Key elements and recommendations for a National Air Quality Management Framework and National Ambient Air Quality Standards in the Federative Republic of Brazil

Prepared by Environmental Defense Fund
for Brazil's Ministry of Environment and Climate Change

Sergio Sánchez, Senior Policy Director for Global Clean Air

February 23, 2024

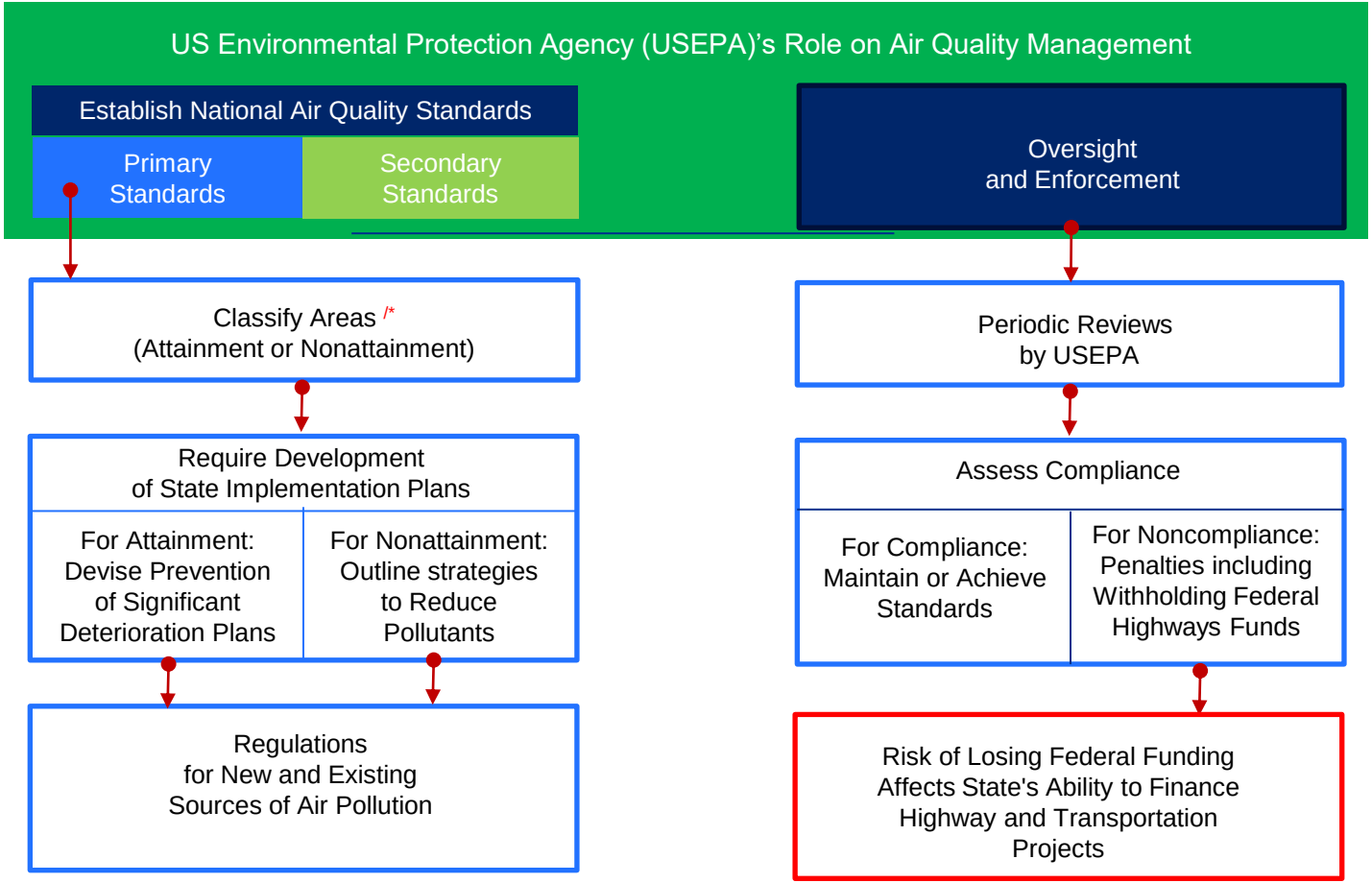
Environmental Defense Fund

Guiding questions for this presentation

- What are the National Air Quality Management Framework's critical components?
- How do National Air Quality Standards drive air quality management and planning?
- What models and best practices exist for Air Quality Management?
- What significance do WHO Air Quality Guidelines hold in air quality standards?
- What are the global trends in updating National Air Quality Standards, and how do they differ regionally?
- What key factors should be considered when setting NAAQS?
- What priority actions are essential for assessing compliance with NAAQS and achieving emission reduction targets?
- What types of data are necessary for this assessment?
- Any specific recommendations for Brazil in improving air quality management?

