-led expansion, and low-cost but polluting fuels and practices. Cleaner alternatives such as efficient public transport, clean industrial technologies, renewable energy, and scientific waste management have not expanded at the same pace as urban and economic growth.

The evolution of air quality management in Delhi should also be read in the larger context of issues of environmental protection and of the Indian constitutional and political framework.ii The increasing attention to environmental concerns and pollution over time at all levels of the Indian government is in sharp contrast to the evidence of persistently high levels of air pollution. Despite the recurring nature of the problem of air pollution, there is a clear absence of a targeted policy

Measures to Curb Air Pollution

Delhi has attempted to curb its air pollution crisis through several reactive and fragmented measures. The Commission for Air Quality Management (CAQM) and the Graded Response Action Plan (GRAP) are Delhi's key air pollution control mechanisms. The CAQM is the authority that implements the Graded Response Action Plans- a set of stage-wise emergency actions based on the Air Quality Index levels (Poor, Very Poor, Severe, and Severe+) in the Delhi-NCR, involving bans on construction, movement of trucks and private vehicles, and promoting public transport when pollution spikes, as seen with the recent invocations and revocations of stage IV actions in late 2025, with the fluctuating improving and deteriorating air quality. The Central Pollution Control Board, in collaboration with State Pollution Control Boards, the Delhi Pollution Control Committee, and other agencies, set up Continuous Ambient Air Quality Monitoring Stations (CAAQMS). The CAAQMS is a specialised system housed in a temperature controlled container and is equipped with all the necessary analysers required for ambient air quality monitoring, calibration equipment, and data acquisition systems with power backup facilities. These systems are installed in metropolitan areas, industrial cities, and ecologically sensitive areas to provide 24x7 real-time data on pollutants. The data is then used to generate the daily Air Quality Index of the city. The National Air Quality Index was launched by the Prime Minister in 2015, with the objective of disseminating information to the public.

Despite these measures and the availability of air quality information improving worldwide, people still lack access to information that can meaningfully fuel policy or public action. The implementation of these measures is further complicated by the fact that multiple actors are involved in the process and have differing responsibilities. While they might prove to be helpful in short bursts; to address critical episodes of high pollution concentrations, these actions fall short of representing a comprehensive, long-term mitigation strategy for Delhi. Further, it was assessed that the GRAP was too slow and ineffective to fight the intense air pollution that Delhi faces, especially in the winter months. Major implementation issues also emerged and the adequacy of the proposed measures was also called into question. Other stop-gap solutions like sweeping machines and ant-smog drives only come into play when the poor quality is highly visible, while year-round road dust management is highly neglected.

Another significant measure was the introduction of the Odd-Even Scheme. The Odd-Even scheme was a temporary traffic rationing measure implemented by the government to curb severe pollution and traffic congestion. Under this rule, private cars with odd-numbered license plates were allowed out on odd-numbered dates, and cars with even-numbered plates on even-numbered dates. Typically, emergency vehicles, public transport, CNG-powered vehicles, and electric vehicles were exempt. The odd-even vehicle rationing rule has been implemented four times in Delhi to combat severe air pollution. The Scheme was first introduced in January 2016 and subsequent phases were implemented in April 2016, November 2017, and November 2019. The odd-even car rationing scheme is part of the emergency measures under Stage IV of the GRAP in Delhi. When the AQI exceeds 450, the government is mandated to consider this scheme to restrict private vehicles.

It was implemented haphazardly because it was not designed as a permanent policy to tackle pollution, it was more of an emergency administrative-political tool. The scheme faced several operational problems, and the public transport system was not robust enough to support it. Public vehicles could not adequately absorb displaced commuters. It became what policy scholars call a “signal policy”— demonstrating government action during a crisis rather than getting down to the root causes. Even so, there were some benefits to the scheme. The first few days of the programme demonstrated that the peak pollution levels were lower than the normal smog peaks of the season- despite the adverse weather conditions. The other benefit of the programme was the reduced congestion that further contributed towards lowering of pollution.

