



Clean Air Measures in **Surat** city

A compilation of best practices across various sectors



Gujarat Pollution Control Board



Surat Municipal Corporation

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

On behalf of:



Federal Ministry
for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

of the Federal Republic of Germany



ENVIRONMENTAL PROTECTION in Germany



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R. B. Barad, IAS
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Foreword

National Clean Air Programme (NCAP) is a flagship programme launched by the Ministry of Environment, Forest and Climate Change to improve air quality at city, regional and national level in the year 2019. It has focus on multi-sectoral policies, clean air measures in the identified cities for targeted reduction of particulate matter, strengthening monitoring and enhancing public participation.

Surat is a major economic growth centre with well-established diamond and textile industries and related trade and commerce. At the same time, it is also one of the non-attainment cities in terms of ambient air quality. Surat Municipal Corporation and Gujarat Pollution Control Board have prepared a detailed air action plan together with micro action plan with well defined set of actions covering all the sectors. Funding under XV-FC is also allocated to each of the city under this programme for improvement in the ambient air quality which is performance linked.

Controlling air pollution and bringing improvement in the quality of air calls for joint & systematic target oriented efforts. However, due consideration is also required to be given on the dynamics of the situation as city limits and activities are increasing day by day. Unless all the stakeholders work in harmony; it is not possible to achieve the result in time bound manner as envisaged.

I appreciate collaborative efforts made by Surat Municipal Corporation with various stake holders and have taken noteworthy initiatives to foster the implementation of the air pollution control action plan for reducing emissions and the latest of them include introducing e-vehicles with charging infrastructure supported by city's own e-vehicle policy, increasing green cover & developing biodiversity parks along with its known road networks and urban infrastructures.

It is a matter of pleasure to share the clean air measures implemented under NCAP in Surat.

I wish all the success to the Surat city for their future endeavours.


Gujarat Pollution Control Board



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Banchhanidhi Pani, IAS
Municipal Commissioner, Surat

Foreword

Surat being one of the fastest growing cities in the world is facing impacts on its air quality from various sources located within and outside the city. These sources comprise various sectors like Traffic and Transport, Industries, Road Dust, Waste Management and so on. Surat Municipal Corporation (SMC) has been working relentlessly on clean air measures which are also part of the Action Plan framed under the National Clean Air Program.

SMC has been a trendsetter in initiating several measures associated with improvement in air quality like e-vehicle policy at city level, introduction of public bicycle sharing to promote the use of non-motorized transport, solid waste collection and processing, development of green corridors, biodiversity parks etc. SMC works with a result-oriented professional approach and even senior officials are on the field regularly.

I am happy and feel honoured that this publication highlighting Surat's efforts on clean air measures is being shared in the National Conference of Ministers of Environment, Forest and Climate Change hosted by Gujarat. SMC will be happy to share and exchange ideas and efforts to combat air pollution together for improving the air quality of the city and the health of the citizens.



(Banchhanidhi Pani)
Commissioner
Surat Municipal Corporation

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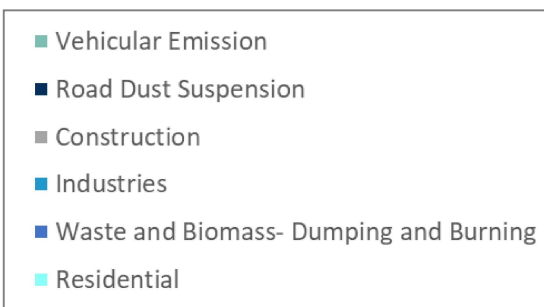
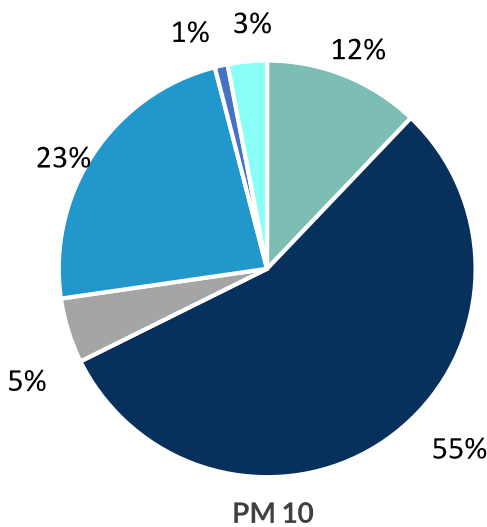
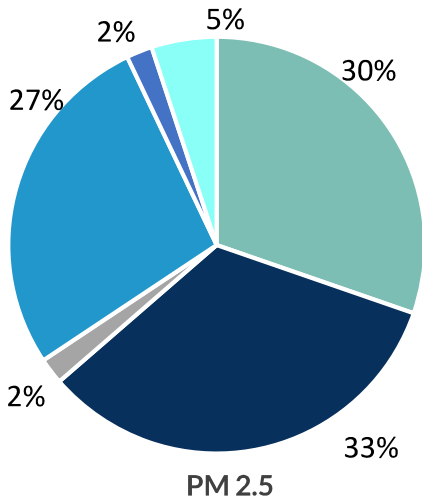
INTRODUCTION

Surat is Gujarat's second-largest city with a population of over 6 million which makes it the 8th largest city in India. Currently it is the 4th fastest developing city as concluded in a study conducted by the City Mayors Foundation, an international think tank on urban affairs. Surat is a port city situated on the banks of the Tapti river and its nearest ports are in the Magadalla and Hazira area of Surat Metropolitan Region.

Ambient air quality monitoring is carried out in seven locations of Surat City and its surrounding industrial areas and at ten locations in Surat District, as per the Central Pollution Control Board's guidelines under National Ambient Air Quality Monitoring Programme (NAMP) and State Ambient Air Quality Monitoring Programme (SAMP). Surat Municipal Corporation (SMC) has also recently installed one Continuous Ambient Air Quality Monitoring Stations (CAAQMS) at Science Centre in Surat City.

Particulate Matter in ambient air is mainly caused by vehicular emission, road dust resuspension, industry, solid waste handling, construction & demolition activities, household emissions etc.

