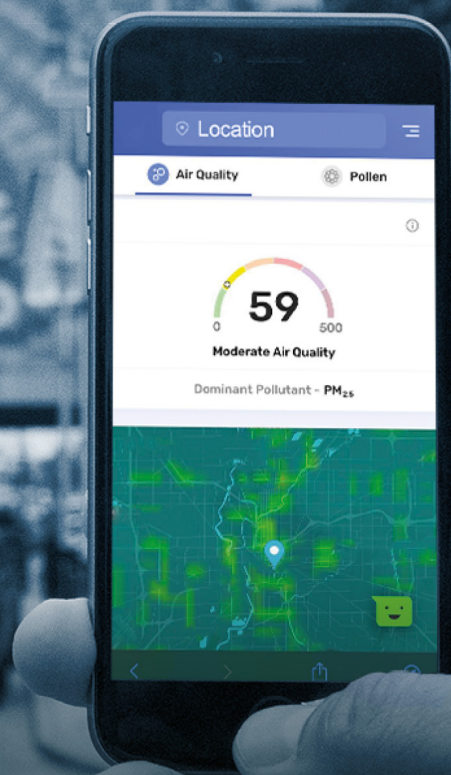


Air Pollution Series

Regulating Air Quality

The first global assessment
of air pollution legislation



First published by the United Nations Environment Programme in 2021

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Regulating Air Quality: The first global assessment of air pollution legislation. Nairobi.

ISBN No: 978-92-807-3872-8

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Design and layout: Strategic Agenda

Publishing Services Section, UNON, Nairobi, Kenya ISO 14001:2004 certified

Regulating **Air Quality**

The first global
assessment of
air pollution
legislation

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List of acronyms

AAQS	ambient air quality standards
APCAP	Asia Pacific Clean Air Partnership
API	air pollution index
ASEAN	Association of Southeast Asian Nations
AQI	air quality index
AQS	air quality standards
CJEU	Court of Justice of the European Union (formally European Court of Justice)
EANET	Acid Deposition Monitoring Framework in East Asia
ECLI	European Case Law Identifier
EPA	Environmental Protection Agency
EU	European Union
ILA	International Law Association
NEC	national emission ceiling
NFP	National Focal Point for the Fifth Montevideo Programme for the Development and Periodic Review of Environmental Law (Montevideo Programme V) (UNEP in-country expert contact)

NGO	non-governmental organization
NO₂	nitrogen dioxide
O₃	ozone
PM_{2.5}	particulate matter with a diameter of 2.5 micrometres (µm) or less
PM₁₀	particulate matter with a diameter of 10 micrometres (µm) or less
SADC	Southern African Development Community
SDG	Sustainable Development Goal
SO₂	sulfur dioxide
UN	United Nations
UNEA	United Nations Environment Assembly
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

Why does
air quality
continue to
deteriorate
despite the
increase in the
number of laws
and regulations
that seek to
address **air**
pollution?

Acknowledgements

This report was researched and drafted by Prof. Dr. Eloise Scotford, Professor of Environmental Law, Centre for Law and Environment, UCL Faculty of Laws, University College London and Prof. Dr. Delphine Misonne, Professor of Environmental Law, Fund for Scientific Research (FNRS) Research Associate and Director of Cedre, Université Saint-Louis Bruxelles. Sean Tseng and Flora McCarthy provided invaluable research assistance, and Michael Rudko managed the research data expertly. An initial draft of the report was presented to focal points of the Fifth Montevideo Programme for the Development and Periodic Review of Environmental Law and the Convention on Long-Range Transboundary Air Pollution (CLTRAP) at webinars organized from 28 September to 9 October 2020. Maria Cristina Zucca, Head of the Pollution and Health Unit; Soraya Smaoun, Air Quality Coordinator, and Victor Nthusi, Pollution and Health Unit, of the Economy Division of the United Nations Environment Programme (UNEP) provided expert input. A final critical review of the report was undertaken by Arnold Kreilhuber, Acting Director and Maria Socorro Mangiat, Head of the National Environmental Law Unit, with support from Soo Young Hwang and Allan Meso, Legal Officers and Lais Paiva Siqueira, Associate Legal Officer, with the Law Division of UNEP.

Foreword

Improving air quality is key to tackling the triple planetary crisis of climate change, biodiversity loss, and pollution and waste. Yet, air quality continues to deteriorate despite the increase in laws and regulations seeking to address air pollution. This global assessment of air quality legislation in 194 States and the European Union seeks to provide insights into this pressing concern.

The study reveals that 31 per cent of countries are yet to adopt ambient air quality standards (AAQS), even as the legal mandate to adopt such standards exists, and that 43 per cent of countries lack a legal definition for air pollution. In addition, monitoring mechanisms in national air quality management systems, which are critical for us to understand just how air quality affects national populations, are not a legal requirement in 37 per cent of countries. The study also reveals that only one third of countries studied have legal mechanisms for managing or addressing transboundary air pollution, even though air pollution knows no borders. Findings point to a lack of enforcement capacity as a key reason for the poor implementation of air quality laws.

While there remain significant challenges, the report importantly draws attention to the progress made in many countries, which can serve as the basis for strong air quality governance systems that protect human health and well-being and address the triple planetary crisis. Many countries now have constitutional provisions that potentially allow for the establishment of rights to clean air in law. Information on air quality is a well-established right in many countries and, in various parts of the world, public interest litigation is improving air quality policies.

Recognizing that there is no silver bullet to address the air pollution crisis, the report outlines a model system of domestic air quality governance that emphasizes the importance of science, accountability, policy coordination, inclusiveness, transparency and participation. The model reinforces the role of environmental governance as critical to addressing the pollution crisis.

This global assessment is the start of efforts to assist Member States in implementing pollution reduction measures grounded in science-based, integrated and coherent regulatory frameworks and policies. Because we know that all countries must raise their ambition on mitigation.

Through the Fifth Montevideo Programme for the Development and Periodic Review of Environmental Law, UNEP is committed to expanding its assistance to countries in addressing the pollution crisis, thereby protecting the health and well-being of all, particularly the most vulnerable members of our population who, as we all know, are disproportionately affected by this problem.



Inger Andersen

Executive Director

United Nations
Environment Programme

A handwritten signature in black ink, which appears to read 'Inger Andersen'.

Executive Summary

From regulating air pollution to laws on air quality governance

"The environment is unlike any other thing; it cannot be put into compartments because an occurrence in one place can have far-reaching effects on another place quite distant from the location. The effects of environmental pollution or degradation have a knack for rearing their ugly heads at the most unlikely of places. They should therefore be everybody's concern."

Superior Court of Judicature of Ghana. Center for Public Interest Law and Anor vs Tema Oil Refinery. Suit No. E12/91/07, Korbieh J, Ghana. www.cepil.org.gh/files/CEPILvs.-TOR.pdf.

This global study assesses national air quality legislation in 194 States and the European Union (EU) against a model of robust air quality governance developed as part of the research. The model is based on the diversity of air quality laws that exist globally, and the nature of air quality as a collective environmental and social problem that requires certain key features in a comprehensive approach to governance.

A robust system of air quality governance is one which:

- » requires governments to develop and regularly review applicable air quality standards in light of public health objectives;
- » determines institutional responsibility for those standards;
- » monitors compliance with air quality standards;
- » defines consequences for failure to meet them;
- » supports the implementation of air quality standards with appropriate and coordinated air quality plans, regulatory measures and administrative capacity;
- » is transparent and participatory.

The report is primarily concerned with national legislative structures for introducing and implementing air quality

standards, while recognizing that the scientific case for setting those standards is likely to change over time. It does not address whether air quality standards are met in practice, but it does address whether legal measures exist for determining whether air quality standards are being met and what legal consequences exist for failure to meet them.

This report adds to previous ones on ambient air quality standards (AAQS) with its clear focus on law and legislative structures, and how these make AAQS binding within States.

Key messages

While there is no one-size-fits-all approach to air quality control, there are important reasons for embedding air quality standards in state-sponsored legal instruments (legislation) as foundations for good national air quality governance. These reasons include ensuring institutional responsibility, transparency and accountability; creating administrative architectures to support and entrench the implementation of air quality standards, including monitoring requirements and enforcement mechanisms; embedding processes for reviewing air quality standards and plans; and the symbolic importance of legislative commitments to air quality standards.

The primary global guidance on air quality is scientific, as provided by the World Health Organization (WHO) air quality guideline values for ambient air quality. These guideline values are not intended to be binding upon States, but they reflect a high degree of scientific consensus, giving them global authority. There is a case for a complementary global treaty on AAQS that supports universal public health goals and evolving human rights protections relevant to health and clean air.

AAQS in most national laws do not comply with the WHO air quality guidelines, which in some cases reflects a process of transitioning to more stringent AQS over time, subject to political and economic circumstances.

Overall, the global picture of national air quality laws is one of heterogeneity. Different metrics, standards and obligations are adopted, and different governance actors are implicated within air quality regimes which can be explained by different systems of government and sociolegal cultures, different technical

knowledge and approaches, and historical patterns of influence in relation to air quality law. Variation in AAQS themselves is particularly complex. Standards can be set at different levels of stringency in terms of allowed pollutant concentration levels; different exceedances or margins of tolerance may be allowed; they may be averaged over different time periods; and/or they may only apply to or exclude certain pollutants. This heterogeneity makes comparison of standards across countries challenging.

This lack of a level playing field means there is no single recommended template for implementing AAQS in law at the national level. It also undermines the control of transboundary air pollution issues, and risks feeding the distortion of global competition, which should be further explored and understood. Furthermore, it is at odds with the demanding requisites of global policies on climate change and climate neutrality expressed in the 2015 Paris Agreement, as far as ambitious regulation of atmospheric pollution is concerned.

The absence of an international regime on AQS partly explains the diversity of national regimes and might also be a barrier to certain legal regimes evolving contemporary approaches. Many countries need further guidance.

This report offers guidance about key aspects of air quality governance that might be embedded in national legislative regimes, by exploring the relevant dimensions of legal and institutional frameworks. A legal regime for AAQS aimed at protecting public health requires more than harmonization of standards at the appropriate level; it requires institutional frameworks to allow those standards to be established and achieved, including monitoring systems for accurate knowledge of air quality and mechanisms for institutional responsibility and enforcement.

Even if they are contained in legislative instruments, in some States, AAQS are not set at stringent levels and/or are unsupported by robust administrative systems, which risks them being used as tools for legally protecting air pollution, particularly in fossil-fuel economies.

Reliable knowledge about air quality is central to any regulatory efforts to control air pollution, and legal regimes can be designed to optimize air quality monitoring.

Effective enforcement of AAQS is a significant legal challenge, since they require legal avenues of enforcement to attain collective outcomes. In principle, this should involve a legal enforcement mechanism against the state or public actors. However, enforcement against the state is not easy legal architecture for many countries to devise, and is more easily developed in multilevel systems of government. As a result, many countries focus enforcement of AQS on individual polluters.

Citizen empowerment is a contemporary theme in global air quality law. Public knowledge about air quality is increasingly facilitated by legal requirements of public access to air quality information, public participation in air quality governance, and, in some countries, justiciable rights to clean air.

The importance of AQS for health protection has come to the fore in recent decades through public interest litigation, which relates to the rise of procedural environmental rights globally and the strategic approaches of environmental non-governmental organizations (NGOs) in pursuing improved air quality.

This report does not set out a detailed menu of regulatory measures for countries to adopt to ensure that AAQS are met in practice. This will often involve a wide range of policy and regulatory levers (from planning and transport to industry and finance). Rather, with a focus on robust air quality governance, the report highlights how such regulation and policy must be well coordinated – whether across government ministries, or across levels of government – to ensure that AQS are achieved.

Key findings

International and constitutional commitments to air quality

- » There is no common legal framework for AAQS globally. A clear legal commitment to certain AAQS which is compatible with the life and health of humans and the natural environment globally does not yet exist in public international law.
- » There are some key regional international legal instruments on air quality, particularly in the EU, which require individual signatory countries to develop relatively robust legal systems of air quality control.
- » 66 per cent of countries are subject to constitutional legal requirements that may be interpreted (over time) to require legally mandated acceptable air quality.

Air quality law in different systems of government

- » Air quality laws are designed differently in federal or devolved States, which in most cases provide opportunities for coordination of minimum air quality standards at the national level, and also regulatory differentiation at subnational levels of government. In any case, even in unitary countries, most national air quality governance systems involve structures of multilevel and shared governance, even if specific governance approaches can vary significantly.

Purpose and scope of national air quality laws

- » Just over half (51 per cent) of national air quality regimes have explicit public health or both public and ecosystem health as their main objective. However, the actual content of many of these regimes does not correspond to that goal.
- » Just under half (49 per cent) of countries define the notion of air pollution in national air quality regimes as extending only to ambient air pollution. Notably, a significant proportion (43 per cent) of countries do not define “air pollution”, which can reflect a weak (or non-existent) scheme of air quality law or an implicit assumption that ambient air quality is the default subject of air pollution control.

Legislative incorporation of national ambient air quality standards

- » The majority of countries (64 per cent) do embed AAQS in legislation, although many countries are in the process of either revising air quality legislation (21 per cent) or planning to introduce/revise air quality standards in legislation soon (16 per cent).
- » The United Nations Economic Commission for Europe (UNECE) and EU legal regions all have a very high incidence of legislative AAQS, reflecting the regional Convention on Long-Range Transboundary Air Pollution and supranational legislation (Directive 2008/50/EC) binding these States. Civil law countries, and States with federal constitutional structures and constitutional guarantees relating to clean air, are also more likely to have entrenched AAQS in law.
- » Of the countries that have legally mandated AAQS, 13 per cent are in primary legislation, 67 per cent are in secondary legislation (introduced under empowering legislation), 14 per cent are in policy or guidelines (with a clear relation established to the legislative framework), and 6 per cent are in more than one of these categories.
- » In at least 34 per cent of countries, ambient air quality is not yet legally protected (there are no legislatively mandated AAQS). Of these countries, 86 per cent have no air quality standards at all, and 14 per cent have air quality standards that are contained in policy or guidelines only with no explicit relation to a legal basis or broader legal framework for environmental policy.
- » At least 31 per cent of countries have powers to introduce AAQS that have not yet been exercised.

Setting national ambient air quality standards in legislation

- » Processes for setting AQS in legislation are often driven by technical expertise and rely on standardization bodies or

technical committees to establish AAQS, with processes that are not always inclusive, transparent or accountable.

- » Interesting models of designing air quality legislation in some countries include mandated input from a wide range of stakeholders and expertise, and are open to public scrutiny.
- » Despite evidence that air pollution can affect men and women differently, this assessment found no differential references to air pollution impacts by gender in the setting of AQS in legislation.

National ambient air quality standards and WHO air quality guideline values

- » Most national air quality laws include AAQS that are not aligned with WHO air quality guideline values in terms of their headline numerical standard. There are various reasons for this, including positive reasons (such as countries intending to improve AQS over time) and less positive ones (such as countries wanting to preserve highly polluting industries, and having difficulties making complex choices).
- » It can be difficult to ascertain true alignment with the WHO air quality guidelines in many cases. Constructing AQS is a matter of precise legislative drafting. AAQS are generally designed as concentration-based standards, but their stringency is affected by design features such as geographical coverage, the air quality metric adopted, the time frame for compliance, allowed margins of tolerance and other kinds of derogations. Over half (55 per cent) of countries allow air pollution exceedances, which risks disguising the true level of ambition embodied in AAQS.

Legal responsibility for national ambient air quality standards

- » Institutional responsibility for AAQS, even when legally adopted, is relatively weak globally. Legal requirements to achieve AAQS as guaranteed environmental outcomes are not the norm – only 33 per cent of countries impose obligations on the state actually to meet legislatively mandated AAQS. Even where such obligations exist, their true impact on pollution sources can vary according to the stringency or leniency of the applicable standards.
- » Common types of requirements on the State when legal AAQS are not being met include: duties to report this to a relevant body (such as a parliament or an environmental authority) (32 per cent); requirements to develop plans to improve air quality (32 per cent); and emergency planning requirements when air pollution is severely elevated (35 per cent). At least 17 per cent of countries impose no obligations at all on the State in relation to legislatively mandated AAQS.
- » Some countries seek to make individual operators primarily responsible for achieving collective AAQS. This individualization of collective standards targets high-polluting sources and allows for private enforcement. This approach can be combined with other forms of state accountability for AAQS, but in some countries it is the only form of legal responsibility for AAQS, creating challenges of ensuring that overall levels of air quality are safe for health and that national AAQS are met.

National air quality zones and monitoring

- » Ambient air – and thus people and the natural environment – is not yet legally protected everywhere. This is partly because countries often segment their land into zones, and apply AAQS to only some of these. While zoning is also used to enhance air quality protection in certain areas and adopt monitoring protocols, its use as a means of restricting the coverage of air quality controls undermines protection for all. Zoning requirements are also inherently challenging to meet in practice due to the transboundary nature of air pollution.
- » While ambient air quality is monitored in many countries, this is not a legal requirement in at least 37 per cent of countries. In countries where monitoring is framed in legislation, important questions arise about the rigour of monitoring, as well as issues of capacity (such as expertise and finance).

Enforcing national ambient air quality standards

- » Enforcement measures for meeting AAQS are complex to design in air quality regimes, reflecting the challenge of

enforcing legal requirements that require policy coordination over a wide range of areas.

- » Some forms of AAQS enforcement in some jurisdictions, such as the EU, have been adapted to the collective nature of AQS, and often rely on multilevel systems of government. Other enforcement mechanisms include *actio popularis* civil suits and actions that can be brought against individual operators for failing to comply with legal requirements directly linked to AAQS.
- » Even the best legal enforcement mechanism will be fruitless with no institutional support behind it. From the research undertaken for this assessment, lack of enforcement capacity is often a key reason for the poor implementation of air quality law.

Empowering the public through procedural and substantive rights to air quality

- » Public participation and other procedural rights relating to air quality are relatively strong globally, reflecting a wider movement of environmental democracy which has transformed environmental law in many countries, in light of Principle 10 of the Rio Declaration.
 - * The majority of countries (61 per cent) include legal rights to access air quality information in their legislation. By contrast, 14 per cent of countries with legislative AAQS do not make their main text containing AAQS publicly available.
 - * 11 per cent of countries have rights to participate in setting AAQS in their legislation.
 - * 33 per cent of countries include legal rights to participate in devising air quality plans or actions in their legislation.
 - * 19 per cent of countries have legal rights of access to justice within air quality regimes, representing a notable evolution in air quality law.
- » At least 25 per cent of countries affirm justiciable rights in relation to air quality law.
- » Air quality indices (AQIs) are used by 27 per cent of countries to communicate real time state of air quality to the public. However, the relationship between publicized AQI levels and compliance with legally binding AAQS is not always clear.

Coordinating national policy and regulation for achieving ambient air quality standards

- » Legal coordination of policy to achieve AAQS is complex to design in many legal systems. About a third of countries (35 per cent) have legislation that includes legal requirements



Ainars Djatlevskis on Unsplash

to coordinate air quality policy to support implementation of AAQS, with some interesting examples of legislative measures that seek to foster policy coordination for good air quality. In 41 per cent of countries, there is an established legal relationship between permitting of industrial activity or development and legally mandated AAQS.

National legal measures for transboundary air pollution

- » Only 31 per cent of countries have legal mechanisms for managing or addressing transboundary air pollution, despite transnational and transcontinental transport of air pollutants affecting national air quality.

National indoor air quality standards

- » Indoor air quality standards (IAQS) are infrequently included in air quality legislation globally – only 7 per cent of countries have some form of general IAQS. This is an important area for legal development, particularly in light of the impact of household air pollution on health outcomes, disproportionately for women and children, in low- and middle-income countries.



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By focusing on **legislative structures**, this assessment explores a key legal avenue by which standards are made **legally binding** and **enforceable**: their expression and institutionalization through State-sponsored legal instruments.

Introduction

a. Policy background

Effectively addressing air pollution is a key component of Sustainable Development Goals (SDGs) 3, 11 and 12.¹ It is also implicated in, and facilitated by, achieving SDG 7² and SDG 17.³

At its first session, the United Nations Environment Assembly (UNEA) called on Member States to take action across sectors to reduce all forms of air pollution.⁴ This call was reiterated at UNEA 3, which, inter alia, urged Member States to set ambitious ambient air quality standards (AAQS), taking into account the guidelines from the World Health Organization (WHO).⁵

Following UNEA 3, the United Nations Environment Programme (UNEP) developed an Air Quality Programme with a view to offering an integrated menu of services to governments at different levels. This programme seeks to ensure that, by 2030, 30 per cent of the world's population live in areas that meet the 2005 WHO air quality guideline values, and 50 per cent live in areas that meet the WHO interim targets.⁶

Indoor and outdoor air pollution are “among the leading avoidable causes of diseases and death globally, and the world's largest single environmental health risk”.⁷ They are “a cause of global health inequities, affecting in particular women, children and old persons, as well as low-income populations”.⁸

A revised set of WHO air quality guidelines are expected to be adopted by mid-2021. These revised guidelines seek to be more ambitious and better aligned with the most recent science of air pollution pathways and population health risks. This forthcoming policy development reflects the facts that first, existing guidelines are not the final and best goals for protecting human health from air pollution, and second, that this is an area of policy in a state of flux amid developing scientific knowledge.

A study by Joss et al. collected data on ambient air quality standards (AAQS) from 170 countries between March and June 2016, and highlighted a lack of clarity concerning whether air quality standards (AQS) in some countries were legally binding or only guidelines, and a lack of clarity for most countries on whether and how compliance with such standards was monitored and enforced.⁹

Efforts to attain the 2005 WHO air quality guideline values and interim targets, and to significantly reduce the danger posed by air pollution to human health, cannot succeed without a legal and institutional foundation that establishes a robust system of air quality governance, as outlined in this report (Figure 1). **Actions on Air Quality**, a report published by UNEP in 2016,¹⁰ identified air quality laws and regulations as one of the key policy actions to significantly improve air quality.

This global assessment of air pollution legislation contributes to the policy support action area of UNEP's Air Quality Programme. It will provide a foundation for work on assisting some countries and preparing guidance to enable effective utilization of laws and regulations to address air pollution.¹¹

b. Project rationale and scope

This assessment reviews air quality legislation in 194 States plus the European Union (EU).¹² This includes all UN Member States, plus the observer States of the Holy See and the State of Palestine. “States” and “countries” are referred to interchangeably in the report.

By “air quality legislation”, the assessment refers to all legislation relating to AQS and their implementation. “Legislation” includes all laws and regulations established by any formal state-sponsored legal process, and includes both primary legislation (enacted by a parliament or legislature) and secondary legislation (created under delegated legislative authority). Most of the analysis relates to AAQS, as these are the most regulated form of AQS, but legislative references to indoor air quality standards (IAQS) are also considered.

Jerry Wang on Unsplash



The focus on legislation concerning AQS is deliberate. This is for two main reasons:

1. AQS have become **the centrepiece of air quality law** in most countries globally, as a legal benchmark for protecting public health from diffuse pollution;
 2. this assessment aims to investigate how these standards sit within a system of **legally binding air quality governance** in order to institutionalize these standards.
- i. Air quality standards: the centrepiece of air quality law and governance**

There are many aspects of air quality law. Most States take a “mixed regulation” approach to addressing air pollution, regulating diverse sources (industry, private vehicles, public transport, power generation, ships etc.), and diverse behaviours that generate air pollution (through urban planning, control of individual pollution incidents, or other means). These different approaches reflect the fact that air pollution is a collective problem resulting from a wide range of social and economic behaviours, combined with geographical, environmental and population conditions. States may choose to address and regulate different sources, behaviours or spaces depending on their local conditions.

Box 1: Mixed regulation approaches to air quality control

Bangladesh has dedicated policies and legislation focused on brick kilns as a major source of air pollution,¹³ while the United Arab Emirates (UAE) has laws focusing on clean indoor air environments since local climatic conditions mean that much of the population’s time is spent indoors.¹⁴ Similarly, many States regulate heavily polluting industries by permitting systems that limit the amounts of pollutants released into the air through point source emission standards.¹⁵

As an outcome-based form of regulation, today **AQS** sit at the pinnacle of these various forms of regulation. They ensure that overall levels of air pollution are kept within acceptable limits. They are sometimes called “immission” standards.¹⁶ AQS regulate diffuse pollution – that is, they control the impact of pollution on the air that humans breathe rather than pollution sources,¹⁷ controlling the collective accumulation of polluting air emissions in terms of the resulting air quality.¹⁸ They represent the ultimate regulatory objective of other kinds of air pollution controls (such as industrial permits or vehicle design standards), which contribute to meeting AQS. AQS may relate to the quality of all air within a territory or jurisdiction, or set variable standards for different areas, spaces, or “zones” (see sections 5 and 6).

In principle, AQS define an ideal for our air quality which is compatible with human health and/or environmental protection, and a distinction is often made between those focused on human health (sometimes called “primary standards”) and those focused on environmental protection (“secondary standards”).¹⁹ In practice, national AQS are usually set at politically determined levels that take into account the need to accommodate certain types of polluting economic and industrial activity (such as transport, use of non-mobile machinery, and heavy industry, including fossil-fuel energy production where this fulfils basic energy needs).²⁰ The WHO air quality guideline values recognize that national AQS may validly “pursue policies which will result in pollutant concentrations above or below the guideline values”.²¹ The stringency of AQS may also be affected by a time factor, with some designed to apply immediately and others to apply in the future (see section 5(c)).

This study assesses AQS as standards for the averaged concentrations of key air pollutants, as defined in the WHO air quality guidelines. The study also considers some national systems for real time measurement of air quality, particularly where these are used as a basis for informing the public about air pollution levels (see section 6(b)(iii)). Most AQS globally are AAQS – that is, they relate to the outside air – but AQS can also be set for indoor air²² and there are increasing calls across different countries to introduce stronger regulation and standards for indoor air quality in light of the serious health effects of poor indoor air quality, across all country income levels.²³ See section 5(e) for findings on IAQS in some national legal systems.

AQS **in law** are conceptually the most demanding type of regulations relating to air quality, in that they require a final result or environmental outcome, rather than establishing standards of behaviour such as limits on individual pollution sources (which may or may not lead to acceptable levels of air quality). They also require that policy and regulation and behaviours across a wide range of policy areas and across different layers of government work together to achieve acceptable levels of air quality, particularly regarding AAQS.

The primary concern of the assessment is with the legislative structures for introducing and implementing AQS, while being aware that the scientific case for setting those standards, and at what levels, is likely to change over time.

ii. Embedding air quality standards in law and governance

By focusing on legislative structures, this assessment explores a key legal avenue by which standards are made legally binding and enforceable: their expression and institutionalization through State-sponsored legal instruments (legislation).²⁴ This approach examines how AQS are embedded (or not) in domestic legal regimes (at the country level and at the EU level), and how they are secured within domestic systems of air quality governance. Figure 1 is a conceptual map explaining how legislative

incorporation of AQS may sit within, and provide the foundation for, a domestic “system of air quality governance”. It maps the various features that exist with national air quality regimes and showing their interrelationships. It illustrates the importance of

entrenching AQS in law, and related legislative features that may be required to embed them within national administrative and legal processes.

Figure 1: Air quality governance system founded in air quality standards legislation



Air quality laws in different countries may have some or all of these features, and not all of them may be required for, or will guarantee, a robust system of air quality governance. There is no one-size-fits-all approach to air quality control. National air quality legislation in particular sits within a broader policy, economic, resourcing and governance picture which determines its effectiveness.

With that bigger picture in mind, a focus on **legislation**, as a national expression of legally entrenching AQS, is important for at least three reasons.²⁵ First, legislative processes are well adapted to the nature of the air pollution problem, which is cross-sectoral and evolving.

Legislative processes allow for review and updating of legal and regulatory arrangements, including standards, as knowledge evolves. Legislative assemblies also provide a legitimate site for political deliberation in balancing socioeconomic priorities so that AQS can be set in the first place.²⁶ Second, the enforceability of legislation is important in implementing AQS, and a key aspect of an air quality governance system. Third, legislation is significant symbolically, both in projecting an authoritative State-sponsored vision on air quality issues, and in facilitating social and economic change. Legislation can lead to policy and social culture change such that air pollution is taken more seriously.²⁷



Duncan Moore Media for UN Environment Programme, Dandora dump in East Africa

Even with these advantages, legislative expression of AQS does not guarantee that they are applied and respected. AQS need to be operationalized; this requires the establishment of robust **institutional and governance structures** to support AQS, shaping the wide discretion of public authorities to address air pollution sources and behaviours. It also requires reliable information about air quality, in addition to accountability and enforcement mechanisms. These implementation issues also fall within the province of air quality legislation. Legislative regimes can construct administrative processes and structures for implementing AQS, such as monitoring regimes, accountability of public actors and formal sanctions. Figure 1 maps these different aspects of air quality legislation, which are constitutive elements of a broader system of air quality governance.

To give a robust picture of how legislative AQS can be understood as legally binding and anchored within an air quality governance system, this assessment focuses on three aspects of the legal implementation of these AQS through legislation (see Table 1, covering primarily the legislative requirements for air quality governance set out in Figure 2).



