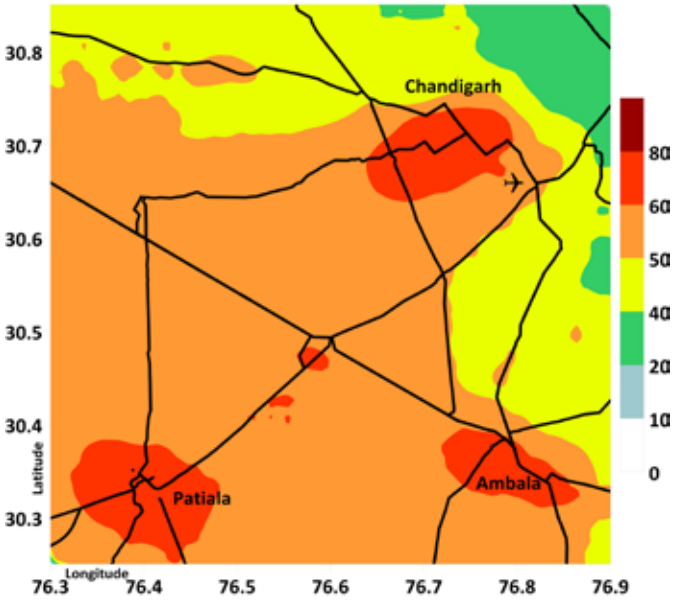
Modeled annual average $PM_{2.5}$ concentration (2015) µg/m³



For urban Chandigarh, average $PM_{2.5}$ concentration was 58.1 ± 6.9 µg/m³. This is more than 5 times the WHO guideline (10) and considerably higher than the national standard (40).

Air monitoring infrastructure

Chandigarh has 1 Continuous Air Monitoring Station (CAMS) reporting data for all the criteria pollutants and 5 manual stations reporting data on PM_{10}, SO_2, and NO_2. There should be at least 27 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
226.9 ± 103.6	44.3 ± 32.4	4.0 ± 1.9

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

URBAN emissions .info

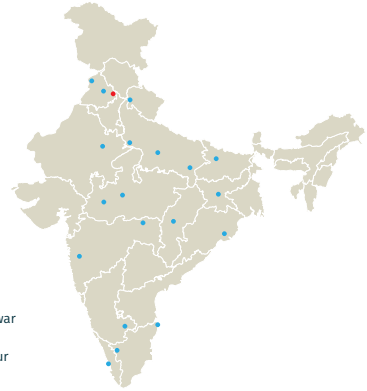
SHAKTI SUSTAINABLE ENERGY FOUNDATION

APnA CITY PROGRAM

Clearing the air with data

The Air Pollution Knowledge Assessment (APnA) City Program

Clearing the air with data



• Agra • Amritsar • Bengaluru • Bhopal • Bhubaneshwar
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• Indore • Jaipur • Kanpur • Kochi • Ludhiana • Nagpur
• 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