Neighbouring Beijing also attempted to put the odd-even scheme in place in an effort to clean up air pollution and congestion before the 2008 Summer Olympics. They implemented a temporary road space rationing, they imposed restrictions on private vehicles by allowing even and odd license plates to drive on alternate days with the violators having to pay up 200 yuan for breaking the rules. These restrictions did significantly reduce particulate matter, and traffic volume was also reduced during the source control period. Other pollution relevant policies were also imposed to complement the driving restrictions. These included bus-fare reductions and subway-line openings. Beijing added subway capacity during the time when it imposed the Odd-Even Policy, so as to compensate for the impact of people’s substitution from auto to public transport. The high cost involved in the purchase of a second vehicle incentivises people to reduce the consumption of cars and switch to public transportation as a regular means of transportation. Effective monitoring by traffic surveillance cameras and high penalties to prospective defaulters helped Beijing's Odd-Even policy to materialise on the ground level and show its desired results.

Although command-and-control measures like the Odd-Even policy were initiated and enacted in both Delhi and Beijing, their impact differed as they were implemented differently. When the OddEven policy was implemented in Delhi, it was done so in isolation to other such policy incentives that made public transportation a cheaper and a more economically convenient way to travel. Rather than making the public transportation system reliable and attractive enough to encourage car users to shift to public transport, surge pricing by cab aggregators like Ola and Uber made transportation more costly than before. Furthermore, the capacity of the Delhi metro rail remained the same and the excessive commuters added to the strain of the limited public infrastructure. On the air quality front, Delhi's Odd-Even scheme has provided only limited benefits.

Odd-Even Scheme in Delhi, Source: India Times

Despite years of government-led interventions, air pollution in Delhi has continued to remain a problem. This brings us to the real root of the problem which can be encapsulated within weak environmental governance, fragmented institutional coordination, inadequate enforcement of pollution norms, low investment in sustainable public infrastructure, and policy prioritisation of economic growth at the cost of environmental sustainability. In 2025, the Supreme Court also mentioned that while all the regulatory measures exist, the enforcement and implementation continue to be the weak link.

There have also been efforts from the side of civil society; citizen-led initiatives, advocacy campaigns and the like, to address the worsening air quality in Delhi. One of the most influential civil society interventions came through environmental litigation led by NGOs and activists in the Supreme Court. The Center for Science and Environment played a major role in pushing for cleaner fuels, tighter vehicular emission norms, and public awareness around air pollution. The landmark PILs filed by environmental lawyer M.C. Mehta led the Supreme Court to intervene in Delhi's pollution crisis. These cases resulted in conversion of buses to CNG, closure and/or relocation of polluting industries, phasing out old vehicles and strengthening emissions standards. There was also the Help Delhi Breathe coalition of environmental advocates responding to the ongoing air quality crises. This was a citizen-led clean air campaign demanding stronger action from the government. It framed clean air as a public health and a constitutional rights issue.

As with government intervention, civil society interventions have borne limited fruit. They played an important role in bringing air pollution into mainstream public and policy discourse, but their impact on actual long term air quality has been mixed. Many initiatives remain reactive, seasonal, and dependent on judicial intervention, while deeper challenges such as automobile dependence, industrial emissions, weak enforcement across the board, biomass burning, and lacking inter-state coordination persist. As a result, civil society efforts have been more effective in shaping discourse rather than producing sustained reductions in pollution levels.

Citizens protesting against worsening air quality, Source: The Hindu

The Case of Beijing

Countries around the world also face the burden of deteriorating air quality. China's tackling of air pollution, for example, provides a good framework that India can draw lessons from. In 1998, Beijing began an intensified air pollution control programme, and the city has implemented a series of measures including energy infrastructure optimisation, coal-fired pollution control, and vehicle emission controls. From 2013-2017, PM2.5 levels in Beijing fell by 35% and by 25% in surrounding regions. Beijing's air pollution control system is characterised by complete legislation and enforcement mechanisms, systematic planning, powerful local standards, strong monitoring capacity, and high public environmental awareness.

Beijing has established a number of local environmental-economic policies like subsidies, fees, pricing, and other financial practices, to provide economic incentives for the effective implementation of various measures. The spending on air pollution control also increased, especially after 2013. By 2013, Beijing had established 35 ambient air quality monitoring stations which can monitor six major pollutants. In 2016, combining advanced technologies like high resolution satellite remote sensing and laser radar, a new generation of integrated air quality monitoring network was established. The city also continuously promoted end-of-pipe control and energy structure adjustment over the past 20 years. Pollution from coal-fired boilers, power plants, and residential coal use was controlled simultaneously, resulting in significant environmental and health benefits. The prevention and control of vehicle pollution have long been a critical task in Beijing's air pollution control. Focusing on new vehicles, in-use vehicles and fuel quality, Beijing has implemented a series of local emission standards and comprehensive control measures; as well as strengthened traffic management and economic incentives continuously. A large scale public transport system has been built to allow gradual formation of a green and low-carbon in-city travel habit by the people.