1. Key elements of a National Air Quality Framework

- What are the National Air Quality Management Framework's critical components?
- How do National Air Quality Standards drive air quality management and planning?
- What models and best practices exist for Air Quality Management?



/* Note: Based on local air quality monitoring.

China Ambient Air Quality Assessment Method

Establish National Ambient Air Quality Standards

Primary standards

Secondary standards

Release Action Plan to Improve Air Quality

PM2.5 Reduction Goal

Heavily Polluted Day Control

Emission reduction targets

Classify Zoning Areas

Key Areas:

- Beijing-Tianjin-Hebei region and surrounding areas
- The Yangtze River Delta region
- The Fenwein Plain

Implementing Urban Air Quality Attainment Management

For nonattainment cities with PM2.5 below 40 $\mu g/m^3$ in 2020:

- Require Urban Air Quality Attainment Plans

For other nonattainment:

- Defining air Quality improvement milestones for the 14th Five-Year Plan.

For attainment: continuous improvement of air quality.

Enforcement assessment by Ministry of Ecology and Environment (MEE)

Cities Meet Targets:

- Financial incentives.

Cities failing to meet targets:

- Financial penalties, project oversight, recognition and accountability, special Inspections.

Source: EDF-China

Key elements of National Air Quality Management Systems

Features of an air quality management system	USA	European Union	China	India
Nature of national ambient air quality standards for PM2.5*	Primary and secondary	Primary and secondary	Primary with 2 classes	Single standard
Magnitude of NAAQS for PM2.5 (in micrograms per cubic meter, annual average)	Primary: 9 Secondary: 15	Primary: 10 (proposed) Secondary: (pending)	Class 1: 15 Class 2: 35	40
Established target for emission reduction	Each State Implementation Plan should establish emission reduction targets.	EU rules set national reduction commitments for five main air pollutants.	Class 1: 15% Class 2: 25%	30% by 2024 Revised to 40% (of 2017 levels) by 2027
Classification of areas or zones based on compliance	Yes	Yes	Yes	Yes
Mandated compliance action plan for non-attainment cities	Yes	Yes	Yes	Yes
Financial reward for attainment	Grants of more than $1 million each available for enhanced monitoring and other activities	The EU supports Member States to implement clean air related policy through a broad range of financial instruments.	$1.6 billion fund created in 2014 to reward top performers	INR 5 crore ($700,000) distributed every year to cities across population categories
Penalty for non-attainment	Risk of losing federal funding	Declaration of non-compliance by the Court of Justice. The state concerned is obliged to take all necessary measures to put an end to the non-compliance.	Financial penalties, special inspections	No financial penalty

*PM2.5 is highlighted given its disproportionate health impacts in comparison with other critical air pollutants.

2. Key elements for Setting National Air Quality Standards in Brazil

- What significance do WHO Air Quality Guidelines hold in air quality standards?
- What are the global trends in updating National Air Quality Standards, and how do they differ regionally?
- What key factors should be considered when setting NAAQS?
- What priority actions are essential for assessing compliance with NAAQS and achieving emission reduction targets?
- What types of data are necessary for this assessment?
- Any specific recommendations for Brazil in improving air quality management?

Overview of WHO Air Quality Guidelines

- **Objective:** Minimize health impacts of air pollution.
- **Guidelines:** Stringent recommendations for key pollutants.
- **Interim Targets:** Steps for countries to progressively improve air quality.
- **Research-Based:** Formulated from global studies on pollution's health effects.
- **Global Impact:** Encourages countries to adopt stricter air quality measures.
- **Aspirational Targets:** Motivates worldwide improvements in air quality management.
- **Public Health Focus:** Aims for the highest level of health protection globally.

EPA's Revised PM2.5 Air Quality Standard

- **New Standard:** 9 µg/m³ for PM2.5, annual average, prioritizing health.
- **Partnerships:** Collaboration among federal, state, local, and Tribal entities, with USEPA support.
- **Strategies:** Utilization of national rules and EPA measures to decrease PM pollution.
- **Compliance:** Clean Air Act dictates area designations and state implementation plans.
- **Permitting:** New Source Review permits essential for major new or modified sources.
- **Wildfire Management:** EPA integrates wildfire smoke and exceptional events in air quality considerations.

