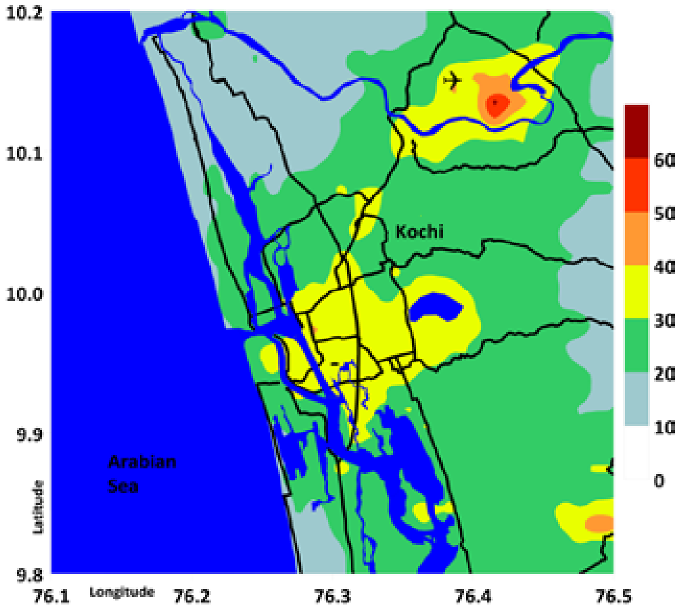
Modeled annual average $PM_{2.5}$ concentration (2015) µg/m³



For urban Kochi, average $PM_{2.5}$ concentration was 29.1 ± 7.6 µg/m³. This is much lower than the national standard (40) though it is twice the WHO guideline (10).

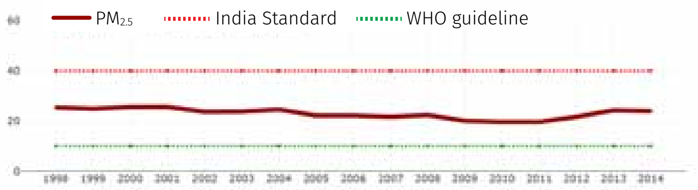
Air monitoring infrastructure

Kochi has 0 Continuous Air Monitoring Station (CAMS) reporting data for all the criteria pollutants and 7 manual stations reporting data on PM_{10}, SO_2, and NO_2. There should be at least 23 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
221.6 ± 167.0	38.4 ± 30.5	10.7 ± 10.6

