Study maps ₹233 Crore opportunity for Sambhajinagar through Low Emission Zone Policy

ICCT's latest study shows that a well-designed low-emission zone in Sambhajinagar can reduce significant air pollution, up to 53% reduction in particulate matter (PM) and 46% in nitrogen oxides (NOx) emissions from 2026 to 2030. LEZs could also generate economic benefits of up to ₹232.8 crores in the form of avoided social costs associated with air pollution. The greatest impact is achieved by restricting older and higher-emitting vehicles and incentivising zero-emission options.

Chhatrapati Sambhajinagar, July 14, 2025: A new study by the International Council on Clean Transportation (ICCT) finds that a well-designed low-emission zone (LEZ) in Chhatrapati Sambhajinagar could deliver environmental and public health benefits valued at up to ₹233 crores.

Chhatrapati Sambhajinagar (formerly Aurangabad) in Maharashtra has long grappled with air pollution, prompting the development of a comprehensive clean air action plan to improve the city's air quality. The ICCT, along with Urban Research Foundation and the Institute for Transport and Development Policy (ITDP), has supported the city in planning and implementing LEZ.

LEZ's are designated areas within cities where the most polluting vehicles are restricted or phased out to improve air quality. It typically targets older, high-emission vehicles and promotes cleaner alternatives, such as zero-emission transportation. In the latest study, the key air pollutants considered include particulate matter (PM), nitrogen oxides (NOx), carbon monoxide (CO), and hydrocarbons (HC).

The ICCT study evaluated two potential LEZ configurations in Chhatrapati Sambhajinagar, each offering different scales of impact. The first is a compact 6 km² zone covering 3.3% of the city, which could reduce $PM_{2.5}$ concentrations by up to 1.3 µg/m³ and NOx by 4 µg/m³, addressing approximately 10% of vehicular emissions. The second option, a more expansive 28 km² zone (15.5% of the city), could cover up to 41% of emissions and deliver larger reductions up to 1.7 µg/m³ for $PM_{2.5}$ and 5.3 µg/m³ for NOx.

The city's emissions profile reveals that two-wheelers are the dominant polluters, comprising over 70% of vehicle registrations and contributing the highest share of emissions across all major pollutants. BS III vehicles, although no longer manufactured, continue to be the top emitters, responsible for the majority of PM and NOx emissions. Vehicles aged 6 to 15 years were found to be the most polluting segment, underscoring the need for policies targeting older, high-emitting vehicles in LEZ design.

To address this, the study modeled two LEZ implementation strategies for the period 2026–2030. The age-based strategy, which restricts older diesel and petrol/CNG vehicles, could cut PM emissions by up to 53% and NOx by 46%. The standards-based strategy, phasing out vehicles based on Bharat Stage norms, could reduce PM by up to 27% and NOx by 23%. "

"*Our study clearly shows that low-emission zones are not just an environmental imperative, but an economic opportunity. By prioritising cleaner vehicles and phasing out older, polluting ones, cities like Sambhajinagar can safeguard public health while unlocking significant social and economic benefits*," said **Amit Bhatt, India Managing Director, ICCT.**

"*Chhatrapati Sambhajinagar city, with its rich heritage, tourism, and agriculture, cannot overlook the impact of transport emissions. A well-designed low-emission zone can position the city as a model for others grappling with air pollution. However, its success depends on well-coordinated, cross-sectoral actions to ensure the benefits of LEZs are sustained and not undermined*," said **Moorthy Nair, Researcher, ICCT.**

About the Study

This research, conducted by the International Council on Clean Transportation (ICCT), models the potential impact of a low-emission zone (LEZ) on tailpipe emissions across Chhatrapati Sambhajinagar. The analysis shows that an LEZ could generate significant emission reductions in the Chhatrapati Sambhajinagar Municipal Corporation. The modeled LEZs also generated substantial economic savings by avoiding the social costs of air pollution.

Read more here: https://theicct.org/wp-content/uploads/2025/07/ID-318-%E2%80%93-Chhatrapati-Sambhajinagar_LEZ_paper_final.pdf

About ICCT

The International Council on Clean Transportation (ICCT) is an independent research organization providing first-rate, unbiased research and technical and scientific analysis to environmental regulators. Our mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation in order to benefit public health and mitigate climate change. Founded in 2001, we are a nonprofit organization working under grants and contracts from private foundations and public institutions