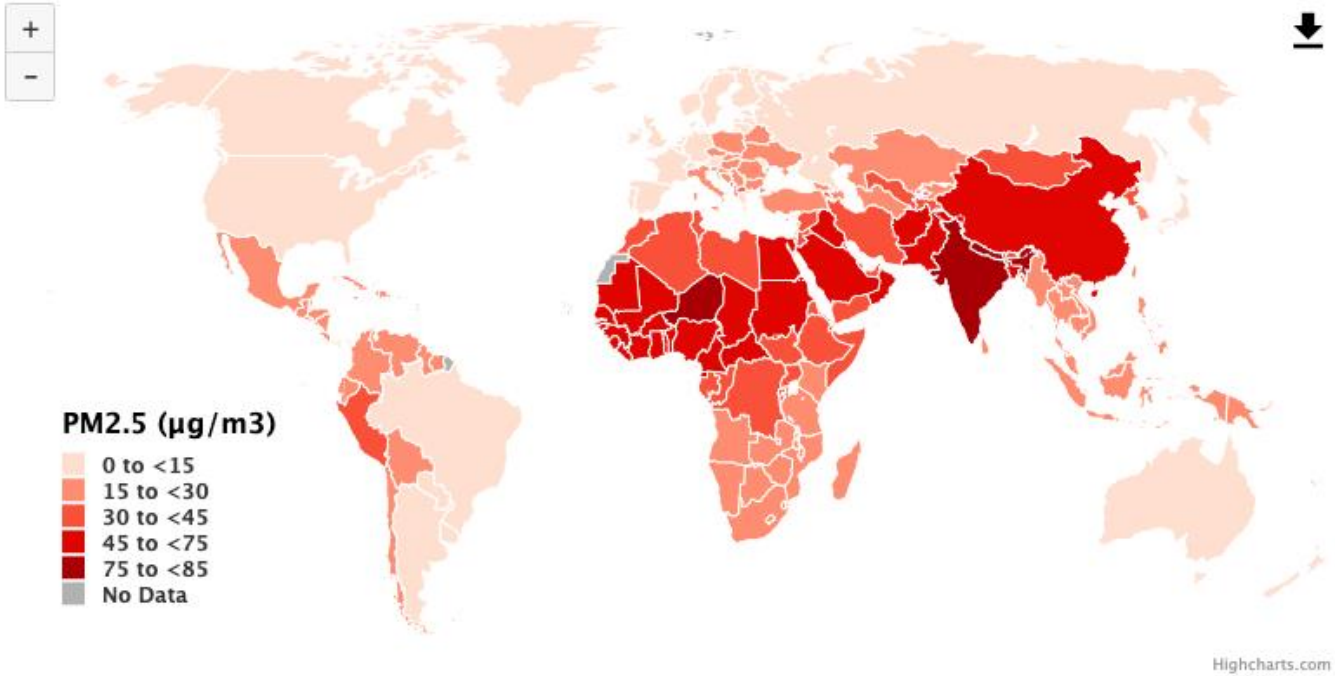
Provisional Agreement on EU Air Quality Standards

Press release 20 February 2024

- **Goal:** Align with WHO recommendations for zero pollution by 2050.
- **Key Pollutants:** Stricter limits for annual averages regarding PM2.5 (reduced to 10 µg/m³) and NO2 (reduced to 20 µg/m³) by 2030.
- **Flexibility:** Possibility for member states to request deadline postponements under specific conditions.
- **Action Plans:** Requirement for air quality roadmaps and plans in exceeding areas.
- **Public Health:** Access to justice and compensation for health damage due to standard violations.
- **Enforcement:** Member states must establish penalties for non-compliance.
- **Next Steps:** Awaiting formal adoption by EU institutions.