Surat is implementing the Action Plan for improvement of air quality framed under National Clean Air Programme (NCAP). The best practices of clean air measures across various sectors implemented by Surat Municipal Corporation are presented here.



Source: Report of Source Apportionment Study and health risk assessment (By The Energy & Resources Institute).



Vehicular Emissions



BRTS

108 km
.....
NETWORK

166
.....
BRTS FLEET
BUSES

163
.....
BRTS
STATIONS

13
.....
OPERATIONAL
ROUTES



1 Public Transportation

Bus Rapid Transit System (BRTS)

In order to boost its public transportation, Surat city has developed the robust Bus Rapid Transit System (BRTS) which has been operational since 26 January, 2014 by Surat Municipal Corporation (SMC).

In addition to this, the city buses in Surat have an operational network of 450.5 km. These are operational along 43 routes with a fleet size of 575 buses.

Furthermore, a total subsidy of INR 130 Crore is to be received for 300 electric buses. Presently there are 82 electric buses that are operational. Depots for the same are under construction at Palanpur, Althan and Magob.

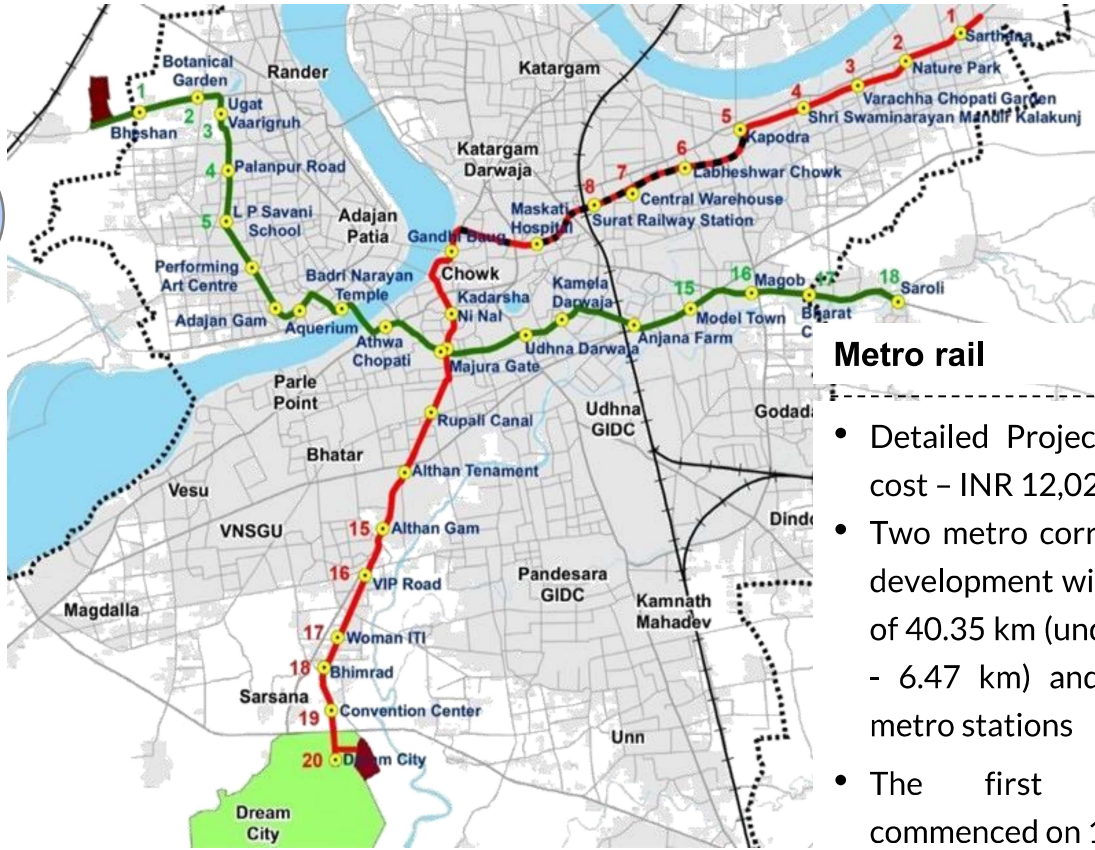


Vehicular Emissions



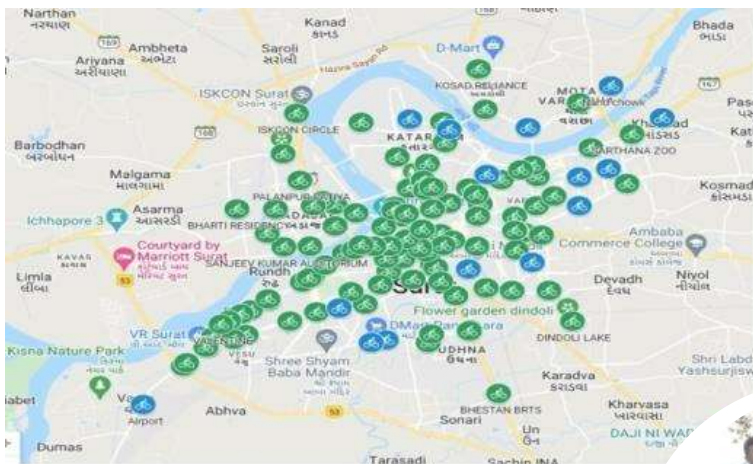


Vehicular Emissions



Metro rail

- Detailed Project Report (DPR) cost – INR 12,020 Crores
- Two metro corridors are under development with a total length of 40.35 km (underground route - 6.47 km) and a total of 38 metro stations
- The first phase work commenced on 18 Jan 2021



Public bicycle sharing

The percentage of coverage of Non-Motorized Transport Network (pedestrian and bicycle) in the city is 17.54 %



