

ISSUE BRIEF

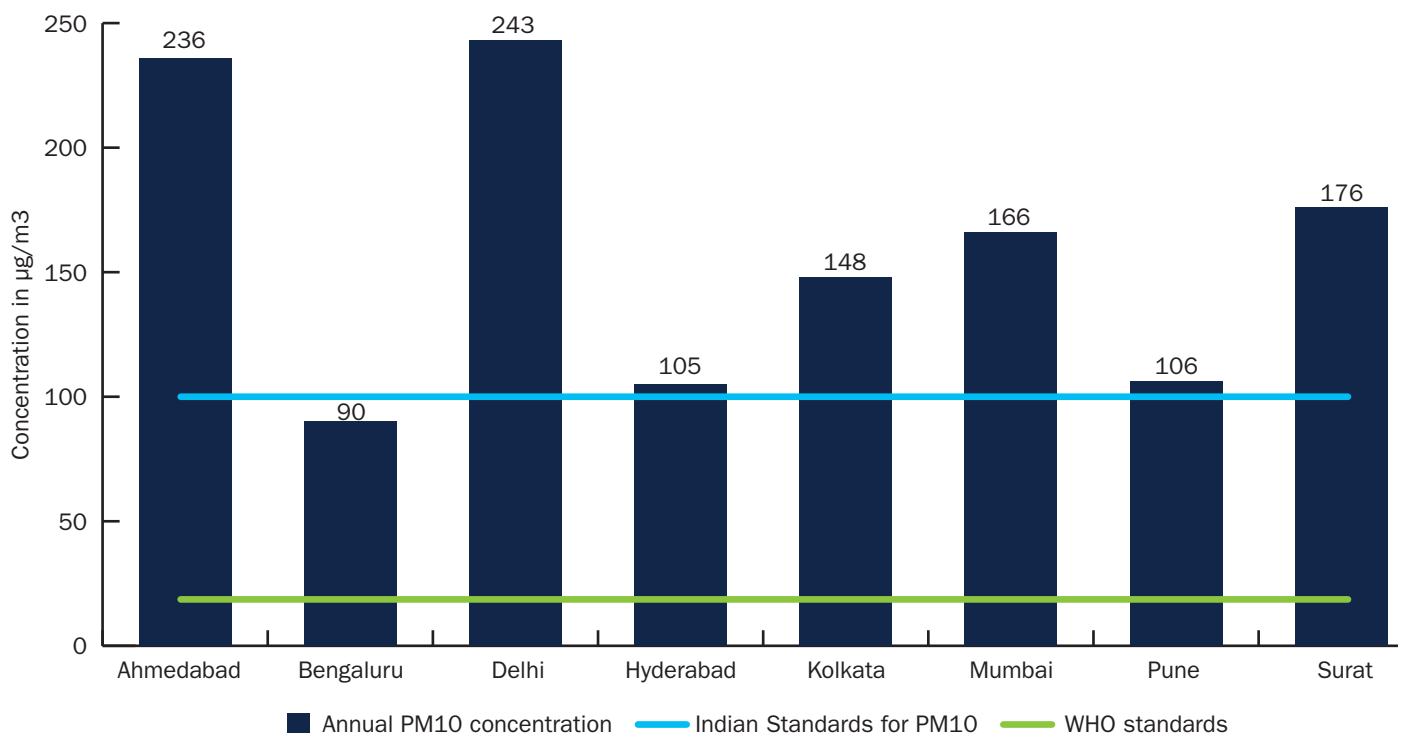
CLEARING THE AIR: HIGHLIGHTS OF CITY ACTIONS IN 2020 TO REDUCE AIR POLLUTION

Globally, 4.1 million deaths¹ were linked to outdoor air pollution exposures in 2019 – with nearly half of those deaths – more than 1.67 million in India². With increased respiratory threats from COVID-19, tackling rising air pollution and protecting public health are even more urgent. While the media covers New Delhi's air pollution crisis, over 80% of Indian cities with a population of more than one million struggle with unhealthy air.³

The national government and many cities in India are taking action to improve air quality through the National Clean Air Programme (NCAP) and city Clean Air Plans (CAPs). The NCAP aims to reduce national levels of high particle air pollution (PM_{2.5}, PM₁₀) by 20-30% by 2024 compared to 2017 levels. Under the NCAP, India's 122 non-attainment cities that do not meet its National Ambient Air Quality Standards (NAAQS) need to develop city-level CAPs to reduce outdoor pollution levels. More than 100 cities across India have developed CAPs that are in various stages of implementation.⁴

In a major advancement in 2020, the national government increased funding to cities for improving ambient air quality through a new performance-based grant from the Finance Commission (FC). This issue brief builds on the 2020 factsheet from Natural Resources Defense Council (NRDC) and partners — Indian Institute of Public Health- Gandhinagar (IIPH-G) and Centre for Environment Education (CEE) — to provide updates on financing mechanisms, air pollution sources, and city CAPs; and includes recommendations for improving CAP implementation with the Finance Commission grants in 2021.⁵

Annual PM₁₀ concentration for selected cities (2018 data)



Source: Authors analysis based on Ministry of Statistics and Programme Implementation, Government of India, Environmental Statistics 2020, Volume 1.