Across all urban areas, the Beijing 2013-17 Clean Air Action Plan aimed to reduce PM10 by at least 10% relative to 2012 levels. The most heavily-polluted areas in the country were given specific targets: to reduce PM2.5 in the three target regions of Beijing-Tianjin-Hebei, Pearl River Delta, Yangtze River Delta by 25, 20, 15 percent, respectively, and to reduce annual PM2.5 in Beijing by 34% from the 2013 levels.

The government's strategies for achieving these goals included; building pollution reduction into government officials' incentives so promotions depended on both environmental audits and the economic performance of their jurisdictions. Provincial and local officials are now incentivised to improve the environment in their jurisdictions. They prohibited new coal-fired plants in the three target regions and require existing coal plants to reduce emissions or be replaced with natural gas.

In 2017, Shanxi province, China's largest coal producer, shut down 27 coal mines. By January 2018, Beijing had closed its last coal-fired power plant and the national government cancelled plans to build 103 more. The government aimed to increase renewable energy generation. Renewable sources made up more than a quarter of energy generated in China in 2017. In comparison, they made up just 18% of the U.S. energy generation that year, and they aimed to reduce iron and steel making capacity in industry. Between 2016 and 2017, China shut down 115 million tons of steel capacity, and further cuts are planned. In large cities such as Beijing, Shanghai, and Guangzhou, the government wanted to control vehicle emissions by restricting the number of cars on the road on any given day. Each of these cities had a quota on the number of new license plates issued each year, capping the number of cars on the road. They wanted better enforce emissions standards. In late 2017, China suspended the production of 553 car models that do not meet fuel economy standards, including ones made by foreign and state-run companies. Finally, there was increased transparency in government reporting of air quality statistics. China built a nationwide network of air pollution monitors and makes the data publicly available. By March 2017, there were over 5000 monitoring stations in China.

Due to these actions, all the targets set by the National Air Quality Action Plan, which expired in 2017, were met. China's government, however, remained acutely aware that the country's air pollution was still a serious problem. To achieve further improvements, the Chinese government announced in July 2018 a new plan for 2018-2020. Regions that did not meet the national air quality standard of 35 μg/m3 would need to reduce particulate pollution by 18% relative to 2015 levels. Though the national targets are less ambitious than those set for 2013-2017, some prefectures set more stringent targets for themselves in their local five-year plans. For example, Beijing committed itself to a 30% reduction from 2015 levels by 2020 and as per the latest satellite data, it ended up reducing pollution by 55.5% in this period. These aggressive targets have come with some unintended consequences. For example, in the winter of 2017-2018 officials began removing coal boilers used for heating from many homes and businesses even though replacements were not yet available everywhere. This left some without heat. Those who were connected to natural gas lines saw their prices surge because of the undersupply. For China, work remains not only in sustaining and furthering its pollution reductions, but also in aligning incentives, market structures and local realities to smooth transitions to cleaner options.

Air pollution in Beijing, Source: The ChinaPower Project

Air pollution control evolved from a local effort to a coordinated regional strategy. Beijing led the establishment of a mechanism for the "2+26" cities in the surrounding region, involving collaborative planning, unified emission standards, and joint emergency responses to heavy pollution episodes. Regional emission reductions accounted for approximately 23% of the total decline in Beijing's PM2.5 levels between 2013 and 2017. Despite these historic achievements, Beijing still faces significant hurdles. PM2.5 levels remain far higher than national standards and WHO guidelines. Ozone pollution (ground-level ozone which is a component of urban smog) has become a growing concern and has not yet been addressed. Future efforts must focus on synergistic control of PM2.5 and O3, further optimising the transport structure for zero emissions, and integrating local environmental goals with the 2030 Sustainable Development Goals.