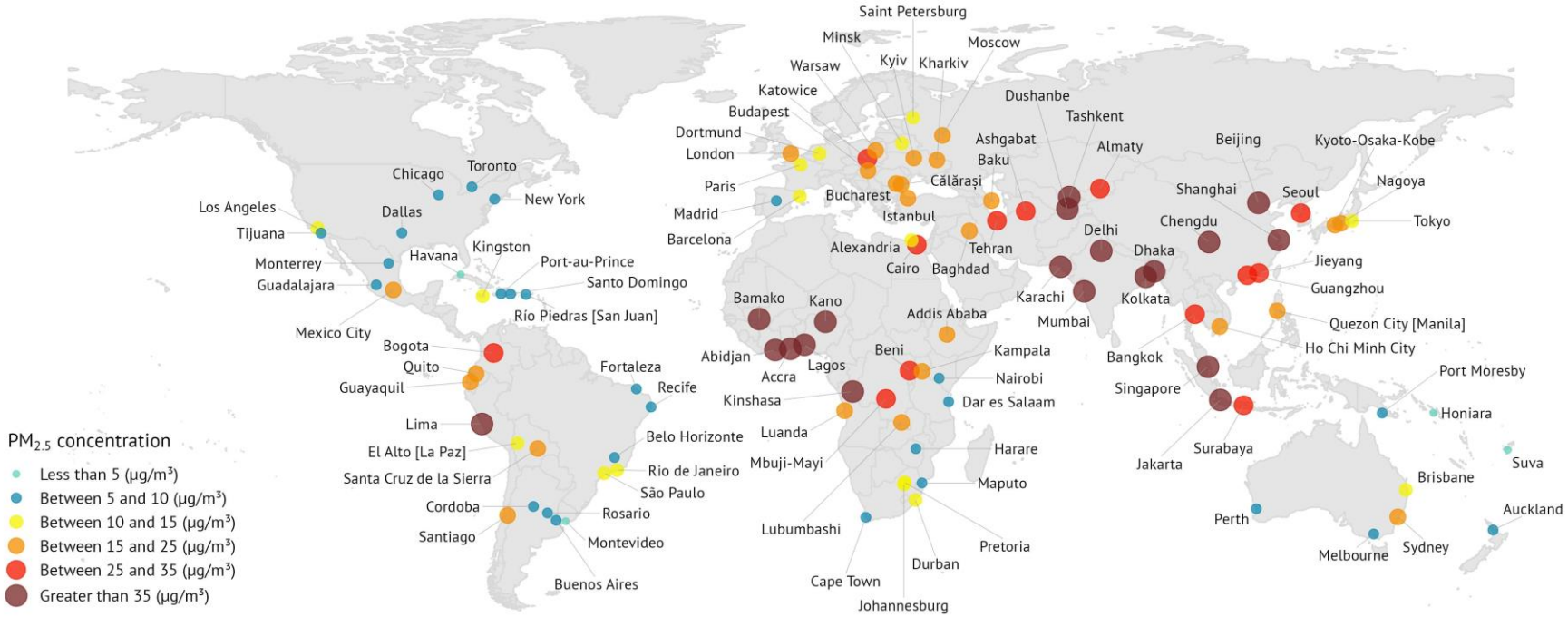
More detailed and updated information: EU's official communication on the provisional agreement.

Population-weighted annual average PM2.5 concentrations in 2019.



Source: State of Global Air 2019

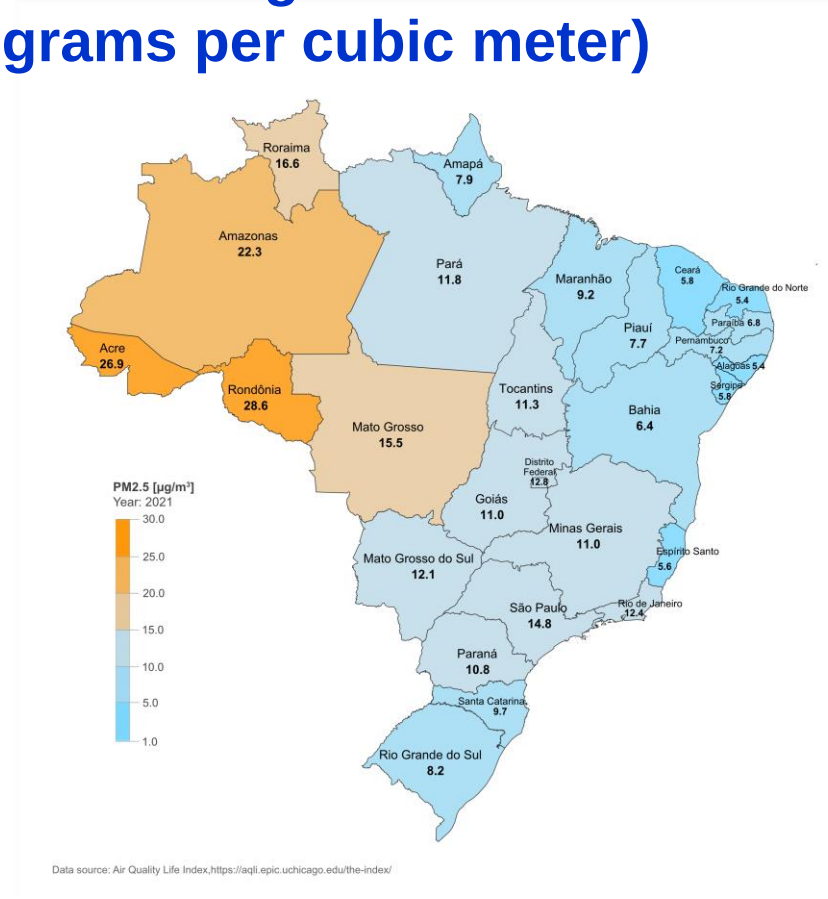
Annual mean PM2.5 concentrations around the world