121
STATIONS

1852
DOCKS

1227
BIKES

2 Electric Vehicle Policy

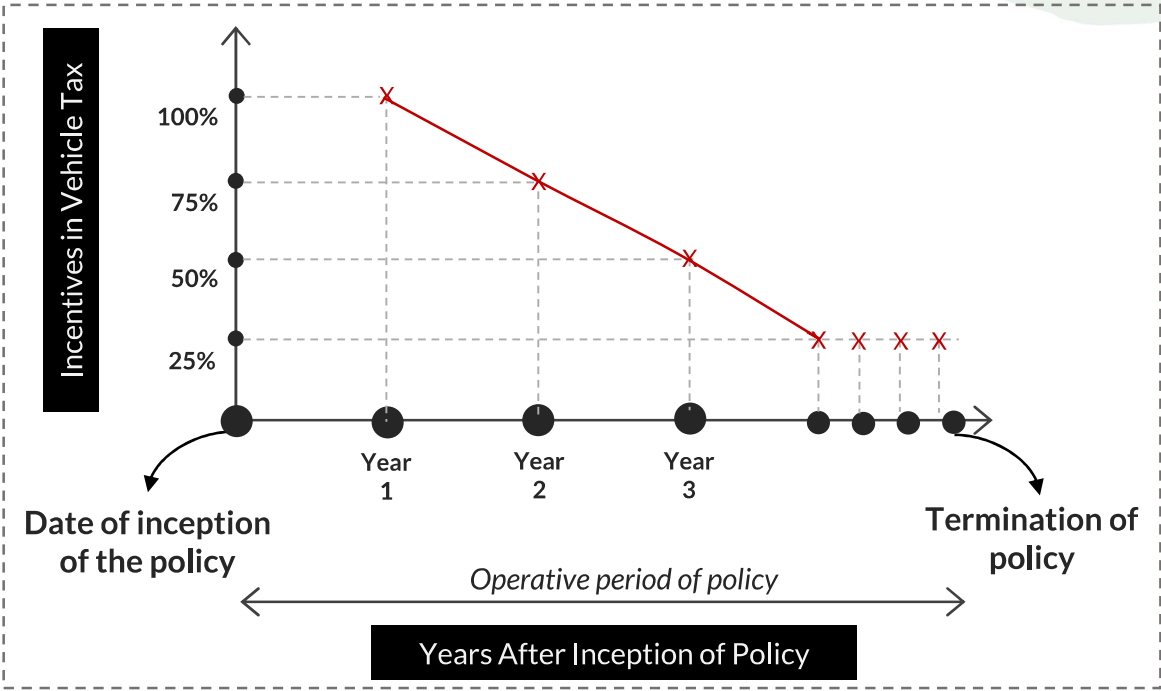
Surat Municipal Corporation (SMC) has introduced Electric Vehicle Policy-2021 for Surat City. It has planned to install 500 Public Electric Charging Stations in the city by 2025 with 5 total charging stations that have already been installed. The goal for SMC is to replace all the diesel buses with E-Buses by 2030.



Vehicular Emissions



Incentives in Vehicle Tax for all Electric Vehicles Registered in Surat City





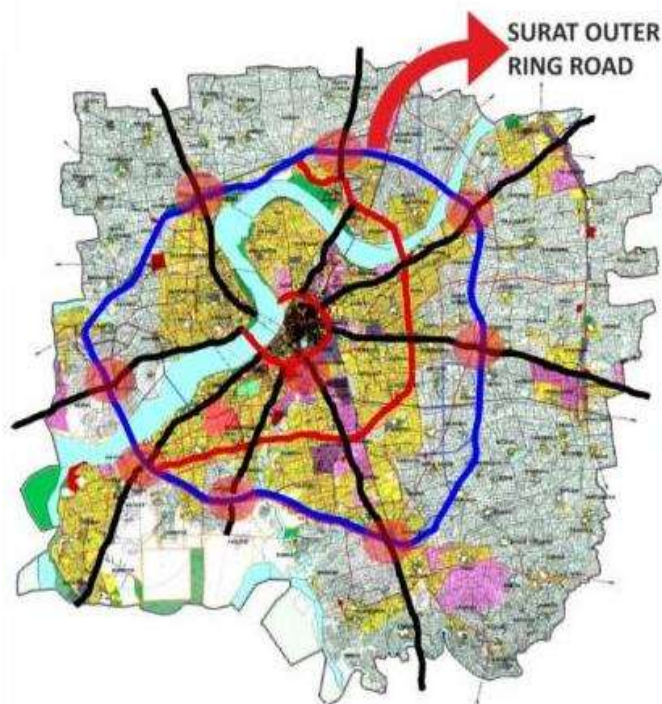
Vehicular Emissions



Type of EVs	No of EVs presently in Surat	State's target in State EV Policy Period	SMC's target in City EV Policy Period
2 W	12815	1,10,000	20,000
3 W	207	70,000	15,000
4 W	497	20,000	5,000
Buses and others	82	-	300
Total Nos of EVs	13601	2,00,000	40,300



3 Road Development



OUTER RING ROAD

- 90 m wide road with service lane connecting 60 villages
- Outer Ring Road length – 62.70 km (with 27.70 km long Greenfield corridor)
- The right of way for the said project has been acquired through the planning and notification of eleven town planning schemes, out of which eight are in Surat Urban Development Authority (SUDA) area and three are in Surat Municipal Corporation (SMC) area.