The issue brief also spotlights a study underway by NRDC and partners that estimates the health benefits by 2030 from reducing air pollution via cleaner energy sources.

FUNDING CLEAN AIR: NCAP AND FINANCIAL COMMISSION

The Ministry of Environment, Forests and Climate Change (MOEFCC) released the NCAP in 2019 with initial funds totaling ₹ 300 crores (\$41 million) for the first two years. MOEFCC allocated the initial NCAP funds through the State Pollution Control Boards (SPCBs), dividing funds among the 122 non-attainment cities, with 28 cities having million plus population and annual PM₁₀ concentrations above 90 µg/m³ receiving the majority of the funds (₹ 10 crore (\$1.4 million) each). MOEFCC allocated the residual funds (₹ 20 crores (\$2.8 million)) to the remaining 94 non-attainment cities based on population.

Through the annual Union Budget 2021, the Government of India allocated ₹ 460 crores (\$62.7 million) to the Central Pollution Control Board (CPCB) for “Control of Pollution.” These funds are likely to be used to control air pollution, including initial funding of ₹ 300 crores to the NCAP.⁶

Recognizing that additional funding is needed, in March 2020, the Indian government allocated an additional ₹ 4,400 crores (\$600 million) as grants to urban local bodies (ULBs) in cities and Urban Agglomerations (UAs) to improve air quality for 2020-2021, based on the recommendations of the XVth Finance Commission.

The allocation is part of the XVth Finance Commission (FC) report to the Government of India.⁷ The Finance Commission allocation is 14 times higher than the initial NCAP allocation.

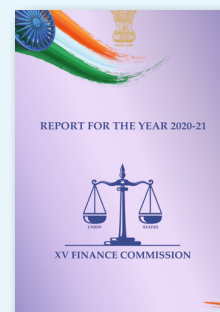
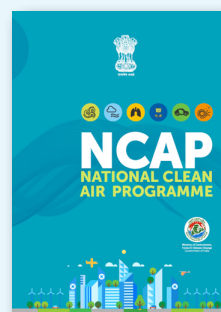
In November 2020, the first tranche of 50% of the Finance Commission grants totaling ₹ 2,200 crores (\$300 million) were released to state governments to allocate to selected city ULBs. These grants are routed through the Ministry Finance to the state department and to the cities and UAs and will fund air quality measures, including capacity-building of the local bodies and air quality monitoring. MOEFCC and stakeholders are discussing a framework for funded cities & UAs to track performance through air quality indicators and demonstrate how the grants will be used for prioritized areas for air quality improvement before they receive the second tranche of the FC grants.

CLEAN AIR HIGHLIGHTS

January 2021 marks one year since India's cities, classified as non-attainment cities, developed time bound city CAPs to meet specific air quality targets. In 2020, NRDC and partners examined CAPs from 10 major cities to identify the common strategies and opportunities to learn among the shortlisted cities.⁸ This section provides an update on actions on air quality management in these cities. National level source control updates are also summarized below. The CAP implementation remains inconsistent across sectors, cities and states, an issue that NRDC and partners identified in our 2020 analysis.

Summary & Timeline of National Funding Support for Air Quality Management

- **January 2019:** Launch of the National Clean Air Programme (NCAP)
- **February 2019:** Government of India's (GOI) budget 2019-20 allocates funding of ₹ 300 Crore (\$41 million) for two years
- **July 2019:** 28 cities including Ahmedabad allocate ₹ 10 Crore (\$1.4 million) each under the NCAP
- **November 2019:** XVth Finance Commission (FC) submits report to the GOI and recommends allocation ₹ 4,400 Crores (\$600 million) of dedicated grants to cities and Urban Agglomerations (UAs) for “improving ambient air quality”
- **March 2020:** GOI's budget 2020-21 allocates funding of ₹ 4,400 Crore (\$600 million) to 42 cities and UAs Grant allocation is through the Ministry of Finance and is not directly linked to NCAP
- **May 2020:** 102 non-attainment cities submit city level CAP for consistency with the target of reducing PM_{2.5} & PM₁₀ by 20-30% by 2024 over 2017 levels
- **August 2020:** GOI announces “Mission for Clean Air”
- **November 2020:** 42 UAs allocate 1st instalment of FC grants totalling ₹ 2,200 Crore (\$300 million)
- **April 2021:** Expected disbursement of the second instalment of the FC grants to cities and UAs against the stipulated performance-based outcomes in terms of year-on-year improvement in air quality