Source: State of Global Air 2019

Geographic Distribution of Annual Average PM2.5 Concentrations in Brazil (micrograms per cubic meter)

- **Urban Areas:** Higher PM2.5 concentrations due to traffic and industrial activities.
- **Amazon and Forested Regions:** Elevated levels during dry seasons from biomass burning.
- **Satellite Analysis:** Insights by Van Donkelaar et al. highlight regional air pollution disparities.
- **Variability:** Significant differences across regions, influenced by human activities and natural events.
- **Monitoring:** Advanced satellite technology provides comprehensive air quality data across Brazil.



Introduction to National Air Quality Standards (NAQS) for Brazil

- **Purpose of NAQS**: Fundamental for public health protection, translating scientific knowledge into actionable thresholds.
- **Design Principles**:
  - **Health-Based Criteria**: Prioritize vulnerable populations including children, the elderly, and those with health conditions.
  - **Scientific Evidence**: Rely on epidemiological studies, toxicological research, and exposure assessments.
  - **Review and Update Mechanism**: Regularly align standards with the latest scientific and technological advancements.

Comparison between WHO AQ Guidelines and selected NAAQS around the world.

Pollutant	Averaging period	WHO IT4	WHO AQG	US EPA	Chile	China	Colombia	India	South Africa	UK	European Union	PF R491/2018	PF R491/2023
$PM_{2.5}$	Anual	10	5	9	20	35	25	40	25	20	10*	10	5
	24 h	25	15	35	50	75	50	60	65	--	--	25	15
PM_{10}	Anual	20	15	--	50	70	50	60	40	40	40	20	15
	24 h	50	45	150	130	150	150	100	75	50	50	50	45
O_3	Peak season	70	60	--	--	--	--	--	--	--	--	--	--
	8 h	120	100	137	120	160	80	100	120	100	120	100	100
NO_2	Anual	20	10	100	100	40	100	40	40	40	20*	40	10
	24 h	50	25	--	--	--	--	--	--	--	--	--	--
	1 h	--	--	188	400	200	200	--	200	200	200	200	200
SO_2	Anual	--	--	--	--	--	--	--	--	--	--	--	--
	24 h	50	50	40	250	150	250	80	125	125	125	20	40
	1 h	--	--	--	--	--	--	--	--	350	--	--	--
CO	8 h	10 mg/m^3	10 mg/m^3	10 mg/m^3	10	--	10 mg/m^3	2 mg/m^3	10 mg/m^3	10 mg/m^3	10 mg/m^3	9 (ppm)	9 (ppm)

*Provisional agreement.

3. Preliminary recommendations for Brazil

Introduction to a Proposed Brazil's National Air Quality Management Strategy

Goal

- Achieve significant air quality and health improvements, fulfilling climate goals for a healthier Brazil.

Strategy Pillars

- Stringent air quality and climate goals.
- Robust local and state management plans.
- Strong focus on implementation, enforcement, and stakeholder engagement.

Funding and Support

- Innovative Endowment Fund with diverse sources (surcharges, fines, PPPs).
- Supports monitoring infrastructure and adoption of cleaner technologies.

Community and Justice

- Emphasizes education, public participation, and environmental justice.
- Ensures equitable benefits of cleaner air for all, especially marginalized communities.

Implementation and Evaluation

- Coordinated federal to local approach.
- Continuous improvement, transparent reporting, and adaptive strategies.

Towards a National Air Quality Management Framework in Brazil

Establish National Ambient Air Quality Standards

Primary standards

Secondary standards

Release National Action Plan to Improve Air Quality

Reduction Goals (health and climate)

Critical episodes

Emission reduction targets

Funding mechanisms

Classify Zoning Areas

Key Areas:

- Attainment
- Nonattainment
- Other

Implementing Urban Air Quality Attainment Management

For nonattainment cities:

- Require Air Quality Improvement Plans

For attainment: continuous improvement of air quality.