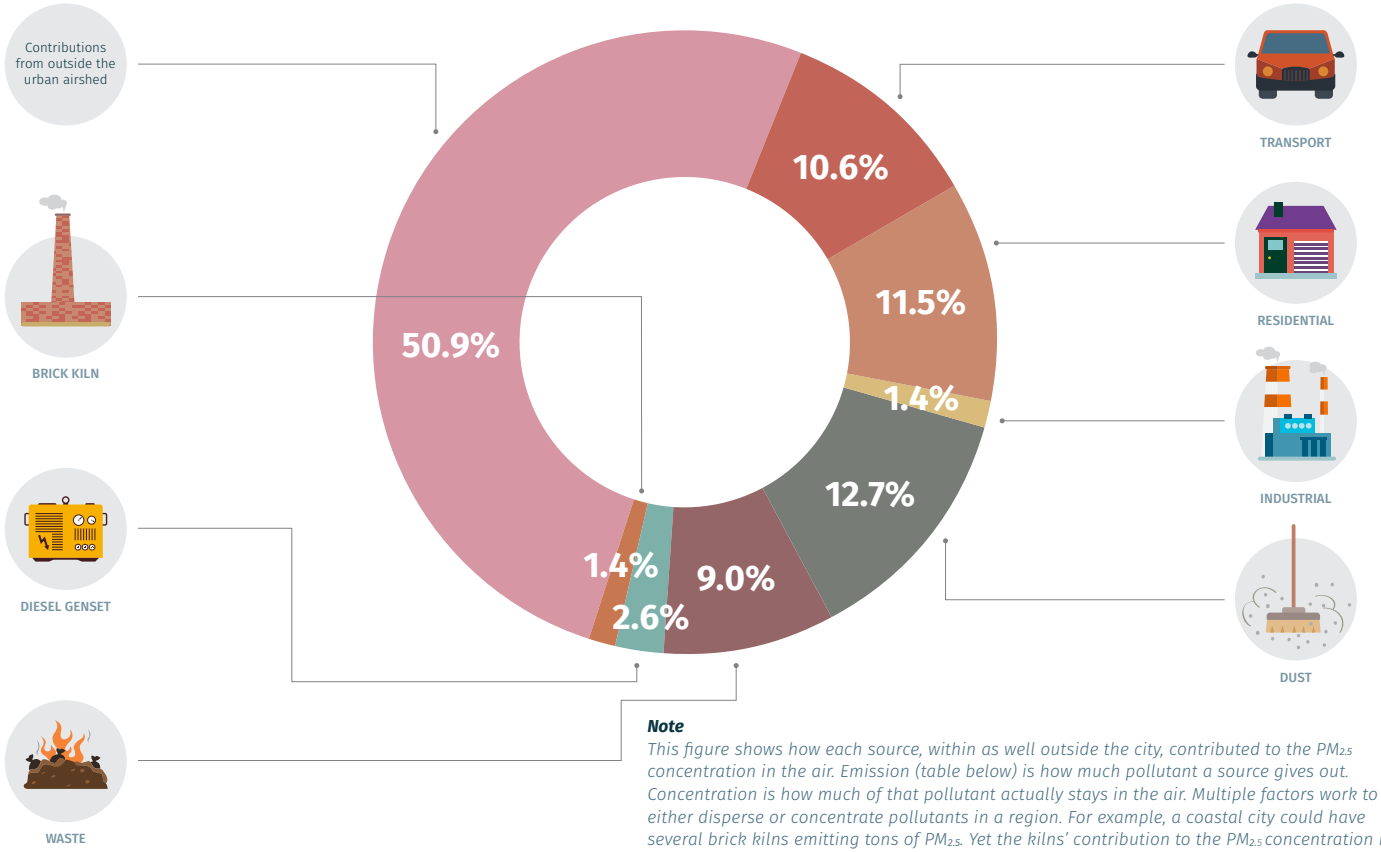
Photo: Chiara Facchetti

Chandigarh

The city's per capita income is higher than the country average and so is its $PM_{2.5}$ count.

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

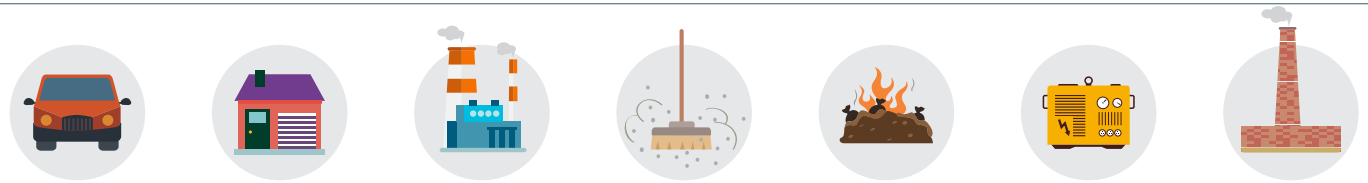
$PM_{2.5}$ concentration : source–wise percentage share in 2015



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)



2,950	2,450	6,300	6,300	1,500	700	1,600
6,200	2,750	8,050	5,600	2,150	800	2,100

Total emissions in 2015 = 18,300 tons **Total emissions in 2030 = 27,650 tons**

Findings & Recommendations

- The modeled source contributions highlight transport (including on-road dust), domestic cooking and heating, and open waste burning as the key air pollution sources in the urban areas.
- An estimated 51% of the ambient annual $PM_{2.5}$ pollution (in 2015) originated outside the urban airshed, largely from coal-fired power plants, brick kilns and seasonal crop burning. This suggests the need for strong regional interventions to reduce the pollution loads in the city.
- The needs to aggressively promote public and non-motorized transport and improve road infrastructure to reduce on-road dust re-suspension (which is partly enhanced due to the seasonal dust storms in the region).
- 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, emissions from residential cooking and lighting is expected to decrease with a greater share of LPG, residential electrification and increasing urbanization. However, since biomass and coal are easily available in the region, their use will continue unless an aggressive program is understaken to shift to cleaner options like LPG and electricity.
- The 160 mapped brick kilns in the urban airshed are fueled mostly by coal, agri-waste, and sometime discarded tyres. These kilns can improve their energy efficiency by upgrading from the current fixed-chimney and clamp-style baking to (for example) zig-zag. Coal-fired power plants closer to the urban centers need to enforce stricter environmental standards for all the criteria pollutants.
- Open waste burning is dispersed across the city and requires stricter regulations for addressing the issue.