SOURCE CONTROL UPDATES

Power plant implementation delays: Coal-fired thermal power plants (TPPs) are one of the largest sources of air pollution in Indian cities. TPPs account for about 60% of India's total electricity production.⁹ Many of India's coal-fired power plants are aging, inefficient, and thus, highly polluting.¹⁰ In many cities, older power plants continue to operate within city limits, and along with other more distant plants, contribute to the total emission load of the airshed.¹¹

The national government revised the permissible limits for emissions of particulate matter, sulfur oxides (SO_x) and nitrogen oxides (NO_x) for coal-based power plants in 2015. The deadline for implementing the stronger emission standards was extended from 2017 to 2019, and is now moved to 2022. Even with these relaxed timelines for implementation, a September 2020 analysis by one of India's leading environmental organizations estimates that a majority of currently operational power plants in India will miss this 2022 deadline.¹² Serious compliance issues in following stronger emissions standards exist among power plants. There is a lack of accountability and with expected delays it is likely that higher emissions from these TPPs will continue unabated for longer.¹³

Electric vehicles and phasing out older vehicles:

Transportation is one of the most significant source of air pollution in Indian cities. Adopting Bharat Stage (BS) VI emission standards in India across vehicle categories — light, medium and heavy-duty vehicles, and more significantly for 2 and 3 wheelers, which account for more than 80% of India's new vehicle sales — is a major opportunity to control pollution.¹⁴ The national government is developing an incentive program to scrap older vehicles.¹⁵ The government is also promoting electric vehicles (EVs)

through a combination of national programs, such as the Faster Adoption and Manufacturing of Hybrid and EV (FAME) and other fiscal interventions, which will have an impact on air quality levels. Several states have announced their state EV policies in 2020 and more are expected to release their EV policies in 2021 and beyond.

More robust source apportionment studies and emission inventories: Cities are developing emission inventories as well as source apportionment¹⁶ studies to better understand the particular sources of pollution, as well as for more effective planning for air quality management. In 2020, the National Knowledge Network introduced guidelines to improve apportionment studies through support to cities from technical and research institutions, such as the National Environmental Engineering Research Institute (NEERI), Indian Institute of Technology campuses (IITs) and civil society groups.¹⁷

Expanding air quality monitoring networks: The national network of ambient air quality monitoring stations of India has steadily grown. In 2019, less than 200 automated, continuous real time air quality monitors and about 600 manually-operated monitors — each one documenting two days of data per week — existed in India. The NCAP aims to increase monitoring of air quality data and install new continuous real-time monitoring stations. Cities such as Kanpur, Mumbai and Pune, are adopting a hybrid approach of integrating air quality data from distinct sources, using a combination of satellite-based pollution estimates and local data from low-cost sensors. The national government also created draft standards and guidelines to increase the reliability of sensor-based air quality monitors. City governments are increasingly adopting sensor-based air quality monitors to expand the air quality monitoring network.



A thermal power plant and its fly-ash pond in Haryana



Electric three wheelers can reduce emissions in dense city-centers



A real-time air quality monitoring station in the National Capital Region

COVID-19 and Air Quality

Over the past year, the coronavirus pandemic has caused rapid and widespread damage to human health around the world. In addition to high exposure to frontline health workers, other populations identified as being particularly vulnerable to severe complications from COVID-19 include older adults, people such as cancer patients who have compromised immune systems, and people with chronic heart and lung disease. Unfortunately, exposure to air pollution worsens many of these pre-existing health problems, compounding public health risks from the pandemic.¹⁸

India enforced stringent lockdown measures starting on March 24, 2020 to mitigate the spread of the virus. In many parts of the country, the sudden and widespread curtailment of economic activity and transportation operations resulted in dramatic improvements in local air quality.¹⁹ Several studies have observed large reductions of certain pollutants (including fine particle air pollution and nitrogen dioxide) in outdoor air, relative to levels observed in recent years. For example, an Indian Institute of Tropical Meteorology (IITM)-led analysis of System of Air Quality Weather Forecasting and Research (SAFAR) air quality monitoring data in four cities (Delhi, Pune, Mumbai, and Ahmedabad) showed 25-50% reductions in fine particulate matter compared to prior years.²⁰

While the national lockdown achieved significant short-term improvements in air quality, the benefits varied by city and did not compensate for the significant damage to lives and livelihoods inflicted by the pandemic.²¹ The benefits of lockdown imposed clear skies were short lived, as the air pollution levels rose back to very high levels once the lockdown restrictions were lifted and economic activities started to resume. In October 2020, air pollution took over major cities, especially Delhi, and India struggled with two major health challenges - COVID-19 and air pollution, both of which assault the respiratory system. However, the COVID-19 lockdown demonstrated that effective control of pollution sources can substantially and rapidly improve air quality. Further analysis of the lockdown can provide new evidence to inform future air quality management policies, economic activity, livelihoods, and public health.