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Figure 2: Legislative requirements for air quality governance



Table 1: Legislative implementation of air quality standards – global assessment focus

Assessment focus	Description
How AQS are constructed in legislation	How legislative standards are designed (who is involved in setting standards and how they are determined) and their level of ambition (including whether national legal standards reflect WHO air quality guideline values in law), their purpose and scope, the types of legislative instruments in which they are contained, and the legal obligations to which they give rise.
How AQS are administered and implemented through legislation	The legal structures created for administering AQS, including legislatively mandated zoning and monitoring requirements, obligations to disclose air quality data, inclusion of civil society and stakeholders in air quality governance, and enforcement mechanisms.
Other legal contextual factors relating to legislative AQS	This includes the role of governance, litigation (including access to justice), and regulatory coordination across public bodies.

This assessment adds to existing global studies on AQS with its clear focus on law and legislative structures, and how these make AQS binding within States. Previous studies have focused on policy measures adopted to achieve good air quality²⁸ and the levels of AQS set in different countries, often raising questions about their legal effect and implementation that are yet to be answered.²⁹

Finally, by focusing on national air quality legislation and how it embeds air quality governance in domestic legal systems, this assessment does not necessarily give definitive answers as to why AQS are not being met in individual countries. Standards may not be achieved for reasons relating to policy choices, individual and collective behaviour, industrial priorities, national wealth and fiscal policy, resourcing public administration, urban planning, demographics, and geographical conditions.³⁰ The assessment also does not consider sub-national regimes in detail.

Rather, it highlights the importance of robust national systems of air quality governance, founded in legislation, for establishing accountable, transparent, participatory and enforceable systems for air quality control, which entrench State commitments to achieving good air quality outcomes. Robust national air quality governance within individual States can also benefit neighbouring countries due to the transboundary nature of air pollution. For all these reasons, there is a strong rationale for regional or global good practice in air quality governance that seeks to enhance air quality outcomes across regions through law.

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Burning dry grass by Videopoint on Shutterstock

Chapter 1 Endnotes

1. Target 3.9 calls for a substantial reduction in the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination by 2030, as part of SDG 3 to ensure healthy lives and promote well-being for all at all ages. Indicator 3.9.1 refers to the mortality rate attributed to household and ambient air pollution. Target 11.6 seeks to reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management by 2030, as part of SDG 11 to make cities and human settlements inclusive, safe, resilient and sustainable. Indicator 11.6.2 refers to annual mean levels of fine particulate matter (e.g. PM_{2.5} and PM₁₀) in cities (population weighted). Target 12.4 aims, by 2020, to achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment, as part of SDG 12 to ensure sustainable consumption and production patterns.
2. Ensuring access to affordable, reliable, sustainable and modern energy for all includes, for instance, moving away from highly pollutive sources of fuel for heating and cooking.
3. The technology, capacity-building and trade aspects of SDG 17 are particularly relevant, as is enhancing policy coherence for sustainable development (target 17.14).
4. UNEA Resolution 1/7, *Strengthening the Role of the United Nations Environment Programme on Promoting Air Quality*.
5. UNEA Resolution 3/4, *Environment and Health*.
6. While the programme refers to both the WHO air quality guidelines and the interim targets, this assessment focuses only on the air quality guidelines, since the ultimate goal is to work towards these and countries are at different stages of developing AQS.
7. World Health Assembly Resolution 68.8, Health and the Environment: Addressing the Health Impact of Air Pollution, preambular paragraph 3, citing Global Health Observatory data (2015). https://apps.who.int/iris/bitstream/handle/10665/253237/A68_R8-en.pdf?sequence=1&isAllowed=y.
8. Ibid., p. 21.
9. Joss, M.K., Eeftens, M., Gintowt, E., Kappeler, R. and Künzli, N. (2017). Time to Harmonize National Ambient Air Quality Standards. *International Journal of Public Health* (62), 453-462. <https://doi.org/10.1007/s00038-017-0952-y>.
10. UNEP (2016). *Actions on Air Quality*. <https://www.unep.org/resources/assessment/actions-air-quality>
11. This will contribute to expected accomplishment (b) of subprogramme 4 (environmental governance) of the UNEP programme of work for the biennium 2020–2021, i.e. institutional capacities and policy and/or legal frameworks enhanced to achieve internationally agreed environmental goals, including the 2030 Agenda for Sustainable Development and the SDGs. Indicator (i) of this expected accomplishment is the number of countries that have enhanced institutional capacity and legal frameworks to fully implement the multilateral environmental agreements and to achieve internationally agreed environmental goals, including the SDGs as a result of UNEP support. It will also contribute to expected accomplishment (c) of subprogramme 5 (chemicals, waste and air quality), i.e. national emissions sources identified, policies and legal, regulatory, fiscal and institutional frameworks and mechanisms for the reduction of air pollution developed, institutional capacity built for improved air quality, and air quality assessments. Indicator (ii) of this expected accomplishment is the number of governments that have developed or adopted policies, technologies/practices, standards and legal, regulatory, fiscal and institutional frameworks and mechanisms for improved air quality with UNEP support.
12. It does not cover air quality law in the Democratic People's Republic of Korea, for which no data was available.
13. Brick Manufacturing and Brick Kilns Establishment (Control) Act 2013 (as amended) (Bangladesh).
14. Cabinet Decree (12) of 2006, The Regulation Concerning the Protection of Air from Pollution (UAE) regs. 12 and 13.
15. For example, European Union, Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) [2010] OJ L334/17.
16. This word focuses on the air as a receptacle rather than on the emitting source(s).
17. Air pollution standards may also be set in the permitting of individual polluting installation (emission limit values) but these are not AAQS.
18. AQS are different from "national emission ceilings" or national "emission reduction obligations", which control collective emissions from point sources by aggregating those emissions, rather than evaluating the resulting quality of the air. Emission ceilings are the key regulatory instruments for air quality under the amended Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone. As expressed by the European Court of Justice in Case C-165/09 to C-167/09 *Stichting Natuur en Milieu v Nederland* [2011] ECLI:EU:C:2009:393, AAQS are "rules laying down 'requirements which must be fulfilled at a given time by a given environment or particular part thereof', whereas "ceilings refer to the total quantity of polluting substances that can be discharged into the atmosphere and not to specific qualitative requirements, relating to concentrations of polluting substances, that must be met at a given time by that particular medium" (paras. 61-62).
19. Primary standards are established to protect human health and secondary standards protect public welfare (including crops and property). The US Clean Air Act makes this distinction (sect. 109). See Moeller, D (2005). *Environmental Health*. Cambridge: Harvard University Press.
20. See Case C-644/18 *Commission v Italy* [2020] ECLI:EU:C:2020:895, para. 84.
21. WHO (2017). *Evolution of WHO Air Quality Guidelines: Past, Present and Future*. Copenhagen, 2. <https://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/2017/evolution-of-who-air-quality-guidelines-past-present-and-future-2017>
22. Like ambient air, indoor air quality can be regulated in a range of ways, and this is especially so because direct interventions are possible. Regulatory approaches range from AQS for individual pollutants to building design standards, to ventilation and equipment requirements. See the WHO guidelines for indoor air quality (there are three sets of guidelines relating to dampness and mould, selected pollutants, and household fuel combustion, issued in 2009, 2010 and 2014, respectively). For a mixed regulatory approach to regulating different indoor air quality problems, see United States Environmental Protection Agency [EPA] (1993). *Targeting Indoor Air Pollution: EPA's Approach and Progress*.

23. <https://nepis.epa.gov/Exe/tiff2png.exe/000001PR.PNG?-r+75+-g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C91THRU94%5CTIFF%5C00000189%5C000001PR.TIF> Note the studies showing that human exposure to pollutants indoors can be two to five times and up to 100 times higher than outdoor levels.
24. For example, UK Royal College of Pediatrics and Child Health (2020). The Inside Story: Health Effects of Indoor Air Quality on Children and Young People, 28 January. www.rcpch.ac.uk/resources/inside-story-health-effects-indoor-air-quality-children-young-people. Accessed 18 January 2021. See no. 22.
25. AQS can also gain legal force by other means: soft law mechanisms and transnational governance structures, and potentially constitutional and rights jurisprudence. A comprehensive examination of all legal aspects of AQS is beyond the scope of this assessment.
26. Eloise Scotford & Stephen Minas (2019). "Probing the Hidden Depths of Climate Law: Analysing National Climate Change Legislation", Review of European, Comparative and International Environmental Law, 28(1), 67.
27. Jeremy, W. (1999). Law and Disagreement. Oxford: Oxford University Press, chapter 5.
28. Saudi Arabia is a good example of this.
29. (UNEP 2016) (see no. 10).
30. For example, *ibid.*; Vahlsing, C. and Smith, K.R. (2012). Global Review of National Ambient Air Quality Standards for PM₁₀ and SO₂ (24 h). Air Quality Atmosphere & Health 5, 393-399. <https://doi.org/10.1007/s11869-010-0131-2>; Joss, M.K., Eeftens, M., Gintowt, E., Kappeler, R. and Künzli, N. (2017) (see no. 9).
31. This is particularly true for India, where air quality laws are no guarantee of good air quality due to lack of awareness of the laws on the part of the public, lack of agency will, and environmental, cultural and economic variation across the country – Bhawe, P. and Kulkarni, N. (2015). Air Pollution and Control Legislation in India. *Journal of the Institution of Engineers (India)* 96(3) Series A, 259-265. <https://doi.org/10.1007/s40030-015-0125-z>.

Methodology

The methodology adopted for this assessment focuses on the three aspects of legal implementation of AQS through legislation outlined in Table 2. These three aspects were researched via two research streams:

» quantitative global analysis of relevant legal indicators;

» selective case study analysis of more complex issues of legal implementation.

a. Quantitative global analysis of legal indicators

The 194 States, plus the EU, covered by this assessment are set out in Table 2.

Table 2: List of 194 States, plus the EU, assessed for this report

Africa	Asia and the Pacific	Western Asia	Latin America and the Caribbean	Europe	North America
Algeria Angola Benin Botswana Burkina Faso Burundi Cabo Verde Cameroon Central African Republic Chad Comoros Congo Côte d'Ivoire Democratic Republic of the Congo Djibouti Egypt Equatorial Guinea Eritrea Eswatini Ethiopia Gabon Gambia Ghana Guinea Guinea-Bissau Kenya Lesotho Liberia Libya Madagascar Malawi Mali Mauritania Mauritius	Afghanistan Australia Bangladesh Bhutan Brunei Darussalam Cambodia China Fiji India Indonesia Iran (Islamic Republic of) Japan Kiribati Lao People's Democratic Republic Malaysia Maldives Marshall Islands Micronesia (Federated States of) Mongolia Nauru Myanmar Nepal New Zealand Pakistan Palau Papua New Guinea Philippines Republic of Korea Samoa Singapore	Bahrain Iraq Jordan Kuwait Lebanon Oman State of Palestine Qatar Saudi Arabia Syrian Arab Republic United Arab Emirates Yemen	Antigua and Barbuda Argentina Bahamas Barbados Belize Bolivia Brazil Chile Colombia Costa Rica Cuba Dominica Dominican Republic Ecuador El Salvador Grenada Guatemala Guyana Haiti Honduras Jamaica Mexico Nicaragua Panama Paraguay Peru Saint Kitts and Nevis Saint Lucia Saint Vincent and the Grenadines Suriname Trinidad and Tobago Uruguay	Albania Andorra Armenia Austria Azerbaijan Belarus Belgium Bosnia and Herzegovina Bulgaria Cyprus Czechia Croatia Denmark Estonia Finland France Georgia Germany Greece Hungary Iceland Ireland Israel Italy Kazakhstan Kyrgyzstan Latvia Liechtenstein Lithuania Luxembourg Malta Monaco Montenegro Netherlands North Macedonia Norway	Canada United States of America

Africa	Asia and the Pacific	Western Asia	Latin America and the Caribbean	Europe	North America
Morocco Mozambique Namibia Niger Nigeria Rwanda Sao Tome and Principe Senegal Seychelles Sierra Leone Somalia South Africa South Sudan Sudan Togo Tunisia Uganda United Republic of Tanzania Zambia Zimbabwe	Solomon Islands Sri Lanka Thailand Timor-Leste Tonga Tuvalu Vanuatu Viet Nam		Venezuela (Bolivarian Republic of)	Poland Portugal Republic of Moldova Romania Russian Federation San Marino Serbia Slovakia Slovenia Spain Sweden Switzerland Tajikistan Turkey Turkmenistan Ukraine United Kingdom of Great Britain and Northern Ireland Ireland Uzbekistan European Union (EU) Holy See	

In framing the quantitative analysis of air quality legislation covering all 194 States and the EU, a set of legal indicators was devised to capture comparable information on setting and designing AQS through national legislation, and on implementing and administering those legal standards. The full set of legal indicators is set out in Appendix 2. These indicators were initially devised from the background knowledge of the academic experts who prepared the assessment, and were then tested on a diverse sample of countries and adjusted to ensure they were adaptable to different legal contexts.

While a full sociolegal analysis of legislative AQS is beyond the scope of this study, contextual issues were addressed through the collection of background legal contextual information for each country assessed. This included data on the type of legal system, participation in legal regions, State governance arrangements for air quality, and relevant constitutional guarantees or other supranational constraints on a State's discretion to set or implement AQS.

Many of the indicators were devised as "yes/no" questions, and most were multiple-choice questions. This meant that quantitative results could be calculated, which are outlined in sections 4 to 6. Where possible or useful, quantitative results have been compared with legal contextual information to determine any relevant trends. It was also possible to draw out qualitative information and examples to inform the narrative analysis, which is also outlined in sections 4 to 6.

In terms of the air pollutants covered by the quantitative analysis, the assessment focuses on the four pollutants covered by the 2005 WHO air quality guidelines (particulate matter with a diameter of 10 micrometres (μm) or less [PM_{10}] and particulate matter with a diameter of 2.5 micrometres (μm) or less [$\text{PM}_{2.5}$], ozone [O_3], nitrogen dioxide [NO_2] and sulfur dioxide [SO_2]) when looking specifically at levels of ambition reflected in legal AQS. Otherwise, the other indicators and analysis cover AQS in law more broadly.¹

Researching the legal indicators for each country was primarily a desk-based exercise involving the direct examination of legislative sources, supplemented by searches in legal journals, legal databanks,² reports of international organizations, publications of associations, or other relevant literature. The country research was supported by key information from in-country experts (mainly National Focal Points for the Fifth Montevideo Programme for the Development and Periodic Review of Environmental Law designated by UNEP Member States, National Focal Points for the Convention on Long-Range Transboundary Air Pollution, and other UNEP contacts) where available, between July and mid-November 2020. This included regional webinars with in-country experts in September–October 2020, where early findings of the research were presented and discussed. The assessment's researchers also drew on valuable information from the UNEP Asia Pacific Clean Air Partnership (APCAP) Clean Air Solutions Tracker 2020. Local experts were not asked to validate desk-based research. Translation issues also arose in some cases; where official translations were not available, online translation tools were used, which may impact the accuracy of some data. For countries where it was not possible to find or access all relevant data, "data not available" was recorded against relevant indicators in our research records. All primary data gathered for this exercise will be made available online in a PDF-format questionnaire.

As a final caveat, air quality legislation is a very fast-moving area of law. To reflect this, the experts who prepared this assessment inquired directly whether national air quality legislation was under

review, or whether revisions to national AQS were expected in the short term (see section 4). The data underpinning the report are accurate as at 15 December 2020. Some data will expire after this time and the overall findings and trends should be read with this in mind. This assessment is a snapshot in time, reflecting countries' respective legal progress and legislative development in the area of air quality law.

b. Selective case study analysis of more complex issues of legal implementation

A qualitative approach was also adopted in assessing air quality legislation through a series of case studies, dedicated to specific trends at the national and regional level. These case studies examined various aspects of the legal implementation of AQS, extending beyond those covered in the quantitative assessment.

Case studies were selected as examples of different conditions under which AQS have been given prominence through law, focusing on the role of civil society, the importance of litigation, and the role of technology and information on air quality. They also illustrate multilevel governance and policy coordination issues which are key determinants of effective AQS implementation. Case study highlights can be found in boxes throughout the report.

Chapter 2 Endnotes

1. Including in relation to standards for other pollutants addressed within national legal systems.
2. Such as legislation filed in ECOLEX (www.ecolex.org/), FAOLEX (www.fao.org/faolex/country-profiles/en/), and standards and texts in AirLex (<http://airlex.web.ua.pt>), as well as legal information institutional databases (e.g. Australasian Legal Information Institute – AusTLI, British and Irish Legal Information Institute – BAILII, Pacific Islands Legal Information Institute – PACLII).

International legal framework on air pollution: Overview

A clear commitment to **a certain level of ambient air quality** that is compatible with human health and the natural environment globally does not yet exist in public international law. The lack of an international legal framework on this issue is reflected in the disparity of national approaches to AQS, as demonstrated in section 4–6.

a. Formal law

i. Treaties and cooperation agreements

In 2020, no international treaty requires or encourages the adoption of AAQS. Public international law on air pollution does exist, but the regulatory approach is different (see Table 3).

Table 3: Global treaties on air pollution

Pollutants	Main treaties	Contain AAQS?	Main regulatory approach	Objective	Parties ¹
Ozone depleting substances and some substances with global warming potential	The Vienna Convention for the Protection of the Ozone Layer (1985) The Montreal Protocol on Substances that Deplete the Ozone Layer (1987)	No	Products and processes (phasing out of production and consumption of ozone depleting substances; phasing down of production and consumption of hydrofluorocarbons that affect the climate)	Ozone layer and climate protection	198
Greenhouse gases	The United Nations Framework Convention on Climate Change (UNFCCC) (1992) The Kyoto Protocol (1997) The Paris Agreement (2015)	No	Collective goals; nationally determined contributions to mitigate climate change; national adaptation planning (Paris Agreement)	Climate change mitigation and adaptation	191 (Paris Agreement)
Persistent organic pollutants (POPs)	The Stockholm Convention on Persistent Organic Pollutants (2001)	No	Products, processes (reduce/eliminate releases from production and use of intentionally and unintentionally produced POPs); regulation of trade, waste and stockpiles	Human health and environmental protection from POPs	184
Mercury	The Minamata Convention on Mercury (2013)	No	Products and manufacturing processes; regulation of supply, trade, storage and waste; control of emissions, releases and contaminated sites and artisanal and small-scale gold mining	Human health and environmental protection (from emissions and releases of mercury and mercury compounds)	131

By contrast, there has been significant regional development of treaties and agreements concerning air quality, motivated by shared transboundary air pollution problems. In the 1970s, the need to cooperate and develop common approaches to transboundary acid rain problems across Europe led to the first international law structure on long-range transboundary air pollution, with the adoption of the Convention on Long-Range Transboundary Air Pollution in 1979,² at the initiative of the United Nations Economic Commission for Europe (UNECE), by 51 Parties comprising much of the industrialized world at the time. Cooperation, monitoring and development of scientific knowledge were key elements of the Convention on Long-Range Transboundary Air Pollution framework which, progressively through eight protocols, imposed more specific requirements for pollution control and expanded to new pollutants (e.g. black carbon and PM_{2.5} with the 2012 amendment to the Gothenburg Protocol³), but never imposed AAQS as such.⁴ Nor did it ever expand to other regions of the world, but it is nonetheless a source of inspiration beyond Europe and Central Asia (for instance, in the Republic of Korea).

Regional cooperation through formal agreements on air pollution also exists in other regions of the world: in North America, there

is the US-Canada Air Quality Agreement, which was established in 1991 to address transboundary sources of acid rain. Its scope was expanded in 2000 with an Ozone Annex, which aims to reduce transboundary smog emissions.

In Asia, the Acid Deposition Monitoring Network in East Asia (EANET)⁵ was established in 2001 as an intergovernmental initiative to create a common understanding on the state of acid deposition problems in East Asia, to provide useful inputs for decision-making at various levels, and to promote cooperation among the 13 countries. The 2002 ASEAN [Association of Southeast Asian Nations] Agreement on Transboundary Haze Pollution⁶ focuses on a different topic: the anticipation, prevention and monitoring of land and forest fires.⁷ Finally, the 2006 Framework Convention on Environmental Protection for Sustainable Development in Central Asia⁸ includes provisions on a regional system of indicators of air pollution, but has not entered into force.

In Africa, three agreements call for regional cooperation on the harmonization of AQS, monitoring procedures and data management (see Table 4).

Table 4: African regional cooperative agreements on air pollution

Regional Cooperative Agreement	Objective
The Eastern Africa Regional Framework Agreement on Air Pollution (Nairobi Agreement; 2008)	Harmonize among States as far as practicable national air quality management legislation, standards, monitoring procedures and data management procedures Enhance stakeholder participation in air quality management
The Southern African Development Community (SADC) Regional Policy Framework on Air Pollution (Lusaka Agreement; 2008)	Similar
West and Central Africa Regional Framework Agreement on Air Pollution (Abidjan Convention; 2009)	Similar

ii. Customary international law

The obligation to prevent, reduce and control pollution to avoid doing significant harm beyond a national territory is well established in customary international law (the “no-harm rule”) (see Table 5)⁹. This rule implies that States have a duty to prevent pollution across borders. This is unhelpful for the protection of public health against pollution at the local level inside a national

territory, where national sovereignty reigns. It also requires a clear chain of causation to be shown, from pollution in one country to harm incurred in another. However, it is a useful international law remedy in the case of immediate air pollution across borders. Furthermore, combined with human rights duties, it may contribute to a systemic approach to guaranteeing air quality (see section 3(b)(ii)).

Table 5: Customary international law on air pollution

Customary international law	
No-harm rule	States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. Rio Declaration on Environment and Development¹⁰ (Rio Declaration), Principle 6, inspired by the Declaration of the United Nations Conference on the Human Environment¹¹ (Stockholm Declaration), Principle 21.

There is willingness among States and multiple stakeholders to cooperate on air pollution globally,¹² as demonstrated by UNEA resolution 1/7, on strengthening the role of UNEP in promoting air quality.¹³ Whether this willingness is sufficient for States to work towards a global and legally binding agreement is another matter, and is not assessed in this report.

Various options for more systemic global air quality governance have been proposed in academic research (see Table 6).¹⁴

Table 6: Options for more systemic global air quality governance

Reform options
• a global treaty on the atmosphere • a global treaty on AAQS • widening of the scope of existing global treaties (climate) • widening of the geographic base of existing regional frameworks • soft law (regional plans, declarations, etc.) • non-legal approaches: - scientific - other (transnational standardization)

In light of the findings in this report, particularly concerning heterogeneity in approaches to designing AQS (see section 5(c)), there is a case for a global treaty on AAQS that supports universal public health goals and evolving human rights protections relevant to health and clean air (see section 3(b)(ii)). To support robust air quality governance, and in view of the fact that many countries' air quality laws often require revision, any such treaty should be supported by a strong technical secretariat to ensure regular review in line with

scientific evidence and WHO guidance. Such a treaty could facilitate global knowledge-sharing on air quality policy and scientific assessment, and could leave room for differentiation based on national circumstances, as currently accepted by the WHO air quality guidelines (see section 4(b)(i)). There is also a case for widening the geographic base of existing regional frameworks, given the patchy adoption of national provisions on transboundary air pollution (see section 4(c)).

b. Soft law

i. Science-based governance: WHO air quality guidelines

In 1958, WHO published a technical report called *Air Pollution* which acknowledged the link between air pollution and health.¹⁵ Several more technical reports were later published by WHO on air pollution, based on the work of expert groups.¹⁶ These evolved in the mid-1980s into guidelines with evidence-based recommendations for protecting populations worldwide from the adverse health effects of air pollutants (see Table 7).¹⁷ Three editions of air quality guidelines have been produced so far, the latest in 2005:

- » a 1987 first edition,¹⁸ providing recommendations in the form of numerical values/ranges or unit risk factors for a total of 28 air pollutants;
- » a 2000 second edition,¹⁹ providing recommendations in the form of numerical values/ranges and unit risk factors for 35 air pollutants, with a separate section for indoor air pollutants and a chapter discussing several air quality management issues to be considered when guidelines are to be used for the development of legally enforceable standards;
- » a 2005 global update, published in 2006,²⁰ focused on four pollutants: PM, ozone, NO₂ and SO₂.

Table 7: WHO air quality guidelines over time

	WHO air pollution guidelines			Revision
Date of publication	1987	2000	2005	Expected 2021
Number of pollutants	28	35	4	?
Scope	Global	Global	Global ²¹	Global
Author and influences	WHO Regional Office for Europe, inspired by US Environmental Protection Agency (EPA) (definition)	WHO Regional Office for Europe	WHO Regional Office for Europe, inspired by the development of the EU's Clean Air for Europe (CAFE) programme in 2002–2004	?

A revised edition of the 2005 guidelines is pending,²² as evidence of the effects of air pollutants on health has continued to grow in the years following their publication.

As indicated in section 2, since 2006, the WHO has worked on developing separate guidelines for indoor air quality, and has

published a series of indoor-specific air quality guidelines²³ providing health-based recommendations on selected air pollutants commonly found in indoor environments, particularly biological agents (dampness and mould) and household fuel combustion (see Table 8).²⁴

Table 8: Scope of WHO air quality guidelines over time

WHO air quality guidelines	1987	2000	2005	2009	2010	2020
Ambient air (outdoor)	✓	✓	✓			
Indoor air		✓		✓	✓	

Work on preparing air quality guidelines is coordinated by the WHO Regional Office for Europe but is meant to be globally relevant. It is funded by public sources. The contents of the guidelines are discussed and produced in a process that takes years, involving a steering group, working groups, external reviewer, and WHO.

ii. The status of WHO air quality guidelines

The 2017 WHO report²⁵ states that the WHO air quality guidelines are not intended to be taken as recommendations for AQS per se, but rather as a rigorous scientific tool that can be used by regulatory authorities as a basis for setting standards, taking into account local sociopolitical and economic conditions and prevailing ambient concentrations of air pollutants.

In the 2005 update, WHO had already asserted that national AQS “will vary according to the approach adopted for balancing health risks, technological feasibility, economic considerations and various other political and social factors, which in turn will depend on, among other things, the level of development and national capability in air quality management.”²⁶ The WHO air quality guideline values “acknowledge this heterogeneity and... recognize that when formulating policy targets, governments should consider their own local circumstances carefully before adopting the guidelines directly as legally based standards.”²⁷

In any case, even the WHO air quality guidelines do not necessarily represent the optimal level of health protection. The expert consultation informing the next edition of WHO guidelines indicates that several of the current guideline values require re-evaluation in light of new evidence of health risks, including at pollution levels below the existing WHO guideline values.²⁸ One critical aspect concerns the protection of the sensitive population, such as children.

Although they were not originally intended to be binding, the WHO guidelines have progressively acquired more normative strength. This is because they represent a high degree of global scientific consensus in modern society and this is not devoid of possible consequences in law.²⁹ They act as a benchmark, a common reference point for good air quality globally (often alongside United States [US] and EU standards). Thus, for example, Timor-Leste’s air quality law provides that “[u]ntil environmental quality standards have been established by domestic law, the standards endorsed by the World Health Organization shall apply.”³⁰

Litigation in some countries also demonstrates that WHO guidelines have an impact on legal frameworks, especially procedurally, since they are a respected global benchmark. The Supreme Court of Chile has asserted the need to formally

take the WHO guidelines into account, together with other recognized air quality standard benchmarks, when the relevant decision maker is in the process of negotiating the adoption of new AAQS (see Box 8). And while the Court of Appeal in the Netherlands did not find any breach of the constitutional rights to life and health by the state when the Dutch Government was aiming only at complying with European law and not with stricter WHO guidelines, the case shows how the WHO guidelines have become legally influential, at least in argument.³¹

The WHO air quality guidelines can also be framed in terms of legal rights. The 2000 and 2005 guidelines are introduced by the statement that clean air is a basic requirement of human health and well-being.³² As observed by the Special Rapporteur on human rights and the environment,³³ obligations relating to clean air are implicit in a number of international human rights instruments, including the Universal Declaration of Human Rights (the right to an adequate standard of living), the International Covenant on Civil and Political Rights (the right to life), and the International Covenant on Economic, Social and Cultural Rights (the right to health). The “framework principles on human rights and the environment” embrace the three categories of State obligations: procedural, substantive, and special obligations to those in vulnerable situations.³⁴ Procedural duties include access to information, public participation, and access to remedies. On substantive obligations, as asserted by the Special Rapporteur on human rights and the environment, there are seven key steps that States can take to ensure the right to breathe clean air:³⁵

- » monitor air quality and impacts on human health;
- » assess sources of air pollution;
- » make information publicly available, including public health advisories;
- » **establish air quality legislation, regulations, standards and policies;**
- » develop air quality action plans at the local, national and, if necessary, regional levels;
- » implement an air quality action plan and enforce the standards;
- » evaluate progress and, if necessary, strengthen the plan to ensure that the standards are met.

Regarding special obligations to those in vulnerable situations, this dimension is rarely taken into account in current legal regimes and doing so might contradict the need to avoid

discrimination,³⁶ but it is an important issue of equity and air quality justice.

The recommendations of the Special Rapporteur are notable insofar as they link the right to clean air with the establishment of air quality legislation and standards. This legal link has also been made by the EU courts (see Box 2). The Special Rapporteur's suggested steps to fulfil a right to clean air track key aspects of a robust air quality governance model introduced through legislation, as modelled and assessed in this report.