Other: Specific measures

Enforcement assessment by Ministry of Ecology and Environment (MEE)

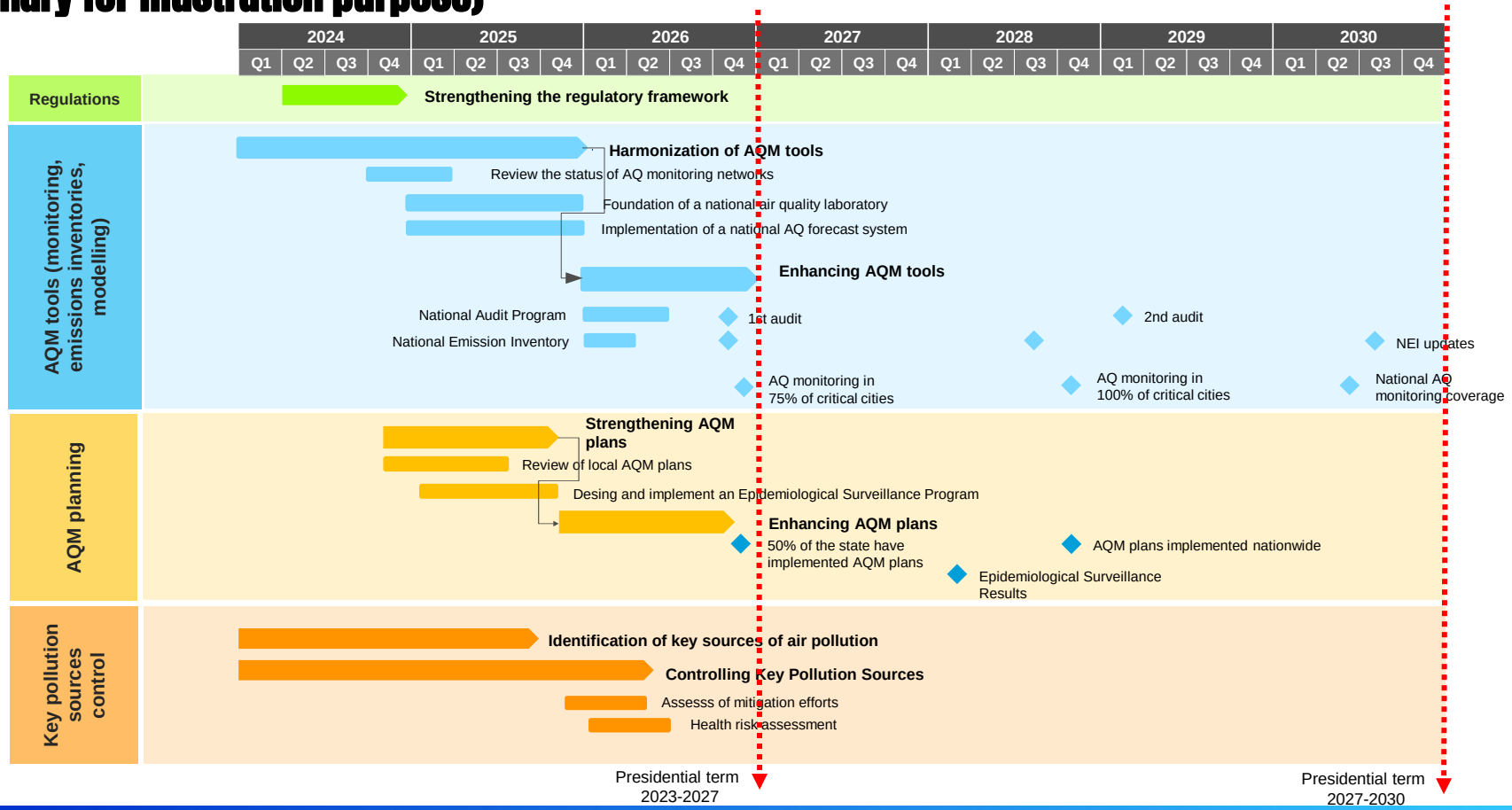
Cities Meet Targets:

- Financial incentives.