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



URBAN emissions .info

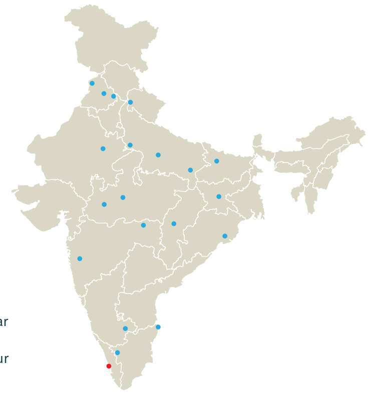
SHAKTI SUSTAINABLE ENERGY FOUNDATION

APnA CITY PROGRAM

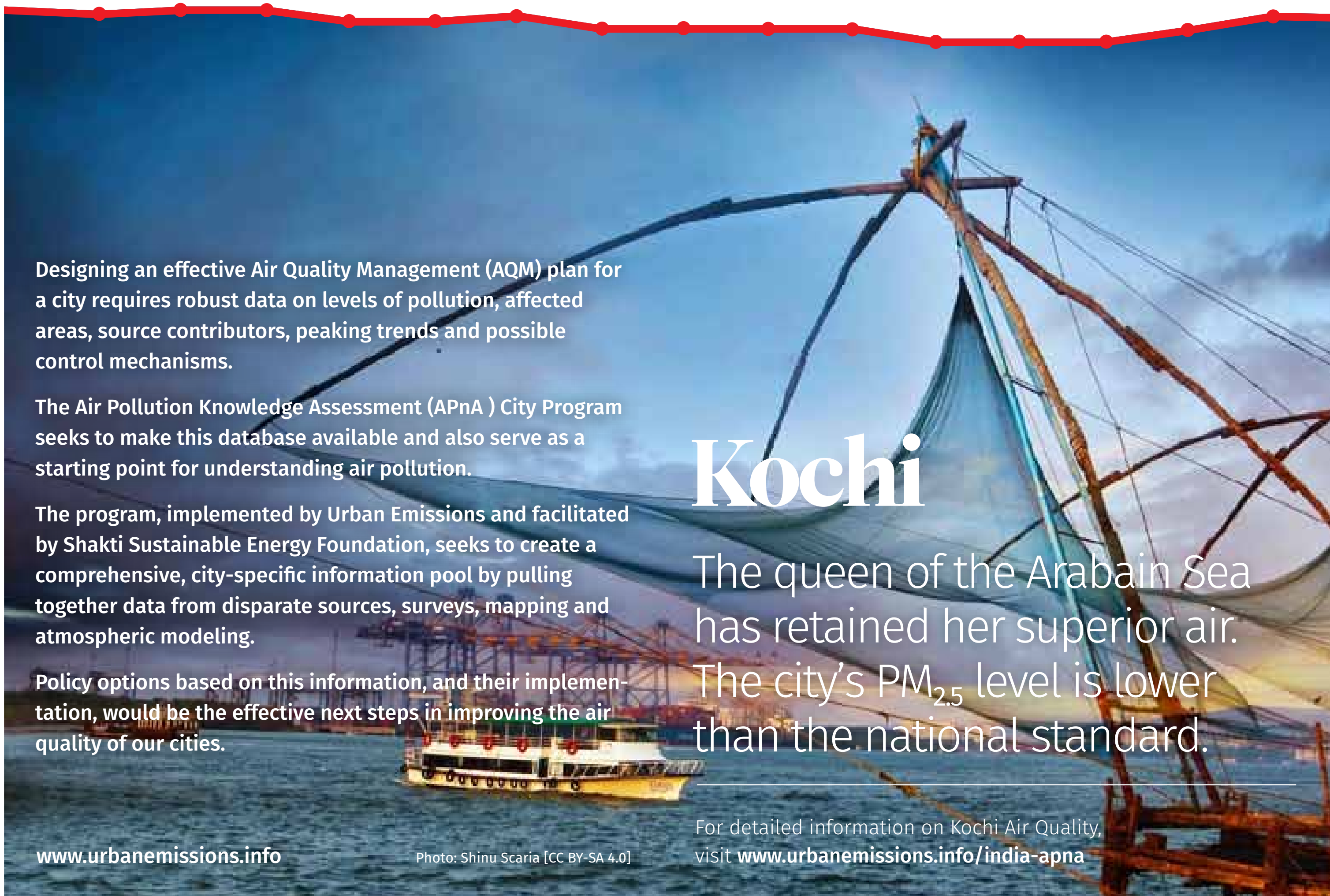
Clearing the air with data

The Air Pollution Knowledge Assessment (APnA) City Program

Clearing the air with data



• Agra • Amritsar • Bengaluru • Bhopal • Bhubaneswar
• Chandigarh • Chennai • Coimbatore • Dehradun
• 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.