Box 2: EU case study – linking legally binding AAQS and legal rights

“Whenever the exceeding of the limit values [AAQS] could endanger human health the persons concerned must be in a position to rely on mandatory rules in order to be able to assert their rights. Furthermore, the fixing of a limit value in a provision the mandatory nature of which is undeniable is also necessary in order that all those whose activities are liable to give rise to nuisances may ascertain precisely the obligations to which they are subject.”

Case C-59/89 TA-Luft [1989] ECLI:EU:C:1991:225, para. 19 (European Court of Justice). https://eur-lex.europa.eu/resource.html?uri=cellar:505bad8e-ba91-4a01-b075-a8cbd4c8c1f4.0002.03/DOC_2&format=PDF.

Chapter 3 Endnotes

1. As at 10 May 2021.
2. United Nations, *Treaty Series* (1302), 217.
3. C.N.155.2013.TREATIES-XXVII-1-h of 28 February 2013.
4. Its key regulatory instrument is the notion of an annual national emission ceiling (NEC; now called emissions reductions commitments), differentiated for each Party and based on the concept of critical load, with potential for adjustments.
5. See www.eanet.asia for more information.
6. The Association of Southeast Asian Nations, *ASEAN Agreement on Transboundary Haze Pollution* (Jakarta, Indonesia, 2016).
7. Alam, S. and Nurhidayah, L. (2017). The International Law on Transboundary Haze Pollution: What Can We Learn from the Southeast Asia Region?. *Review of European Community and International Environmental Law* 26 (3), 243. <https://doi.org/10.1111/reel.12221>.
8. Available at <https://leap.unep.org/content/treaty/framework-convention-environmental-protection-sustainable-development-central-asia>.
9. *USA v Canada* (1941) 3 RIAA 1907, 1965 ("Trail Smelter Arbitration").
10. *Rio Declaration on Environment and Development* (1992). www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf
11. *Declaration of the United Nations Conference on the Human Environment* (1972). <https://digitallibrary.un.org/record/523249>.
12. *Review of European, Comparative and International Environmental Law* (26)3 (November 2017) <https://doi.org/10.1111/reel.12223>, including Yulia Yamineva and Seita Romppanen, "Is Law Failing to Address Air Pollution? Reflections on International and EU Developments", <https://onlinelibrary.wiley.com/doi/10.1111/reel.12223>
13. UNEP, document UNEP/EA.2/6.
14. Ibid.
15. WHO (1958). *Air Pollution: Fifth Report of the Expert Committee on Environmental Sanitation*. Geneva: World Health Organization. WHO Technical Report Series, No. 157. <http://apps.who.int/iris/handle/10665/40416> WHO (2017). *Evolution of WHO air quality guidelines: past, present and future*. Copenhagen: WHO Regional Office for Europe, 2017, 2.
16. Their findings influenced the adoption of the first EU-wide legislation on air quality limit values and guide values for sulfur dioxide and suspended particulates in 1980 ([1980] OJ L229/30).
17. (WHO 2017), 12.
18. WHO (1987). *Air quality guidelines for Europe*. Copenhagen: WHO Regional Office for Europe, WHO Regional Publications, European Series, No.3. <https://extranet.who.int/iris/restricted/handle/10665/107364>.
19. WHO (2000). *Air quality guidelines for Europe*. Copenhagen: WHO Regional Office for Europe, WHO Regional Publications, European Series, No. 91, 2nd edition. www.euro.who.int/en/publications/abstracts/air-quality-guidelines-for-europe.
20. WHO (2005). *Air quality guidelines: global update 2005 – particulate matter, ozone, nitrogen dioxide and sulfur dioxide*. Copenhagen: WHO Regional Office for Europe. <https://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/pre2009/air-quality-guidelines-global-update-2005-particulate-matter-ozone-nitrogen-dioxide-and-sulfur-dioxide>
21. Of particular importance in deciding that the guidelines should apply worldwide was "the substantial and growing evidence of the health effects of air pollution in the low- and middle-income countries of Asia, where air pollution levels are the highest" – (WHO 2005), 1.
22. WHO (2016). *WHO expert consultation: available evidence for the future update of the WHO global air quality guidelines (AQGs)*. Copenhagen: WHO Regional Office for Europe.
23. See the WHO guidelines for indoor air quality (there are three sets of guidelines relating to dampness and mould, selected pollutants, and household fuel combustion, issued in 2009, 2010 and 2014, respectively).
24. (WHO 2017), 12.
25. Ibid., 29.
26. (WHO 2005), 7.
27. Ibid.
28. WHO Expert Consultation (2015), *Available Evidence for the Future Update of the WHO Global Air Quality Guidelines (AQGs)*. Meeting report. Bonn, Germany. See also (WHO 2017).
29. For example, under the European Convention on Human Rights, existing consensus or common ground in society can play a role in interpreting legal rights ("The Court must also recall that the Convention is a living instrument which, as the Commission rightly stressed, must be interpreted in the light of present-day conditions" – *Tyrer v United Kingdom* 25 April 1978, sect. 31, Series A no. 26). The link between that approach and established scientific consensus, emanating from established bodies like the Intergovernmental Panel on Climate Change (IPCC), was made in 2019 by the Supreme Court of The Netherlands, in relation to climate change, informing State duties under human rights guarantees (*The Netherlands v Urgenda* ECLI:NL:HR:2019:2006, 20 December 2019, referring to ECtHR jurisprudence (eg *Oluić/Croatia* ECtHR 20 May 2010, no. 61260/08)).
30. Basic Environmental Act of 2021, art. 67 (Timor Leste).
31. *Milieudefensie & Adem v The Netherlands*, C/09/516573/HA ZA 16-975 (The Hague, 7 May 2019).
32. WHO (2017) mentions that "achievement of clean outdoor and indoor air is recognized as a basic right, and WHO activities in the air pollution field for the past 60 years have contributed substantially in moving towards this goal" (p. 29).
33. United Nations, *Issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment - Report of the Special Rapporteur, Human Rights Council, Fortieth Session, 25 February–22 March 2019* (A/HRC/40/55).
34. Ibid., para. 58.
35. Ibid., para. 61.
36. Ibid., para. 60.

Air quality
legislation is
developed and
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world.

National approaches to regulating air quality since the 2005 WHO air quality guidelines

Air quality legislation is developed and implemented in a wide range of national legal cultures around the world. This section explores the legal and constitutional cultures in different countries and the types of regulatory approaches adopted in relation to air quality, while sections 5 and 6 delve more deeply into the details of national AQS. These legal contextual factors are fundamental to understanding how AQS are devised, interpreted and implemented.

a. Legal system and constitutional arrangements for air quality governance

Different countries have different systems of law and different state constitutional structures, which can determine how air quality laws are devised and implemented.

The type of legal system can be important, particularly the type of influence that judicial reasoning has in interpreting legal norms relating to air quality governance.¹ In terms of legal systems, 46 per cent of the countries surveyed were civil law countries, 15 per cent were common law countries, 4 per cent had religion-based legal systems, and 36 per cent had a combined system.

States also have different constitutional arrangements, which can impact their arrangements for air quality governance. Of the countries surveyed, 84 per cent had unitary constitutional arrangements, 14 per cent were federal systems; and 19 per cent were part of a supranational region. In terms of air quality governance, being part of a supranational region adds a powerful layer of accountability for AQS, as seen in the specific case of the EU given its political integration, where very detailed EU legislation on ambient air quality,² subject to the common interpretation of the Court of Justice of the European Union (CJEU), is applicable in each of the 27 Member States.

Box 3 explains how the CJEU's rulings have strengthened air quality law throughout the EU. In particular, individuals can directly rely on EU law to claim better air quality law enforcement at the national level, which has led to a spate of public interest litigation on air quality law in national courts across the EU.

Box 3: EU case study – strengthening air quality legislation through supranational law and judicial interpretation

The CJEU is a powerful supranational court, establishing robust legal requirements throughout the EU to achieve AAQS ("limit values" and "target values") after serial public interest litigation.³ The CJEU has delivered several preliminary rulings judgments (in answer to questions asked by national Member State courts) on the meaning of Directive 2008/50 on ambient air quality, especially on the stringency of duties to achieve the limit values (article 13)⁴ and on the need to adopt appropriate plans to make periods of exceedances as short as possible (article 23)⁵. Even the location of monitoring stations has become a matter for judicial review under EU law.⁶ Risks to human health have motivated the CJEU to adopt an expansive interpretation of EU legislation on ambient air quality.

An early case on Directive 2008/50 established the right of individuals to demand State action where AAQS are likely to be breached:

"Persons directly concerned by a risk that the limit values or alert thresholds may be exceeded must be in a position to require the competent authorities to draw up an action plan where such a risk exists, if necessary by bringing an action before the competent national courts."⁷

In federal systems, different considerations arise. Allocation of federal/sub-federal policy competence will affect which level of government has legal control over air quality governance, and may lead to policy coordination issues if powers to legislate for AAQS are spread across subnational states or regions. In federal countries, the setting of AQS is often under the control of the federal government, even where subnational governments may have primary competence for environmental matters generally.⁸ Federal systems may resolve this allocation of authority in different ways by meeting the impetus to set common national standards (see Figure 3).

Exceptions to the typical set-up whereby the authority to set AQS rests with the federal government can be found in Belgium and Bosnia and Herzegovina, where the federal level has no involvement in the establishment of AAQS, which are to be decided by each of the devolved entities (except for Belgium, with common features due to EU legislation). In Germany, by contrast, standards are established at the federal level and cannot be differentiated across Länder.

Figure 3: Examples of federal state arrangements and national coordination of air quality standards in legislation



Within countries more generally, there are often structures of multilevel governance for air quality control, with roles for local, regional, national and sometimes supranational government. Figure 3 shows that, while national governments are mainly responsible for AQS, that responsibility is often shared (e.g. in the implementation of standards, or even in the primary setting of standards) with other levels of government. This creates challenges of coordinating governance, as highlighted by the case study in Box 4.

**Box 4: United Kingdom (UK) case study
-multilevel governance and regulatory
coordination for ambient air quality standards**

**Navigating scales and orbits of governance in UK air
quality law**

The coordination problem posed by air quality often manifests in a regulatory coordination problem for attaining AAQS. A country may have ambitious AAQS enshrined in law. However, if different regulatory agencies, government departments/ministries, levels of government (not to mention different countries) are responsible for regulating the diverse range of pollution sources that accumulate to produce overall air quality levels, then all those public actors and levels of government are implicated in addressing air pollution and attaining AAQS as collective standards. Thus, for example, a national government department may be responsible for national transport policy (including development and control of highways and train networks), while local authorities are responsible for land-use planning, and a discrete environmental regulator is responsible for industrial pollution control. These regulatory bodies and spheres of government must be coordinated to ensure their combined actions support the achievement of AAQS.

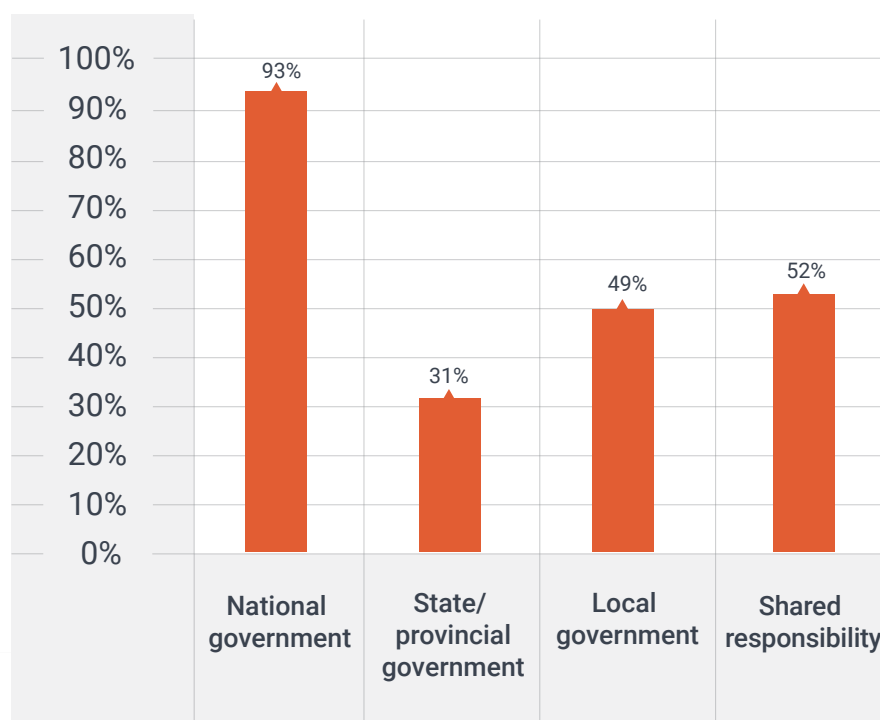
This has been a particular challenge in the UK. Since 2010, the UK, like many EU Member States, has been in breach of EU limit values, for NO₂ in particular.⁹ The UK government is legally responsible for attaining these standards, and remains so under “retained” EU law following its departure from the EU (Brexit).¹⁰ The UK government has drawn up a series of plans for addressing its NO₂ pollution exceedances, which are legally required to bring the country into compliance in as short a time as possible.¹¹ These plans effectively

place primary responsibility on local authorities for achieving compliance with NO₂ limit values, taking the approach that “local problems need local solutions”. As a result, significant pressure has been placed on local authorities to resolve air pollution problems beyond their sphere of regulatory competence.

A regulatory coordination problem for air quality control has thus arisen, both horizontally (across regulatory authorities responsible for controlling different pollution sources) and vertically (concerning the appropriate balance of national/local regulatory control). In the drafting of a new UK Environment Act, to be introduced in 2021 to fill gaps in UK environmental law after Brexit, this regulatory coordination problem has been acknowledged and partially addressed. Revisions to the regime of local air quality management are being introduced to create a notion of “air quality partners”¹² – that is, relevant regulatory agencies that are responsible for different sources of air pollution and which must work together to achieve legally required AAQS.

Just over half of the countries surveyed have some shared governance arrangements for AQS between layers of government, highlighting national multilevel governance as an important area for exploring AQS implementation issues (see Figure 4).

Figure 4: Countries' allocation of responsibility for air quality governance (including establishing, coordinating and implementing ambient air quality standards)



b. Legal constraints on national discretion in setting air quality standards

National governments may not always be free to set and implement AQS – or not to set them – as they see fit, due to legal constraints. Similarly, national laws on AQS will in turn constrain the discretion of subnational states or regions in managing air quality. The US Clean Air Act is a good example of this, where national AAQS frame what is required of states. US states must develop State Implementation Plans to achieve nationally set AAQS, and the federal EPA can take over regulation and policy planning by states if it is not adequate to enforce the US Clean Air Act,¹³ or it may impose sanctions on states, including financial retaliation (see Table 12).

In terms of **binding legal constraints** on national governments, international treaties or other supranational laws are the primary source of these. However, as outlined in section 3, international treaties relating to air pollution have not set AAQS in international law, or required their adoption so far.

The main type of air pollution regulatory instrument set by regional international treaties is the “national emission ceiling” or national reduction commitment, which was set by the Gothenburg Protocol under the Convention on Long-Range Transboundary Air Pollution for various pollutants. This type of instrument is not designed to ensure adequate levels of ambient air quality, but rather uses standards to limit the collective emissions of key pollutants within a Party’s territory each year.

A powerful supranational legal instrument that constrains national discretion to set AAQS is found in EU law with its Directive 2008/50 on ambient air quality and cleaner air for Europe. It sets binding AAQS for a wide range of pollutants that must be complied with in all 27 Member States. There is a strict legal obligation to achieve these EU standards, as explained in Box 3. National EU Member State governments may set more stringent AAQS¹⁴ but they cannot set weaker standards. The EU Directive is also influential beyond EU borders, through neighbouring (Georgia) and accession policies (Albania) for instance, or as a reference point (Iceland).

As indicated in section 3(b)(ii), some constraints on national discretion to set AQS also potentially come from substantive **international human rights** norms that apply in national legal systems, in relation to the protection of health and life in

particular. Treaties on procedural environmental rights also influence the discretion of public authorities to adopt and enforce their policies on air quality, as shown in section 6(b)(iii).¹⁵

Many countries also have **national constitutional rights or other guarantees** for clean air or a healthy environment (see Figure 5), which may impact on a government's obligations in setting and implementing AQS.¹⁶ Such constitutional guarantees vary considerably in their formulation, from those that are heavily anthropocentric to those that are more ecocentric in focus, and in the stringency of their expressed guarantees (see Figure 6). The legal impact of these constitutional constraints on air quality law is or would be revealed in national constitutional jurisprudence, and the likelihood of courts interpreting constitutional rights in relation to air quality governance will depend on the legal culture of the courts, and relevant litigation being brought (see Box 5).¹⁷

Figure 5: Percentage of countries surveyed with national constitutional guarantees for clean air or a healthy environment

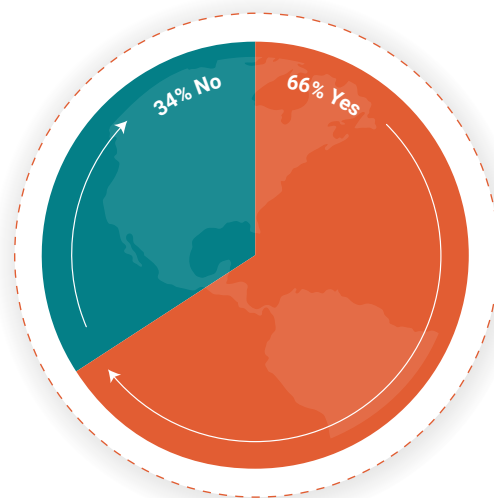
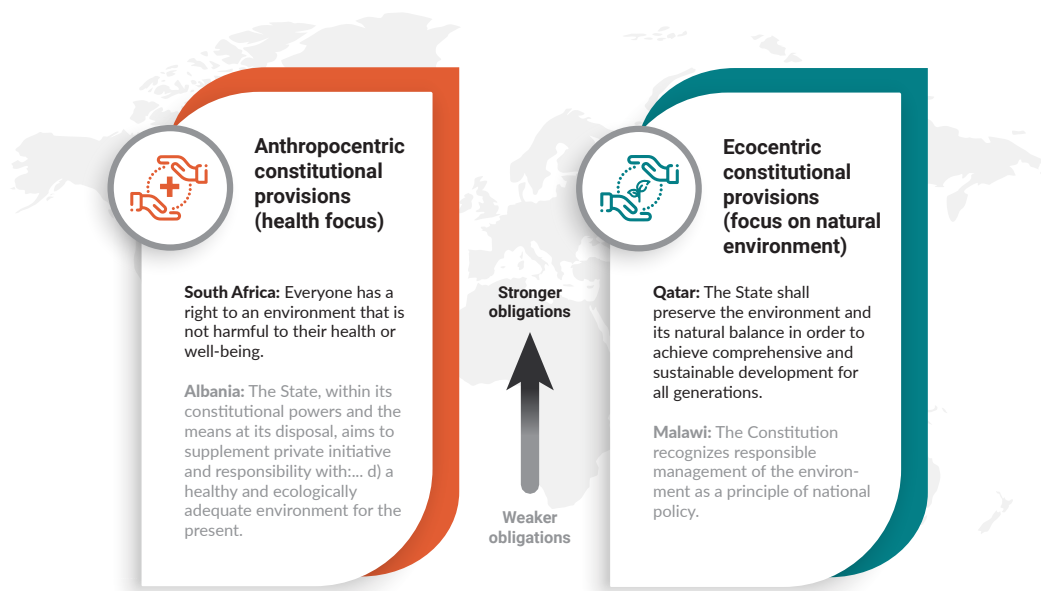


Figure 6: National constitutional provisions relating to clean air or a healthy environment

Box 5: India case study – interpreting a national constitutional right to clean air

In some countries, generally stated constitutional rights may be interpreted to give rise to discrete rights to clean air. A notable example is seen in the long-running Indian public interest litigation case of *M C Mehta v Union of India*, in which the Supreme Court stated the following when making an order in relation to the right to the “protection of life and personal liberty” in Article 21 of the Indian Constitution:

“Today everyone is concerned about level of pollution in Delhi and [the National Capital Region]. This is not something new, every year this kind of piquant situation arises for a substantial period. ... This is blatant and grave violation of right to life of the sizeable population by all these actions and the scientific data which has been pointed out indicates that life span of the people is being reduced by this kind of pollution which is being created and that people are being advised not to come back to Delhi or to leave the Delhi due to severe pollution condition which has been created. ... Time has come when we have to fix the accountability for this kind of situation which has arisen and is destroying

Right to Life itself in gross violation of Article 21 of the Constitution of India.”

M C Mehta v Union of India, Writ Petition (Civil) No 13029/1985, Daily Order, 4 November 2019.

Finally, there are **soft law constraints** on national governments’ discretion to set AQS. Some of these were set out in section 3, including the regional agreements in Africa (see Table 4), which have some influence on the governments of Parties to these agreements, particularly in relation to harmonizing national AQS across these regions and through the institutions and processes of dialogue they create.

Some countries may not be subject to constraints in setting national air quality law but may be influenced by or take inspiration from existing models, such as another country’s AAQS. For example, US AQS influence those of countries such as Argentina and Costa Rica.¹⁸ In other countries, such as Guyana, AAQS from other jurisdictions may be used as a default pending the adoption of nationally specific AAQS. Again, US standards or WHO air quality guidelines are particularly influential.

c. Purpose and scope of air pollution legislation

Air pollution legislation can operate quite differently in national legal systems depending on its purpose and scope. These are foundational issues that map how air quality law applies within a particular country's legal system.

The **purpose or objective** driving air quality law is an important foundation of an air quality governance system, informing its level of ambition and the focus of regulatory attention. Some air quality laws have no explicit objectives, but a purpose may be inferred from the process by which standards are set; section 5(b) explores national processes for creating AAQS and shows how it is often a technocratic process. However, increasingly, air quality is explicitly framed in legislation (and in constitutions)¹⁹ as a matter of public health and/or environmental protection, and not as a mere technical issue to be settled in scientific circles. Objectives can have legal consequences, as Box 6 shows.²⁰

Box 6: EU case study – air quality objectives and legal consequences

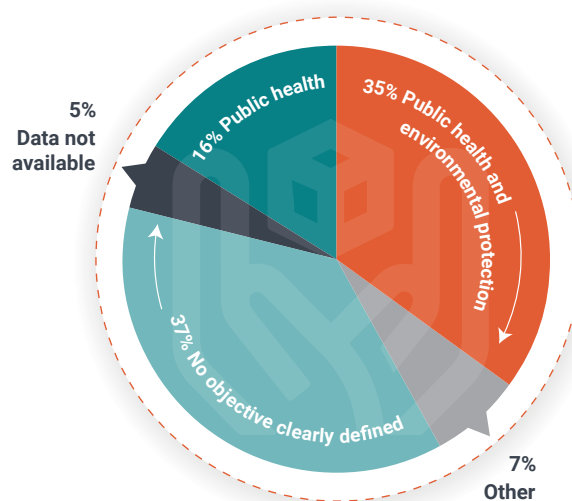
In a CJEU judgment of 30 May 1991, an obligation imposed by European legislation on Member States – to prescribe limit values not to be exceeded within

specified periods and in specified circumstances – was found to pursue the goal to protect human health. The CJEU found that this implied that, whenever exceedances of limit values could endanger human health, the persons concerned must be in a position to rely on mandatory rules in order to be able to assert their rights. Furthermore, it is also necessary to fix limit values in a provision of a binding nature so that all those whose activities are liable to give rise to nuisances may ascertain precisely the obligations to which they are subject. It follows that a Member State must adopt binding laws relating to AAQS with the specificity, precision and clarity required to satisfy the requirement of legal certainty. The insertion of limit values in a technical circular did not meet such requirements.

Commission of the European Communities v Federal Republic of Germany [1991] ECLI:EU:C:1991:224.

Figure 7 gives a sense of the kinds of objectives that are explicitly stated in air quality legislation as the basis for setting AAQS. The “other” category includes legal regimes in which the protection of public health is not ranked among the main priorities of the relevant air quality regime.

Figure 7: Objectives of ambient air quality standards in legislation



As for the **scope** of air quality law, three critical issues arise:

1. which pollutants are covered by national air quality law;
2. whether national air quality law covers indoor as well as ambient air pollution;
3. whether national air quality law covers transboundary air pollution.

In terms of the pollutants covered by a national pollution control regime, this can vary across national legal regimes, as indicated in section 2(a). Sometimes the scope is obvious, in that AAQS are listed in legal instruments for discrete pollutants. However, in other cases, it is a matter of legal interpretation and affects the scope of air pollution control in profound ways. A good example is the US case of *Massachusetts et al. v Environmental Protection Agency et al.*, described in Box 7, which shows how the scope of air pollution law might assist in resolving tensions that can arise between air quality law and climate change regulation.

Box 7: US case study – interpreting the scope of air quality law by defining an “air pollutant”

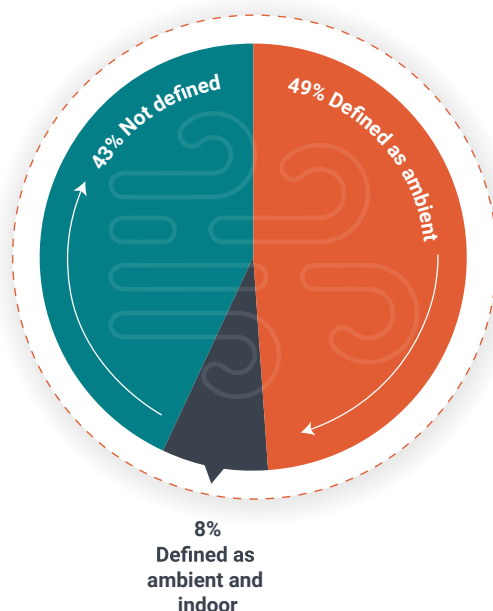
In *Massachusetts et al. v Environmental Protection Agency et al.*, the US Supreme Court construed section 202(a)(1) of the US Clean Air Act, which requires the Administrator of the US EPA to set emission standards for “any air pollutant” from motor vehicles or motor vehicle engines “which in his judgment cause[s], or contribute[s] to, air pollution which may reasonably be anticipated to endanger public health or welfare.” The Act defined an “air pollutant” as containing “any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive ... substance or matter which is emitted into or otherwise enters the ambient air.”

The Court held that the US Clean Air Act’s “sweeping definition” was unambiguous. It “embraces all airborne compounds of whatever stripe, and underscores that intent through the repeated use of the word ‘any’.” Carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons are without a doubt ‘physical [and] chemical ... substance[s] which [are] emitted into ... the ambient air.’” As a result of this finding, the Court confirmed that

greenhouse gases were covered within the US Clean Air Act’s regulatory scope, authorizing the US EPA “to regulate greenhouse gas emissions from new motor vehicles in the event that it forms a ‘judgment’ that such emissions contribute to climate change.” As a result of this interpretation, the Act could be part of the US’ legal response to the “serious and well recognized” harms associated with climate change.²¹

Massachusetts v Environmental Protection Agency
549 US 497 (2007).

On the regulation of **indoor air quality**, there is a trend in national air quality law **not** to include this within the scope of air quality law. This is seen in the definitions of “air pollution” used in many bodies of air quality law (see Figure 8). Reasons for the predominant focus on ambient air quality are considered in section 5(e), and many relate to the complexity of regulating indoor air quality. Notably, a significant proportion (43 per cent) of countries do not define “air pollution”, which can reflect a weak (or non-existent) scheme of air quality law or an implicit assumption that ambient air quality is the default subject of air pollution control.

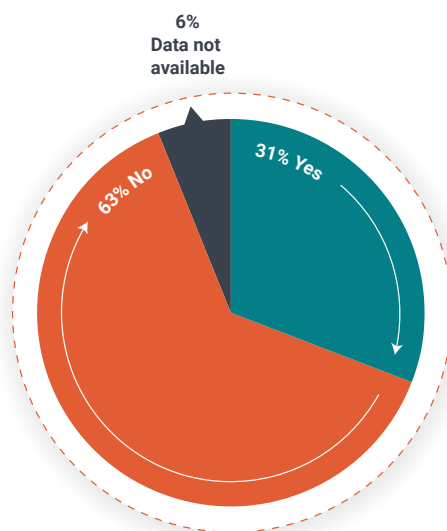
Figure 8: Definition of air pollution in air quality legislation

In terms of **transboundary air pollution**, this is not always incorporated into national regimes for national air quality control (see Figure 9). Where the scope of air pollution law is restricted to domestic sources of pollution only, and does not account for the influence or control of transboundary pollution, this can give rise to problems in attaining domestic AQS and, more generally, for addressing public health problems associated with air pollution.

Furthermore, while national provisions are useful, regional or global legal cooperation is required for well-designed control of transboundary air pollution. Of the countries with transboundary

pollution provisions, 66 per cent are Parties to the Convention on Long-Range Transboundary Air Pollution, which is a regional treaty designed to tackle transboundary air pollution (see section 3(a)(i)). Similarly, some national provisions on transboundary air pollution, such as the US Clean Air Act, are limited by conditions of reciprocity (that is, provisions for cooperatively managing transboundary air pollution only apply if the relevant country from where pollution is arising has similar legal provisions).²²

Figure 9: National legal provisions for transboundary air pollution among countries surveyed



d. Other approaches to regulating air quality

Countries have varying approaches to regulating air quality. Some have regulatory schemes with AAQS at their core, whereas others rely on different forms of air quality control to address air quality (see Figure 10).