Vehicular Emissions





Resurfacing of roads

A) Resurfacing by polymeric method / CGBM technology

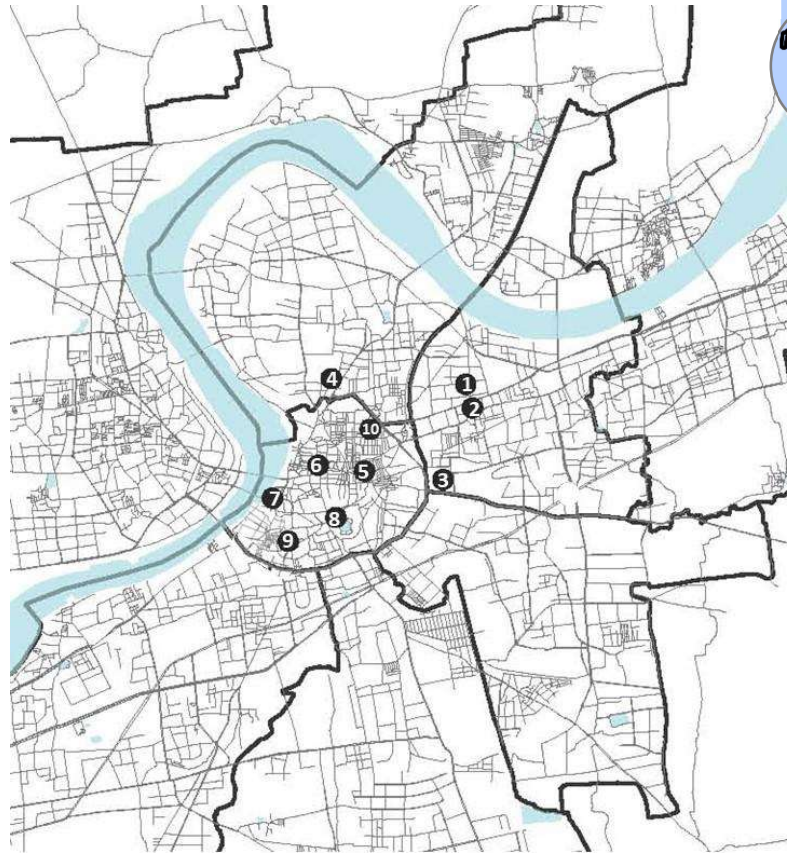
Sr. No.	Name of Road	Length In Meter	Expenditure in Cr
1	Dotiwala Bakery to Zinga Cricle in Central Zone	330.00	6.04
2	Swagat BRTS to Mahavir Chowk in East Zone-B	895.00	
3	Surat Navsari Road to Pramuk park Bridge road with ROB Approach in South zone	735.00	
4	Parvat Patiya to Parvat Khadi Bridge in South East zone	820.00	
5	Olpadi Mohalla Road in South West zone	305.00	
Total		3085.00	

B) Resurfacing by shredded plastic waste

Sr. No.	Name of Road	Length In Meter	Expenditure in Cr
1	Kailashnagar to GandhiKutir Bridge in South Zone	600.00	2.20
2	Siddharth Canal junction to NFI Garden in South zone	950.00	
Total		1550.00	



4 Multi-Level Parking Facilities



Source: UMTC

1. Sardar Smriti Bhavan MLCP
2. Mini Bazar MLCP
3. Umarwada MLCP
4. Katargam MLCP
5. Maskati hospital MLCP
6. Chauta Bazaar MLCP
7. Rang Upvan MLCP
8. Gopi talav MLCP
9. Nanpura pumping station MLCP
10. Khansaheb no Delo MLCP

10
.....
**MULTI-LEVEL
PARKINGS**

1132
.....
4 WHEELERS

6143
.....
2 WHEELERS

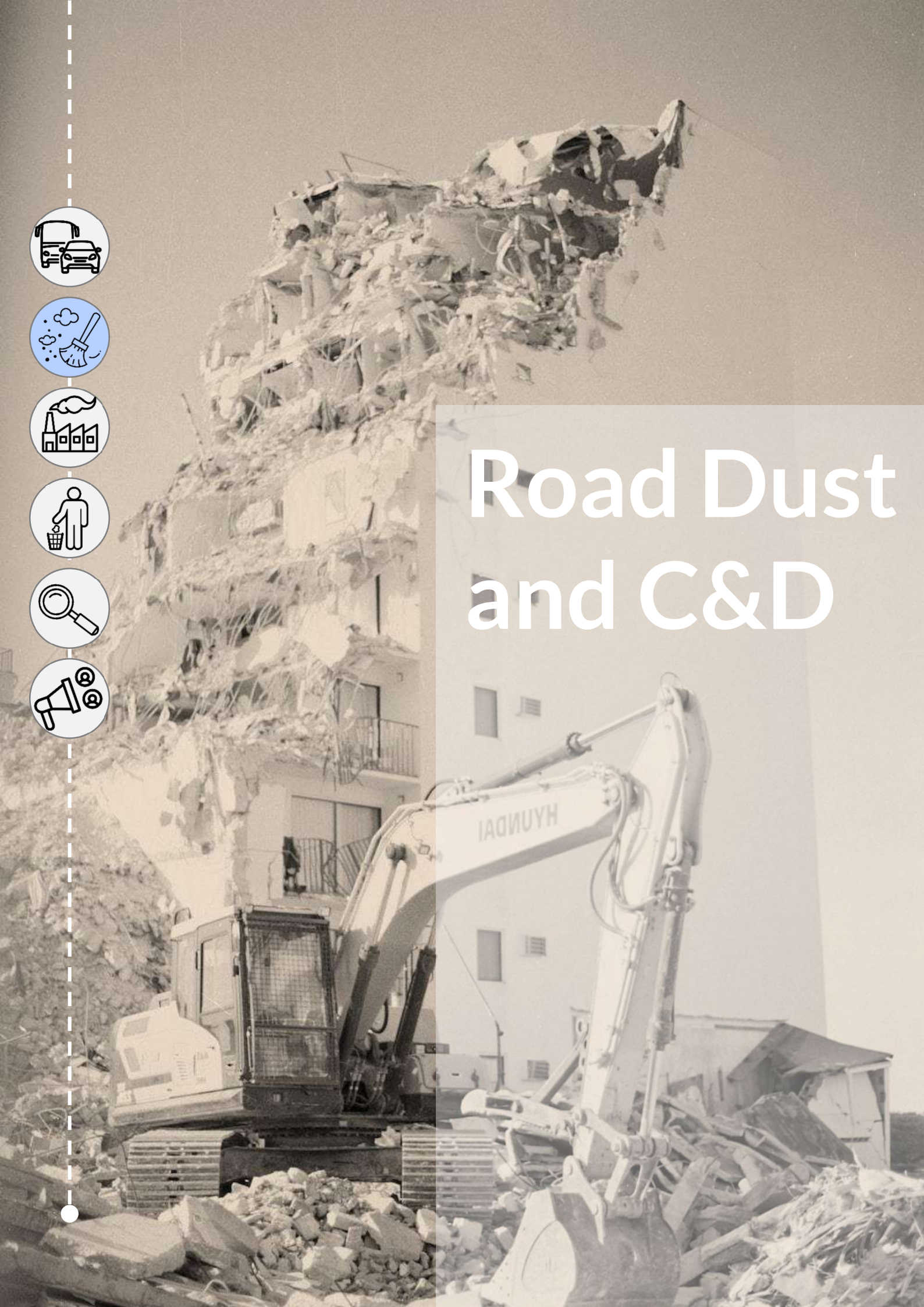


Vehicular Emissions





Road Dust and C&D



1 Urban Planning, Green Cover and Biodiversity

Surat city currently has a green cover of 38.34%. As part of the endeavour to further increase this percentage and promote biodiversity within the city, various activities have been prepared to promote the plantation of trees.

