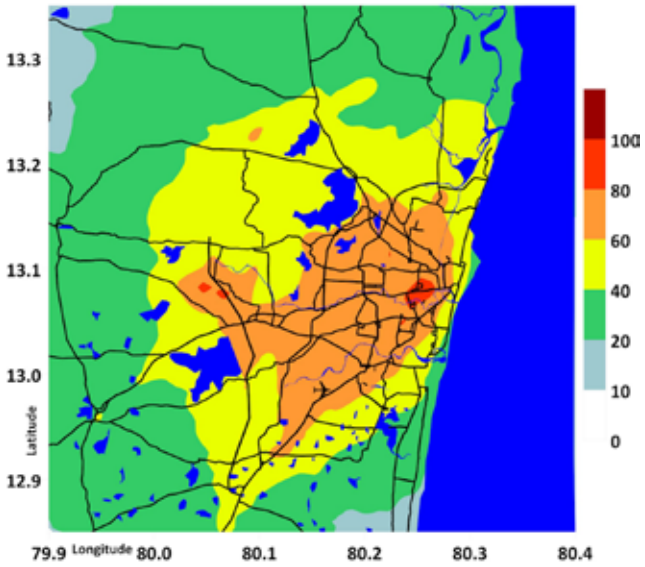
Modeled annual average $PM_{2.5}$ concentration (2015) µg/m³



For urban Chennai, average $PM_{2.5}$ concentration was 57.5 ± 16.8 µg/m³. This is much higher than the national standard (40) and more than 5 times the WHO guideline (10).

Air monitoring infrastructure

Chennai has 3 Continuous Air Monitoring Station (CAMS) reporting data for all the criteria pollutants and 11 manual stations reporting data on PM_{10}, SO_2, and NO_2. There should be at least 38 CAMS in the city for efficient reporting.

Annual averages from the national ambient monitoring program (2011-2015) µg/m³

PM_{10}	NO_2	SO_2
199.8 ± 101.5	65.5 ± 37.1	39.7 ± 31.8

Trend in $PM_{2.5}$ concentrations, based on satellite observations and global model simulations (1998-2014) µg/m³

URBAN emissions .info

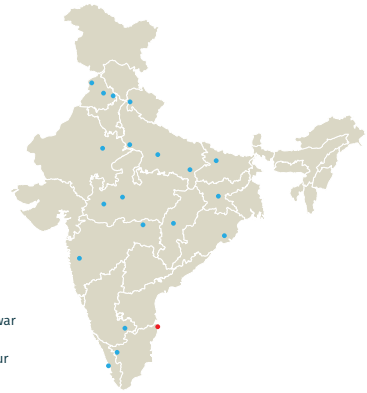
SHAKTI SUSTAINABLE ENERGY FOUNDATION

APnA CITY PROGRAM

Clearing the air with data

The Air Pollution Knowledge Assessment (APnA) City Program

Clearing the air with data



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• Patna • Pune • Raipur • Ranchi • Varanasi

Designing an effective Air Quality Management (AQM) plan for a city requires robust data on levels of pollution, affected areas, source contributors, peaking trends and possible control mechanisms.

The Air Pollution Knowledge Assessment (APnA) City Program seeks to make this database available and also serve as a starting point for understanding air pollution.

The program, implemented by Urban Emissions and facilitated by Shakti Sustainable Energy Foundation, seeks to create a comprehensive, city-specific information pool by pulling together data from disparate sources, surveys, mapping and atmospheric modeling.

Policy options based on this information, and their implementation, would be the effective next steps in improving the air quality of our cities.