Figure 10: Delivery of air quality standards through law and policy



The regulatory and policy measures that might support the attainment of AQS in a robust system of air quality governance are, in some countries, the central plank of air quality law. These are often sectoral approaches to regulating air quality, and operate in lieu of AQS being embedded in law or a more comprehensive scheme of air quality governance. Some countries, depending on their political choices and major sources of air pollution, focus on the following as their core approach to regulating air quality in law:

- » regulation of vehicles (mobile point sources), as in Liberia;
- » regulation of industrial point sources (fixed point sources), as in Antigua and Barbuda, Belize, Dominica, and Malaysia;
- » environmental impact assessment of new polluting projects (fixed point sources), as in Sierra Leone;
- » regulation of smoke from fuel-burning and other discrete controls (fixed and mobile point sources), as in Namibia;
- » in many countries inspired by the original Soviet Union approach to ambient air pollution, charges on air pollution,²³ as in the Russian Federation,²⁴ Tajikistan, Turkmenistan and Uzbekistan.

As part of this approach of focusing air quality law on point sources, countries may also set "air quality standards" for industry or "legal air quality criteria" to use in permitting decisions,²⁵ but these should not be mistaken for AAQS that regulate the air anywhere in, or in a defined portion of, a country. These are point source controls or emission standards. The conceptual difference is important since these kinds of controls do not guarantee overall air quality.

Other countries have a range of regulatory schemes that sit alongside, and support, AAQS that are embedded in law. In this way, most countries have a scheme of industrial permitting to support attainment of AAQS.²⁶ Urban planning control can also be linked to applicable AAQS.²⁷ Smoke control areas are used in some countries to restrict the use of burning fuels that produce smoke in urban, and particularly residential, areas.²⁸ Other countries have innovative regulatory strategies, such as the use of an Air Quality Management Fund in the Philippines (funded by permit fees and pollution fines) to finance air pollution clean-up, containment and restoration operations.²⁹ Again, these air quality laws are part of a mix of national air quality laws and policies that support the achievement of good AQS.

Concern arises when different regulatory approaches to air quality overlap but are not aligned. For example, approaches based on AAQS and national emission ceilings (NECs) can both require the adoption of programmatic processes that replicate duties for governments without being fully consistent in terms of underlying air quality objectives. Requirements to plan can accumulate, increasing the administrative workload of public authorities. This is seen in Europe, where different national plans must be produced for both the achievement of AAQS under Directive 2008/50 and the attainment of the CLTRAP NECs, addressing overlapping pollutants, but with different regulatory approaches.

Other forms of collective emissions controls, such as "bubble" approaches (as in Trinidad and Tobago)³⁰ or "offset" market-based mechanisms (as in the US)³¹ also emanate from the existence of AAQS in some countries. The details of such mechanisms are not covered in this assessment.

Figure 11: A robustly framed air quality standards review process



e. Review and revision of air quality law

A robust system of air quality governance includes a clear air quality law review and revision process. This is because evidence about national air quality grows and changes over time through monitoring, as does scientific understanding about the effects of air pollution. Apart from in countries with no significant air pollution sources or problems, air quality law revision is inevitable in a system of air quality law focused on public health objectives. Legislative review and revision provide an opportunity for knowledge-sharing and continual improvement of air quality law.

The assessment shows that air quality legal frameworks are widely different today from when they were first adopted, suggesting that national air quality laws are at different states of revision globally. While some were recently overhauled (such as in Georgia),³² others date back decades (such as in the Gambia).³³

Many countries have completed, or are engaging in, processes for revising their air quality legislation. Revisions can overhaul air quality legislation entirely, or change only the content of an AQS without changing the main legal structure. In some cases, updating AQS is a regular process that is built into the air quality governance system.³⁴ In other cases, air quality law may be revised due to political pressure and changes in policy priority.³⁵ The revision process can be a sensitive issue, as seen in Chile with the intervention of the Supreme Court (see Box 8), or in Brazil with the intervention of the Deputy Attorney General on the constitutionality of the AQS revision process (see Box 9). Overall, the continual evolution of national air quality law is highlighted by the significant proportion of countries in which review or revision processes were under way at the time of the assessment (see Figure 12) or new or updated legal AQS are expected in the near future (see Figure 13).

Figure 12: Countries in which air quality law was being reviewed or revised at the time of assessment

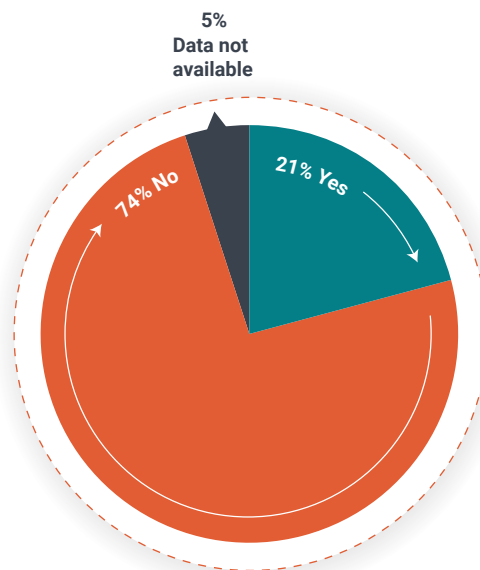
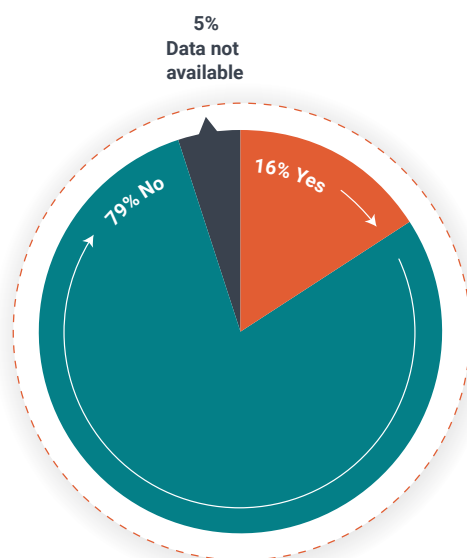


Figure 13: Countries in which new or updated legal air quality standards are expected in the near future, at the time of assessment



Chapter 4 Endnotes

1. For example, a landmark air quality case in the UK involved notable judicial reasoning on administrative law doctrine to hold the UK government to account for not meeting its air quality governance obligations set out in legislation: *R (ClientEarth) No 3 v Secretary of State for Environment, Food and Rural Affairs* [2018] EWHC 315 (Admin).
2. *European Parliament and Council Directive (EC) 2008/50 on ambient air quality and cleaner air for Europe* [2008] OJ L152/1.
3. For example, Case C404/13 *ClientEarth* [2014] ECLI:EU:C:2014:2382, para 58; Case C-723/17 *Craeynest and Others* [2019] ECLI:EU:C:2019:533, para 56; Case C-752/18 *Deutsche Umwelthilfe eV v Freistaat Bayern* [2019] ECLI:EU:C:2019:1114. See Misonne, D. (2020). Arm Wrestling Around Air Quality and Effective Judicial Protection: Can Arrogant Resistance to EU Law-Related Orders Put You in Jail? *Journal for European Environment & Planning Law* 17(4). 409-425. <https://doi.org/10.1163/18760104-01704004>; Misonne, D. (2021). The Emergence of a Right to Clean Air Transforming European Union Law through Litigation and Citizen Science. *Review of European Community and International Environmental Law*. (forthcoming).
4. Case C-644/18 *Commission v Italy* [2020] ECLI:EU:C:2020:895.
5. For example, Case C-237/07 *Janecek* [2008] ECLI:EU:C:2008:447; Case C404/13 *ClientEarth* [2014] ECLI:EU:C:2014:2382.
6. Case C-723/17 *Craeynest* (see no. 73); Case C-752/18 *Deutsche Umwelthilfe eV v Freistaat Bayern* [2019] ECLI:EU:C:2019:1114.
7. Case C-237/07 *Janecek* [2008] ECLI:EU:C:2008:447, para. 39 (European Court of Justice).
8. This is the case in the US, where standards are set by the federal EPA, and states are the primary actors for implementing these through State Implementation Plans (Clean Air Act). Canada and Australia have similar arrangements, albeit more bottom-up collaboration between states/provinces and the federal level to pool their policy competence and work together on air quality standards and policy.
9. In 2018, the UK was referred to the CJEU in ongoing infringement proceedings concerning breach of NO₂ limits (Case C-664/18 *Commission v UK*).
10. European Union (Withdrawal) Act 2018 (UK).
11. The Air Quality Standards Regulations 2010 SI 2010/1001 (England), reg. 26.
12. Environment Bill 2019-21 (England) schedule 11. <https://services.parliament.uk/bills/2019-21/environment.html>. <https://services.parliament.uk/bills/2019-21/environment.html>.
13. US Clean Air Act, sect. 110.
14. Many EU Member States do set more stringent standards, such as Austria and Sweden.
15. Most notable of these are the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (the Aarhus Convention), (1998), which entered into force on 30 October 2001, and potentially the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (the Escazú Agreement), which came into force in 22 April 2021.
16. (UNGA 2019). United Nations, *Issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment - Report of the Special Rapporteur, Human Rights Council, Fortieth Session, 25 February–22 March 2019* (A/HRC/40/55).
17. Boyd, D. R. (2012). The Constitutional Right to a Healthy Environment. *Environment: Science and Policy for Sustainable Development* 54(4), 3-15. <https://doi.org/10.1080/00139157.2012.691392>.
18. Vahlsing, C. and Smith, K.R. (2012). Global Review of National Ambient Air Quality Standards for PM₁₀ and SO₂ (24 h). *Air Quality Atmosphere & Health* 5, 393-399. <https://doi.org/10.1007/s11869-010-0131-2>, Table 4.
19. As noted earlier, a large number of countries in the world include constitutional guarantees on the environment and many of them also adhere to protection of procedural environmental rights (see section 6).
20. (Misonne 2021).
21. For an analysis of how this case has affected US regulatory practice, see Revesz, R.L. (2021). Bostock and the End of the Climate Change Double Standard. *Columbia Journal of Environmental Law* (in press).
22. US Clean Air Act, sect. 115.
23. These include charges on pollution within or above enterprise-specific limit values – “maximum allowable concentrations” – established in light of environmental quality standards.
24. The status of these charges was discussed before the Constitutional Court of the Russian Federation in 2002: see Organisation for Economic Co-operation and Development [OECD] (2004). *Reform of Pollution Charges in the Russian Federation: Assessment of Progress and Opportunities and Constraints for Further Improvement*. www.oecd.org/russia/34500191.pdf.
25. For example, Antigua and Barbuda: The Environmental Protection and Management Act 2019 (No 10 of 2019) sch VIII.
26. For example, Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) [2010] OJ L334/17.
27. The Netherlands has developed an array of specific approaches in this regard, including, in the past, offset mechanisms in relation to planning and AAQS, and currently, the need for projects to be tested against applicable AAQS, with exceptions made for a category of “projects not making a significant contribution to air pollution”.
28. For example, Clean Air Act 1993 (UK), part III.
29. Clean Air Act 1999 (Philippines), sect. 14.
30. Air Pollution Rules 2014, reg. 20(2) (Trinidad & Tobago).
31. US Clean Air Act, sect. 173.
32. The Ordinance of the Government N383, 27/0/2018 on approval Technical Regulation on Ambient Air Quality Standards (Georgia).
33. The Environmental Quality Standards Regulations 1999 (Gambia).
34. For example, in Australia, there is a statutory process for notifying that an AQS (as a National Environmental Protection Measure) is being varied, triggering a process of public consultation (National Environment Protection Council Act 1994 (Cth), sect. 20, and equivalent provisions in the corresponding Acts of Australian states and territories). This process has taken place periodically as part of the [Work Plans](https://www.environment.gov.au/protection/air-quality/national-clean-air-agreement) agreed by the Australian Government to work towards improving air quality based on evidence over time. See Australia, Department of Agriculture, Water and the Environment, National Clean Air Agreement. www.environment.gov.au/protection/air-quality/national-clean-air-agreement.
35. For example, in the UK in light of its withdrawal from the EU. See Environment Bill, schedule 11.

Establishing air quality standards in legislation

This section provides an overview of AQS in legislation across the 194 countries, and the EU, covered in the assessment. It considers a range of attributes relating to AAQS embedded in legislation: whether they exist at all, how they are promulgated, the process by which they are devised, their design, their level of ambition, and their extension to indoor air quality and newly emerging pollutants. In doing so, this global overview outlines a range of issues that influence whether AQS are adopted in legislation, and how this is done.

Appendix 1 contains a full list of legal instruments containing AAQS in individual countries globally. "Legal instruments" or "legislative instruments" refer to either primary or secondary legislation or policy/guidance documents empowered under a legislative provision. All of these types of legislative instruments contain AAQS, reflecting the diverse ways in which AAQS are embedded in national legislation.

a. Promulgation of national legislative ambient air quality standards

Whether or not countries have any AAQS adopted in a legislative instrument is a critical question in this assessment,

since it indicates whether AAQS are embedded in systems of national air quality governance.

This question is answered by determining whether AAQS are contained within a legislative instrument and, if so, what kind of instrument. The character of any legislative requirement can be relevant in understanding *how* AAQS are embedded within legal systems.

The majority of countries surveyed in the assessment have AAQS contained within a legislative instrument (see Figure 14, Figure 15 and Table 9). This indicates a global trend in legislating for AAQS. Table 10 shows more specific trends observable across different legal regions and national constitutional contexts. In particular, the EU,¹ UNECE² and the Arctic Council³ all have a very high incidence of legislative AAQS, reflecting the regional treaty (Convention on Long-Range Transboundary Air Pollution) and supranational legislation (Directive 2008/50) binding these States. Notably, civil law countries, and States with federal constitutional structures and constitutional guarantees relating to clean air, are also more likely to have legislated to entrench AAQS in law.

Figure 14: Percentage of countries with legislative instruments containing ambient air quality standards

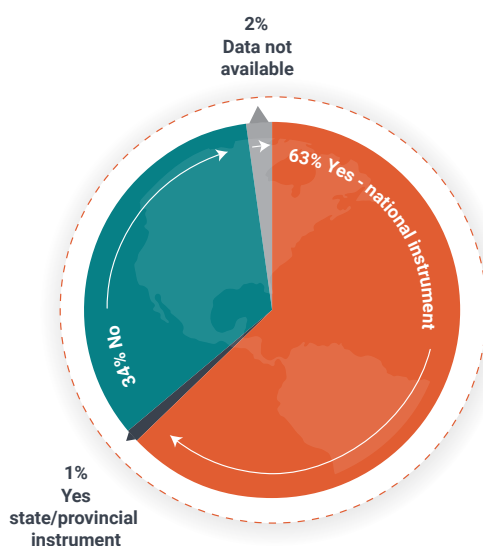
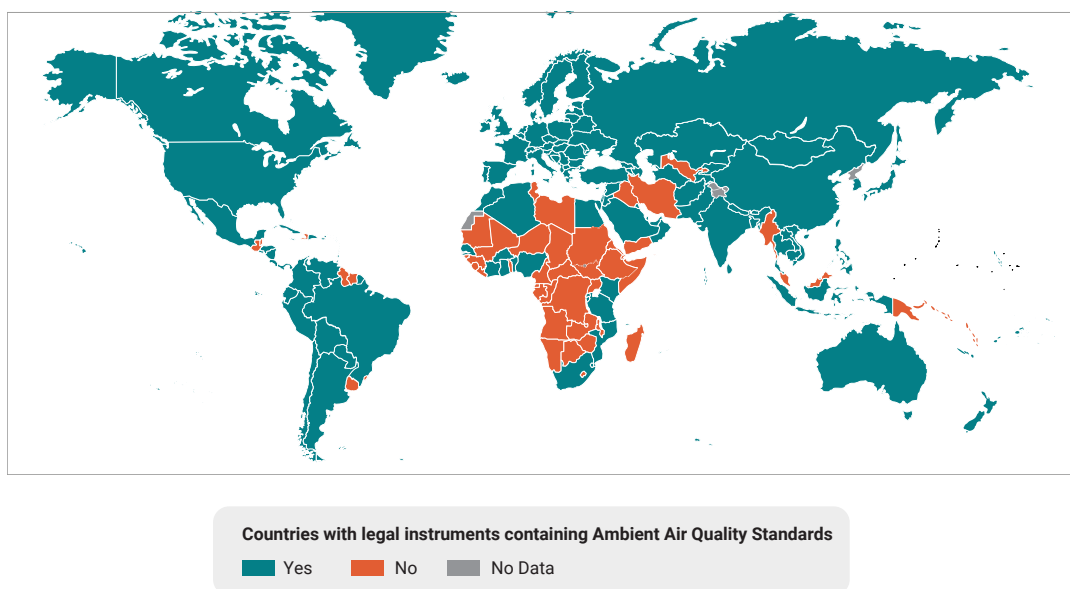


Figure 15: Countries with legislative instruments containing ambient air quality standards



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The boundaries and names shown, and the designations used, on this map do not imply official endorsement or acceptance by the UN Secretariat.

Table 9: Countries with legislative instruments containing ambient air quality standards

Africa	Asia and the Pacific	Western Asia	Latin America and the Caribbean	Europe	North America
Algeria Benin Burkina Faso Côte d'Ivoire Egypt Eswatini Gambia Ghana Kenya Mauritius Morocco Mozambique Nigeria Rwanda Senegal South Africa United Republic of Tanzania	Afghanistan Australia Bangladesh Bhutan Cambodia China Fiji India Indonesia Japan Lao People's Democratic Republic Micronesia (Federated States of) Mongolia Nepal New Zealand Pakistan Palau Philippines (the) Republic of Korea (the) Sri Lanka Thailand Timor-Leste Viet Nam	Bahrain Jordan Kuwait Lebanon Oman State of Palestine Syrian Arab Republic Qatar Saudi Arabia United Arab Emirates	Antigua and Barbuda Argentina Bolivia Brazil Chile Colombia Costa Rica Cuba Dominican Republic Ecuador El Salvador Honduras Jamaica Mexico Nicaragua Panama Paraguay Peru Trinidad and Tobago Venezuela (Bolivarian Republic of)	Albania Andorra Armenia Austria Azerbaijan Belarus Belgium Bosnia and Herzegovina Bulgaria Croatia Cyprus Czechia Denmark Estonia Finland France Georgia Germany Greece Hungary Iceland Ireland Israel Italy Kazakhstan Kyrgyzstan Latvia Liechtenstein Lithuania Luxembourg Malta Montenegro Netherlands North Macedonia Norway Poland Portugal Republic of Moldova Romania Russian Federation San Marino Serbia Slovakia Slovenia Spain Sweden Switzerland Tajikistan Turkey Turkmenistan Ukraine United Kingdom of Great Britain and Northern Ireland European Union (EU)	Canada United States of America

Table 10: Global trends in legislating for ambient air quality standards

		AAQS are found in a legislative instrument	
All countries		125	64%
Legal region	EU	30	100%
	Commonwealth	21	40%
	UNECE	55	96%
	ASEAN	8	67%
	The Arctic Council	8	100%
Type of legal system	Civil law	74	83%
	Common law	14	48%
	Religious law	4	57%
	Combined	33	47%
State constitutional arrangement	Unitary	102	63%
	Federal	21	75%
	Part of supranational region	37	100%
Regional framework agreement	Eastern Africa Regional Framework Agreement on Air Pollution (Nairobi Agreement)	2	25%
	Central and Western African Regional Framework Agreement on Air Pollution (Abidjan Agreement)	8	38%
	Southern African Development Community Regional Policy Framework on Air Pollution (Lusaka Agreement)	3	30%
	Regional Action Plan for Intergovernmental Cooperation on Air Pollution for Latin America and the Caribbean	4	33%
Constitutional guarantees		94	73%

b. Types of legislative instruments containing ambient air quality standards

Air quality legislation is often a multilayered body of laws, including some combination of:

- » primary legislation, such as Clean Air Acts (as in Cyprus, the Philippines and the US);⁴
- » secondary legislation containing AAQS adopted under more general primary legislation – often an Environmental Protection Act or similar (many countries adopt this model);
- » AAQS that are not themselves contained in legislation (e.g. contained in guidance) but which are created under a legislative framework. While such AAQS are contained in

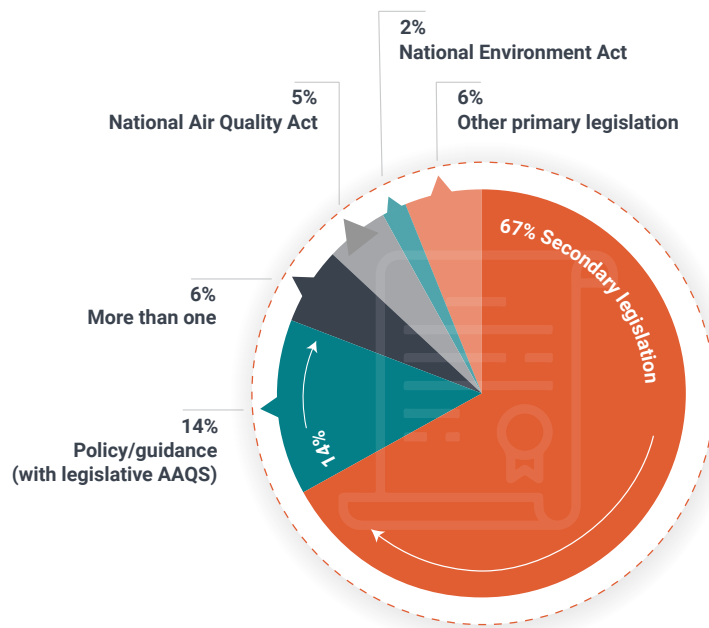
policy or guidance, they have some legal effect since they are empowered by legislation, so we have included these instruments as “legal instruments” for the purpose of this assessment.

Air quality governance – and its effectiveness – will vary depending on how AAQS are framed in legislation. In particular, secondary or delegated legislation is widely used to promulgate AAQS (see Figure 16). Using secondary or delegated legislation to embed AAQS has advantages: it allows detailed technical information not normally found in primary legislation to be set out, and greater flexibility in the updating of requirements over time. Both of these are important for incorporating AAQS in law and keeping them up to date with the latest scientific thinking.

However, there are also risks associated with the use of secondary legislation:⁵ it may be subject to less robust scrutiny in its creation, it is at greater risk of repeal or regressive revision than primary legislation, and it needs to be well designed within a wider legislative scheme to create a robust system of air quality

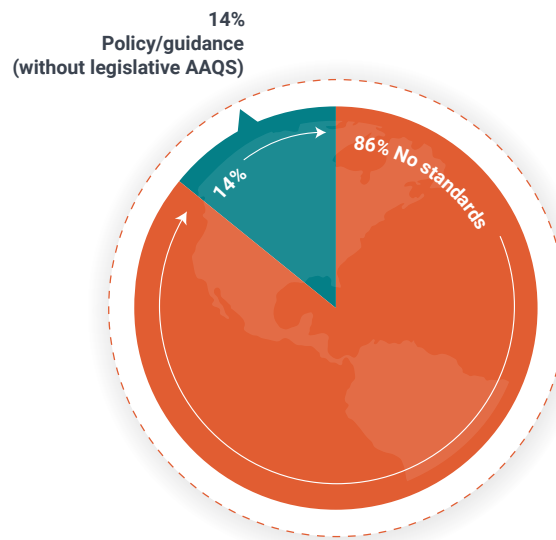
governance. In particular, powers to create AAQS in secondary legislation are not always linked to legal obligations on the State to achieve these standards, monitoring requirements, or sanctions for non-compliance with AAQS, as subsequent sections of this report demonstrate.

Figure 16: Types of legislative instruments within national air quality governance systems promulgating ambient air quality standards



While legislating for AAQS may be a global trend and ambitious AAQS are central to a robust system of air quality governance, there are several reasons why AAQS are not adopted in or under legislation in some countries (see Figure 17). These include:

- » There is no perceived or identified air quality problem and thus no political necessity to legislate in this area (e.g. in Brunei Darussalam, Marshall Islands, Saint Kitts and Nevis, and Tonga).
- » AAQS are included in policy/guidance only (e.g. in China, Ethiopia, Guinea, Malaysia, Myanmar and Singapore). AAQS in policy/guidance may provide practical guidance for national air quality policy and sectoral regulation, but are of limited help with regard to ensuring citizen rights relating to air quality or in establishing legal certainty for operators.
- » Legislative powers to adopt AAQS exist but have not yet been exercised. This was the case in 31 per cent of the countries surveyed, indicating that the legislative frameworks for air quality governance are not yet being fully utilized. This often occurred when the task to adopt AAQS was left to a Minister alone without a more detailed administrative process being prescribed.
- » Adopting AAQS in or under legislation is currently being contemplated (e.g. in Cameroon, Ethiopia, Monaco, Saint Lucia and Sierra Leone).
- » Air quality law is needed but not yet established and there are no powers for adopting AAQS.

Figure 17: Breakdown of countries without legislative ambient air quality standards

c. Law-making processes for adopting ambient air quality standards

The diverse forms of legislative instruments adopting AAQS (primary or secondary legislation, or guidance) outlined in the previous section indicate that a range of actors are involved in the determination of AAQS, from legislators to Ministers to other executive actors. These different actors are associated with different legislative and executive processes for the creation of AAQS. In relation to executive processes in particular, which are commonly used to set AAQS (due to heavy use of secondary legislation), there may be a wide range of approaches to setting AAQS.

In many countries, standardization bodies play an important role in the determination of applicable AAQS. Standardization bodies are created to adopt agreements on voluntary technical standards and usually involve industrial interests. They can produce standards that are not necessarily available to the public and not necessarily adopted with the participation of a wide range of informed actors (civil society, academia etc.). However, most countries relying on this kind of mechanism have hybrid regimes with more participatory approaches to standard-setting, in which standards produced by standardization bodies are mandated by governmental authorities and involve a broader constituency of stakeholders, with resulting texts being made publicly and freely available.⁶ Similarly, in Nicaragua, within established deadlines, interested parties can submit their

comments on the draft of the mandatory standard establishing the maximum permissible limits for air quality before the President of the National Standardization Commission orders its publication.⁷

Law-making processes can be important in determining why national legal AAQS do not always reflect the highest scientific standards for air quality. For example, public health interests may not be systemically represented.⁸ In fact, the national legislative framework cites a mandatory role for interdisciplinary assessment or various kinds of expertise in setting AAQS in only 30 per cent of countries assessed. Such interdisciplinary assessment may occur in practice, but the relative lack of legislative requirements in this respect, for instance in relation to epidemiological studies, is notable and may affect the level of ambition in setting some AAQS.

Another way in which processes for setting AAQS can be constructed to prioritize public health objectives is by requiring consideration of global standards. In 11 per cent of legal regimes on AAQS, there is a direct reference to WHO guidelines. Such references may also be required through administrative law doctrine (see Box 8).

Box 8: Chile case study – legal requirements for informed process of setting and reviewing ambient air quality standards

In a judgment of 30 September 2015, the Supreme Court of Chile considered the process of revising AAQS and declared that a standard that had been in force for almost 20 years, at the national level, should not be withdrawn without an adequate policymaking process. The Ministerial Decree of 2013, which established the new standards, was found to be illegal due to a lack of appropriate justification for establishing the new standard on fine particulate matter at a certain level. Of particular relevance was the lack of essential reference in the Decree to documents such as the WHO guidelines, the European Directive 2008/50 or related US AAQS.⁹

In another case, the Supreme Court required applicable environmental standards (primary and secondary AQS) to be reviewed, based on the right to live in an environment free of contamination and the right to life.¹⁰

d. Design of legal ambient air quality standards

AAQS can be designed in legislation in different ways, which will influence their stringency and how focused they are on achieving public health objectives. Some variations in designing standards relate to the following factors:

Quality metric: All AAQS are concentration-based standards. Most AAQS simply set a limit for the overall concentration of pollutants in the ambient air, following the model of the WHO air quality guidelines. One limitation of designing AAQS in this way is that they can act as “pollute up to” levels, which do not incentivize improving air quality over time. However, some AAQS use a more nuanced metric of quality, most notably exposure-based standards, which account for how many people are exposed to a defined concentration of pollution. This kind of standard is important when considering how to protect vulnerable populations from air pollution. Exposure-based standards exist

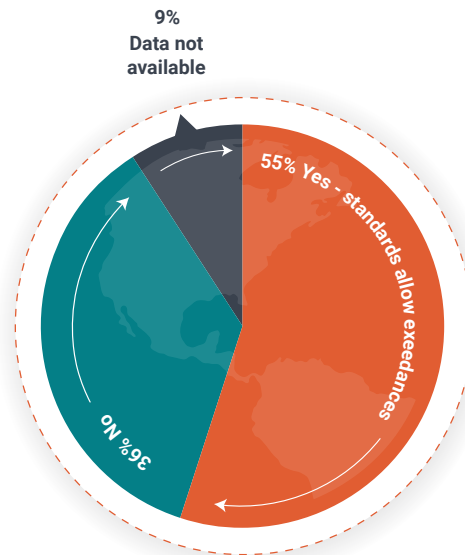
in EU law for PM_{2.5} (a “national exposure reduction target” based on a baseline “exposure concentration obligation”)¹¹. In this way, AAQS that are sensitive to population density also require continual improvement in air quality.