HIGHLIGHTED CITY ACTION ON AIR POLLUTION

AHMEDABAD

As part of its CAP, Ahmedabad is working to reduce emissions from its largest landfill in Pirana. The landfill has exceeded its waste storage capacity and is a significant source of PM, volatile organic compounds, and greenhouse gases (carbon dioxide and methane). Ahmedabad is reducing the total municipal solid waste flows into the Pirana landfill site. To offset emissions from the landfill, the city is part of the “Mission Million

Trees” for urban greening and plantations drives and installing green barriers to prevent toxic water pollution. Ahmedabad has also used a portion of the ₹ 10 crores (\$1.3 million) funding it received under the NCAP towards road dust management, through the procurement and operation of mechanical road sweepers.²² In 2019, Ahmedabad has added 50 electric buses to its public transport fleet.²³ As part of FAME II, 300 additional e-buses are to be introduced.²⁴

To further strengthen the interventions for air quality improvement, in 2020, Ahmedabad initiated a detailed air pollution emission inventory and source apportionment

study through the Gujarat Environment Management Institute (GEMI), Gandhinagar.²⁵ Gujarat Pollution Control Board (GPCB) announced plans to scale up the Particulate Matter Emissions Trading Scheme (ETS) piloted in Surat to industries in and around Ahmedabad.²⁶ This is significant since the number of industrial sources in this area is much larger – up to 1,500 units. The ETS in Ahmedabad is expected to be rolled out in a phased manner, starting in 2021. The XVth FC allocated ₹ 182 crores (\$24 million) as a grant to the Ahmedabad UA and the city is now in the process of evaluating measures for air quality control (highlighted in the next section of the issue brief).

BENGALURU

The Bruhat Bengaluru Mahanagara Palike (BBMP), the ULB for Bengaluru, prepared a detailed expenditure plan for the FC grant in 2020. These involved implementing nine projects over a period of two years.²⁷ The FC allocated Bengaluru UA ₹ 279 crores (\$37 million), half of which has been disbursed to the city. The planned projects aim to advance NCAP objectives, some of these projects include:

- better governance mechanisms for air quality management,
- compliance with public interest litigation with the National Green Tribunal (NGT),
- a dedicated air quality management command and control center,
- monitoring and surveillance of open areas susceptible to garbage burning,

- mechanisms to control construction and demolition waste dumping,
- procurement and operation of mechanical road sweepers and water sprinkler vehicles,
- procurement of remote sensing devices to identify and reduce vehicular emissions from grossly polluting individual vehicles.

The state of Karnataka was one of the first few states to release an EV policy in 2017. Since then, the state is working on implementing the policy and has introduced several projects. Trials are currently underway to introduce electric buses to the public transport fleets. Over 300 additional e-buses will be added to its fleet under FAME II.²⁸ Earlier in 2020, Bengaluru also introduced pop-up cycle lanes to promote cycling and walking during the lockdown.²⁹

DELHI

Delhi continues to lead policy interventions in air quality management in India. In 2020, the national government set up the “Commission for Air Quality Management” (CAQM) for the states of Delhi, Punjab, Haryana, Rajasthan and western Uttar Pradesh. The CAQM recognizes for the first time in India that air pollution management requires coordinated action at the air-shed level, across political and administrative boundaries. Previously, Delhi employed a pollution hotspot-based approach to air quality management. The CAQM is likely to coordinate with state and central governments, and stakeholders to control pollution. The Commission will operate as an independent body within a supra-centralized framework for air-quality management in the region, similar to the California Air Resources Board (CARB) in the U.S. and will oversee air quality management issues in the National Capital Region (NCR) and nearby states.³⁰

To reduce pollution from the transport sector, Delhi finalized one of India’s most comprehensive EV policies in 2020.³¹ The policy details plans to set up public charging stations, EV-ready buildings, and adds a number of new e-buses to its fleet. Other ongoing interventions include actions against individually polluting vehicles, such as the imposition of an Environmental Compensation Charge (ECC) for incoming heavy duty and commercial vehicles and a ban on the operation of older vehicles. The city is also piloting AI-based remote sensing technology to detect higher than permissible emissions from vehicles operating on the road. There are ongoing reforms for the mandatory emission compliance certification for vehicles, and in 2020 Delhi has enforced a much higher non-compliance penalty.