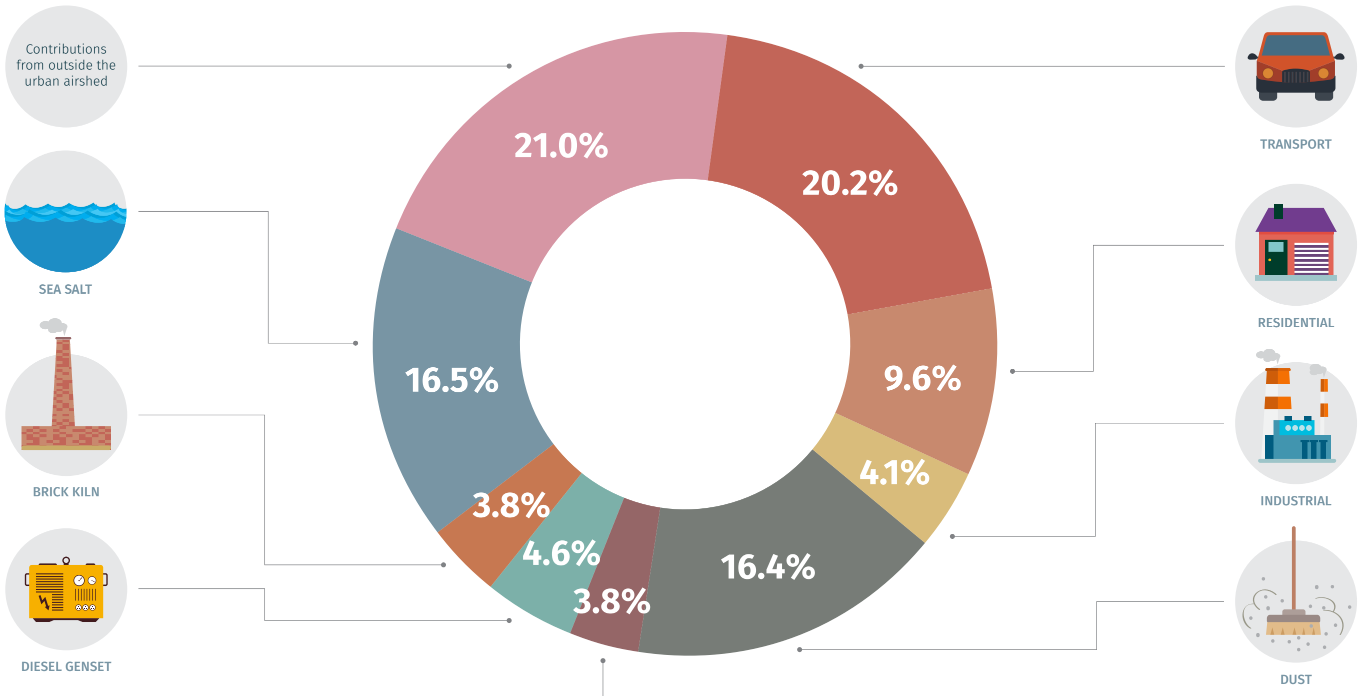
Kochi

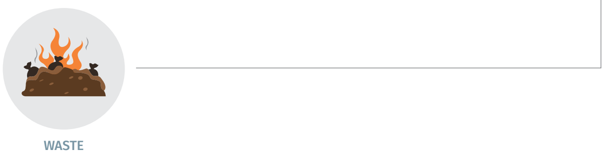
The queen of the Arabain Sea has retained her superior air. The city's $PM_{2.5}$ level is lower than the national standard.

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

www.urbanemissions.info

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

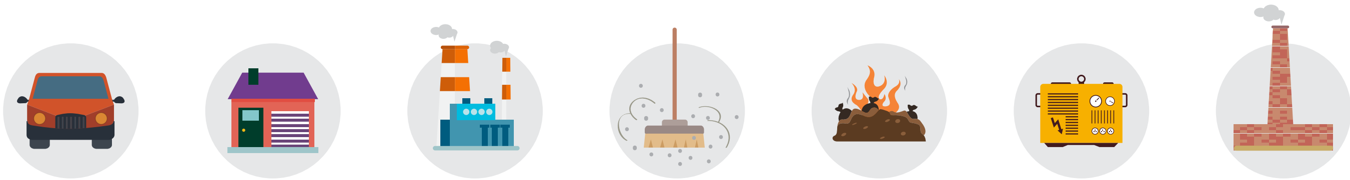




Note

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)



2,650	850	2,550	1,350	400	600	750
3,400	1,000	3,050	2,150	600	650	1,000

Total emissions in 2015 = 9,150 tons | Total emissions in 2030 = 11,850 tons

Findings & Recommendations

- The modeled source contributions highlight transport (including on-road dust), industries (including brick kilns), domestic cooking and heating and natural sea salt, as the key air pollution sources in the urban area.
- The city benefits from the land-sea breeze, limiting the contribution of sources outside the urban airshed to an estimated 21% of the ambient annual PM$_{2.5}$ pollution (in 2015) and even less in terms of the absolute contributions.
- The city needs to aggressively promote public and non-motorized transport and improve road infrastructure to reduce on-road dust re-suspension.
- Due to the presence of a large commercial port, the freight movement through the city is among the highest in the country. The city can benefit from a freight management program to reduce the emissions from these heavy and light duty vehicles and associated port activities.
- 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 an increase in LPG, residential electrification and urbanization
- The 250 brick kilns in the urban airshed are fueled mostly by coal, agri-waste, ship bunker fuel, and other biomass. These kilns 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
- Open waste burning is dispersed across the city and requires stricter regulations to address the issue.