Timing: Some AAQS are to be met now; others are to be met in the future. The latter kind are often referred to as “targets” or “long-term objectives”. For example, under Israeli law, there are target values “whose exceedance constitutes potential danger or harm to the life, health and quality of life of human beings, to property and to the environment” and which should be “striven to achieve as a target” in setting programmes of action on air quality.¹² In Colombia, targets are divided into immediate ones (in force since 2018) and those that must be achieved by 2030.¹³

Geographical coverage: Some AAQS only cover a defined area (such as those of Argentina)¹⁴ rather than the entire country. The most common type of geographical differentiation for AAQS is in relation to industrial areas, residential areas and sensitive areas (such as national parks), with more stringent standards applying to the latter areas.¹⁵ This approach risks leaving remaining areas without adequate protection against air pollution, and, in the case of more lenient standards applying in areas such as heavily industrialized zones, AAQS effectively act as controlled authorization to pollute up to a certain level. This is problematic when one of the main characteristics of air pollution is that it does not remain within given zones or territories, but moves (even if there are dispersal effects). Notably, this approach is being phased out in some countries, such as India,¹⁶ reflecting the difficulty of avoiding pollution spillover between geographical areas and the need to avoid discriminatory application of health protections. Another example of geographical limits on AAQS is seen in Kenya with the notion of “boundary standards”, which apply at the boundary of properties.¹⁷

Exceedances/margins of tolerance: Figure 18 shows that the majority of countries with legal AAQS allow routine exceedances without these constituting a formal breach of the standards. This design feature can disguise non-compliance with ideal AAQS if set sufficiently generously. Some countries seek to reduce allowed exceedances over time, such as Turkey, whose air quality law requires that margins of tolerance in meeting limit values decrease over time.¹⁸

Figure 18: Percentage of countries with legal ambient air quality standards that allow exceedances



A drawback in the design of legislative AAQS globally is their complexity. This is problematic for public authorities (difficulty managing the link between standards and sources), for the general public (difficulty understanding the air quality people should enjoy, in light of various tolerances and exceptions), and for all economic operators (the flexibility of AAQS levels is a source of legal uncertainty and of possible competitive disadvantage). By contrast, unqualified WHO guideline values are universal in application and a clear reference point for AQS.¹⁹

It is also worth noting that, despite evidence that air pollution can affect men and women differently, particularly in low- and middle-income countries (see section 5(f)), the assessment found no differential references to air pollution impacts by gender in the setting of specific AQS in legislation.

e. Level of ambition of legal ambient air quality standards

The level of ambition of legal AAQS can vary significantly. The level of ambition can be affected by the design of standards, as set out in the previous section, but it is also a result of the decisions made in the standard-setting process (see section 5(c)) about the concentration limit for a particular pollutant. As Figure 19 shows, WHO air quality guideline concentration limits are legally incorporated in only a minority of countries globally, and the adoption of the guidelines varies by pollutants. For

example, the WHO air quality guidelines for NO₂ are more likely to be adopted in law than those for ozone. The results for PM_{2.5} are set out separately in Figure 20 since the incorporation of WHO standards for this pollutant has been noted as an issue of particular concern in air quality policy globally.²⁰ Around 9 per cent of countries have AAQS for PM_{2.5} that meet the WHO air quality guidelines, and in some of these countries, legally binding standards for PM_{2.5} have been introduced, such as South Africa.²¹

Interestingly, not one country has legally incorporated all WHO air quality guidelines investigated for this assessment other than Timor-Leste, which adopts the WHO guidelines as standards by default.²² This raises questions regarding the level of ambition for legal AAQS globally, and whether they are sufficiently focused on protection of public health. Most legal regimes appear to fix their thresholds within the context of a fossil-fuel economy, accommodating certain levels of production of SO₂, NO₂, PM₁₀ and ozone. This explanation is especially relevant when considering the interaction between air quality law and climate law: global climate policy commitments can be achieved by shifting to “clean” modes of energy generation, which would be supported by more stringent SO₂ and NO₂ standards.

Figure 19: Legal incorporation of 2005 WHO air quality guidelines in national ambient air quality standards

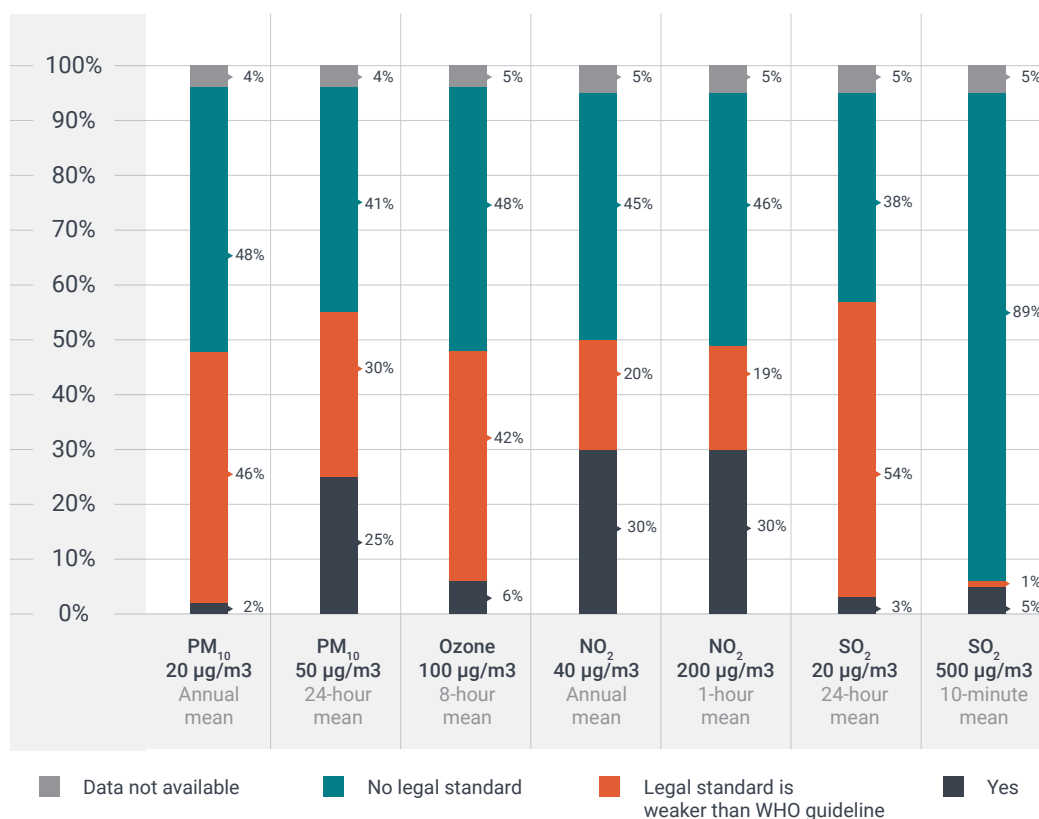
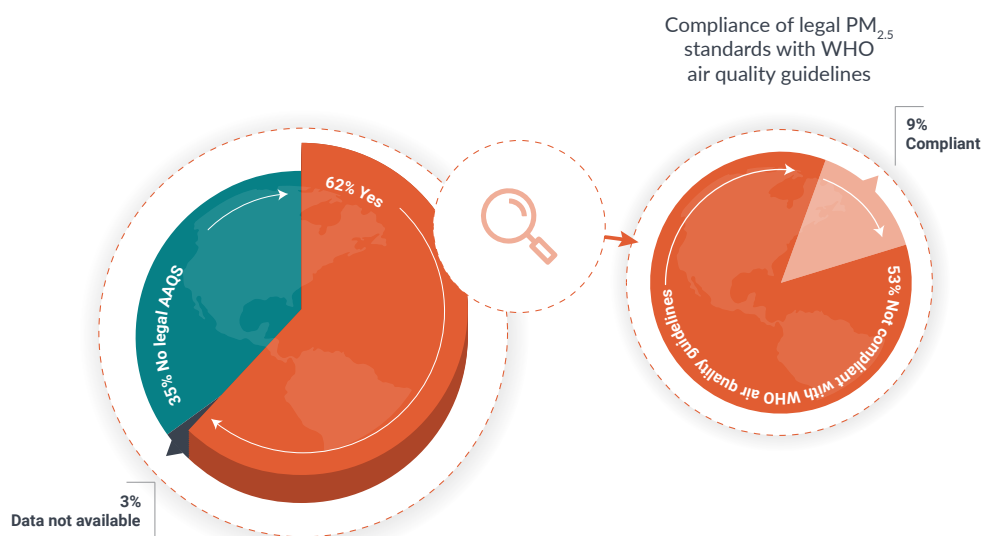


Figure 20: Legal incorporation of WHO air quality guidelines for PM_{2.5} in national ambient air quality standards



These headline figures tell us something, but not everything, about national progress in embedding good AQS with legislation. There are reasons why ambitious WHO-compliant standards are adopted. In some countries, political will inspires national governments to go further than expected or required: some EU Member States have adopted WHO-compliant standards despite this not being required under EU Directive 2008/50.²³

There are also a range of reasons why WHO air quality guidelines are not incorporated in legal AAQS, as the WHO 2005 guidelines themselves admit:²⁴

- » Countries are focused on embedding WHO interim guideline values, and are planning a process of increasing ambition over time (e.g. Mauritius and Mexico).
- » WHO air quality guidelines are legally incorporated in target values (future standards) rather than in AAQS that apply currently (e.g. Israel), again setting in law a trajectory towards WHO-compliant standards.
- » Air quality guidelines are adopted as legally binding standards for some pollutants but not others. This is apparent from Figure 19 and reflects the fact that guidelines for some individual pollutants are harder to achieve, or are less of a political priority.
- » The focus of a legal regime for air quality is on establishing a system of air quality governance with substantive administrative requirements (see section 6) rather than on embedding all WHO air quality guidelines in law. The level of ambition is thus more accurately reflected in the governance arrangements set up by legislation (as in Israel, the US and the EU). Conversely, some countries may have ambitious WHO-compliant standards without the necessary administrative machinery to support their implementation. In this way, some WHO-compliant AAQS may be more “legally binding” than others in a holistic assessment of air quality governance.
- » Lack of prioritization of public health in air quality law.

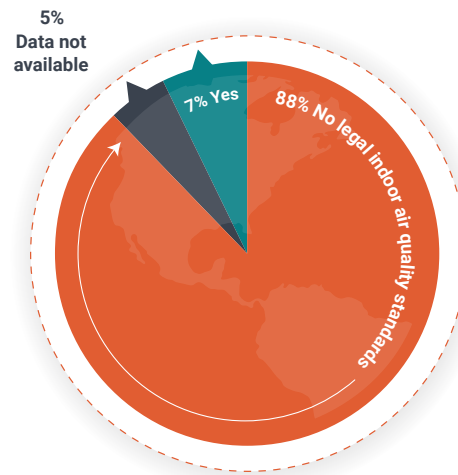
This assessment did not determine whether the margin of non-compliance with WHO air quality guidelines was large or small. There were, however, some trends. For example, many countries adopt a standard of 120 micrograms per cubic metre of air ($\mu\text{g}/\text{m}^3$) instead of $100\mu\text{g}/\text{m}^3$ for ozone (as an 8-hour mean). By contrast, some margins of non-compliance were much higher – by up to ten times in some cases – regarding SO_2 and NO_2 standards. Given that SO_2 is a pollutant that predominantly arises from burning fossil fuels in power plants and other industrial installations, this larger margin permits national reliance on heavily polluting industry such as coal-powered facilities.

f. Air quality standards for indoor air pollution

Ambient air is conventionally expressed as outdoor air. As the COVID-19 crisis showed, this limited scope exposes a false binary between outdoor and indoor air.²⁵ However, national air quality legislation still tends to approach air quality control in this way.

The WHO guidelines for indoor air quality set out a series of concentration-based standards for common indoor air pollutants.²⁶ These guidelines were produced as “a scientific basis for legally enforceable standards”,²⁷ and were recognized as important due to the significant risk to public health posed by indoor air quality in low-, middle- and high-income countries, given the high proportion of time that people spend in buildings. This is particularly the case for women and children who are involved in daily cooking and other domestic activities.²⁸

However, only a minority of countries have dedicated legal standards for indoor air pollution (see Figure 21). Most IAQS apply to workplaces (such as those of Antigua and Barbuda, Kenya and Kuwait) or are also established for fitness checks in housing for public health reasons (such as those of Belgium). Regarding workplaces, the Environmental Management and Co-ordination (Air Quality) Regulations of Kenya provide “occupational air quality limits” that require the occupiers or owners of workplace premises not to exceed exposure limits set out in relevant workplace safety legislation or manufacturer guidelines.²⁹

Figure 21: Percentage of countries with legal indoor air quality standards

An interesting example of a country where IAQS apply more generally is the UAE. Alongside workplace IAQS, there are requirements for closed and semi-closed “public places”;³⁰ they must have adequate means of ventilation, as appropriate to the premises, to “ensure the renewal of air, its freshness, and appropriate temperature.”³¹ The UAE indoor air quality regime also recognizes the movement of air pollution from indoor to outdoor environments: workplaces are required to maintain indoor ventilation systems, but these must only allow emission of air pollutants (to the outside air) within specified limits.³²

Similarly, in Belgium, the Brussels-Capital Region defines indoor air pollution as the poor air quality within closed spaces, with the exception of that contained in workplaces to which the occupational health and safety provisions apply.³³ Also in Belgium, the Walloon Region has a legislative act entirely dedicated to indoor air pollution, with indoor air meaning indoor air within a closed space, whatever its source, but excluding workplaces.³⁴ In Bolivia, as in many countries, the regulation on AAQS contains provisions on the prohibition of smoking in educational and health establishments.³⁵

These national regimes for IAQS are different from AAQS in several key respects. Most significantly, it is possible to frame requirements for IAQS as an obligation on the owner or occupier of the relevant indoor premises. Premises that are regulated

(workplaces being the most obvious example) provide an extant legal framework within which to impose air quality controls. This contrasts with AAQS which relate to “unowned” air and for which there is no readily identifiable individual to carry legal responsibility.

Regulating indoor air quality, however, raises the challenging question of how it might be controlled on private premises. In many countries, the State is unwilling or unable to control air quality within domestic or other private, unregulated settings. Monitoring indoor air quality levels in private settings is a challenging task for any State, and without monitoring, it is impossible to know whether levels are safe. At the same time, regulating indoor air quality in domestic spaces is important (particularly where domestic cooking infrastructure is heavily polluting, such as in low- and middle-income countries,³⁶ or in relation to the impact of new materials) and increasingly so in light of shifts to increased home-working during the COVID-19 pandemic.³⁷

Some countries get around these monitoring or implementation challenges by adopting general regulations that control sources of indoor air pollution. For example, by designating “smoke control areas” in urban areas, the UK has effectively banned domestic burning.³⁸ In Belgium (the Walloon Region), the Government restricts the use of certain products inside a public

building or specific private space, and imposes controls on the functioning of devices that can have an impact on ambient air.³⁹ In Nigeria, comprehensive legal AQS apply to indoor spaces, including both homes and offices.⁴⁰ Meanwhile, Canada⁴¹ and Germany⁴² have developed IAQS for domestic settings, although these are guidelines rather than legal standards.

It should be noted that some countries have powers to regulate indoor air quality that have not yet been exercised, such as Sierra Leone and the Gambia. In Vanuatu, the Minister has the power to make regulations providing for the prevention of indoor air pollution from open and closed fires and stoves.⁴³

Chapter 5 Endnotes

1. As at 10 May 2021, the following countries are members of the EU: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden. See European Union, Countries. https://europa.eu/european-union/about-eu/countries_en.
2. As at 10 May 2021, the following countries are Members of UNECE: Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Republic of Moldova, Romania, Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, UK, USA and Uzbekistan. See UNECE, Member States and Member States Representatives, 28 April 2021. <https://unece.org/member-states-and-member-states-representatives>.
3. As at 10 May 2021, the following countries are Members of the Arctic Council: Canada, Denmark, Finland, Iceland, Norway, Russian Federation, Sweden and USA. See Arctic Council, About the Arctic Council. <https://arctic-council.org/en/about/>.
4. Clean Air Act 1999 (Philippines); Clean Air Act 42 U.S.C. §7401 et seq. (1970) (US); The Air Quality Law of 2010 (Law 77(I)/2010) (Cyprus). Some countries are working towards a major clean air act, such as Bangladesh and Viet Nam.
5. Scotford, E. and Robinson, J. (2013). UK Environmental Legislation and its Administration in 2013: Achievement, Challenges and Prospects. *Journal of Environmental Law* 25(3), 383-409. <https://doi.org/10.1093/jel/eqt023>.
6. Mexico is one such country: related official Mexican Standards (NOM-022-SSA1-2019, NOM-023-SSA1-1993, NOM-020-SSA1-2014, NOM-025-SSA1-2014, NOM-025-SSA1-2014) are published by the Ministry of the Environment: see www.semarnat.gob.mx/gobmx/biblioteca/nom.html. Art. 116 of the Environmental Act (2014) (Vietnam) provides that "whole or part of the environmental technical regulations becomes compulsorily applicable when it is cited from legal documents and environmental technical regulations."
7. Nicaragua, Ley N°217, 'Ley General del Medio Ambiente y Los Recursos Naturales' (2014) title IV.
8. Kutlar Joss *et al.*, "Time to harmonize national ambient air quality standards".
9. Supreme Court of Chile. *Fernando Dougnac Rodríguez & ors*, 30 September 2015, 1.119-2015.
10. Supreme Court of Chile. *Punchunkavi case*, 28 May 2019, 830-2005. www.diarioconstitucional.cl/wp-content/uploads/5010/320/1559321846.pdf
11. Directive 2008/50, art 15.
12. Clean Air (Air Quality Values) Regulations (Temporary Provision) 5771-2011 (Israel).
13. Resolución n° 2254 de 2017 (Colombia).
14. Decreto n° 198/006 BOCBA N° 2394 (2006), Reglamenta la Ley N° 1.356, Anexo III (air quality standards) applies to Buenos Aires.
15. This is the case in Bhutan, China and Kenya: Environmental Standards 2020 (National Environmental Commission - Royal Government of Bhutan) (sensitive areas include natural parks); GB 3095-2012 (2012) (China) (Class I standards apply to natural parks); The Environmental Management and Co-ordination (Air Quality) Regulations 2014 (Kenya) schedule 1.
16. A 2009 notification for residential, industrial and rural area limits ended the practice of less stringent limits for industrial zones, but higher standards for NO₂ and SO₂ have been maintained for ecologically sensitive areas notified by the Government.
17. The Environmental Management and Co-ordination (Air Quality) Regulations 2014 (Kenya), reg. 20.
18. Air Quality Assessment and Management Regulation 2008 (as amended) (Turkey).
19. French Agency for Food, Environmental and Occupational Health & Safety (2017). *Les Normes de Qualité de l'Air Ambiant [Ambient Air Quality Standards]*. www.anses.fr/en/system/files/AIR2016SA0092Ra.pdf.
20. UNEP (2016). *Actions on Air Quality*. www.unenvironment.org/resources/assessment/actions-air-quality, 8.
21. National Ambient Air Quality Standards for Particulate Matter with Aerodynamic Diameter less than 2.5 micron metres (PM_{2.5}) 2012, updating National Environmental Management: Air Quality Act 2004 (Act 39 of 2004) (South Africa).
22. Basic Environmental Act of 2021, art. 67 (Timor Leste). See also Myanmar, where the WHO air quality guidelines have been adopted as default standards in policy only: National Environmental Quality (Emission) Guidelines (29 Dec 2015) (Myanmar).
23. For example, Austria, Scotland and Sweden.
24. See section 3(b)(i).
25. Scotford, E. (2020). Rethinking Clean Air: Air Quality Law and COVID-19. *Journal of Environmental Law* 32(3). <https://doi.org/10.1093/jel/eqaa027>.
26. Benzene, carbon monoxide, formaldehyde, naphthalene, nitrogen dioxide, polycyclic aromatic hydrocarbons (especially benzo[a]pyrene), radon, trichloroethylene and tetrachloroethylene: WHO (2010). WHO Guidelines for Indoor Air Quality: Selected Pollutants. World Health Organization <https://www.euro.who.int/en/health-topics/environment-and-health/air-quality/policy/who-guidelines-for-indoor-air-quality/chemical-indoor-air-pollutants-selected-pollutants-2010/who-guidelines-for-indoor-air-quality-selected-pollutants>
27. *Ibid.*, p. xvi.
28. WHO (2016). *Burning opportunity: clean household energy for health, sustainable development, and wellbeing of women and children*, p. ix. World Health Organization. <https://apps.who.int/iris/handle/10665/204717>
29. The Environmental Management and Co-Ordination (Air Quality) Regulations, part VII.
30. Defined as "[t]he place prepared for the reception of the public or a certain category of people for whatever purpose" (Cabinet Decree (12) of 2006 regarding The Regulation Concerning the Protection of Air from Pollution (UAE), art 1.).
31. *Ibid.*, art. 13.
32. *Ibid.*, art. 12.
33. Brussels Code on Air, Climate and Energy (2013) art. 3.1.1.

34. Decree on Indoor Air (2019) (Walloon Region).
35. Bolivia, Reglamento en Materia de Contaminación atmosférica (1995), arts. 57–59. <https://bolivia.infoleyes.com/norma/2227/reglamento-en-materia-de-contaminación-atmosférica-rmca>.
36. WHO (2014). *Guidelines for Indoor Air Quality: Household Fuel Combustion*. Geneva: World Health Organization. <https://www.who.int/publications/i/item/9789241548885>; see also (WHO 2010).
37. Scotford, E. (2020). Rethinking Clean Air: Air Quality Law and COVID-19. *Journal of Environmental Law* 32(3). <https://doi.org/10.1093/jel/eqaa027>.
38. For example, Clean Air Act 1993 (UK), part III.
39. Target values and intervention values are established for assessment purposes, in public buildings or social housing, and made upon medical advice only: Decree on Indoor Air (2019) (Walloon Region).
40. The National Environmental (Air Quality Control) Regulations 2014 (Nigeria), schedule XI and XII.
41. Health Canada (2020). Residential Indoor Air Quality Guidelines. www.canada.ca/en/health-canada/services/air-quality/residential-indoor-air-quality-guidelines.html.
42. The Indoor Air Hygiene Commission (IKR) has developed guidelines concerning indoor air hygiene: see Umweltbundesamt, Indoor Air Hygiene Commission", 10 January 2019. www.umweltbundesamt.de/en/topics/health/commissions-working-groups/indoor-air-hygiene-commission.
43. The Public Health Act 1994 (Vanuatu), art. 94.

Implementing and administering ambient air quality standards

Legislative AAQS give rise to a range of legal obligations (see Figure 22). The nature of these obligations will determine how legally binding AAQS are and how well they are embedded as part of a robust air quality system. In particular, it is important to determine on whom obligations are imposed and what those

obligations require in relation to AAQS. This section explores the range of legal obligations to which legislative AAQS give rise, from having no clear legal effects, to imposing obligations on the State to achieve AAQS as binding obligations of result (environmental quality outcomes that must be achieved).

Figure 22: Legislative requirements for air quality governance



AAQS are also implemented by a range of legal measures that establish an administrative framework for air quality governance. These include monitoring requirements, rights to participate in air quality planning, rights to information about air quality, and importantly, enforcement mechanisms. Other important administrative arrangements include coordination of AAQS with other legal regimes (such as permitting regimes) and legislative frameworks to coordinate policy in order to support the attainment of AAQS. Together with the legislatively prescribed standards themselves, these legislative measures entrench AQS within government processes and foster their implementation in practice.

a. Implementing ambient air quality standards: Legal responsibility

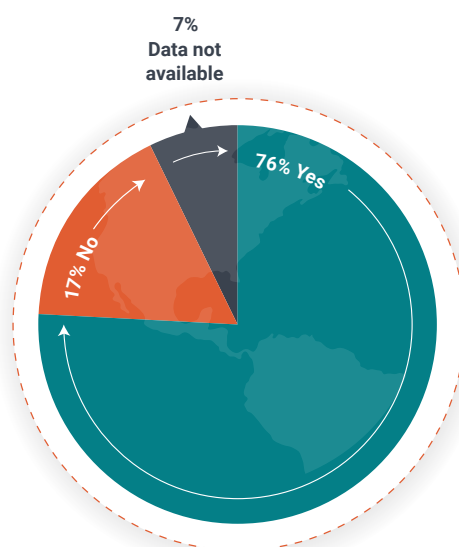
i. Obligations on the State

In a robust system of air quality governance, there should be some obligations on the State in relation to the implementation and/or achievement of legal AAQS. This is partly due to the fact that ambient air is a public good and there are no individual “owners” of air at large who can be regulated and required to control it. It is also due to the fact that sources of air pollution are diverse and dispersed, meaning that the State plays an important

coordination function in controlling these diverse sources to achieve the overall environmental outcomes required by AAQS. It is problematic for robust air quality governance if there is no institutional responsibility for air quality outcomes, and Figure 23

shows that this is recognized in most air quality regimes globally. However, at least 17 per cent of countries impose no obligations on the State in relation to legal AAQS.

Figure 23: States with institutional responsibility of any kind for legal ambient air quality standards



Obligations on the State may take different forms, which reflects a spectrum of stringency and the range of actions that States can take to ensure AAQS are met. At the most stringent end of the scale, the State may be legally obliged, without exception, to ensure that AAQS are met (this is the case for the EU and the Gambia).¹ This provides a strong legal basis for ensuring that States are held to account if AAQS are not met. A duty to make best efforts to reach AAQS is a less stringent form of this legal obligation, or any obligation less than this, and weakens the enforceability of standards.

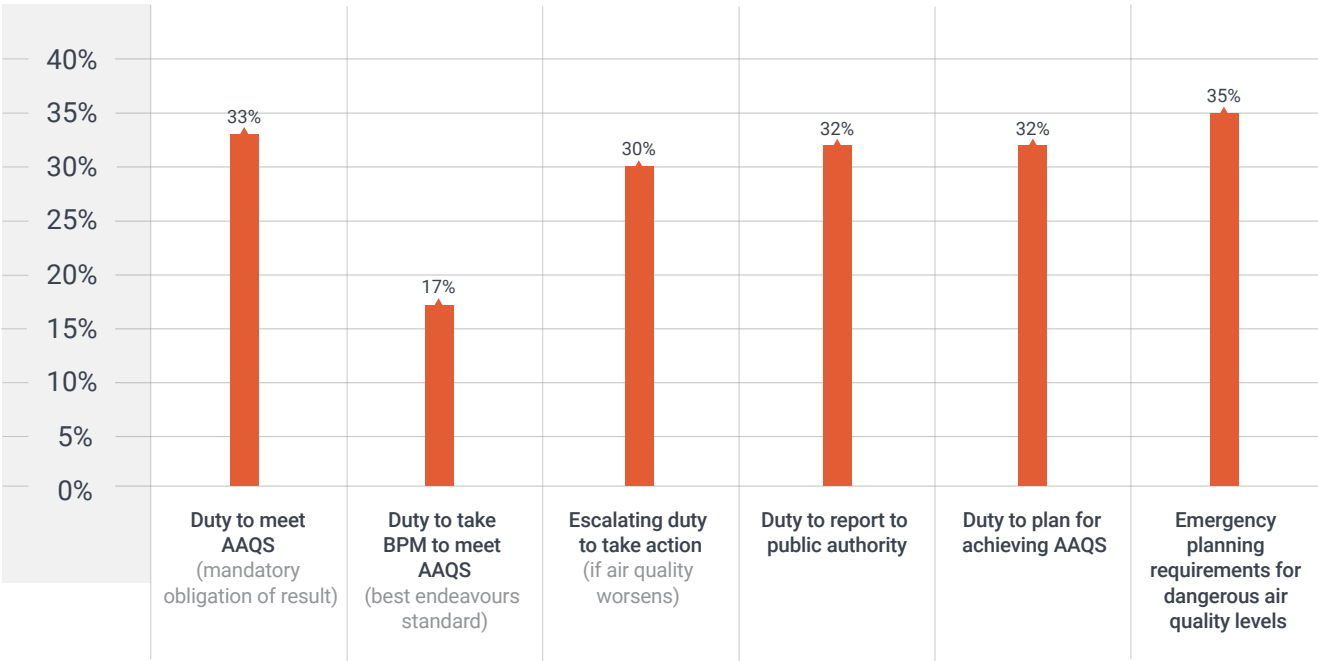
Another type of obligation on the State is the requirement to take action if AAQS are not being met. Common types of this kind of obligation include:

- » escalating duties to take action (as in Switzerland, where there is a phased approach to meeting AAQS);²
- » duties to report to a public authority, which includes reporting to a government agency (as in Australia)³ or to a legislature (as in the Philippines);⁴
- » duties to plan for achievement of AAQS (either nationally or locally or within specific zones);⁵

- » emergency planning requirements when air quality reaches dangerous levels (as in the United Republic of Tanzania where an "emergency prevention order" may be issued).⁶

Figure 24 shows that these different obligations to take action are similarly common obligations on States. Of these, the duty to plan to meet AAQS is a notable obligation which can be a powerful legal requirement, depending on its legislative construction. It is particularly powerful when combined with a binding obligation on the State to achieve AAQS. In EU Member States, the stringent legal duty to plan, under Directive 2008/50, when AAQS ("limit values") are not met has put real pressure on national governments to reach those standards (for instance by introducing low emissions zones), since it is framed as a requirement to plan to bring zones in which values are exceeded into compliance with AAQS in as short a time as possible.⁷ Similarly, Israel's air quality planning requirements require the setting of AAQS targets within a specified time period and the articulation of ways and means to achieve this, with sanctions (including fines) imposed if lawful plans are not devised or implemented (see section 6(c)(i)). These kinds of stringent planning requirements, which impose duties on the State to adopt meaningful air quality policy measures, can be contrasted with more lenient duties to plan to "contribute to" or "act in pursuit of" the achievement of AAQS.⁸ Figure 24 does not differentiate between the various possible types of plan-making obligations.