Figure 1: Highlighted cities with action on clean air

“Green Fireworks” were introduced to reduce firework pollution, which is a traditional source in the fall air pollution peak in Delhi. Town and cities surrounding Delhi strengthened the air quality network in 2020. Gurgaon and Faridabad began operating four new regulatory-grade monitors, and Gurgaon is installing a network of sensor-based monitors.

HYDERABAD

The city worked to strengthen the air quality monitoring network, with installation of seven new continuous monitoring stations.³² The city is also working on expanding urban greening and is creating urban parks to improve air quality.

The 6th Air Quality Monitoring Committee meeting held in the Telangana State Pollution Control Board (TSPCB) in 2020 advised departments to focus on the implementation of lane discipline, open biomass burning, as BS-VI vehicles are introduced.³³ The Committee suggested upgrading the infrastructure to monitor transport in the city and implement mechanisms for discarding old vehicles and penalizing polluting vehicles. It also instructed the industries department to prepare a roadmap for shifting the polluting industries beyond the Outer Ring Road of the city.

KOLKATA

Kolkata is working to modernize and electrify its transport sector, as one of the means to improve air quality. Under FAME II, Kolkata has introduced and operates e-buses. In addition, the city is phasing out older vehicles and prohibits commercial vehicles older than 15 years in the city. Along with seven other cities in the state of West Bengal, Kolkata will give an incentive of ₹ 1 lakh (\$1300) each to first 1,000 commercial vehicles towards scrappage and fleet modernization.³⁴ The West Bengal Pollution Control Board (WBPCB) has started a fuel substitution scheme to provide gas stoves and smokeless chulhas, to facilitate the transition away from solid fuel for a large number of small-scale coal users, such as roadside eateries, iron shops and small businesses.³⁵

MUMBAI

An important measure for air quality improvement in Mumbai in 2020 is the decision to relocate a biomedical waste incineration plant from within the city limits to 70 kms outside the city limits.³⁶ The city has also developed localized micro-action plans for particular pollution hotspots, such as the micro-zone action plan for Mahul.³⁷ A judicial order has asked the city to regulate emissions from brick kilns in the Mumbai Metropolitan Region and



Waste burning in Pirana, Ahmedabad

the Maharashtra Pollution Control Board (MPCB) also included the transition to cleaner brick kilns as part of its localized action plan under the NCAP.³⁸

The state of Maharashtra has an EV policy and is introducing incentives to promote the electrification of vehicles. Mumbai has added to its e-bus fleet and more e-buses will be added under FAME II. Mumbai initiated the installation of five new real-time regulatory grade monitoring stations in its suburbs, as an attempt to strengthen its air quality monitoring network.³⁹ The city has also started the installation of one of the largest networks of air monitoring sensors - a total of 105, including 15 by the MPCB, 80 by the Brihanmumbai Municipal Corporation (BMC) and 10 mobile sensors. Mumbai is also one of the few cities to have established a local level air quality monitoring committee, chaired by the Municipal Commissioner, based on the recommendation of the NCAP.

PUNE

As a part of its city CAP, Pune has initiated measures on road improvement and development of non-motorized transportation (NMT) options on key routes within the city.⁴⁰ In 2020, construction of cycle tracks on a two km stretch were planned. The city adopted and is implementing revised Urban Street Design Guidelines (USDG) on specific streets in a phased manner. As part of Maharashtra's ongoing state-level EV policy to incentivize the electrification of vehicles, Pune has introduced electric buses to its public transport fleet. At the end of 2020, 75 electric buses were operational in the city. As part of the FAME II program, 150 additional e-buses are to be introduced. Pune is strengthening its existing network of regulatory grade air quality monitoring stations. It has added two new real-time stations and 6 manual air quality monitoring stations. These additions were in progress in 2020, and the new stations are yet to be commissioned. Automotive Research Association of India (ARAI) conducted a source apportionment and emission inventory in Pune in 2019-20 and the Indian Institute of Tropical Meteorology (IITM) carried out another emission inventory in 2020. These studies will allow the city to better understand and identify the sources of air pollution.

For dust management, Pune has planned to utilize a part of the ₹ 10 crores (\$1.3 million) NCAP funding for the purchase of two mechanical road sweepers and three water sprinklers. In October 2020, Pune launched the Pune Air Information and Response Plan, a plan for strategic health risk communication on air pollution for the city. As part of the Plan, the city also initiated a public awareness and capacity building program on urban air quality and carried out a school education program on air quality

for the Pune Municipal Corporation (PMC) schools in partnership with the education department. The XVth FC grants for air quality improvement have allocated ₹ 134 crores (\$17.8 million) to the Pune UA and the city is in the process of examining prioritized actions. A City Level Air Quality Monitoring Committee under NCAP for the city of Pune was notified through a government order by Government of Maharashtra. The committee reports to a state level steering committee chaired by the Chief Secretary of Maharashtra.