These are beneficial as trees help in the natural purification of air and, thus, counter the air pollution generated from various sources.

When planted by the sides of roads, they also act as a natural barrier and reduce the dust generation from these transport corridors.



Sapling Distribution
.....
1 lakh free distribution of saplings in 2021



Theme Plantations
.....
Viranjali Van, Rashi Van, Nakshtra Van, Oxygen Park

World Environment Day
.....
Celebration of Van Mahotsav with students, NCC/NSS cadets and different NGOs and clubs

Tree Plantations
.....
Request plantation or donate saplings via mobile application

- ✓ Tree plantations by SMC
- ✓ Individual plantations using free saplings from SMC
- ✓ Donate saplings
- ✓ Donate tree guards



Road Dust and Construction and Demolition





Road Dust and Construction and Demolition



Garden Development

Construction of conservatory dome and Atmospheric Control System work



Floral Park South East Zone Limbayat, Surat.



South West (Athwa) Zone



Construction of various type of civil works like kota stone fitting, soil filling & colour work etc.



(Pond) in East Zone (Varachha) Area

Development of Garden



2 Future Planning



It is proposed that 80 acres of waste land will be reclaimed and developed under a Biodiversity Park project. It will be designed with walking and cycling tracks, water bodies and play areas among other things.

OVER 6 LAKH
.....
Small and big trees



Road Dust and Construction and Demolition



Green Energy

INDUSTRIAL EMISSIONS
SECTOR





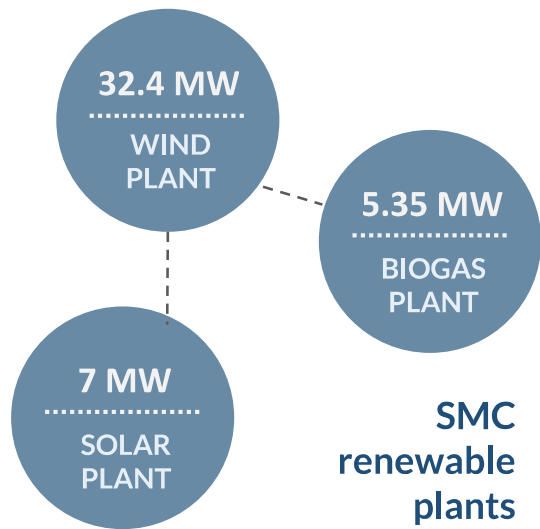
Industrial Emissions

1 Energy and Green Buildings

35% of the total electrical energy for the Surat Municipal Corporation (SMC) services are derived from renewable sources. This will increase to 42% after the commissioning of a 10 MW Solar plant.

Energy Efficient Street Lighting in the city is currently 83%.

Total number of Solar Plants installed are 42,079 with a total capacity of 205 MW.



Share of Surat In rooftop solar Installation in Gujarat	11.78 %
Share of Surat In rooftop solar Installation in India	3.16 %

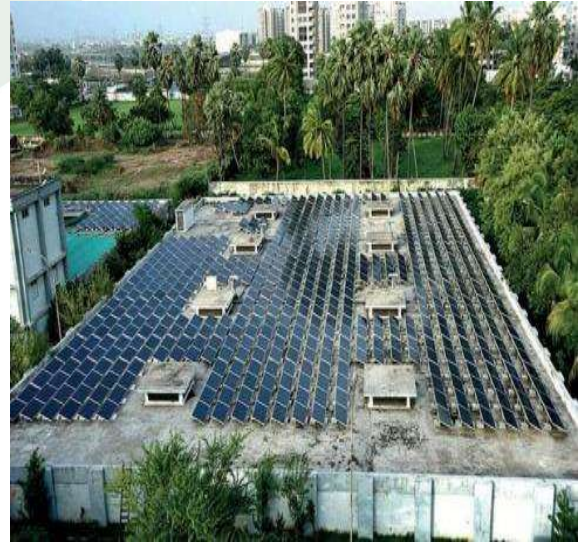
2 Future Planning

Surat Municipal Corporation (SMC) is planning to engage with city experts and private sector energy saving companies (ESCO) as per the guidelines, templates, and methodologies provided by government authorities.

It plans to increase the share of renewable energy utilization in heating/cooling networks, municipal solid waste management, street lighting etc.

Surat city also is planning to implement traffic management system, strengthen public transportation system, promote the use of cleaner fuels for vehicular consumption (bio fuels, CNG, LPG, renewable energy), and make PUC Certification implementation more strict to reduce the fuel usage and pollution in the city.

SMC has started activities aligned towards the promotion of Green Buildings and is the leading city in India for the development of the same.



Industrial Emissions



Solar Plant Capacity : 10 MW (AC)

Solar Plant Capacity : 13 MW (DC)

Total Capital Cost : 60.66 Cr

Date of Work order : 31.03.2022

Date of completion of work as per tender : 28.02.2023

Waste and Biomass

DUMPING AND BURNING



1 Waste Collection and Processing

Surat was ranked as the second cleanest city in India during Swachh Survekshan 2021. It follows the 5R Policy (Refuse, Reduce, Reuse, Recover, Recycle) to reduce its waste generation.

SMC is collecting almost 1800 MT/day of waste in the segregated manner from Door to Door Vehicles.