Figure 24: Legal obligations on the State in relation to legislative ambient air quality standards



ii. Obligations on individual entities

A significant number of countries take an individualized approach to implementing AQS; this might be understood as “privatization” or “individualization” of AQS. Rather than setting national AAQS that apply across the entire country and are enforceable against the State, AAQS apply only to individual installations or operators. In this way, AAQS are used as a basis for permitting individual installations or for the legal use of vehicles, for example. These kinds of AAQS are effectively a form of emission standards being used as proxy quality standards. In terms of the air quality governance system in Figure 1, individualized regulatory mechanisms (in black) are the primary site of legal obligations relating to AAQS.

The picture is further complicated when determining whether regulatory schemes such as permitting regimes are directly linked to the achievement of AAQS. This can be difficult due to variable definitions of “air quality standards”. Some legal standards relevant in the operation of regulatory regimes are indeed national AAQS, while others are in fact emission limits that apply to individual installations.⁹

The relationship between regulation of individual actors/ installations and AAQS ultimately depends on the details of the legislative framework. A distinction can be drawn between:

- * countries in which there are legal AAQS (relating to the ambient air at large and expressed in legal form) and the only – or main – legal obligations that relate to them are obligations on individual entities;
- * countries in which permitting regimes on individual operators/sources are the primary regulatory strategy but which are not legally linked to any AAQS (such as Ghana).¹⁰ In these cases, the regulatory focus is on legal emission limits for key air pollutants from stationary sources, which operate through licensing as a form of industrial pollution control.

Some countries in category A are explored in Table 11. Their air quality laws are deliberately designed to implement legal AAQS through individualized obligations.

Table 11: A sample of countries with legal ambient air quality standards that give rise only or primarily to individualized legal obligations

Country with legal AAQS	Individualized obligations
Antigua and Barbuda	Test of causation effectively converts emission standards into AAQS ("A point source or a non-point source of an air polluting substance should not, in isolation or combination with any other source(s) of that substance, cause a concentration of that substance in the ambient air around any premises used primarily for residential purposes to exceed the [relevant AAQS]"). ¹¹
Bangladesh	National AAQS must be complied with by relevant industries, projects and motorized vehicles. ¹²
Fiji	Individual emitters of pollution may work together (self-regulate) to reduce emissions if these are jointly causing a breach of AAQS in a residential area; otherwise a regulator may impose individual emissions reductions on each facility. ¹³
Jamaica	Complex obligations are imposed on individual polluting installations through a licensing regime requiring modelling and monitoring if AAQS are being exceeded or likely to be exceeded. Permitting decisions/conditions are required where there are significant impacts on AAQS. ¹⁴
Kenya	An individual polluter is liable for doing anything that causes any exceedances of AAQS (note that there are also some obligations on the State alongside the primary obligations on private operators). ¹⁵
Nigeria	Individual operators have an obligation to ensure that air quality inside premises or the operational area, associated with its emissions, is not greater than 80 per cent of relevant AAQS. ¹⁶
Pakistan	A pollution charge is levied on a person who discharges, emits or allows the emission of any air pollutant at a concentration in excess of the National Environmental Quality Standards. Those who pay the pollution charge are not guilty of an offence. ¹⁷

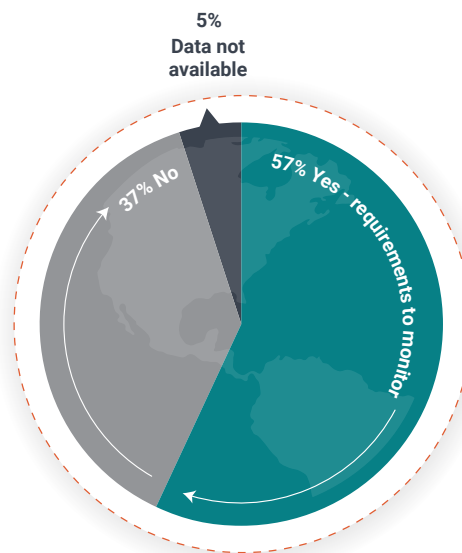
This "individualization" of collective standards creates various challenges. First, it augments the complexity of national air quality law, with a range of approaches being taken and understood as "air quality law". Second, relying on individualized obligations is an inherently limited mechanism for enforcing collective AAQS. Ensuring safe levels of ambient air overall requires coordination of all sources of air pollution, which includes major emitters that are subject to regulation, as well as the behaviours and activity of diverse actors within and beyond an affected local area. Third, this approach risks individual permits to operate acting as licences to pollute, particularly if causal links to breaches of AAQS cannot be shown.¹⁸ That said, individualized obligations are appealing since they provide more obvious enforcement routes for collective AAQS (see section 6(c) (i)). This trend of individualizing AAQS could be the result of either political resistance to obligations being imposed on the state, or a strong legal culture of legal rules needing to be imposed on individuals, or both.

b. Implementing ambient air quality standards: Establishing administrative frameworks

i. Monitoring requirements

Knowledge of air quality depends on active pollution monitoring through measurement stations, supplemented in some cases by reliable modelling methods. Organizing air quality monitoring involves political choices: on siting requirements, financial resources and human needs, areas that need to be covered, and even on how to interpret the results. Legislative frameworks play an important role in making these choices transparent and consistent with the overall achievement of AAQS.

Specific details of monitoring schemes are critical to the effectiveness of a robust national air quality system. In some countries, this role is legally recognized and even legally challenged: monitoring is a matter for judicial control.¹⁹ However, not all air quality regimes legally require monitoring (see Figure 25).

Figure 25: Percentage of countries with legal requirements to monitor air quality

Among those countries that do have legal requirements to monitor air quality, there are different kinds of requirements. One distinction is between *fixed* and *dynamic* criteria for monitoring. Some monitoring regimes require monitoring stations to be located according to fixed criteria: for example, in Australia, a certain number of monitoring stations are required per head of population,²⁰ and in the EU, detailed requirements including specific measurements are given for the location and number of monitoring stations.²¹ In other countries, more dynamic criteria are used: in Mauritius, monitoring requirements are driven by the objective of ensuring compliance with environmental law;²² in Fiji and the EU, there are risk-based requirements for fixed monitoring.²³

Monitoring is not necessarily required everywhere; countries may provide for an exclusion of monitoring in certain areas.²⁴

Another trend detected in the assessment was that key decisions on monitoring are often delegated to a lower level of government which is more "local" to the manifestation of air pollution (as is the case in Cabo Verde), or they are mainly framed in technical guidance (as is the case in Brazil).

Finally, some legal regimes provide for air quality monitoring without this being linked to pre-established AQS (such as those of Cameroon and Cabo Verde). This is still a valuable requirement. Knowledge about air quality can allow a State to determine, and the public to know, whether air quality controls are required for the protection of public health. In addition, some countries engage in air quality monitoring without any legal framework to dictate or constrain this process. This can be problematic in ascertaining the rigour of monitoring that is undertaken, and for the accountability of those who undertake this important aspect of air quality law.

ii. Zoning requirements

There are different kinds of zoning or "enclave" requirements in air quality law. These are relatively common globally (see Figure 26). However, the significance and purpose of zones vary dramatically.

Different types of zones (air quality zones, attainment areas, airsheds, air quality management areas, etc.) are established by law for various purposes in air quality governance, such as:

- * for setting variable AQS (see section 5(d) on geographical coverage);
- * for assessment purposes and identification of areas where AAQS are or are not being met;
- * for air quality management purposes, particularly for air quality planning and for the introduction of enhanced air quality measures due to poor air quality;
- * for adopting additional measures to protect sensitive population groups, such as children.

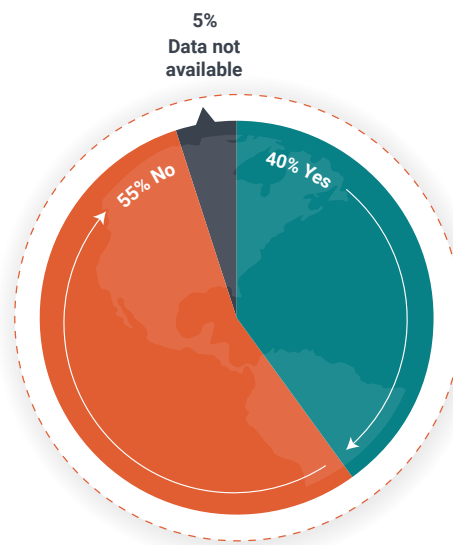
There are many examples of zoning requirements for air quality management purposes. This is a form of risk-based regulation of air quality in which zones (also referred to as "air pollution impacted areas",²⁵ "air quality management areas"²⁶ and "controlled areas"²⁷) are imposed when there are exceedances, or risks of exceedances, of AAQS. Once the relevant zone is declared, extra measures are required to control air quality in that area. These measures usually include some form of action

planning to improve air quality, and may also include enhanced monitoring or other requirements.

One challenge posed by this kind of local planning approach to air quality control is that it requires coordination of policy with governance actors who are outside or operate beyond that local zone of political control (see Box 4 on coordinating local and national air quality governance in the UK).

Zones are rarely established as additional measures for the protection of sensitive groups, even if allowed (as in the EU air quality regime).²⁸ In Estonia, the Minister responsible for air policies may, at the proposal of the Health Board, establish more stringent air quality limit values or target values for a list of pollutants through secondary legislation, to protect the health of sensitive population groups.²⁹

Figure 26: Countries with legal requirements for air quality zones



- iii. Procedural air quality rights – information, participation and justice

Since the establishment of the principle of access to information, access to public participation and access to justice in the Rio Declaration of 1992,³⁰ the recognition of procedural environmental rights has gained momentum in many national legislative regimes across the world. This recognition has been consolidated in two regional treaties: the 1998 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (the Aarhus Convention) and the 2018 Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (the Escazú Agreement).

Procedural environmental rights are expressed in three interrelated pillars:

- * access to information concerning the environment, held by or under the control of public authorities,³¹ without having any special interest or explaining the reasons for the request;
- * access to participation in environmental decision-making for the general public;
- * access to justice on environmental matters, including for non-governmental organizations (NGOs).

The guarantee of such procedural rights facilitates the protection of substantive rights to a healthy environment.³² More than 150 States recognize the right to a healthy environment in law, either in their constitutions, in environmental legislation, through ratification of a regional treaty or, in the majority of cases, through a combination of these legal elements.³³ This global assessment found 66 per cent of countries with constitutional rights to a healthy environment or to environmental protection efforts, and 32 countries with substantive legal rights relating to good air quality. These rights may arise from constitutions or from national legal frameworks, including through their interpretation in the courts (see section 4(b)). An explicit national right to clean air can be found in the Philippine Clean Air Act 1999, which provides that citizens' "right to clean air" is recognized, and that the state must seek to guarantee its enjoyment.³⁴

Access to information

This assessment shows that the first pillar, on access to information on air quality, is already very broadly embedded (albeit using different approaches) in many legal regimes, sometimes even at the constitutional level. In the digital age where information is readily available in many regions of the world, the procedural right of access to environmental information is an essential component of air quality policies, especially in relation to air pollution, which is not always visible.

Box 9: Brazil case study – litigating the right to information on air quality

On 29 May 2019, the Deputy Attorney General, in the exercise of the position of Attorney General, filed a Direct Unconstitutionality Action denouncing the unconstitutionality of the National Council of the Environment (CONAMA) Resolution No. 491/2018 establishing new AAQS, due to the weak levels of protection and insufficient contribution to the constitutional right to a healthy and balanced environment **and to the obligation to disclose environmental information to the population**. The argumentation was founded on the content of the latest scientific assessments and on the 2005 WHO guidelines.

Procuradoria-Geral da República, Pedido de declaração de inconstitucionalidade sem pronúncia de nulidade, No. 287/2019 – SFCConst/PGR, 19 November 2018, in: Supremo Tribunal Federal, ADI 6148, Ação Direta de Inconstitucionalidade contra a Resolução CONAMA nº 491.

Various duties correspond to this procedural right. The existence and quality of any accessible information depends on the quality of the monitoring scheme. As such, public authorities need to develop knowledge and capacity to appropriately assess the state of ambient air through monitoring and modelling, and there may be legal requirements for how they do this (see section 5(b)(i)).

Box 10: Mexico case study – fundamental link between air quality monitoring and public access to air quality data

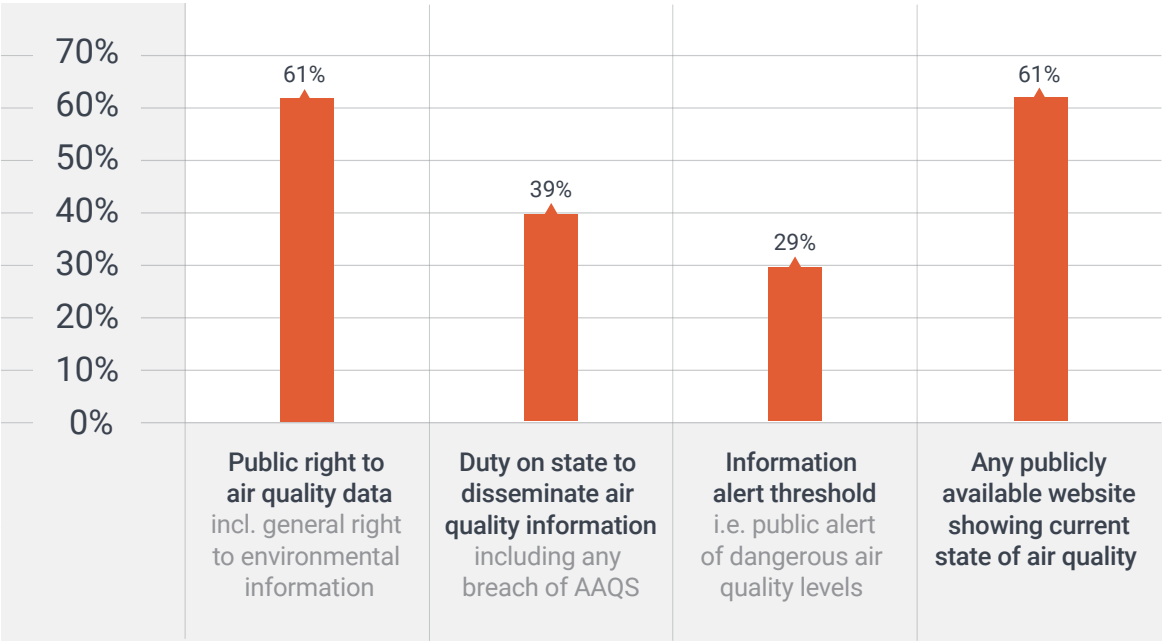
The National Human Rights Commission produced General Recommendation No. 32/2018 on the violations of the human rights to health – including recommendations for an adequate standard of living, a healthy environment, and public information – relating to urban air pollution. It recommended a review of the applicable AQS, taking due account of the WHO guidelines, and guaranteed access to information concerning their technical basis. It also recommended an improvement of the air quality monitoring network. In its recommendations, the Commission pointed out the special circumstances of vulnerable groups such as children, people over 65 years of age, pregnant women, people with asthma, people with chronic respiratory diseases, and people who work outdoors.

México, Comisión Nacional de los Derechos Humanos: Recomendación General 32/2018 (24 July 2018)

Once air quality information has been gathered, public authorities may have a duty to provide that information, depending on how these rights are constructed in national legislation. In some cases, the State must proactively and publicly communicate the state of ambient air quality, both generally and in dangerous situations or emergencies. In other cases, the right to

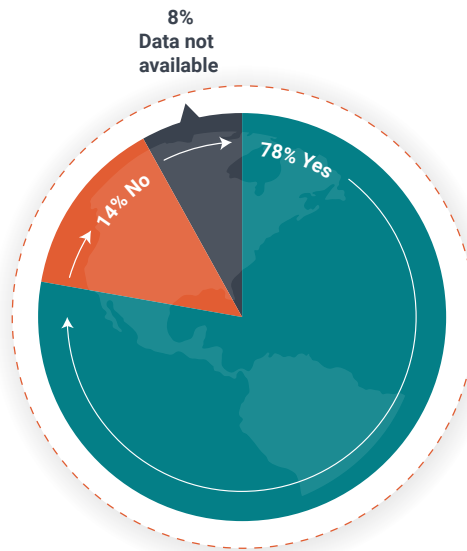
environmental information is something that the public must actively exercise by submitting a request for information, which, as Figure 27 shows, is more common.

Figure 27: Percentage of countries with legal rights to information on air quality



Access to information is generally recognized as a precondition for raising awareness among civil society, including the awareness of industrial actors and economic sectors, on the state of ambient air quality. Furthermore, the right of access to information is often a prerequisite for realizing other procedural rights, such as the rights to participate and seek justice. That access is not self-generating; it must be constructed by a legal regime to be guaranteed.

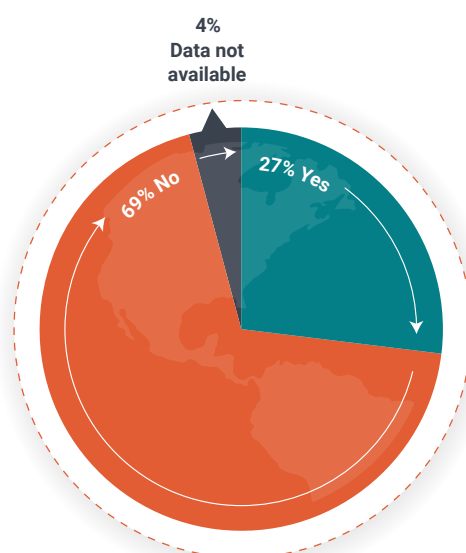
Laws containing AQS are a form of environmental information, according to the Aarhus Convention.³⁵ This includes the considerations that were taken into account during the process of adopting legal AQS and related assessments. However, the assessment shows that in some countries, laws containing AQS, despite existing, are not publicly available online. Figure 28 shows how many States globally make national air quality legislation containing AAQS publicly available.

Figure 28: Percentage of countries with publicly available air quality legislation

Note: States with no relevant legislation are marked N/A.

Given the highly technical nature of information on air quality, communicating this information to the public in an accessible manner can be challenging. In this respect, official **air quality indices (AQIs)** have become particularly important, along with

public websites. The global assessment found that 27 per cent of countries use AQIs to inform the public about the state of air quality (see Figure 29).

Figure 29: Percentage of countries that use a national air quality index

AQIs are complex tools. They provide information about air quality in real time, interpreting and transmitting information from air quality monitoring almost automatically. They tend to use a numerical scale, usually with colour coding, to indicate when air quality is acceptable and when it becomes dangerous for human health. There is no universal scale; a wide variety of AQIs are used globally, which are not readily comparable. That said, some countries use the US EPA Air Pollution Index (API).³⁶

For an AQI to communicate reliable and scientifically robust knowledge to the public about air quality levels, much depends on the relationship between what it considers “acceptable”, “good” and “low” levels of air pollution and the country’s AAQS, and ultimately how its “breakpoints” relate to the WHO air quality guidelines. These relationships are not always clear, and the methodologies underlying national AQIs can differ and be difficult to understand. One transparent methodology is that adopted in the UK (using a 1–10 index), where green “low” levels (1–3) of air pollution tend to, although do not always, indicate levels of air pollution below national AAQS for key regulated air pollutants (based on short-term means).³⁷ India uses a different numerical scale (1–500); again, the lower index bands (“good” and “satisfactory”) relate to India’s national “sacrosanct” AAQS,³⁸ but these differ from those of the UK. Other AQIs have methodologies that are less directly connected to AAQS, such as that of Malaysia, where the “dominant pollutant” (the pollutant with the highest index value) determines the overall index value.³⁹ Other AQIs use different scientific units, such as that of the US (locating levels of air pollution in parts per billion [ppb] against a 1–500 scale to determine index categories).

The variety of AQIs in terms of their methodologies and scales makes it difficult to easily appraise the information they communicate to the public and whether they are reliably alerting the public to dangerous levels of air pollution.

Access to participation in decision-making

On the second pillar of procedural environmental rights – access to participation in environmental decision-making for the general public⁴⁰ – the assessment explores legal rights to public participation, in three different respects:

- » **Rights to participate in the establishment of AQS.** This might include broad public involvement (including academia and citizens) or involvement of a selection of private actors (such as industry representatives involved in standardization processes). Notably some countries have general constitutional rights of public participation in formulating all laws, which would in principle extend to devising AQS in legislation.⁴¹

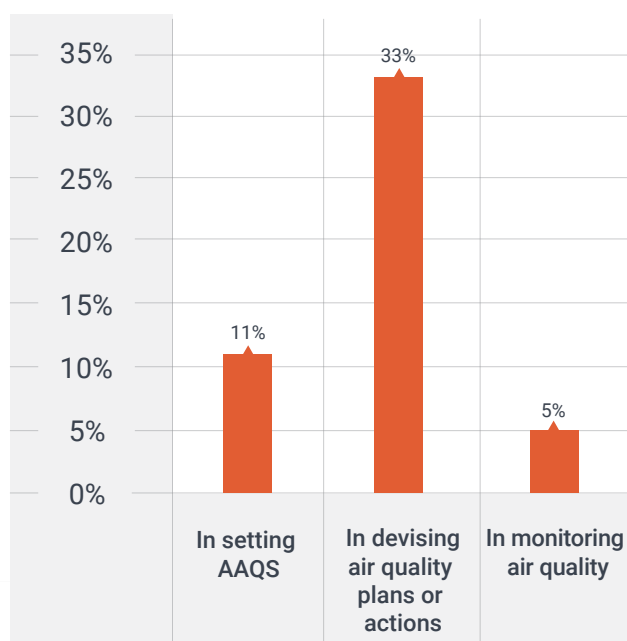
Box 11: Argentina case study – legally constructed public participation in setting air quality standards

Argentinian air quality law establishes a participation process in the adoption of AQS. This allows any interested party to submit its opinion to the Enforcement Authority, based on the proposal of the Permanent Advisory Council, within a period of ten business days after the proposal is publicized. After analysing the proposals, the Enforcement Authority must issue the relevant administrative act justifying the taking into account or rejection of the proposals made by the interested parties.

Ley N° 1356 - Regúlese la preservación del recurso aire y la prevención y control de la contaminación atmosférica (2004) arts. 16–18.

- » **Rights to participate in air quality plan-making, at any level.** In this regard, the assessment adopted a broad scope, considering that constitutional provisions on public participation in environmental policymaking,⁴² or corresponding provisions in main environmental acts,⁴³ should apply for the adoption of plans and programmes on air policies, regardless of whether this right is implemented in practice.
- » **Rights to participate in air quality monitoring.** This might include broad public involvement (including academia and citizens) or the involvement of a selection of other actors. This is less likely to be embedded as a right within legal frameworks (see Figure 30) although informal “citizen science” initiatives are an increasing phenomenon in air quality governance.⁴⁴

Figure 30: Percentage of countries with public rights to participate in air quality law

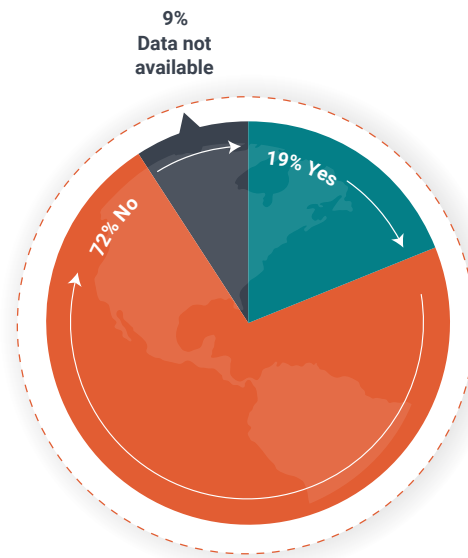


Access to justice

Provisions on access to justice are inserted directly into air quality legislative frameworks in about a fifth (19 per cent) of the

countries examined (see Figure 31). This does not mean that the other four fifths provide no access to justice regarding air quality, but the precise articulation of access to justice in some countries highlights an interesting shift in both air quality law, and environmental law more generally, towards more explicit and specific rights of access to environmental justice.

Figure 31: Percentage of countries with legal rights of access to justice within air quality regimes



Access to justice in environmental matters has improved globally in the last decade, particularly in countries under the influence of the Aarhus Convention, and this has impacted the way in which air quality laws are interpreted and understood today. Environmental NGOs have become focused and strategic in using public interest litigation to pursue improved air quality.⁴⁵ This has led to a growing trend of testing or challenging the content of air quality legal regimes. This type of litigation often demands, first, consistency and clarity in the interpretation of air quality regimes (often resulting in appeals to supreme courts) and, second, the appropriate implementation of air quality legal frameworks. This trend has been accompanied by an improvement in the development of air quality policies across the world.

Box 12: Case study – access to air quality justice in Indonesia

Since 1997, the main Act on Environmental Management has ensured the right of communities to file class actions, in their own interests or the public interest, in relation to issues of environmental pollution or damage. After the Supreme Court promulgated the Regulation of the Supreme Court of the Republic of Indonesia Concerning Class Actions in 2002, cases have been filed concerning pollution by haze.

Jakarta Legal Aid Institute (LBH Jakarta), Greenpeace Indonesia, and Friends of the Earth Indonesia (Walhi) v

Republic of Indonesia, Central Jakarta District Court, Case register number 374/PDT.G/LH/2019/PN.JKT. PST (pending at the time of writing).⁴⁶

c. Enforcement

i. Enforcement of ambient air quality standards

Many factors affect the enforcement of legal AAQS. There are the legal mechanisms of enforcement – that is, who can enforce a legal obligation and with what procedure or sanction – which the report examines in this sub-section. There are also issues of institutional capacity and resources. Even the best legal enforcement mechanism will be fruitless with no institutional support behind it. The research undertaken for this assessment revealed that enforcement capacity is often a key reason for the poor implementation of air quality law.⁴⁷ But ensuring there is a clear legal route for enforcement is also a fundamental aspect of how AAQS are legally binding, and is a complex issue in itself.

Enforcement mechanisms for achieving AAQS are particularly challenging to design, as outlined in section 1 and discussed earlier in this section. Air quality levels are collective outcomes and require many different activities and actors to work together to ensure that cumulative air quality levels are not harmful. As such, enforcing AAQS obligations against individual private entities, as is the more common model of environmental regulation, is incompatible with the nature of air quality as a problem. This is why obligations on the State are particularly important in air

quality law (see section 6(a)(i)). Enforcement mechanisms against the State can be difficult to design and implement, since the State acts as both enforcer and the body being enforced against. Table 12 sets out some interesting solutions to this challenge, and some enforcement mechanisms against individual entities, which support air quality governance systems.

Under a rule of law approach, enforcement options should be explicit and known in advance, particularly where they involve criminal offences.⁴⁸ To further complicate matters, AAQS may also be enforced indirectly: national legal doctrines (in public or tort law, for example) may provide avenues for enforcing legal obligations that do not involve bespoke enforcement routes included within air quality law itself. These avenues require legal action to be brought in courts or relevant tribunals, and may only become clear once court cases have been brought and judgments handed down, at the national or even supranational level. In Indonesia, for instance, the notion of “usual function of air” (breathing, maintenance of monuments and agriculture)⁴⁹

could open up new enforcement avenues.

The enforcement mechanism examples in Table 12 demonstrate a number of things. First, they show that enforcement avenues can relate to different aspects of air quality laws, from direct enforcement of legislative AAQS to enforcement of monitoring requirements. They also show the structural advantage of multilevel air quality governance systems insofar as the top tier of government (at the national or supranational level) can enforce air quality law obligations at lower tiers, solving to some extent the problem of the State being judge in its own cause. The majority of examples in Table 12 fit this model. However, this approach also risks “over-localizing” air quality governance (see Box 4). National governments have important roles to play in air quality policy coordination, beyond enforcing action delegated to lower tiers of government. Finally, it should be noted that air quality law enforcement mechanisms are still being developed in some countries.