Measures adopted by other countries

The Climate and Clean Air Coalition collated a list of measures to control air pollution for Asia and the Pacific. Asia Pacific countries display some of the world's highest recorded levels of air pollution. Urban and heavily industrialised areas with high population densities have the highest levels of air pollution. In addition to adverse effects on health, air pollution also threatens agricultural productivity and food security in the regionvi. Selected air pollution measures are distributed into three categories: conventional emission controls, further (next-stage) air-quality measures for reducing emissions that lead to the formation of PM2.5 and are not yet major components of clean air policies in many parts of the region, and measures contributing to development priority goals with benefits for air quality. Measures cover industry (post-combustion controls, energy efficiency standards for industries) to transport (introducing EVs, improving public transport, vehicle inspection) to measures for agriculture and residential cooking, heating and lighting to waste burning, to name a few.

The United Nations Environmental Programme outlined measures that are being adopted by five different cities to tackle the air pollution crisis.

• Bogota- The city is electrifying its public bus network and aims to completely electrify the metro system, part of an ambitious plan to reduce its air pollution by 10 per cent by 2024. Bogota's mayor, Claudia López Hernández, has also highlighted the importance of bikes.

• Warsaw- Launched Breathe Warsaw, a partnership with Clean Air Fund and Bloomberg Philanthropies to improve air quality. Warsaw now has 165 air sensors across the city, the largest network in Europe, and Breathe Warsaw will use them to develop an air quality database, allowing officials to better understand pollution sources. The initiative will also provide technical assistance to support the phase-out of coal heating, set up a low-emission zone by 2024 and connect local leaders to share best practices.

• Seoul- In 2020, the city announced it would ban diesel cars from all public sector and mass transit fleets by 2025. Meanwhile, a partnership with the United Nations Environment Programme (UNEP) will explore the lessons learned over the past 15 years on improving air quality and help share these experiences with other cities in the region.

• Accra- The city has started a campaign to educate people about the health dangers of indoor cookstoves and to discourage locals from burning their waste. A joint effort between the WHO and the Climate and Clean Air Coalition is supporting a city-wide assessment of the health benefits of switching to more sustainable transport, waste and household energy systems.

• Bangkok- The Green Bangkok 2030 project, launched in 2019, aims to increase the ratio of green space in the city to 10sq/m per person, have trees covering 30 per cent of the city's total area, and ensure footpaths meet international standards. Eleven parks are set to open during the project's first phase, as well as a 15km greenway, all with the aim of encouraging less reliance on private transportation, thereby reducing pollution.

• Japanese efforts to control air pollution was prompted by public movements and court cases that culminated in a concerted and intense regulatory effort in the Pollution Parliament. Japan brought in adaptive Air Pollution Control Acts that incorporated locally designed standards and targets and the empowerment of local governments, sincere monitoring and follow-up action plans, encouraging green procurement, effective waste management, facilitation of the EV ecosystem, and supporting research and strategisation among research institutes. India can learn from this experience; especially through the following ways- learning from specific instances of regulation, and their implementation, better design of air quality monitoring and better use of the monitored data, strengthening the EV ecosystem through innovative/non-financial incentives, infrastructural support, tax/subsidy incentives etc, education and outreach for waste management, and promotion of green products through GeM portals.

Emissions Trading Schemes: A Market-Based Intervention

As mentioned earlier, the air pollution crisis in Delhi persists with alarming intensity. Many of these approaches have struggled due to fragmented enforcement, weak monitoring capacity, interstate coordination challenges, and the sheer scale of emission sources embedded within everyday economic activity. Currently, there is growing interest in complementing state action with more market-based mechanisms that use incentives to drive change.

There are relevant examples of market-based interventions. Carbon markets are trading systems where carbon credits are bought and sold to put a price on greenhouse gas emissions, typically encouraging companies to reduce their carbon footprint. India has had some experience with carbon markets previously; through the Clean Development Mechanism under the Kyoto Framework, where clean technology projects generated Certified Emission Reduction credits. Currently, India's carbon market operates through the centralised Carbon Credit Trading Scheme (CCTS), which is designed to concert carbon emission reductions into a tradeable asset to help the nation achieve its net-zero goals by 2070. However, carbon markets have certain limitations. They remain focused on removing carbon emissions from the atmosphere, while air pollution can be attributed more to the presence of local pollutants like PM2.5 and PM10. For India's air pollution scenario, carbon markets may only work as a partial strategy, because it is primarily a greenhouse gas removal mechanism.

Almost all the identifiable root causes for air pollution point towards local emissions of PM2.5 and PM10 being its major components. Therefore, tackling emissions seems to be more urgent in reducing air pollution than carbon and greenhouse gases. In light of this, a more workable solution is required– one that focuses more on the extraction and removal of local pollutants to lessen air pollution.