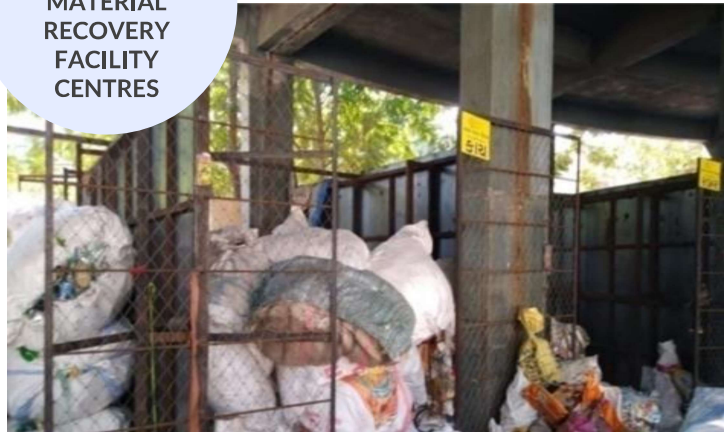
152

DECENTRALIZED ORGANIC WASTE COMPOSTING CENTRES



8

MATERIAL RECOVERY FACILITY CENTRES



Centralized Waste Processing



Wet waste is being converted to compost using traditional wind rose method



Dry Waste is been converted in to Refuse Derived Fuel (RDF).



A Centralized Municipal Solid Waste Processing Plant of a capacity of 1500 TPD has been commissioned at the Khajod Final Disposal site



Waste and Biomass - Dumping and Burning





Waste and Biomass- Dumping and Burning



2 Transformation of Dumpsite into Ecological Park



24 Lakh MT
.....
QUANTUM OF
WASTE

3,44,300
sq m
.....
AREA OF
PARK

2,67,000
sq m
.....
RECLAIMED
AREA

The project envisions the transformation of a dumpsite into an ecological park comprising recreational areas, walking and cycle tracks for public use.

As a result of this project, a 20% reduction of air pollution was observed in the vicinity. The green cover of Surat city has also increased by 0.2%.



3

Sculptures out of Waste Scrap

Waste and scrap materials have been collected and modelled into sculptures based on different themes. These sculptures have been placed at different traffic junctions across the city.



Waste and Biomass - Dumping and Burning



300 TPD
CAPACITY



4 Construction and Demolition Waste Management

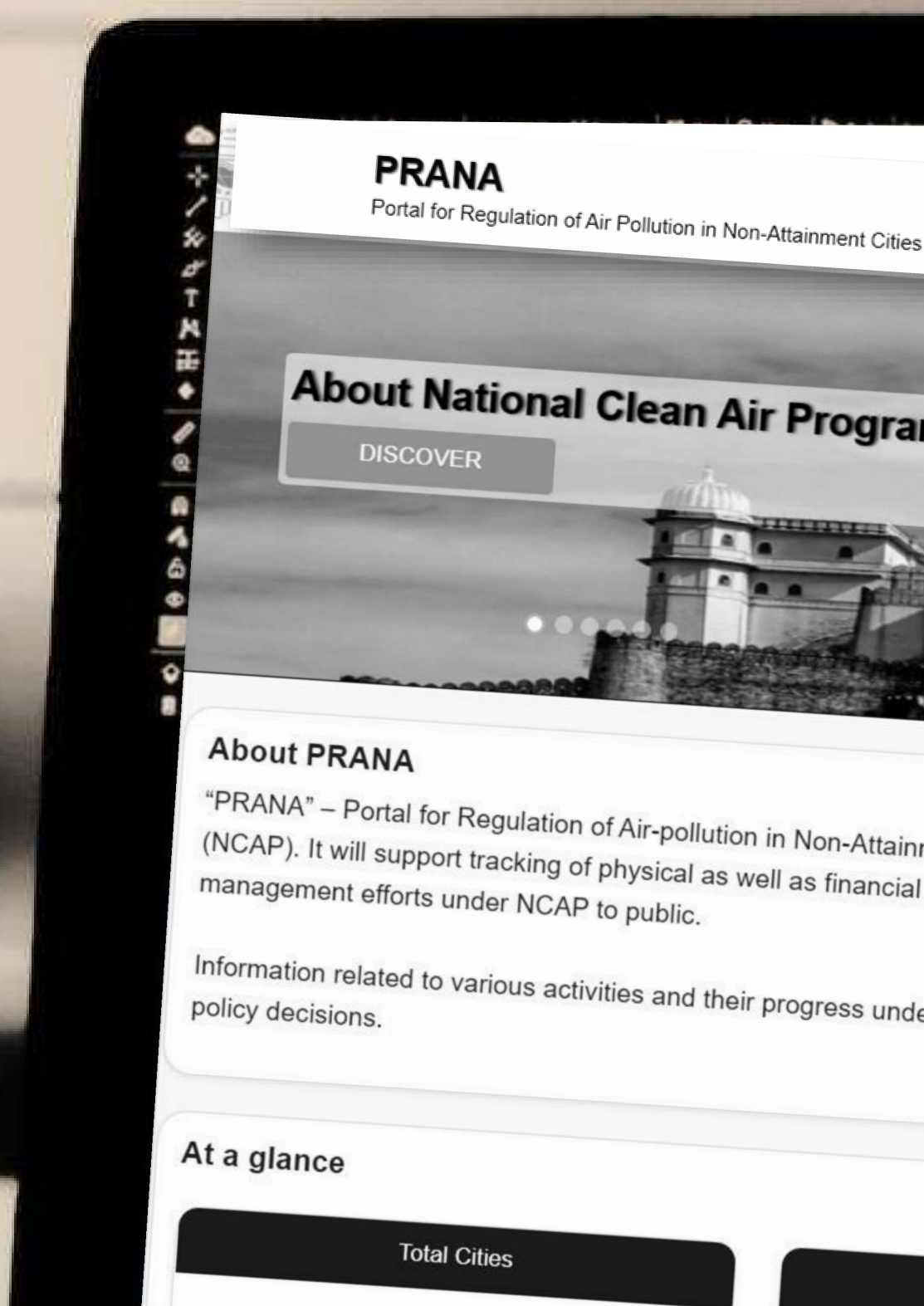
The Surat Municipal Corporation (SMC) had provided land of 3 acres on token rent at Kosad for the implementation of this project.