SURAT

The Gujarat Pollution Control Board (GPCB) in Surat is implementing one of the world's first Emission Trading Scheme (ETS) for particulate matter. This pilot project is in operation since 2019-20 and is implemented on a total of 350 textile manufacturing units. The city is strengthening its air quality monitoring network, with the installation of five to ten new Continuous Ambient Air Quality Monitoring System (CAAQMS). Surat is reducing Construction & Demolition (C&D) source emissions and is building capacity with developers and construction companies. The city closed a landfill site at Khajod and began scientific management of landfills.⁴¹ While Surat does not have an EV policy, it is working on transportation electrification and has introduced 150 e-buses under FAME II.⁴² The city is modernizing its fleet and phasing out older vehicles owned and operated by Surat Municipal Corporation.⁴³

LOOKING AHEAD – FINANCE COMMISSION'S GRANTS PROGRAM

A major opportunity for 2021 is the Finance Commission's grants for cities and UAs to improve air quality. The grant funding allows for much needed integrated planning and implementation of air quality measures in India at the city-level. To achieve improvement in air quality, it is critical to ensure there are mechanisms and tools in place to ensure the right use of these grants to have maximum impact on air pollution reduction. Stakeholders that work with cities on air quality improvement have highlighted certain ambiguities in air quality funds utilization and governance, which need to be strengthened. These findings include:

Standalone sources of funding: Two separate and seemingly disconnected sources of funding for air quality improvement in Indian cities and UAs, currently exist. The first is the dedicated NCAP funding via the CPCB and the MOEFCC for implementation of the approved city action plans. The second is the Finance Commission grants to ULBs routed through the Ministry of Finance. The guidelines for ULB funding from the FC grants have

not made any linkage or alignment with the ongoing NCAP programme that has remained underfunded. Additionally, the NCAP funds, have been made available only after a particular city has submitted a detailed action plan for air quality improvement. This plan which is “approved” by the MOEFCC, is a timebound plan according to which all air quality improvement interventions would be implemented within a city. However, the FC grants have not been explicitly linked to these city action plans, or the actions contained in them. There is thus, a need to align these funds and link them to the existing city CAPs to avoid duplication of action and increase impact.

Uneven allocation of resources to non-attainment cities:

Both the sources of funding have not been made available for all the non-attainment cities.²⁸ Metropolitan cities with population exceeding 1 million have received significant NCAP funding. The FC grants have been allocated to 42 metropolitan cities with more than 1 million population. At least 8 UAs which have received the FC grants are not listed in the non-attainment list of cities which are covered under NCAP, and therefore have no existing city CAP for air quality improvement under NCAP.⁴⁴ Conversely, at-least 3 non-attainment cities with population of over 1 million covered under NCAP who have approved city action plans have been left out of the FC grants. There should be an alignment of cities that are covered through these funds in such a way that cities with existing CAPs under the NCAP should also receive FC grants and cities that have received FC grants but not covered under the NCAP should be required to develop prioritized CAPs.

Inconsistent approaches to management of air quality:

The NCAP makes the city or the ULB the unit of implementation for the action plans. The State Pollution Control Boards (SPCBs) are in-charge of developing these action plans. Further, the NCAP sets up a local level implementation committee headed by the District Collector/Municipal Commissioner, which has the SPCB representative as the member-secretary. The SPCB is responsible for coordination between the ULB and the various other departments that play a role in implementing the city action plan – Department of Transport, Industry and Energy and others. In effect, the SPCBs drive the actions through the implementation

committee under the NCAP. However, in the case of the FC grants, the grants have been made unilaterally to the ULBs, without referring to this existing institutional governance framework or setting up a new one. In addition, the NCAP is clear about the city being the unit of action planning and implementation. The November 2019 FC report brings into focus the “airshed” as the unit of planning and air quality management. The airshed approach that brings in the sources of pollution impacting the air quality outside the city limits, is a mismatch with NCAP’s action planning that is restricted by the city limits of the non-attainment city.

These two sources of funding represent divergent frameworks for monitoring, reporting and accountability. There is thus, an urgent need for the state governments to have creative and innovative solutions to align the FC, ULB focused funding with the NCAP process to be able to leverage the substantial funding and prevent actions in isolation. The local level implementation committees that have already been formed for NCAP monitoring at the state level need to ensure this alignment to prevent duplication of actions. The FC grants to the ULBs have come with an air quality improvement target as well as an accountability framework, similarly the NCAP funding has its own target and framework. It is important that these two merge and re-enforce the gaps to achieve air quality improvement targets for the cities. The funding should lead to broader reforms, identify key buckets of prioritized actions, roles of different agencies and a well-defined institutional framework to ensure seamless and effective implementation.