An alternative can be found in a particulate matter emissions market. An Emissions Trading System sets a cap on total emissions and allocates emission permits to participating industries. At the end of the compliance period, each entity must hold enough permits to match its verified emissions or face penalties for non-compliance.vii This approach was pioneered in Surat, Gujarat. The Jameel Abdul Lateef Poverty Action Lab (J-PAL) conducted a study in Gujarat where the Gujarat Pollution Control Board (GPCB) collaborated with the research team and NCDEX eMarkets Limited (NeML) to introduce an ETS in the industrial city of Surat, where the majority of polluting firms were part of the textile industry. Around 30% of these firms were polluting more than the national standard. The average level of fine particulate matter in the air near the plants was between ten and twenty times higher than the WHO's recommended maximum concentration.

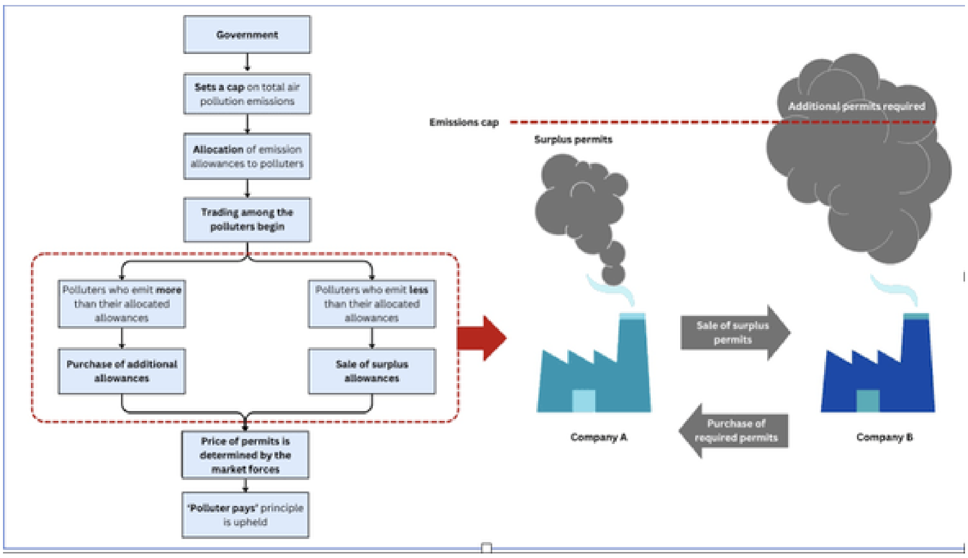
The Surat ETS pilot demonstrated that market-based mechanisms can effectively reduce industrial air pollution in India while maintaining economic efficiency. Introduced in partnership with the GPCB, the ETS targeted particulate matter emissions from highly polluting industrial plants, particularly textile industries in Surat. Participating firms were equipped with Continuous Emissions Monitoring Systems (CEMS), which recorded real-time particulate emissions and transmitted the data directly to regulators. Under the scheme, firms were allocated emission permits, with each permit allowing the release of 1 kg of particulate matter during a 4–6 week compliance period. Initially, firms received permits covering around 80% of their historical emissions, while the government imposed an overall cap on total emissions in the market.

The ETS differed significantly from India's traditional command-and-control regulatory system. It created economic incentives for firms to reduce emissions wherever it was cheapest to do so. Smaller or more efficient firms could profit by selling unused permits, while firms facing higher abatement costs could temporarily buy permits instead of making expensive immediate upgrades. Strict penalties for non-compliance ensured credibility and resulted in very high compliance rates among participating firms. The study found that firms under the ETS emitted 20–30% less particulate matter than firms regulated under the conventional system, without major increases in abatement costs. Researchers concluded that the combination of real-time monitoring, enforceable emission caps, and permit trading made pollution reduction both flexible and cost-effective. The success of the pilot has since encouraged the Gujarat government to scale the ETS to additional industries and cities, highlighting its potential as a scalable industrial air pollution control mechanism in India.