This project has been developed on a PPP mode with a concession period of 20 years. The agency thus assigned collects the waste from the users/generators and directly charges them a collection fee. They have deployed GPS based vehicles for efficient monitoring of the same .

The collected waste is then processed into various construction products and materials such as sand, blocks , paver blocks etc.

SMC has further made it compulsory for the utilization of 20% recycled products in all tenders as per the guidelines of the Swachh Bharat Mission.

Strengthening Infrastructure, MONITORING NETWORK AND SOURCE APPORTIONMENT



PRANA

Portal for Regulation of Air Pollution in Non-Attainment Cities

About National Clean Air Program

DISCOVER

About PRANA

“PRANA” – Portal for Regulation of Air-pollution in Non-Attainment (NCAP). It will support tracking of physical as well as financial management efforts under NCAP to public.

Information related to various activities and their progress under policy decisions.

At a glance

Total Cities

1 Air Quality Monitoring

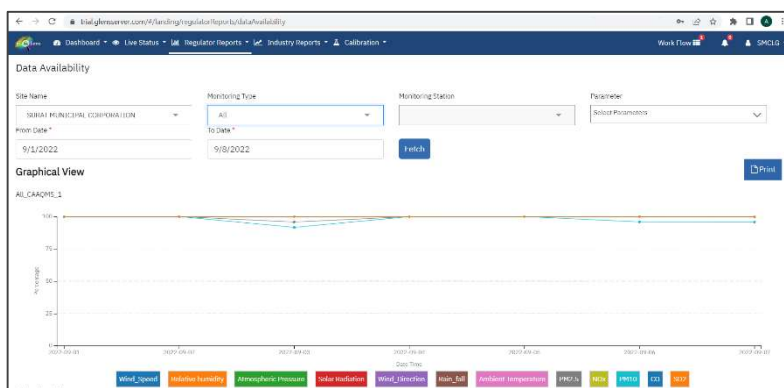


There are 10 locations for air quality monitoring in Surat District, as per the CPCB guidelines under National Air Monitoring Programme (NAMP) and State Air Monitoring Programme (SAMP).

Gujarat Pollution Control Board (GPCB) and Surat Municipal Corporation (SMC) have also decided to install 7 air monitoring stations (AQMS) in Surat under NCAP.

SMC has already installed one CAAQMS at the Science centre and work has been in progress from 7 September 2022.

The air quality status is displayed on SMC's home page and other web pages for public consumption.



Link- <https://trial.glensserver.com/#/landing/regulatorReports/dataAvailability>