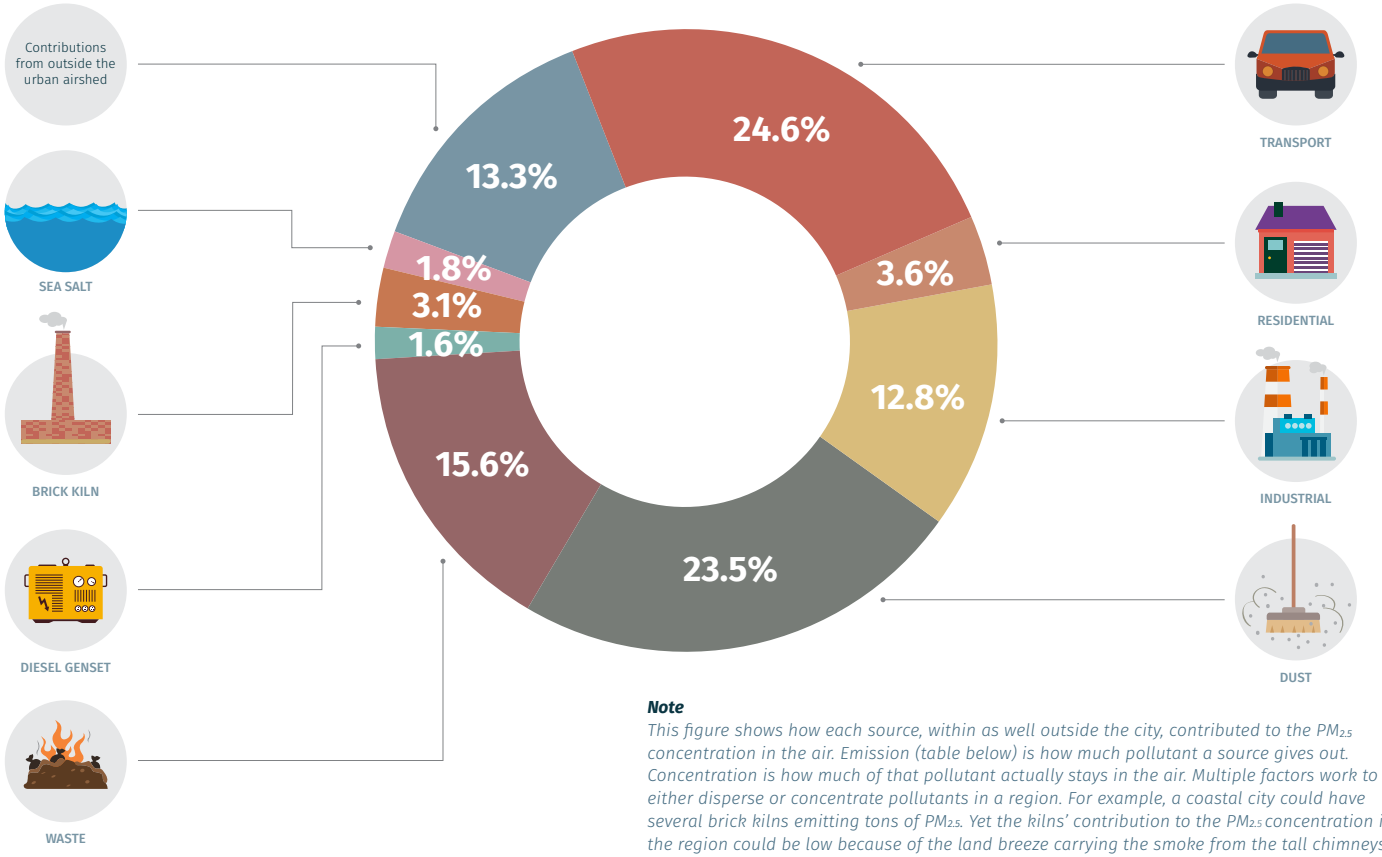
www.urbanemissions.info

Chennai

India's Health Capital has $PM_{2.5}$ levels that are currently 5 times the WHO standard.

For detailed information on Chennai Air Quality, visit **www.urbanemissions.info/india-apna**

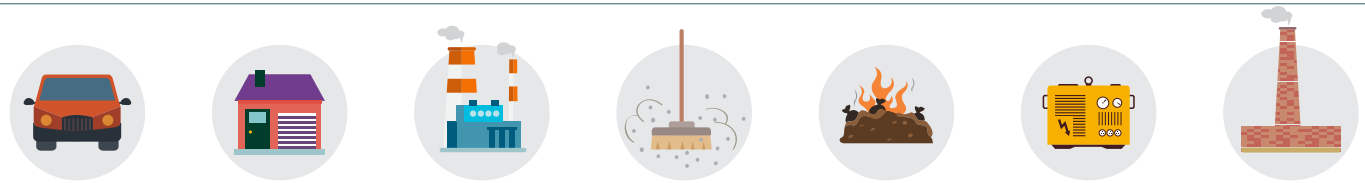
$PM_{2.5}$ concentration : source-wise percentage share in 2015



Note

This figure shows how each source, within as well outside the city, contributed to the $PM_{2.5}$ concentration in the air. Emission (table below) is how much pollutant a source gives out. Concentration is how much of that pollutant actually stays in the air. Multiple factors work to either disperse or concentrate pollutants in a region. For example, a coastal city could have several brick kilns emitting tons of $PM_{2.5}$. Yet the kilns' contribution to the $PM_{2.5}$ concentration in the region could be low because of the land breeze carrying the smoke from the tall chimneys to the sea. To know how source concentration is calculated please visit the APnA city website.

$PM_{2.5}$ emissions : source-wise share in tons in 2015 and 2030 (projected)



11,800	1,450	65,700	5,750	5,100	800	3,450
15,250	1,650	72,400	9,750	7,350	850	4,500

Total emissions in 2015 = 94,050 tons **Total emissions in 2030 = 111,750 tons**

Findings & Recommendations

- The modeled source contributions highlight transport (including on-road dust), industries (including the coal-fired power plants) and open waste burning as the key air pollution sources in the urban areas.
- Land-sea breeze limits the contribution of sources outside the urban airshed to an estimated 13% of the ambient annual $PM_{2.5}$ pollution (in 2015). These sources are primarily the large (metal and non-metal processing) industries and brick kilns.
- The city needs to aggressively promote public and non-motorized transport and also improve road infrastructure to reduce on-road dust re-suspension.
- Chennai has a large commercial port due to which the freight movement on its roads is amongst the highest in the country. It can benefit from a freight management program to reduce emissions from these vehicles.
- By 2030, the vehicle exhaust emissions are expected to remain constant, if and only if, Bharat 6 fuel standards are introduced nationally in 2020, as recommended by the Auto Fuel Policy.
- By 2030, the share of emissions from residential cooking and lighting is expected to decrease with a greater share of LPG, residential electrification and increasing urbanization.
- The 430 brick kilns in the urban airshed can benefit from a technology upgrade from the current fixed-chimney and clamp-style baking to (for example) zig-zag, in order to improve their overall energy efficiency.
- The two coal-fired power plants need to enforce stricter environmental standards for all the criteria pollutants, to reduce their share of influence on urban air quality.
- Open waste burning is dispersed across the city and requires stricter regulations for addressing the issue.