Recognizing the need for prioritization and alignment of city action on air pollution, NRDC and partners have started a prioritization analysis for city action on air pollution for the cities of Ahmedabad and Pune. In order to effectively use the funds provided through the FC grants to the cities, cities must provide a prioritization of how the funding will be used to control air pollution. Air quality interventions that will result in large air quality gains in the short term such as, controlling emissions from non-compliant power plants and removal of highly polluting vehicles from the transport fleet, must be prioritized under the city action plans. Cities in early 2021 are in the process of determining the priority action across sectors for FC grants.

Enhancing City Actions on Clean Air: Ahmedabad and Pune

Keeping health as the focus of its action on air pollution, in 2017, working with NRDC and IIPH-G the city of Ahmedabad developed the first of its kind health risk communication plan on air pollution called the Air Information and Response (AIR) Plan.⁴⁵ Since then, the city has implemented the health-based components of the plan focused on vulnerable sections of the population, raising awareness on the major health problems caused by air pollution. Building on the success achieved by Ahmedabad's plan, Pune collaborated with NRDC, IIPH-G and CEE to develop its own AIR Plan, which was released in October 2020.⁴⁶ Like the Ahmedabad effort, the Pune AIR Plan is a health-based program designed to protect and increase awareness among residents on the health dangers of air pollution. The AIR Plan links the AQI developed by IITM with community stakeholders. The School Flag program is a key component of the plan, which tailors health risk communication and announcements to children. Children are especially vulnerable to the impacts of prolonged exposure to high air pollution levels.⁴⁷ The program could only be implemented in part in 2020, due to limited school operations on account of the ongoing COVID-19 pandemic.

Ahmedabad and Pune are also the two key cities that received the funding from the FC's grant program for improving air quality. The cities have prepared and submitted their mitigation focused Clean Air Action Plans to MOEFCC. Currently, it is only the city of Bangalore that has prepared a detailed plan of action for using the FC grant fund (highlighted in the previous section); other cities are still in the initial stages of discussion. Ahmedabad and Pune, to prepare their expenditure plans for the allocated FC grants, are developing a framework to prioritize action under their CAPs. NRDC and partners IIPH-G and CEE are working with the cities as knowledge partners to develop the framework and identify the prioritized set of action across sources of air pollution. The framework as it is being developed, involves three key steps.

1. Identify major sources of pollution through the emissions inventories, source apportionment data and daily AQI analysis.
2. Evaluate the CAPs and related implementation plans and actions for the identified sources.
3. Evaluate pollution control approaches for top sources of pollution in terms of impact, budgetary allocation, ongoing projects and programs.

This framework leads to prioritized action for air quality management under the CAPs for the Finance Commission grants. To provide an example, for the city of Ahmedabad, a prioritized set of proposed action for air quality management based on the above framework have been identified. These include:

Ahmedabad Prioritized Proposed Recommended Actions Under the CAP for FC Grants

1. AQM & Governance
 - a. Need for capacity augmentation for AQM – specialised air quality project management cell in ULBs
 - b. Develop and operationalize mechanisms for ensuring compliance & CAP implementation with stakeholder engagement
 - c. Adopt airshed management approach and look at pollution sources outside the jurisdiction of the ULB – such as sources around Ahmedabad, trans-boundary pollution etc.
4. Industries and power sector
 - a. Prioritize operationalization of mechanisms for compliance by existing industries with PM, SO_x and NO_x emission norms as well as real time online monitoring requirements
 - Implement a phased but comprehensive fuel substitution scheme – to eliminate use of coal and other emission intensive fuels
 - Apply efficient emission control technologies such as SO₂ scrubbers in industries and power sector
 - b. Institute measures to ensure power plants in the local airshed comply urgently with the PM, SO_x and NO_x emission limits notified by Ministry of Power in 2015
3. Transport
 - a. Removal of highly polluting vehicles (pre-Bharat Stage IV (BSIV) vehicles) from the transport fleet
 - b. Rapid and targeted adoption of EVs in high use vehicle segments such as public transport fleets, taxis and urban freight vehicles
 - c. Improved last mile connectivity to mass transit (metro and Bus Rapid Transit (BRT)) and parking controls to enable shifts away from private motorized vehicles

Co-Benefits: Combatting Air Pollution and Climate Change

Climate change and air pollution are linked problems. The combustion of dirty fossil fuels is a major contributor to dangerous air pollution in India, and also adds to the greenhouse gas emissions that drive climate change. Research shows that climate change itself will likely make air pollution problems worse, through direct and indirect mechanisms. With global temperatures soaring because of climate change, demand for electricity to keep people cool and safe from sweltering heat is critical. But depending on how the country powers that electricity, using dangerous fossil fuels or cleaner and renewable energy sources, it may inadvertently worsen the burden of dangerous air pollution.