Table 12: Examples of ambient air quality standards enforcement mechanisms

Country	AAQS enforcement mechanism
<i>Multilevel government enforcement mechanisms</i>	
All EU Member States	The primary enforcement mechanisms of EU Directive 2008/50 on ambient air quality are left to Member States and vary. However, national courts are empowered by EU law. They must give orders to national governments to adopt more appropriate air quality plans, should a breach of EU AQS be observed and a petition be made (see Box 3). The EU Commission has overriding enforcement power, and can bring infringement proceedings against a Member State in the CJEU for failure to fulfil obligations under EU law. Infringement proceedings include a dialogue with the relevant State about the content of its legislation on ambient air and its enforcement. If an enforcement case is brought before the CJEU for infringement of EU air quality law, the individual EU Member State can be held accountable for failing to achieve legal AAQS, and financial sanctions may also be imposed as a result of persistent non-compliance.
Australia	Has a cooperative “enforcement” mechanism in that failure to meet standards feeds into two yearly work plans under the National Clean Air Agreement 2015 which are undertaken collaboratively by federal and state governments.
Germany	The highest administrative court in Germany confirmed the competence of subnational governments to ban traffic based on diesel to meet AAQS in cities. ⁵⁰
Israel	Fines can be imposed on local authorities for failure to plan properly or failure to implement action programmes. ⁵¹
Japan	The Minister of the Environment may, when he or she finds it urgently necessary to prevent damage to human health from air pollution, issue the necessary instructions to the prefectural governor or to the mayor of a city (including special wards) specified by a Cabinet Order, on air quality. ⁵²
United States of America	Federal action is possible against states: the US EPA can issue sanctions against a state and, if necessary, take over enforcement of the US Clean Air Act in that state. ⁵³
<i>Direct enforcement action against the nation state or against individuals</i>	
China	Falsifying air quality monitoring data has become a crime as severe as creating the pollution itself, under laws that took effect in 2015, though there have been few high-profile prosecutions as yet. Two heads of district environmental protection branches have been imprisoned for ordering staff from national monitoring stations to falsify data, according to the ruling by a court in the central city of Xian. ⁵⁴
France	On 10 July 2020, the French Council of State ordered the French Government to adopt appropriate measures to reduce air pollution, under a penalty of 10 million euros per semester. This was the follow-up decision of another judgment in July 2017 in which France was required to adopt plans for reducing NO ₂ and PM ₁₀ pollution to comply with the European Directive 2008/50. This was the first ever penalty of its kind issued against the State by an administrative jurisdiction. The lawsuit was brought by a non-governmental association, Les Amis de la Terre France (Friends of the Earth France). ⁵⁵

Country	AAQS enforcement mechanism
Jamaica	Legal persons who breach licence conditions or discharge air pollution without a licence face fines/imprisonment. ⁵⁶ This is a standard model for regulating industrial pollution in many countries but in some countries, it is also tied to achievement of AAQS (see section 6(a)(i)).
Palau	Has a wide-ranging civil actio popularis: "The Minister of Justice, any political subdivision of the Republic, any instrumentality or agency of the Republic or of a political subdivision thereof, or any person, partnership, corporation, association, organization or other legal entity may maintain an action in the Trial Division of the Supreme Court for declaratory and equitable relief against the Republic, any political subdivision thereof, any instrumentality or agency of the Republic or of a political subdivision thereof, or any person, partnership, corporation or other legal entity, for the protection of the air, water and other natural resources and the public trust therein from pollution, impairment or destruction." ⁵⁷
United Republic of Tanzania	Has a general civil actio popularis which may apply to AAQS: every person has a right to bring an action to, inter alia, "compel any public officer to take measures to prevent or discontinue any act or omission, which is likely to cause harm to human health or environment". ⁵⁸

- ii. Legal and policy coordination supporting ambient air quality standards

As demonstrated in various ways in this section, achieving AAQS is ultimately a collective endeavour in which the State plays an important coordinating function. There are three ways in which air quality laws can support this function by legally requiring policy and regulatory coordination:

- » In some countries, **policy coordination for achieving air quality outcomes is legally mandated**. Of the countries surveyed, 68 (35 per cent) had some form of legally mandated policy coordination. A good example of this is Kuwaiti law, in which the relevant regulatory authority "in coordination and cooperation with the concerned competent authorities, shall take the necessary actions" when national AAQS are exceeded.⁵⁹
- » **Air quality planning is legally coordinated**. For example, in Austria, the subnational provinces are required to work together to prepare a joint air quality programme in the event of national AAQS exceedances.⁶⁰
- » **Decision-making for individual projects is legally linked to AAQS**. A notable example of this is the Netherlands, where compliance with AAQS is embedded in the land-use planning system.⁶¹ In some countries, such as Estonia, people who generate energy for domestic or community use have preferential rights to emit pollutants into the ambient air.⁶² In other countries, these links may exist in guidance only: for example, in New Zealand, the Government recognizes the impact of state highway improvement projects and vehicle emissions on air quality, and have issued detailed guidance on ensuring that emissions from projects do not exceed AAQS.⁶³

In these different ways, countries are taking the legal and policy coordination challenge posed by AAQS seriously.

Chapter 6 Endnotes

1. Directive 2008/50 (EU), art. 13; The Environmental Quality Standards Regulations 1999 (Gambia) reg 5(2).
2. Ordinance on Air Pollution Control (OAPC) of 16 December 1985 (Status as of 1 April 2020) (Switzerland), arts. 9 and 31.
3. National Environment Protection (Ambient Air Quality) Measure (as amended) (Australia), sect. 18.
4. Clean Air Act 1999 (Philippines), sect. 52.
5. See section 6(b)(ii).
6. Air Quality Regulation 2007 (Tanzania), sect. 26(1).
7. Directive 2008/50, art. 23(1). This has provided a legal hook for extensive public interest litigation on air quality throughout EU Member States; for example, see Case C-237/07 *Janecek* [2008] ECLI:EU:C:2008:447; Case C404/13 *ClientEarth* [2014] ECLI:EU:C:2014:2382.
8. For example, Environment Act 1995 (England), sect. 84(2).
9. For example, in the Philippine Clean Air Act 1999, AAQS are referred to as "ambient guideline values and/or standards", whereas the air quality limits set for "Source Specific Air Pollutants from Industrial Sources/Operations" are described as "National Ambient Air Quality Standards". See also The Environmental Protection and Management Act 2019 (No 10 of 2019), schedule VIII (Antigua and Barbuda).
10. Environmental Assessment Regulations 1999 (LI 1652) (Ghana).
11. Environmental Protection and Management Act 2019 Schedule VIII (Antigua and Barbuda), parts 1(3) and 1(4).
12. Bangladesh Environment Conservation Act 1995 and Environment Conservation Rules 1997 (as amended).
13. Environment Management (Waste Disposal and Recycling) Regulations 2007 (Fiji), reg. 18(2).
14. The Natural Resources Conservation Authority (Air Quality) Regulations 2006 (Jamaica), regs. 35, 33(8) and (9).
15. The Environmental Management and Co-ordination (Air Quality) Regulations 2014 (Kenya) regs. 4, 6–7; see also reg. 12.
16. The National Environmental (Air Quality Control) Regulations 2014 (Nigeria).
17. Pakistan Environmental Protection Act 1997, sect. 11.
18. Breaches of AAQS may also be expressly allowed if an individual permit to operate is in place, as is the case in New Zealand (Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (New Zealand), reg. 14(2)).
19. Case C-723/17 *Craeynest*.
20. National Environment Protection (Ambient Air Quality) Measure (as amended) (Australia).
21. For example, Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe [2008] OJ L152/1, annex III, para. B(1)(b).
22. The relevant enforcement agency shall "conduct such regular monitoring, sampling, test and analyses as to ensure compliance with environmental laws" (Environment Protection Act 2002, sect. 91(2)(c)).
23. 2007 Regulations (Fiji) reg. 17(1); Directive 2008/50, annex III, para. B(1)(a).
24. In the EU, unless a Member State decides otherwise, compliance with the limit values directed at the protection of human health is not assessed at the following locations: (a) any locations situated within areas where members of the public do not have access and there is no fixed habitation; (b) factory premises or industrial installations to which all relevant provisions concerning health and safety at work apply; (c) the carriageway of roads; and the central reservations of roads except where there is normally pedestrian access to the central reservation (Directive 2008/50/EC, annex III).
25. Clean Air Law (Israel), sect. 11(a).
26. Environment Act 1995 (England), part IV.
27. The Environmental Management and Co-ordination (Air Quality) Regulations 2014 (Kenya), reg. 12.
28. Directive 2008/50/EC, art. 23.
29. Atmospheric Air Protection Act 2016 (Estonia), sect. 49. This scheme has not yet been activated.
30. Rio Declaration 1992, Principle 10.
31. The Escazú Agreement also mentions that each Party shall take the necessary measures, through legal or administrative frameworks, among others, to promote access to information on the environment in the possession of private entities, in particular information on their operations and the possible risks and effects on human health and the environment (art. 6).
32. "The right of every person of present and future generations to live in an environment adequate to his or her health and well-being" (Aarhus Convention, art. 1); "the right of every person of present and future generations to live in a healthy environment and to sustainable development" (Escazú Agreement, art. 1).
33. United Nations, General Assembly (2019). *Right to a healthy environment: good practices - Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment*. 30 December. A/HRC/43/53. <https://undocs.org/A/HRC/43/53>.
34. Clean Air Act 1999 (Philippines), sect. 4.
35. "[E]nvironmental information" (art. 2.3) includes administrative measures, environmental agreements, policies, legislation, plans and programmes affecting or likely to affect the elements of the environment (within the scope of the Treaty), and cost-benefit and other economic analyses and assumptions used in environmental decision-making.
36. It has also been used transnationally by the US itself, in its programme to record air quality at all its embassies and consulates worldwide (AirNow. AirNow Department of State. www.airnow.gov/international/us-embassies-and-consulates/). The US EPA is also offering support to countries in setting up countrywide air quality monitoring programmes.
37. See UK Air. What is the Air Quality Index? <https://uk-air.defra.gov.uk/air-pollution/daq?view=more-info&pollutant=pm10#pollutant>.
38. India, Central Pollution Control Board, Ministry of Environment, Forests & Climate Change. *National Air Quality Index* (2014). <https://cpcb.nic.in/displaypdf.php?id=bmF0aW9uYWwtYWlyLXF1YWxpdkhtaW5kZXgvRkIQQUwtUkVQT1JUX0ERSV8ucGRm>.

39. Malaysia, Ministry of Environment and Water, Air Pollutant Index (API) Calculation. http://apims.doe.gov.my/public_v2/pdf/API_Calculation.pdf.
40. Definitions of "general public" vary. Under the Aarhus Convention, it means one or more natural or legal persons, and, in accordance with national legislation or practice, their associations, organizations or groups; under the Escazú Agreement, it means one or more natural or legal persons and the associations, organizations or groups established by those persons, that are nationals or that are subject to the national jurisdiction of the State Party.
41. For example, the Fijian and Kenyan Constitutions.
42. For example, the Ethiopian Constitution contains a general right to participate in environmental policymaking.
43. For example, Armenian law on atmospheric air protection (1994), art. 9.
44. For example, Curieuzeneuzen Vlaanderen in Belgium, where 20,000 citizens measure the air quality near their own home (What is Curieuzeneuzen Vlaanderen? <https://2018.curieuzeneuzen.be/vlaanderen-2018/in-english/>).
45. See, for example, ClientEarth's air pollution litigation campaigns at Air Pollution. www.clientearth.org/what-we-do/priorities/air-pollution/.
46. See also Listiningrum, P. (2019). Transboundary Civil Litigation for Victims of Southeast Asian Haze Pollution: Access to Justice and the Non-Discrimination Principle. *Transnational Environmental Law* 8:1, pp. 119–142.
47. For example, UNEP and Environmental Compliance Institute (2018). *Addis Ababa City Air Quality Policy and Regulatory Situational Analysis*.
48. Case C-752/18 *Deutsche Umwelthilfe eV v Freistaat Bayern* [2019] ECLI:EU:C:2019:1114.
49. Governmental Resolution 41 (1999) on air pollution control (Indonesia), art. 1.
50. *Deutsche Umwelthilfe v The Land of Northern Westphalia*, ECLI:DE:Fed. Admin.Ct:2018:270218U7C26.16.0; *Deutsche Umwelthilfe v The Land of Baden-Württemberg*, ECLI:DE:Fed. Admin.Ct:2018:270218U7C30.17.0.
51. Clean Air Law (Israel), sect. 53(a).
52. Air Pollution Control Act (1968), art. 28(2).
53. See US Clean Air Act, sect. 110.
54. See Yana Jin, Henrik Andersson and Shiqiu Zhang (2016). Air Pollution Control Policies in China: A Retrospective and Prospects, *International Journal of Environmental Research and Public Health*, 13(12); Reuters (2017). Chinese court jails seven for falsifying pollution data, 16 June. www.reuters.com/article/us-china-environment-idUSKBN1971NJ.
55. Conseil d'Etat, Case n°428409, 10 July 2020 (France).
56. The Natural Resources Conservation Authority (Air Quality) Regulations 2006 (Jamaica), reg. 44.
57. Environmental Quality Protection Act (Palau), sect. 163.
58. Environmental Management Act (Tanzania), sect. 5(2)(b).
59. Law 42 of 2014 (Kuwait), art. 48.
60. Federal Law on Ambient Air Quality (Austria), sect. 9a(5).
61. The Netherlands has developed an array of specific approaches in regard to linking urban planning control to applicable AAQs, including, in the past, offset mechanisms in relation to planning and AAQS, and currently, the need for projects to be tested against applicable AAQS, with exceptions made for a category of "projects not making a significant contribution to air pollution".
62. Atmospheric Air Protection Act (Estonia) art. 96.
63. Waka Kotahi New Zealand Transport Agency, "Save One More Life". www.saveonemorelife.co.nz/assets/Highways-Information-Portal/Technical-disciplines/Air-and-climate/Air-pollution/NZTA-Air-quality-assessment-guide-Oct-2019.pdf.

Conclusion

Air quality laws and regulations have been identified as one of the key policy actions to significantly improve air quality. Taking the concept of AAQS as its focus, this assessment shows that ambient air – and thus people and the natural environment – is not yet legally protected everywhere. Furthermore, legal protection of ambient air has been approached in a variety of ways globally. This variety is not simply a matter of divergent acceptable pollution thresholds, but relates to the varying scope and goals of air quality law, and the different administrative processes that support attaining legally framed AAQS.

AAQS, when legally framed and institutionally embedded, create the bedrock of a robust air quality governance system. However, AAQS in legal instruments are not self-fulfilling: they require supporting regulatory instruments to control pollution sources, they impose heavy institutional capacities, and they require financial means. The task they entail can be challenging for public authorities, which must make social and economic choices to meet AAQS levels, beyond assessment and information requirements. They must coordinate wide-ranging spheres of policy action.

This study did not search for, nor find, an ideal template for air quality legislation that could be generalized to all countries. It does, however, propose key elements of an air quality governance model that could serve UNEA resolution 3/4 in relation to developing ambitious AQS globally.¹¹ Based on the rich diversity of air quality laws across the world, and the nature of air quality as an environmental and social problem, a robust air quality governance system is one which:

- » requires governments to develop and regularly review applicable AQS, taking into account public health objectives;
- » determines institutional responsibility for those standards;
- » monitors compliance with AQS;
- » defines consequences for failure to meet them;
- » supports the implementation of AQS with appropriate and coordinated air quality plans, regulatory measures and administrative capacity;
- » is transparent and participatory.

Recommendations

Beyond these general principles of air quality governance, other general recommendations for national air quality legislation based on the findings of this assessment are as follows:

1. All air quality legislation – primary and secondary, and any policies or guidance issued under such legislation – should be publicly available.
2. To promote the setting of AAQS that promote high levels of health and environmental protection, air quality legislation should include: strong public health and environmental objectives in primary legislation; a requirement that any powers to set AAQS in secondary legislation be exercised within a certain time frame; a requirement for interdisciplinary assessment and expert public health input in setting AAQS; public consultation in the standard-setting process; and regular review processes that take into account the latest scientific knowledge.
3. Where secondary legislation is used to promulgate AAQS, any such legislation should be subject to adequate oversight and scrutiny processes. It should also be connected to robust legal mechanisms for accountability and enforcement in relation to the achievement of AAQS.
4. Timely progression towards adoption of the WHO air quality guidelines in legislative AAQS should be considered and planned in all countries where possible, particularly in relation to PM_{2.5}, where protection against unsafe levels of PM_{2.5} is urgently required for public health.
5. Regarding the interaction between air quality law and climate law, global climate policy commitments could be achieved by shifting to “clean” modes of energy generation, which could be supported by more stringent SO₂ and NO₂ standards.
6. Zoning techniques should not be used to restrict coverage of AAQS across the geographical area of a country.
7. Given the collective nature of air pollution, States should be legally responsible for attaining legislative AAQS, including through duties to develop adequate, resourced and coordinated air quality policy plans.
8. Where legal responsibility to meet AAQS is individualized through permitting or similar regulatory controls, this approach should be coupled with other approaches that create coordinated obligations relating to other sources of air pollution.
9. In view of the critical importance of accurate and relevant air quality information in the implementation of air quality

1. UNEP/EA.3/Res.4.

law, suitable legal requirements for monitoring should be adopted in national air quality law. These would serve public authorities in developing knowledge and capacity to appropriately assess the state of ambient air, and also foster transparency, enabling scrutiny of how monitoring is being done and whether this is lawful.

10. National AQIs should be transparent in their methodology and ideally comparable. Index levels should be scientifically robust (ideally reflecting national legislative AAQS or WHO air quality guidelines). There is scope to develop international guidelines on best practice methodologies for designing national AQIs.
11. Implementation of air quality law is supported by citizen empowerment. In this respect, procedural rights for air quality should be part of national air quality laws. In particular, these include the public rights to access environmental information, to participate in air quality governance, and to access justice where air quality laws are not implemented.
12. Enforcement mechanisms can be complex to design for collective AAQS, to ensure that AAQS are in fact met. However, the range of interesting approaches to enforcement adopted by some countries indicates possible options for others to explore. Systems of multilevel governance provide particularly effective frameworks for enforcing AAQS.
13. There should be clear and accountable mechanisms to coordinate policy and regulatory mechanisms to ensure that AAQS are met.
14. Countries should consider the introduction of legislative IAQS, following WHO recommendations in this respect. This is an important area for legal development in all countries, and particularly in low- and middle-income countries due to the impact of household air pollution on health outcomes, which disproportionately affects women and children.
15. Given the heterogeneity in approaches to designing AQS, there is a case for cooperation in negotiating a global treaty on AAQS that support universal public health goals and evolving human rights protections relevant to health and clean air. To support robust air quality governance, and in light of many countries' experiences of air quality law requiring frequent revisions, any such treaty should be supported by a strong technical secretariat to ensure regular review in line with scientific evidence and WHO guidance. Any such treaty would facilitate knowledge-sharing globally in relation to air quality policy and scientific assessment, but could maintain room for differentiation based on national circumstances. It should also address global transboundary air pollution,

enhancing the customary no-harm rule with cooperative international norms on this issue.

Areas for further research

In light of the findings of this assessment, the following areas require further inquiry:

- » national multilevel governance (for exploring AQS implementation issues), due to the variety of governance arrangements in which AQS are shared between layers of government;
- » the comparability of AAQS design in legislation across jurisdictions, particularly in relation to the use of exceedances, margins of tolerance, averaging periods, and other qualifications that affect the stringency of AAQS in practice;
- » how processes to set legislative AAQS are best made inclusive, by taking into account the perspectives of, and impacts on, different groups, particularly those more vulnerable to the effects of air pollution because of their age or gender, or for health reasons – this includes interrogating whether appropriate data is available concerning the impacts on, and roles of, these groups;
- » how air quality law monitoring requirements reflect international best practice;
- » the role of national courts in interpreting air quality obligations, and providing access to justice for concerned citizens;
- » how different kinds of legal systems provide avenues for accountability or enforcement in relation to AAQS that are not provided for on the face of air quality legislation;
- » the legal relationships between law on AAQS and sectoral regulation, beyond the mechanisms of legal policy coordination examined in this assessment;
- » the legal relationships between law on AAQS and other kinds of air quality norms, in particular national emission ceilings, which also require collective policy responses by national governments;
- » how variable national legislative AAQS relates to the distortion of global competition.

Appendix 1: Legal instruments containing national ambient air quality standards (as at 15 December 2020)

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ¹	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
1. Afghanistan	AS 109. Standard of Air Quality. 1389/2011	Data not publicly available	Yes	Policy/guidance
2. Albania	Vendim nr. 594, datë 10.9.2014, për miratimin e strategjisë kombëtare për cilësinë e ajrit të mjedisit	www.akm.gov.al/assets/strategjia-kombetare-per-cilesine-e-ajrit-2014.pdf	Yes	Policy/guidance
3. Algeria	Décret exécutif n° 06-02 définissant les valeurs limites, les seuils d'alerte et les objectifs de qualité de l'air en cas de pollution atmosphérique (2006)	www.ecolex.org/details/legislation/decret-executif-n-06-02-definissant-les-valeurs-limites-les-seuils-d-alerte-et-les-objectifs-de-qualite-de-lair-en-cas-de-pollution-atmospherique-lex-faoc062882/	Yes	Secondary legislation
4. Andorra	Decret que modifica el reglament de control de la contaminació atmosfèrica (2009)	http://airlex.web.ua.pt/uploads/standards/06200905_bop21017.pdf	No	Secondary legislation

1. Where "data not publicly available" is written, other sources (mainly in-country contacts) were used to research national air quality legislation.

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
5. Antigua and Barbuda	Environmental Protection and Management Act 2019 (no. 10 of 2019), schedule VIII	http://laws.gov.ag/wp-content/uploads/2019/08/No-10-of-2019-Environmental-Protection-and-Management-Bill-2019.pdf	No	National environment act
6. Argentina	Decreto n° 198/006, Bocba n° 2394 del 08/03/2006, Reglamenta la Ley N° 1.356, Anexo III	Anexo III www.ciudadyderechos.org/archivos/derechos/anexos_decreto_198/anexoIIIdecreto198.pdf Decreto n° 198/006: http://www2.cedom.gob.ar/es/legislacion/normas/leyes/anexos/drl1356.html	Yes	Secondary legislation
7. Armenia	The 2006 Government Resolution N 160-N	www.arlis.am/DocumentView.aspx?docid=73837	Yes	Secondary legislation
8. Australia	National Environment Protection (Ambient Air Quality) Measure (as amended) (2016)	www.legislation.gov.au/Details/F2016C00215	No	Secondary legislation
9. Austria	Bundesgesetz zum Schutz vor Immissionen durch Luftschadstoffe (Immissionsschutzgesetz – Luft, IG-L) StF: BGBl. I Nr. 115/1997	www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnumm=10011027	No	National air quality act
10. Azerbaijan	Decision 59 of the Cabinet of Ministers of the Republic of Azerbaijan on approval of "Rule of establishment of hygienic and ecological standards of atmosphere air quality and allowed level of physical impact on it" and "Rule of maintaining of state records of harmful substances and substances potentially dangerous for human health and environment" (2003)	Data not publicly available	Yes	Secondary legislation
11. Bahrain	قرار رقم (10) لسنة 1999	www.bahrain.bh/wps/wcm/connect/659b572d-4601-43eb-9594-67ec08eeac28/2810%291999%2%قرارB2%والماءB2%البيئةB2%الهواءB2%المقاييس.pdf?MOD=AJPERES	No	Secondary legislation
12. Bangladesh	Bangladesh Air Quality Standards (Bangladesh Govt. Gazette S.R.O. No: 220-Law/2005 of 16 July 2005) (updating standards by amending the Environment Conservation Rules, 1997)	Data not publicly available	Yes	Secondary legislation
13. Belarus	Hygiene Norms GN no. 186 of 30.12.2010 Maximum Allowable Concentrations of Pollutants in Ambient Air	Data not publicly available	Yes	Secondary legislation

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
14. Belgium	Walloon region: 15 juillet 2010 - Arrêté du Gouvernement wallon relatif à l'évaluation et la gestion de la qualité de l'air ambiant Flemish region: VLAREM II – Besluit van de Vlaamse regering van 1 juni 1995 houdende algemene en sectorale bepalingen inzake milieuhygiëne (Bijlage 2.5.3.11) Brussels region: Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif à la fixation d'objectifs à long terme, de valeurs cibles, de seuil d'alerte et de seuil d'information pour les concentrations d'ozone dans l'air ambiant (2002); Arrêté du Gouvernement de la Région de Bruxelles-Capitale concernant les valeurs limites pour le benzène et le monoxyde de carbone dans l'air ambiant (2001); Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif à la fixation de valeurs limites pour l'anhydride sulfureux, le dioxyde d'azote et les oxydes d'azote, les particules et le plomb dans l'air ambiant (2001)	Walloon region: http://environnement.wallonie.be/legis/air/air063.htm Flemish region: https://navigator.emis.vito.be/mijn-navigator?wold=38570&woLang=nl Brussels region: www.ejustice.just.fgov.be/cgi_loi/change_lg_2.pl?language=fr&nm=2002031207&la=F;www.ejustice.just.fgov.be/cgi_loi/change_lg_2.pl?language=fr&la=F&cn=2001070537&table_name=loi;www.ejustice.just.fgov.be/cgi_loi/change_lg_2.pl?language=fr&nm=2001031244&la=F	No	Secondary legislation
15. Benin	Décret exécutif n° 2001-110 du 04 avril 2001 fixant les normes de qualité de l'air en République du Bénin	www.ecolex.org/details/legislation/loi-no-98-030-portant-loi-cadre-sur-lenvironnement-en-republique-du-benin-lex-faoc016685/ ; decree: http://extwprlegs1.fao.org/docs/pdf/ben86033.pdf (secondary source)	Yes	Secondary legislation
16. Bhutan	Environmental Standards, 2020	http://www.nec.gov.bt/publications/download/environment-standards-2020	yes	Policy/guidance
17. Bolivia	Decreto Supremo N° 24176 – Reglamento en Materia de Contaminación Atmosférica 8 de Diciembre de 1995	http://snia.mmaya.gob.bo/web/modulos/PNGCA/#	Yes	Secondary legislation
18. Bosnia and Herzegovina	Several texts, such as: Republic of Srpska (RS): Regulation on air quality limit values (Official Gazette [OG] of RS 124/12) Federation of Bosnia and Herzegovina (Fbih): Regulation on the manner of monitoring on air quality, and defining the kinds of polluting materials, limit values and other air quality standards (OG FBiH No. 1/2012); Regulation on monitoring of pollutants emissions in the air (OG FBiH No. 9/2014); Regulation on the monitoring of air quality OG FBiH 12/05, 9/16)	RS www.fao.org/faolex/results/details/en/c/LEX-FAOC149098 Fbih: www.fao.org/faolex/results/details/en/c/LEX-FAOC149115; www.fao.org/faolex/results/details/en/c/LEX-FAOC149113; www.fao.org/faolex/results/details/en/c/LEX-FAOC149114 (secondary sources)	Yes	Secondary legislation
19. Brazil	Resolução CONAMA N° 491/2018 – Dispõe sobre padrões de qualidade do ar	www.in.gov.br/web/guest/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/51058895/doi-2018-11-21-resolucao-n-491-de-19-de-novembro-de-2018-51058603	Yes	Secondary legislation

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
20. Bulgaria	НАРЕДБА № 12 ОТ 15 ЈУЛИ 2010 Г. ЗА НОРМИ ЗА СЕРЕН ДИОКСИД, АЗОТЕН ДИОКСИД, ФИНИ ПРАХОВИ ЧАСТИЦИ, ОЛОВО, БЕНЗЕН, ВЪГЛЕРОДЕН ОКСИД И ОЗОН В АТМОСФЕРНИЯ ВЪЗДУХ	www.moew.government.bg/bg/vuzduh/kachestvo-na-atmosferniya-vuzduh/normativni-aktove/	Yes	Secondary legislation
21. Burkina Faso	Décret n° 2001-185/PRES/PM/MEE du 07 mai 2001 portant fixation des normes de rejets des polluants dans l'air, l'eau et le sol	Data not publicly available	No	Secondary legislation
22. Cambodia	Anukret No. 42/ANK/BK of July 10, 2000, on the Control of Air Pollution and Noise Disturbance	https://static1.squarespace.com/static/593a250a15d5dbd460e153ad/t/59784a59bf629a80c566ddce/1501055578125/The+Control+of+Air+Pollution+and+Noise+Disturbances+%282000%29.pdf (secondary source)	Yes	Secondary legislation
23. Canada	Guidance Document on Achievement Determination for Canadian Ambient Air Quality Standards for Sulphur Dioxide (2020); Guidance Document on Achievement Determination for Canadian Ambient Air Quality Standards for Nitrogen Dioxide (2020); Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone (2012)	www.ccme.ca/en/res/gdadforcaagsforsulphurdioxide_en1.0.pdf ; www.ccme.ca/en/res/gdadforcaagsfornitrogendioxide_en1.0.pdf ; http://publications.gc.ca/collections/collection_2013/ccme/En108-4-55-2012-eng.pdf	Yes	Policy/guidance
24. Chile	Primary legislation: Norma de calidad del aire para MP _{2.5} (D.S. N° 12/2010 del Ministerio de Medio Ambiente); Norma de calidad del aire para MP ₁₀ (D.S. N° 59/1998, modificado por D.S. N° 45/2001, ambos del Ministerio Secretaría General de la Presidencia); Norma de calidad del aire para SO ₂ (D.S. N° 104/2018 del Ministerio de Medio Ambiente); Norma de calidad del aire para NO ₂ (D.S. N° 114/2002 del Ministerio Secretaría General de la Presidencia); Norma de calidad del aire para O ₃ (D.S. N° 112/2002 del Ministerio Secretaría General de la Presidencia) Secondary legislation: Norma de calidad del aire para SO ₂ (D.S. N° 22/2009 del Ministerio Secretaría General de la Presidencia); Norma de calidad del aire para material particulado sedimentable en la cuenca del río Huasco, III Región (D. Exento N° 4/1992 del Ministerio de Agricultura)	https://sinca.mma.gob.cl/index.php/pagina/index/id/norma	Yes	Secondary legislation
25. China	GB 3095—2012 (2012)	Data not publicly available	Yes	Policy/guidance