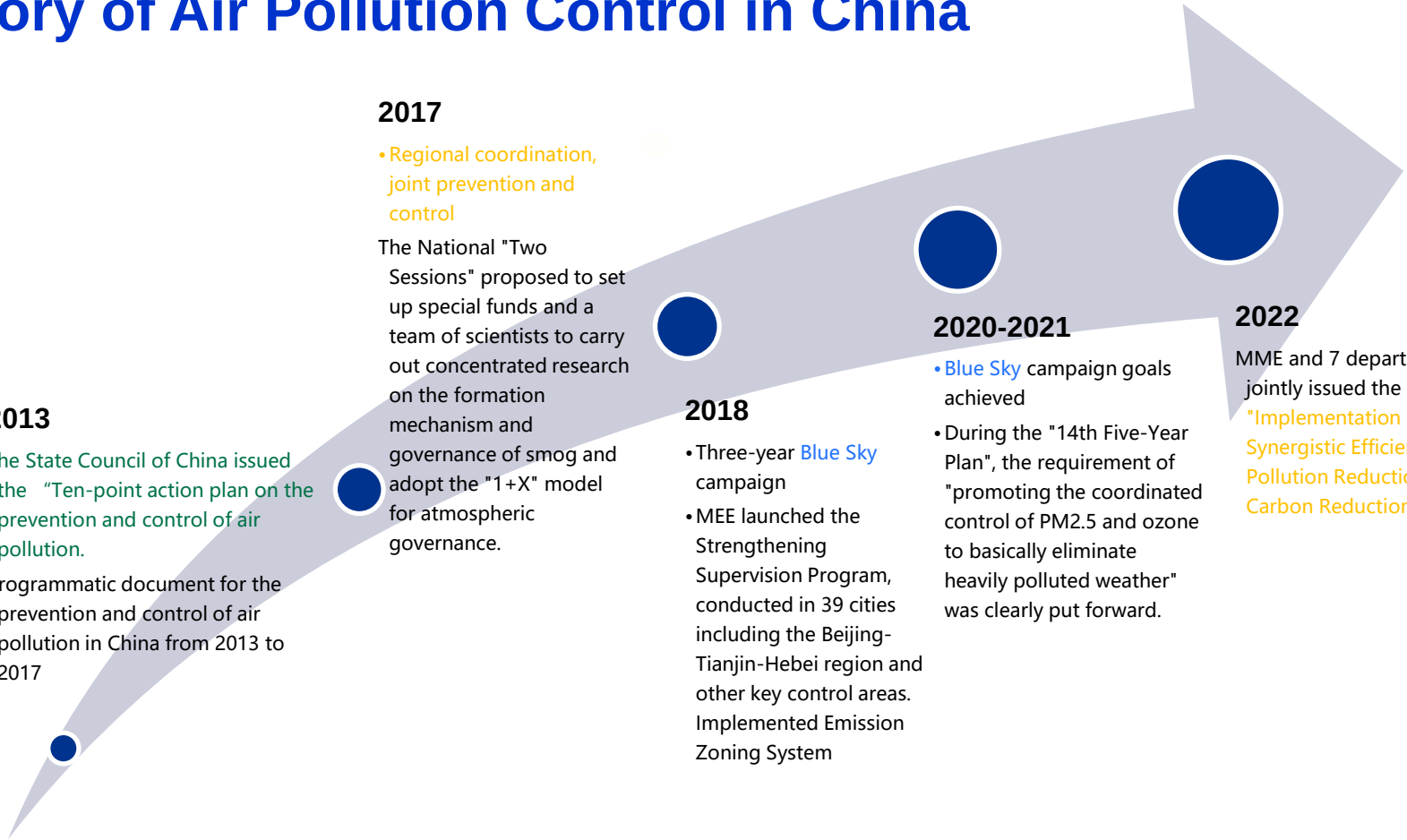
Cities failing to meet targets:

- Financial penalties, project oversight, recognition and accountability, special Inspections.

Chronogram for an air quality management strategy for Brasil (Preliminary for illustration purpose)



History of Air Pollution Control in China



2013

The State Council of China issued the "Ten-point action plan on the prevention and control of air pollution.

Programmatic document for the prevention and control of air pollution in China from 2013 to 2017

2017

- Regional coordination, joint prevention and control

The National "Two Sessions" proposed to set up special funds and a team of scientists to carry out concentrated research on the formation mechanism and governance of smog and adopt the "1+X" model for atmospheric governance.