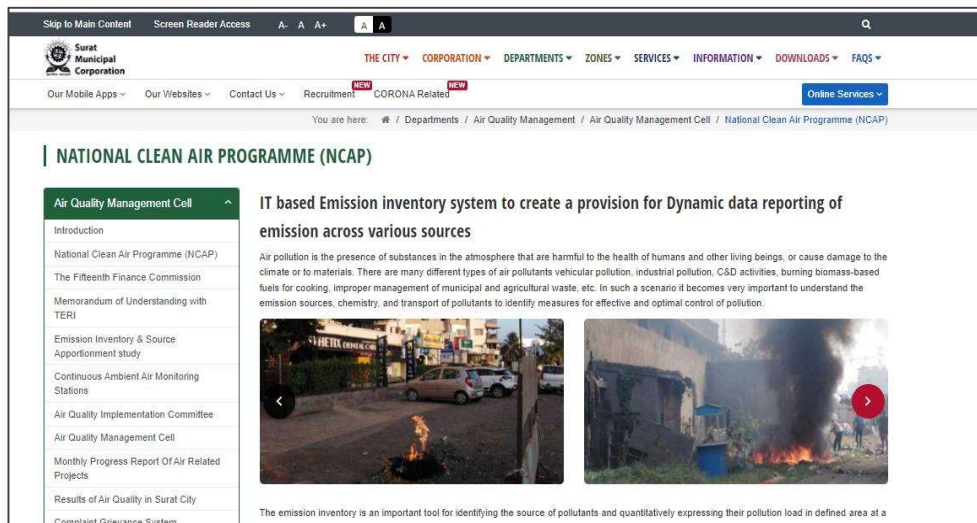


Strengthening Infrastructure, Monitoring Network and Source Apportionment

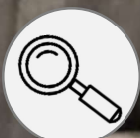
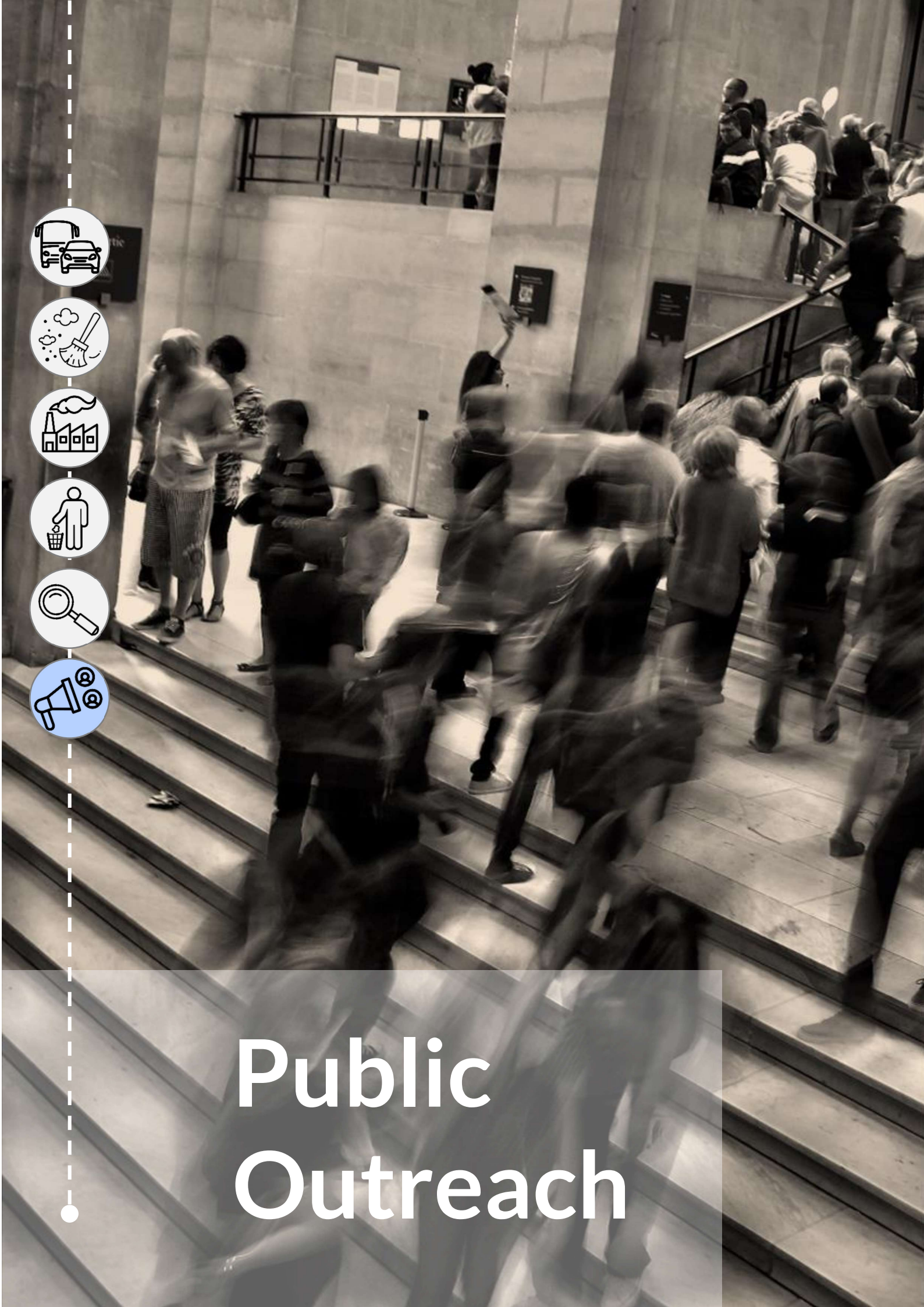




2 IT Based Emission Inventory System



An IT based emission inventory system has been created to provide dynamic data reporting regarding the emission across various sources such as vehicular pollution, C&D activities, biomass burning for cooking, improper waste management.

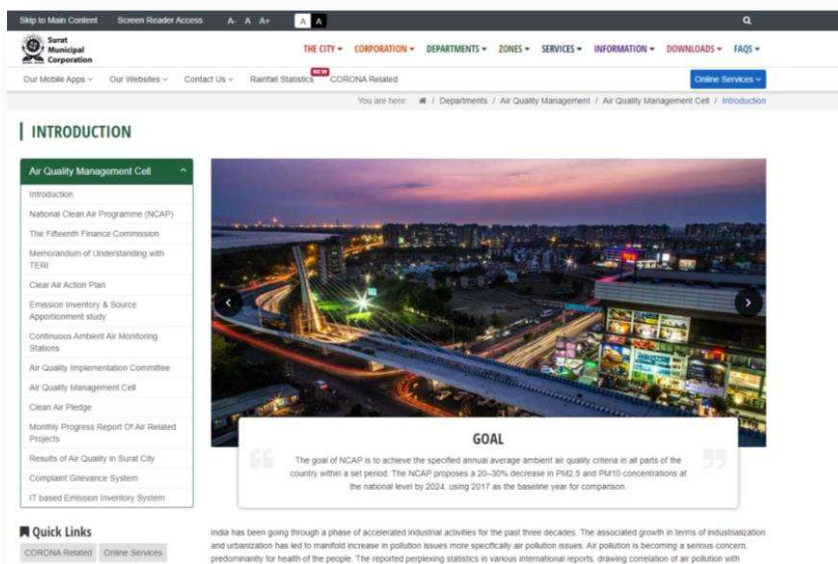
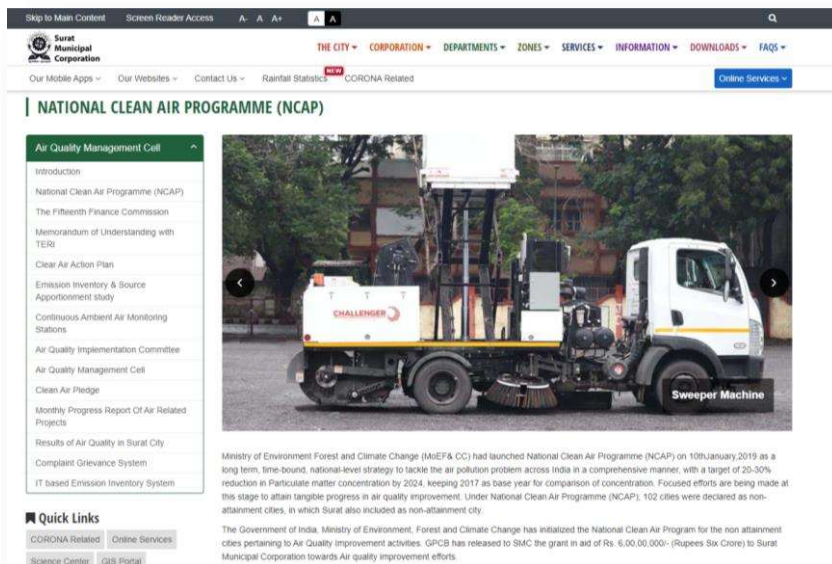


Public Outreach

1 Surat Air Quality Management Cell Website

Surat Municipal Corporation (SMC) launched a website called "Air Quality Management Cell" that contains all information on air pollution, such as air quality data from monitoring stations, monthly progress reports on the municipal action plan, and air quality complaint handling, amongst other things.

SMC has also created a provision on this website for the dynamic data reporting of emissions across various sources.



Public Outreach