Evidence from the pilot ETS in India suggests that market-based mechanisms for controlling industrial pollution are both feasible and scalable, particularly when supported by strong monitoring systems and regulatory oversight. Organisations such as Council on Energy, Environment and Water and Energy Policy Institute at the University of Chicago have argued that ETS expansion should initially focus on local air pollutants such as particulate matter rather than economy-wide carbon markets, since pollution sources are geographically concentrated and public health gains are more immediate and measurable. Over time, inter-operable regional markets, digital reporting platforms, and clearer legal frameworks under central environmental regulation could help integrate state-level systems into a broader national market-based pollution control strategy while still allowing flexibility for local pollution conditions and industrial contexts.

However, scaling such a model would require plugging certain gaps. Credible monitoring is fundamental to any trading mechanism; inadequate calibration can compromise data reliability. Experience shows that overly lenient targets may lead to an oversupply of credits and weaken the incentives. There is also limited sectoral coverage of only steel, cement, and power industries; excluding micro, small, and medium enterprises (MSMEs) restricts the impact of the ETS. Uneven enforcement can lead to carbon leakages, where industries end up shifting operations to places with weaker regulations. This could happen in India, without nationally enforced standards. Limited institutional capacity and cross-sectoral coordination could lead to problems managing complex market operations.

To address these risks, India must focus on institutional readiness, producing reliable data, and inclusive market design. Robust CEMS must be built through mandating certified devices, periodic calibration, and third-party audits to enhance data credibility. Market stabilisation tools need to be strengthened- inclusion of credit reserves or price floors to prevent oversupply by controlling the total number of permits for trade in any compliance cycle is a first step. Targeted technical assistance is also required to bring MSMEs into the fold. Creating dedicated ETS cells, equipping them with digital monitoring tools, and fostering partnerships with institutions like IITs, the National Environmental Engineering Research Institute (NEERI), IIMs, National Institute of Urban Affairs (NIUA), and the Bureau of Energy Efficiency (BEE) for scientific cap-setting, policy design, market governance, and operational frameworks is also important. If supported by these systems and institutionally grounded implementation, an ETS can move beyond city pilots to serve as a national level scheme for cleaner urban air. Scaling ETS beyond Surat, supported by hyper-local emission inventories, transparent data verification, and coordinated guidelines from the Ministry of Environment, Forest and Climate Change (MoEFCC) and the Ministry of Housing and Urban Affairs (MoHUA), can pave the way for city-wide systems that eventually target major pollution sectors such as industries, transport, and construction. A phased, data-driven expansion can help India build a credible, scalable, and self-sustaining clean-air market that complements traditional regulation and improves air quality management.



Surat launches Emissions Trading Scheme

Conclusion

There is often apathy toward air pollution in cities outside the NCR, and specifically Delhi, because Delhi has become the symbolic benchmark for what constitutes a “serious” pollution crisis. Public discourse, media attention, judicial intervention, and political urgency tend to activate only when pollution reaches visibly catastrophic levels like Delhi’s winter smog. As a result, cities with consistently poor but comparatively lower pollution levels are perceived as “manageable” or “normal,” even when their air quality still exceeds safe limits by several times. This creates a dangerous normalisation of pollution. The framing of air pollution as primarily a “Delhi problem” obscures the fact that pollution sources such as biomass burning, coal dependence, industrial emissions, construction dust, and vehicular pollution are structurally embedded across urban India. Consequently, action is often reactive and episodic rather than sustained and preventive.

To adequately address air pollution, isolated efforts from ‘Samaaj, Sarkaar, and Bazaar’ are not enough. There needs to be a more balanced, comprehensive approach where the multi-structural and interconnected nature of the problem is recognised. The root causes are such that they cannot be solved by a single actor. The government must continue to play a strong regulatory role and work towards bolstering public transport and urban planning, and strengthening environmental governance and coordination across institutions. While there is a push towards market-led interventions, it cannot be done without the support of the government. For instance, the government plays a crucial role in strengthening interventions such as the Emissions Trading Scheme by creating the necessary economic and regulatory conditions for it to function effectively. The role of civil society also cannot be ignored- many sources of air pollution are linked to everyday social behaviour and practices. Behavioural shifts such as greater use of public transport, carpooling, waste segregation, reduced open burning, and adoption of cleaner household fuels can significantly reduce local emissions. Civil society, then, is not just a passive recipient of these policies, but an active stakeholder in shaping them. A long-term solution to solving Delhi’s air pollution crisis, therefore, lies not in choosing and implementing specific interventions from one of Samaaj, Sarkaar, or Bazaar, but in building across all three so that they reinforce one another to create lasting impact.

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