However, just as these major threats to public health are intertwined, so are the solutions. Shifting India even further and faster toward clean energy and energy efficiency can help to reduce deadly air pollution and protect the global climate. Understanding these complex effects of climate change on public health is an urgent task, and new work is underway to better describe the problem at a local level in India.

Because this problem has potentially far-reaching consequences, scientists are increasingly working to understand it in more detail. A 2018 U.S. study analyzing energy demand, air pollution, and the health impacts of mid-century heat waves found that climate change and increased energy demand could worsen summer fine particle air pollution by about 60% and ground-level smog by about 16%, compared to current pollution levels.⁴⁸ The study estimated that if today's fossil-fuel heavy mix of energy sources was deployed to meet extra energy demand for air conditioning, it could cause nearly 1,000 deaths each year from worsened air pollution – in just one region of one country. While millions of people around the world already breathe unhealthy air, climate change threatens to make this problem even worse unless governments act to stem the problem on a broader scale.

India currently must cope with brutally hot weather and dangerous levels of outdoor air pollution. India's cooling demand is projected to grow by eight times in the next 20 years, and the country last year launched the India Cooling Action Plan (ICAP), a comprehensive plan to meet the country's skyrocketing cooling demand.⁴⁹ A major component of the ICAP is an effort to improve understanding of the implications of increased cooling demand through applied research. These intersecting risks to public health in the country are challenging to quantify, due to the range of skills and data sources needed across climate, energy, environmental, and health sectors.

That's why NRDC is proud to collaborate with leading Indian scientists and policy experts on an applied research project funded by the Wellcome Trust's Our Planet, Our Health Program. The project aims to estimate the health benefits of climate change response actions at the city level. The team uses linked computer models to estimate the simultaneous air quality and health benefits of climate change mitigation and adaptation policies in Ahmedabad, India. The collaborating teams include the Indian Institute of Tropical Meteorology (IITM), Gujarat Energy Research and Management Institute (GERMI), Public Health Foundation of India/Indian Institute of Public Health-Gandhinagar (IIPH-G) and led by NRDC. Leading Indian scientists at GERMI and IITM will estimate the city's electricity demand in 2030, considering changing demand for air conditioning. Experts at IITM and IIPH-G are also working to model and compare air quality associated with two climate change response strategies: shifting fossil fuel use to solar energy; and expanding cool roofs and green landcover in Ahmedabad. Working together, our team will apply these air quality projections to estimate the health benefits in 2030 from these different climate change response strategies.

Because this research is designed within the context of the ICAP and India's national climate strategy goals, it can help to make the case for expanded action and ambition to address the climate crisis, and at the same time provide near-term improvements for public health.

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Painting of a slum roof in Ahmedabad in February 2020, under the AMC's 15,000 slum cool roofs target (photo: AMC). New research is exploring the air quality and health benefits of cool roofs and urban greening in the city.

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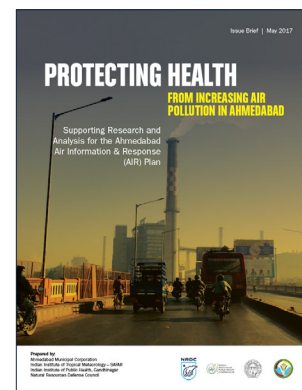
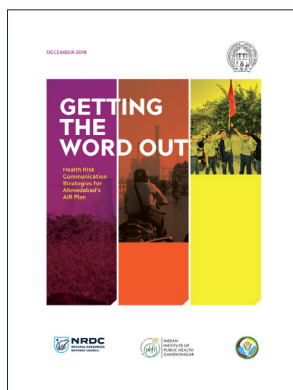
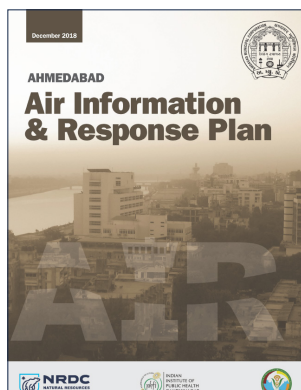
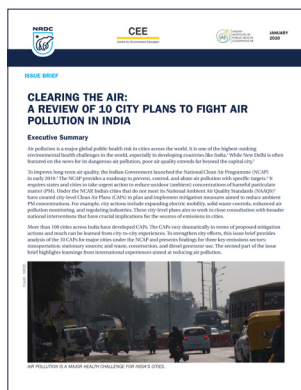
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Clear blue skies were observed in many Indian cities during the COVID-19 induced lockdown in early 2020



The air quality gains have been reversed later in 2020 after resumption of economic activities



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