DEVELOPMENT OF SPATIALLY RESOLVED AIR POLLUTION EMISSION INVENTORY OF INDIA
Development of Spatially Resolved
AIR POLLUTION EMISSION
INVENTORY OF INDIA
Project Team

Advisor: Dr Prodipto Ghosh & Dr Sumit Sharma
Coordinator: Dr Arindam Datta & Mr Suresh R
Team Members: Mr Ved Prakash Sharma, Ms Seema Kundu, Md. Hafizur Rahman, Mr Prabhat Sharma, Mr Nimish Singh, Dr Anju Goel, Mr Mrinal A Emmanuel, Ms Shivani Sharma
Field Assistant: Mr Surender Singh Negi, Mr K Johnson, Mr Kulwant Singh, Mr Mahesh Kumar
Secretarial Assistance: Ms Valsa Charles

Suggested Citation

TERI [The Energy and Resources Institute], 2021 Development of Spatially Resolved Air Pollution Emission Inventory of India.

Prepared by

The Energy and Resources Institute (TERI), Darbari Seth Block, India Habitat Centre, Lodhi Road, New Delhi - 110 003, India.

Published by

Project Management Cell, TERI, Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi 110 003, India
Tel.: +91 11 2468 2100 or 2468 2111 | Fax: +91 11 2468 2144 or 2468 2145
Email: pmc@teri.res.in | Web: www.teriin.org
## CONTENTS

Abbreviations v
Executive Summary vii

1. Introduction 1

2. Methodology 3
   2.1 Methodology to develop sector-specific emission inventory 4
   2.2 Methodology to simulate ambient concentration of PM$_{2.5}$ 4

3. Residential sector 5
   3.1 Estimated fuel consumption in residential sector 7
   3.2 Emission inventory of the residential sector 10

4. Power sector 15
   4.1 Coal-based thermal power plants 15
   4.2 Gas-based power plants 16
   4.3 Emission inventory of the power plant 17

5. Industry sector 19
   5.1 Large-scale industries 20
      5.1.1 Cement industry 20
      5.1.2 Iron and Steel industry 20
      5.1.3 Aluminium industry 21
      5.1.4 Glass industry 21
      5.1.5 Paper and pulp industry 21
      5.1.6 Fertilizer industry 22
      5.1.7 Emission inventory of large-scale industries 22
   5.2 Micro-, small- and medium-scale industries 22
      5.2.1 Emission inventory of micro-, small- and medium-scale industries 24
   5.3 Emission inventory of brick kilns 26
      5.3.1 Emission inventory of brick kilns 26
   5.4 Total emissions from industry sector 29
6. Transport sector
   6.1 Energy consumption in the transport sector
   6.2 Tailpipe emissions of different pollutants
   6.3 Inventory of road dust resuspension
7. Diesel generator operation
8. Open burning of agricultural residues
   8.1 Emission inventory of different pollutants during the open burning of crop residue
9. Refuse burning
   9.1 Emission inventory of different pollutants due to refuse burning
10 Construction sector
    10.1 Estimation of the construction area
    10.2 Estimation of emissions from construction activities
11. Mining sector
12. Crematoria
    12.1 Emission inventory of different pollutants from crematoria
13. Estimated atmospheric concentrations
References
## ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>g</td>
<td>Gram</td>
</tr>
<tr>
<td>kg</td>
<td>Kilogram (10³ g)</td>
</tr>
<tr>
<td>Mg</td>
<td>Tonne or Million gram (10⁶ g)</td>
</tr>
<tr>
<td>Gg</td>
<td>Kilo tonne or Gigagram (10⁹ g)</td>
</tr>
<tr>
<td>Tg</td>
<td>Million tonne or Teragram (10¹² g)</td>
</tr>
<tr>
<td>m</td>
<td>Metre</td>
</tr>
<tr>
<td>km</td>
<td>Kilometre</td>
</tr>
<tr>
<td>ha</td>
<td>Hectare (10⁴ m²), 2.47 acre</td>
</tr>
<tr>
<td>km²</td>
<td>100 ha</td>
</tr>
<tr>
<td>PJ</td>
<td>Peta Joule (10¹⁵ Joule)</td>
</tr>
<tr>
<td>Mm³</td>
<td>Million metre cube</td>
</tr>
<tr>
<td>MMSCM</td>
<td>Million Metric Standard Cubic Metre</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>Atmospheric particulate matter &lt; 10 μm</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>Atmospheric particulate matter &lt; 2.5 μm</td>
</tr>
<tr>
<td>SOₓ</td>
<td>Oxides of sulphur (sulphur dioxide)</td>
</tr>
<tr>
<td>NOₓ</td>
<td>Oxides of nitrogen</td>
</tr>
<tr>
<td>CO</td>
<td>Carbon monoxide</td>
</tr>
<tr>
<td>NH₃</td>
<td>Ammonia</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile organic compound</td>
</tr>
<tr>
<td>NMVOC</td>
<td>Non-methane volatile organic compound</td>
</tr>
<tr>
<td>APCD</td>
<td>Air pollution controlling device</td>
</tr>
<tr>
<td>ARAI</td>
<td>Automotive Research Association of India</td>
</tr>
<tr>
<td>CPCB</td>
<td>Central Pollution Control Board</td>
</tr>
</tbody>
</table>