2018

- Three-year Blue Sky campaign
- MEE launched the Strengthening Supervision Program, conducted in 39 cities including the Beijing-Tianjin-Hebei region and other key control areas. Implemented Emission Zoning System

2020-2021

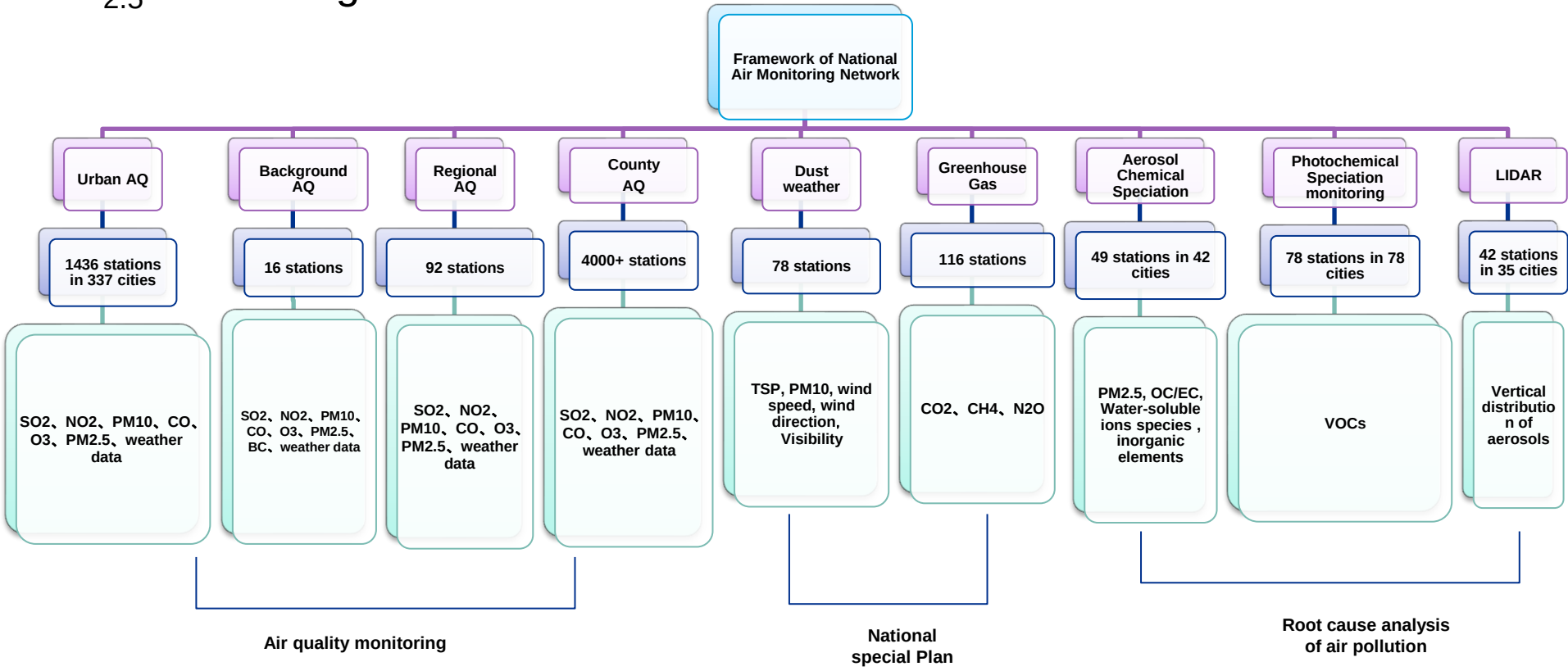
- Blue Sky campaign goals achieved
- During the "14th Five-Year Plan", the requirement of "promoting the coordinated control of PM2.5 and ozone to basically eliminate heavily polluted weather" was clearly put forward.

2022

MME and 7 departments jointly issued the "Implementation Plan for Synergistic Efficiency of Pollution Reduction and Carbon Reduction"

Source: EDF-China

China Framework of National Air Monitoring Network: $PM_{2.5}$ monitoring at all districts and counties



Implementing and Enhancing NAQS

- Phased Approach to Air Quality Improvement:
  - Establish ambitious NAQS up to 2030 aligned with WHO AQ guidelines and Interim Targets.
  - Set emission reduction goals to achieve health and climate objectives.
  - Plan for periodic reviews to elevate ambition and scope of NAQS.
- Comprehensive Strategy Requirements:
  - Expand monitoring and reporting networks for accurate data.
  - Detail enforcement mechanisms for compliance, integrating penalties and incentives.
  - Promote public health, environmental justice, and public participation.
  - Coordinate with other environmental, climate, and health policies for synergistic outcomes.


Bienvenidos!
Muito obrigado