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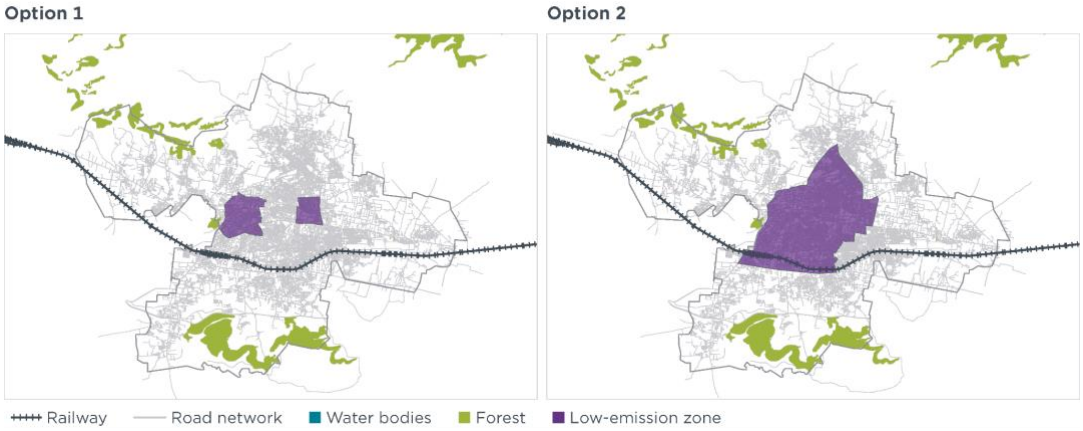
ANNEXURE

Key findings

1. **Potential LEZ boundaries** –
   The study evaluated two potential LEZ boundaries in Chhatrapati Sambhajinagar, each offering varying levels of coverage and impact:



- Option 1: 6 km² area (about 3.3% of the city), covering roughly 10% of vehicular emissions
  A compact LEZ focused on the city core, offering moderate air quality improvements with lower implementation complexity. This smaller LEZ is estimated to reduce $PM_{2.5}$ concentrations by up to 1.3 micrograms per cubic metre (µg/m³) and nitrogen oxides (NOx) by up to 4 µg/m³.

- Option 2: 28 km² area (around 15.5% of the city), covering up to 41% of vehicular emissions
  A more ambitious LEZ that maximizes emissions reduction across a wider area, delivering significantly greater health and environmental gains. This broader LEZ could achieve larger air quality gains, with $PM_{2.5}$ concentrations reduced by up to 1.7 µg/m³ and NOx by up to 5.3 µg/m³.

2. Emissions
   - **Two-wheelers** are the biggest polluters, contributing over 75% of vehicle registrations and a major share of emissions.
   - Bharat Stage (BS) III vehicles were the leading emitters
   - In terms of vehicle age, those between 6-10 years old contributed the highest emissions

Emissions Profile

- Two-wheelers were identified as the largest source of vehicular pollution in Chhatrapati Sambhajinagar, accounting for over 70% of annual vehicle registrations and contributing the highest share of tailpipe emissions across all major pollutants, including PM, NOx, CO, and hydrocarbons.
- Bharat Stage III (BS III) vehicles, despite being phased out from new production since 2017, continue to be the leading emitters—responsible for nearly three-fourths of PM and two-thirds of NOx emissions—due to their continued presence in the active fleet.
- Vehicles aged between 6 to 15 years were found to contribute the highest emissions, with this group responsible for 80% of PM emissions and a significant portion of NOx and hydrocarbon emissions.

These findings highlight the importance of targeting older, high-emitting vehicles in any low-emission zone strategy.

3. **Implementing LEZ from 2026 to 2030** can reduce emissions significantly:

   Age-based strategy: Up to 53% drop in PM, 46% in NOx

   Standard-based strategy: Up to 27% drop in PM, 23% in NOx

4. **Highest gains** are achieved when users switch to zero-emission vehicles (ZEVs).

The study explored two potential strategies for implementing LEZ from 2026 to 2030

a) **Age-based restrictions**, where the operation of petrol/CNG/LNG vehicles older than 15 years and diesel vehicles older than 10 years would be prohibited; Under age based strategy, emissions were projected to decrease by 44-53% for PM, 34-46% for NOx, 5-24% for CO, and 8-24% for HC, compared to the scenario without LEZ implementation.

b) **Emission standard-based restriction**, involving phased restriction on vehicle operations based on BS emission norms, with progressively more stringent requirement every two year: In the standard-based strategy, cumulative emission reductions were projected to range from 20-27% for PM, 11-23% for NOx, 2-10% for CO, and 3-10% for HC. The extent of reduction depends on how commuters choose to comply with the LEZ policy.

Environmental benefits – The study quantified the environmental benefits of avoided emissions in monetary terms. These include benefits from reduced impact on public health, damage to buildings and materials, crop productivity and biodiversity. The estimated benefits range from ₹ 17.2 crores to ₹232.8 crores, depending on the LEZ size, the type of restrictions, and the compliance strategies adopted by vehicle owners. These are conservative estimates and do not capture additional advantages such as reduced noise pollution, avoided greenhouse gas emissions, enhanced public health from more walking and transit use, fewer service delays caused by congestion, and a potential rise in real estate values

As the Chhatrapati Sambhajinagar Municipal Corporation or CSMC progresses toward achieving its air quality and climate goals, integrating LEZs as part of its demand-side regulation strategies can accelerate these efforts.

Regular monitoring, timely updates, and robust support measures through demand-side incentives, such as improved public transport and infrastructure for walking and cycling, subsidies for scrapping polluting vehicles, and ZEV purchase incentives help ensure the successful implementation and transition to a sustainable LEZ.