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
26. Colombia	Resolución N° 2254 "Por la cual se adopta la norma de calidad del aire ambiente y se dictan otras disposiciones" (2017)	www.minambiente.gov.co/images/normativa/app/resoluciones/96-res%202254%20de%202017.pdf	Yes	Secondary legislation
27. Costa Rica	Decreto Ejecutivo N° 39951-S: Reglamento de Calidad del Aire para Contaminantes Criterio, 2016	www.pgrweb.go.cr/scij/Busqueda/Normativa/Normas/nrm_texto_completo.aspx?param1=NRTC&nValor1=1&nValor2=82827&nValor3=106098&strTipM=TC	No	Secondary legislation
28. Côte d'Ivoire	Décret n° 2017-125 relatif à la qualité de l'air du 22 février 2017	Data not publicly available	No	Other primary legislation
29. Croatia	Regulation on levels of pollutants in ambient air, Official Gazette 117/12	Data not publicly available	Yes	N/A
30. Cuba	Data not available	Data not publicly available	Yes	Policy/guidance
31. Cyprus	The Air Quality Law of 2010 (Law 77(I)/2010) and its amendments (Law 3(I)/2017 and Law 20(I)/2020); the Air Quality (Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air) Regulations of 2007 (R.A.A. 111/2007) and its 2017 amendment (R.A.A. 38/2017); the Air Quality (Limit values for Sulphur Dioxide, Nitrogen Dioxide and Oxides, Particulates, Lead, Carbon Monoxide, Benzene and Ozone in Ambient Air) Regulations of 2010 (R.A.A. 327/2010) and its 2017 amendment (R.A.A. 37/2017); the Air Quality (Reduction of National Emissions of Certain Atmospheric Pollutants) Regulations of 2020 (R.A.A. 83/2020).	www.mlsi.gov.cy/mlsi/dli/dliup.nsf/All/C6A943CC070565F2C2257E28003F03F6?OpenDocument	Yes	More than one
32. Czechia	Zákon č. 201/2012 Sb. - Zákon o ochraně ovzduší	www.zakonyprolidi.cz/cs/2012-201?text=Z%C3%A1kon+o+ochran%C4%9B+ovzdu%C5%A1%C3%AD+%C4%8D+201%2F2012	Yes	National air quality act
33. Denmark	BEK nr 1472 af 12/12/2017 – Bekendtgørelse om vurdering og styring af luftkvaliteten	www.retsinformation.dk/eli/ita/2017/1472	Yes	Secondary legislation
34. Dominican Republic	Reglamento Técnico Ambiental de Calidad del Aire (2017)	Data not publicly available	Yes	Secondary legislation
35. Ecuador	Decreto N° 50 – Modifica el Decreto N° 3.516, Norma de Calidad del Aire Ambiente (Anexo IV, Libro VI: De la Calidad Ambiental, del Texto Unificado de la Legislación Secundaria del Ministerio del Ambiente) (2011)	www.fao.org/faolex/results/details/fr/c/LEX-FAOC103264 (secondary source)	Yes	More than one
36. Egypt	Prime Minister's Decree No. 338 of 1995 Issuing the Executive Regulations of the Environmental Law promulgated by Law No. 4 of 1994	http://extwprlegs1.fao.org/docs/pdf/egy4984E.pdf	Yes	Secondary legislation
37. El Salvador	Data not available	Data not publicly available	Yes	Policy/guidance

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
38. Estonia	Õhukvaliteedi piir- ja sihtväärtused, õhukvaliteedi muud piirnormid ning õhukvaliteedi hindamiskiirid (annexes) (2016)	www.riigiteataja.ee/akt/106032019012	Yes	Secondary legislation
39. Eswatini	Air Pollution Control Regulations 2010 (pursuant to section 37 of the Environmental Management Act 2002)	http://eea.org.sz/wp-content/uploads/2020/08/Air-Pollution-Regulations-2010.pdf	Yes	Secondary legislation
40. European Union	Directive 2008/50/EC of European Parliament and Council of 21 May 2008 on ambient air quality and cleaner air for Europe	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=FR	N/A	Other primary legislation
41. Fiji	Environment Management (Waste Disposal and Recycling) Regulations 2007	www.mowe.gov.fj/wp-content/uploads/2019/08/Waste-Disposal-Recycling-Reg-2007.pdf	Yes	Secondary legislation
42. Finland	Statsrådets förordning om luftkvaliteten 79/2017	www.finlex.fi/sv/laki/alkup/2017/20170079	No	Secondary legislation
43. France	Code de l'environnement: Section 1: Surveillance de la qualité de l'air (Article R.221-1) On PM_{2.5} Arrêté du 7 décembre 2016 fixant un objectif pluriannuel de diminution de la moyenne annuelle des concentrations journalières de particules atmosphériques	Main text www.legifrance.gouv.fr/codes/id/LegifranceArticle000006835544/2007-10-18/#LEGIARTI000006835544 On PM_{2.5} www.legifrance.gouv.fr/loda/id/LegifranceArticle0000033582552/2016-12-11/#LEGIARTI0000033582552	Yes	Secondary legislation
44. Gambia	Environmental Quality Standards Regulations (1999)	http://faolex.fao.org/docs/pdf/gam95812.pdf (secondary source)	Yes	Secondary legislation
45. Georgia	საქართველოს ატმოსფერული ჰაერის დამაბინძურებელი ნივთიერებების საზღვარი (საქართველოს ატმოსფერული ჰაერის დამაბინძურებელი ნივთიერებების საზღვარი) (2008)	https://matsne.gov.ge/ka/document/view/4277611?publication=0	Yes	Secondary legislation
46. Germany	Neununddreißigste Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes (also called "Verordnung über Luftqualitätsstandards und Emissionshöchstmengen")	www.gesetze-im-internet.de/bimschv_39/	Yes	Secondary legislation
47. Ghana	Environment and Health Protection – Requirements for Ambient Air Quality and Point Source/Stack Emission (Ghana Standard [GS] 1236:2019)	Data not publicly available	Yes	Secondary legislation
48. Greece	Αριθμ. Η.Π. 14122/549/Ε.103: Μέτρα για τη βελτίωση της ποιότητας της ατμόσφαιρας, σε συμμόρφωση με τις διατάξεις της οδηγίας 2008/50/ΕΚ "για την ποιότητα του ατμοσφαιρικού αέρα και καθαρότερο αέρα για την Ευρώπη" του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου της Ευρωπαϊκής Ένωσης της 21ης Μαΐου 2008	http://extwprlegs1.fao.org/docs/pdf/gre107496.pdf	No	Other primary legislation

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
49. Honduras	Reglamento para el control de emisiones generadas por fuentes fijas (2011)	Data not publicly available	Yes	Secondary legislation
50. Hungary	4/2011. (I. 14.) VM rendelet a levegőterheltségi szint határértékeiről és a helyhez kötött légszennyező pontforrások kibocsátási határértékeiről	https://net.jogtar.hu/jogszabaly?docid=a1100004.vm	Yes	Secondary legislation
51. Iceland	920/2016 Reglugerð um brennisteinsdíoxíð, köfnunarefnisdíoxíð og köfnunarefnisoxíð, bensen, kolsýring, svifryk og blý í andrúmsloftinu, styrk ósons við yfirborð jarðar og um upplýsingar til almennings	www.reglugerd.is/reglugerdir/eftir-raduneytum/umhverfisraduneyti/nr/20277	Yes	Secondary legislation
52. India	National Ambient Air Quality Standards (2009)	https://scoimines.com/env/DOCS/NAAQS-2009.pdf	Yes	Secondary legislation
53. Indonesia	Government Regulation No. 41/1999 on Air Pollution Control (1999)	Data not publicly available	Yes	Secondary legislation
54. Ireland	Air Quality Standards Regulations 2011 (Statutory Instrument [SI] No. 180 of 2011)	http://www.irishstatutebook.ie/eli/2011/si/180/made/en/pdf	Yes	Secondary legislation
55. Israel	Clean Air (Air Quality Values) Regulations (Temporary Provision), 5771-2011	https://perma.cc/ZM5B-HRW6	Yes	Secondary legislation
56. Italy	Decreto Legislativo 13 agosto 2010, n.155 "Attuazione della direttiva 2008/50/CE relativa alla qualità dell'aria ambiente e per un'aria più pulita in Europa"	www.camera.it/parlam/leggi/deleghe/testi/10155dl.htm	No	National air quality act
57. Jamaica	Ambient Air Quality Standards Regulations for Jamaica - August 1996	http://webmail.nepa.gov.jm:7000/new/legal_matters/policies_standards/docs/standards/air_quality_standards_regulations.pdf	Yes	Secondary legislation
58. Japan	Environmental Quality Standards in Japan – Air Quality	www.env.go.jp/en/air/aq/aq.html	Yes	Policy/guidance
59. Jordan	Jordanian Ambient Air Quality Standards (JS 1140/2006)	Data not publicly available	Data not available	Data not available
60. Kazakhstan	Приказ Министра национальной экономики Республики Казахстан от 28 февраля 2015 года № 168 Об утверждении Гигиенических нормативов к атмосферному воздуху в городских и сельских населенных пунктах	http://adilet.zan.kz/rus/docs/V1500011036	Yes	Secondary legislation
61. Kenya	The Environmental Management and Co-ordination (Air Quality) Regulations (2014)	www.nema.go.ke/images/Docs/Regulations/air%20quality%20regulations2014-1.pdf	Yes	Secondary legislation
62. Kuwait	Decision No. 210/2001 Pertaining to the Executive By-Law of the Law of Environment Public Authority	http://extwprlegs1.fao.org/docs/pdf/kuw159620E.pdf	Yes	Secondary legislation

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
63. Kyrgyzstan	Гигиенические Нормативы: "Ориентировочные безопасные уровни воздействия загрязняющих веществ в атмосферном воздухе населенных мест" (2016)	http://cbd.minjust.gov.kg/act/view/ru-ru/11955?cl=ru-ru	Yes	Secondary legislation
64. Lao People's Democratic Republic	Decree on the National Environmental Standard No. 0832/MONRE (2015) and Decree on National Environment Standard dated 81/GV, (2017)	www.eanet.asia/wp-content/uploads/2020/04/5-Lao-PDR_Factsheet_compressed.pdf and http://documents1.worldbank.org/curated/pt/724371515586349195/pdf/SFG3941-V1-REVISED-EA-P163730-PUBLIC-Disclosed-2-8-2018.pdf (secondary sources)	Yes	Secondary legislation
65. Latvia	Cabinet Regulation No. 1290: Regulations Regarding Ambient Air Quality (2009)	https://likumi.lv/ta/en/en/id/200712	Yes	Secondary legislation
66. Lebanon	Law 78/2018 on the Protection of Air Quality (Clean Air Act)	http://extwprlegs1.fao.org/docs/pdf/leb176635.pdf (secondary source)	No	National air quality Act
67. Liechtenstein	Liechtensteinisches Landesgesetzblatt Nr. 245: Luftreinhalteverordnung (LRV) (2008)	www.gesetze.li/konso/2008245000	No	Secondary legislation
68. Lithuania	Įsakymas Nr. 591/640: Dėl Aplinkos oro užterštumo sieros dioksido, azoto dioksido, azoto oksidais, benzenu, anglies monoksidu, švinu, kietosiomis dalelėmis ir ozonu normų patvirtinimo (2001)	www.e-tar.lt/portal/lt/legalAct/TAR_ED13284EBC72/asr	Yes	Secondary legislation
69. Luxembourg	Règlement grand-ducal du 29 avril 2011 portant application de la directive 2008/50/CE du Parlement européen et du Conseil du 21 mai 2008 concernant la qualité de l'air ambiant et un air pur pour l'Europe	http://legilux.public.lu/eli/etat/leg/code/environnement/20201107 (from p. 214)	Yes	Secondary legislation
70. Malta	Subsidiary Legislation 549.59: Ambient Air Quality Regulations	https://legislation.mt/eli/si/549.59/eng/pdf	Yes	Secondary legislation
71. Mauritius	Environment Protection (Standards for Air) Regulations 1998	www.fao.org/faolex/results/details/fr/c/LEX-FAOC052515/ (secondary source)	Yes	Secondary legislation
72. Mexico	Normas Oficiales Mexicanas (NOM)-022-SSA1-2019, NOM-023-SSA1-1993, NOM-020-SSA1-2014, NOM-025-SSA1-2014	www.semarnat.gob.mx/gobmx/biblioteca/nom.html ; www.ordenjuridico.gob.mx	Yes	Secondary legislation
73. Micronesia (Federated States of)	Trust Territory Air Pollution Control Standards & Regulation 1980	www.ecolex.org/details/legislation/trust-territory-air-pollution-control-standards-and-regulations-lex-faoc050317/?q=micronesia%2C+Trust+Territory+Air+Pollution+Control+Standards+%26+Regulation+1980 (secondary source)	Yes	Secondary legislation
74. Mongolia	Mongolian National Standard (MNS) 4585:2007	Data not publicly available	No	Policy/guidance
75. Montenegro	Uredba o utvrđivanju vrsta zagađujućih materija, graničnih vrijednosti i drugih standarda kvaliteta vazduha (Official Gazette of Montenegro no. 25/12 of 11.05.2012)	http://epa.org.me/images/uredbe/Uredba%20o%20utvrđivanju%20vrsta%20zagadjujucih%20materija.pdf	Yes	Secondary legislation

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
76. Morocco	Décret n°2-09-286 du 20 hijra 1430 (8 décembre 2009) fixant les normes de qualité de l'air et les modalités de surveillance de l'air	www.environnement.gov.ma/PDFs/milieux_physiques/Decretn2-09-286.pdf	No	Secondary legislation
77. Mozambique	Regulamento sobre Padrões de Qualidade Ambiental e de Emissão de Efluentes	Data not publicly available	Data not available	Secondary legislation
78. Nepal	National Ambient Air Quality Standards 2012 (NAAQS)	http://doenv.gov.np/public/uploads/Pdfile/New%20Collection%20of%20Environment%20Standards%20(2)-55757.pdf	No	Policy/guidance
79. Netherlands	Wet Milieubeheer (Environment Management Act) of 13 June 1979; Title 5.2 (inserted by Law of 11 October 2007), Annex 2	https://wetten.overheid.nl/BWBR0003245/2020-07-01#Hoofdstuk5_Titeldeel5.2	Yes	National environment act
80. New Zealand	Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NES Regulations 2004)	www.legislation.govt.nz/regulation/public/2004/0309/latest/DLM286835.html	Yes	Secondary legislation
81. Nicaragua	Norma Técnica Obligatoria Nicaragüense de Calidad del Aire 2002	www.fao.org/faolex/results/details/fr/c/LEX-FAOC067205 (secondary source)	Yes	Policy/guidance
82. Nigeria	National Environmental (Air Quality Control) Regulations 2014	www.nesrea.gov.ng/wp-content/uploads/2020/02/air_quality_control.pdf	Yes	Secondary legislation
83. North Macedonia	Decree on the limit values of the levels and types of polluting substances in the ambient air and alert thresholds, deadlines for limit values achievement, margins of tolerance for the limit values, target values and long-term targets (OG of the Republic of Macedonia no. 50/05, 4/13)	www.moepp.gov.mk/?page_id=16548 (secondary source)	Yes	Secondary legislation
84. Norway	Forskrift om begrensning av forurensning (forurensningsforskriften) Del 3. Lokal luftkvalitet	https://lovdata.no/dokument/SF/forskrift/2004-06-01-931/KAPITTEL_3-1#%C2%A77-1	Yes	Secondary legislation
85. Oman	Ministerial Decree No. 41/2017 issuing the Air Quality Regulation	www.informea.org/en/legislation/ministerial-decree-no-412017-issuing-air-quality-regulation	No	Other primary legislation
86. Pakistan	National Environmental Quality Standards for Ambient Air (2010)	www.environment.gov.pk/images/rules/SRO2010NEQSAirWaterNoise.pdf	Yes	Secondary legislation
87. Palau	Republic of Palau Environmental Quality Protection Board Air Pollution Control Regulations (1996)	www.palau.gov.pw/wp-content/uploads/2019/12/PNCA-Title-24.pdf	Yes	Secondary legislation
88. Panama	Executive Decree No. 5 of 2009	http://gacetas.procuraduria-admon.gob.pa/26291-A_2009.pdf	Yes	More than one
89. Paraguay	Resolución N° 259/15 POR LA CUAL SE ESTABLECE PARÁMETROS PERMISIBLES DE CALIDAD DEL AIRE 2015	www.fao.org/faolex/results/details/es/c/LEX-FAOC150910/ (secondary source)	Yes	Secondary legislation

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
90. Peru	Decreto Supremo N° 003-2017-MINAM. Aprueban Estándares de Calidad Ambiental (ECA) para Aire y establecen Disposiciones Complementarias	https://www.minam.gob.pe/disposiciones/decreto-supremo-n-003-2017-minam/	Yes	Secondary legislation
91. Philippines	Philippine Clean Air Act of 1999	https://emb.gov.ph/wp-content/uploads/2015/09/RA-8749.pdf	No	National air quality act
92. Poland	Poz. 1031 Rozporządzenie Ministra Środowiska z dnia 24 sierpnia 2012 r. w sprawie poziomów niektórych substancji w powietrzu	https://isap.sejm.gov.pl/isap.nsf/download.xsp/WDU20120001031/O/D20121031.pdf	Yes	Secondary legislation
93. Portugal	Decree-Law No. 102/2010 on air quality assessment and management	www.ecolex.org/details/legislation/decre-law-no-1022010-on-air-quality-assessment-and-management-lex-faoc099362/ (secondary source)	Yes	Other primary legislation
94. Qatar	Resolution No. 4 of 2005 by the Chairperson of the Supreme Council of the Environment and Natural Reserves (SCENR) issuing executive bylaw for law No. 30 of 2002 on environment protection	www.almeezan.qa/LawPage.aspx?id=2108&language=en	Yes	Secondary legislation
95. Republic of Korea	Enforcement Decree of the Clean Air Conservation Act (2007), as amended last by Presidential Decree No. 27200 of 31 May 2016, and Special Act on the Improvement of Air Quality in Seoul Metropolitan Area (2015)	http://extwprlegs1.fao.org/docs/pdf/kor100505.pdf and www.ecolex.org/details/legislation/special-act-on-the-improvement-of-air-quality-in-seoul-metropolitan-area-lex-faoc163761/ (secondary sources)	Yes	Other primary legislation
96. Republic of Moldova	Concentrațiile maxime admisibile (CMA) pentru parametrii aerului atmosferic investigați și influența lor negativă asupra sănătății umane și mediului înconjurător	www.meteo.md/images/uploads/pages_downloads/tabel_aer2.pdf	No	Secondary legislation
97. Romania	Legea nr.104/15.06.2011 privind calitatea aerului înconjurător	www.mmediu.ro/categorie/calitatea-aerului/56	No	National air quality act
98. Russian federation	Постановление Главного государственного санитарного врача РФ от 19 декабря 2007 г. N 92 'Об утверждении ГН 2.1.6.2309-07"	http://base.garant.ru/12158481	Yes	Secondary legislation
99. Rwanda	East African Standards – RS EAS 751 2010 – Air quality specification	Data not publicly available	Yes	Policy/guidance
100. San Marino	By reference to EU law	Data not publicly available	Yes	More than one
101. Saudi Arabia	Ambient Air Standard 2012	Data not publicly available	Yes	Secondary legislation
102. Senegal	Norme Sénégalaise NS-05-62 (2003)	http://extwprlegs1.fao.org/docs/pdf/sen54266.pdf	Yes	Policy/guidance
103. Serbia	Regulation on monitoring conditions and air quality requirements (2013)	www.fao.org/faolex/results/details/fr/c/LEX-FAOC195755 (secondary source)	Yes	More than one

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
104. Slovakia	Decree of the Ministry of the Environment of the Slovak Republic No 244/2016, on air quality	www.slov-lex.sk/pravne-predpisy/SK/ZZ/2016/244/20200301	Yes	Secondary legislation
105. Slovenia	Uredbo o kakovosti zunanjega zraka (2011)	http://extwprlegs1.fao.org/docs/html/slv114759.htm (secondary source)	Yes	Secondary legislation
106. South Africa	National Ambient Air Quality Standards 2009 – National Environmental Management: Air Quality Act 2004 (Act 39 of 2004)	www.environment.gov.za/sites/default/files/legislations/nemaqa_airquality_g32816gon1210_0.pdf	Yes	Secondary legislation
107. Spain	Real Decreto 102/2011, de 28 de enero, relativo a la mejora de la calidad del aire	www.boe.es/buscar/act.php?id=BOE-A-2011-1645	Yes	Secondary legislation
108. Sri Lanka	The National Environmental (Ambient Air Quality) Regulations (1994), as amended and published in Gazette Extraordinary No. 1562/22 of August 15, 2008	www.cea.lk/web/images/pdf/airquality/1562_22E%20Ambient%20air%20quality%20-%20english.pdf	Yes	Secondary legislation
109. State of Palestine	The Palestinian Ambient Air Quality Standards (PS-801-2010)	Data not publicly available	Yes	Policy/guidance
110. Sweden	Luftkvalitetsförordning (SFS 2010:477); Naturvårdsverkets föreskrifter om kontroll av luftkvalitet (NFS 2019:9)	http://rkrattsbaser.gov.se/sfst?bet=2010:477 ; www.naturvardsverket.se/Documents/foreskrifter/nfs2019/nfs-2019-9.pdf	Yes	Secondary legislation
111. Switzerland	Ordinance on Air Pollution Control (OAPC) of 16 December 1985	www.admin.ch/opc/en/classified-compilation/19850321/index.html	Yes	Secondary legislation
112. Syrian Arab Republic	Resolution No. 67 on the air quality standards and maximum consented limits for air pollution	www.ilo.org/dyn/natlex/natlex4.detail?p_lang=en&p_isn=83637&p_country=SYR&p_count=320&p_classification=14&p_classcount=25 (secondary source)	Yes	Secondary legislation
113. Tajikistan	Data not available	Data not publicly available	Yes	Policy/guidance
114. Thailand	Data not available	Data not publicly available	Yes	Policy/guidance
115. Timor-Leste	Decree Law No. 26/2012 of 4 July 2012 Environment Basic Law [Environmental Framework Law]	www.laohamutuk.org/Agri/EnvLaw/2012/DL26EnvBasicLaw4Jul2012en.pdf	Yes	National environment act
116. Trinidad and Tobago	Air Pollution Rules, 2014 (APR) (pursuant to the Environmental Management Act, Chapter 35:05)	http://news.gov.tt/sites/default/files/E-Gazette/Gazette%202015/Legal%20Notice/Legal%20Notice%20No.%2012%20of%202015.pdf	Yes	Secondary legislation
117. Turkey	Regulation on air quality assessment and management (2008)	www.ecolex.org/details/legislation/regulation-on-air-quality-assessment-and-management-lex-faoc082742/ (secondary source)	Yes	Secondary legislation
118. Turkmenistan	Data not available	Data not publicly available	Yes	More than one
119. Ukraine	Data not available	Data not publicly available	Yes	Policy/guidance
120. United Arab Emirates	Cabinet Decree (12) of 2006 Regarding Regulation Concerning Protection of Air from Pollution	http://extwprlegs1.fao.org/docs/pdf/uae185024E.pdf (secondary source)	Yes	Secondary legislation
121. United Kingdom of Great Britain and Northern Ireland	The Air Quality Standards Regulations 2010 No. 1001; Environment Act 1995 (Part IV)	www.legislation.gov.uk/ukksi/2010/1001/contents/made ; www.legislation.gov.uk/ukpga/1995/25/part/IV	Yes	More than one

Country	Legislative instruments containing ambient air quality standards (original version) [see section 5]	Source [primary source unless otherwise indicated] ²	Made under primary empowering legislation? [see section 5]	Type of instrument [see Figure 12]
122. United Republic of Tanzania	The Environmental Management (Air Quality Standards) Regulations (2007)	http://extwprlegs1.fao.org/docs/pdf/tan151537.pdf (secondary source)	Yes	Secondary legislation
123. United States of America	Code of Federal Regulations (CFR) Title 40, Chapter I, Subchapter C, Part 50	www.ecfr.gov/cgi-bin/text-id?SID=08ea3f431033e1d3e29be453d3ed5a67&mc=true&tpl=/ecfrbrowse/Title40/40cfr50_main_02.tpl	Yes	Secondary legislation
124. Venezuela	Decreto N° 638 – Normas sobre calidad del aire y control de la contaminación atmosférica	www.fao.org/faolex/results/details/en/c/LEX-FAOC181031 (secondary source)	No	Secondary legislation
125. Viet Nam	National Technical Regulation on Ambient Air Quality (QCVN 05: 2013/BTNMT)	Data not publicly available	Yes	Policy/guidance

Appendix 2: Global assessment of air pollution legislation – legal indicators

		[insert country name here]
UN regional group		
Legal region	EU	
	Commonwealth	
	UNECE	
	ASEAN	
	The Arctic Council	

National Approaches to Regulating Air Quality

Type of legal system		
State constitutional arrangement	Unitary	
	Federal	
	Part of supranational region	
	Other	[insert details]
Responsibility for air quality standards	National government	
	State/provincial government	
	Local government	
	Shared responsibility	

Legal constraints on national discretion in setting AQ standards	CLRTAP	
	1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (as amended 2012)	
	1998 POPs Protocol	
	1998 Heavy Metals Protocol	
	1994 Sulphur Protocol	
	1991 VOC Protocol	
	1988 NOx Protocol	
	1985 Sulphur Protocol	
	1984 EMEP Protocol	
	2002 ASEAN Agreement on Transboundary Haze Pollution	
Legal constraints on national discretion in setting AQ standards	2001 Stockholm Convention on POBs	
	Regional framework agreements	
	Constitutional guarantees?	
	Details of other treaty, international or supranational norm, constitutional guarantee?	[insert details]
Other key features	Is national air quality law currently being reviewed/revised?	
	Is an air quality index used to regulate air quality?	
	Any other approaches to regulating air quality (e.g. other than command and control)?	
	Details of any other regulatory approach or other key features	[insert details - if an AQI, note if this is imposed/required by legislation]
Definition of air pollution / air pollutant in legislation	Definition scope	
	Details	[insert definition or description]

Air Quality Standards

Legislative AAQS (Ambient Air Quality Standards)	Are any AAQS found in a legislative or legislatively empowered instrument?	
	Does any legislative instrument contain a power to set AAQS that has not been exercised?	
	Are new or updated legislative air quality standards expected in the near future?	
Legislative instrument containing AAQS	Citation	
	Hyperlink to source	[insert link here]
	Is legislation publicly available?	

How AAQ standards are promulgated	Type of instrument	
	Via empowering legislation?	
	Any mandated role for interdisciplinary assessment, various kinds of expertise?	
	Discretion to differentiate standards e.g. in different subnational states	
	Details	[if more than one give details; nature of differentiation; any interesting political processes for determining/setting AQ standards etc]
Design of legal AAQS	Concentration-based standard	
	Long term objective	
	Exposure-based standard	
	National emissions ceilings	
	Other - specify	
Legal references to AAQS objectives, rights, WHO guidelines	Objective type	
	Legal right to AAQS	
	Direct reference to WHO guidelines	
	Details	[insert details]
Legal standard for PM_{2.5}	Any legal standard?	
	If yes, compliant with WHO guidelines? 10 µg/m ³ annual mean 25 µg/m ³ 24-hour mean	
Legal incorporation of headline WHO standards (NB no Pb or CO limits, revision to WHO guidelines expected 2020)	PM ₁₀ 20 µg/m ³ annual mean	
	PM ₁₀ 50 µg/m ³ 24-hour mean	
	Ozone 100 µg/m ³ 8-hour mean	
	NO ₂ 40 µg/m ³ annual mean	
	NO ₂ 200 µg/m ³ 1-hour mean	
	SO ₂ 20 µg/m ³ 24-hour mean	
	SO ₂ 500 µg/m ³ 10-minute mean	
Legal standards for newly acknowledged pollutants	Eg standard for black carbon, ultrafine particles, VOCs	[insert examples]
Generally allowed exceedences		
		[insert illustrative examples]
Other allowed exceedences	Emergency reasons	
	Details / other allowed exceedences e.g. natural sources	[insert illustrative examples, leave blank if none]
Provisions for transboundary air pollution		
Specific indoor/household air pollution standards	(See WHO Guidelines 2005 update, pp 205-207)	
	Details	[insert details]

Implementing and Administering Ambient Air Quality Standards

Air quality zones	Are there AQ zones, attainment areas, airsheds for implementing AQ standards?	
	If yes, specify name/type of zone	[insert details]
Legal obligations relating to AAQS	Duty to meet AAQS (mandatory obligation of result)	
	Duty to take BPM to meet standard (best endeavours standard)	
	Escalating duty to take action (if AQ worsens)	
	Duty to report to public authority	
	Duty to plan for achieving AAQS	
	If yes to duty to plan, scale of air quality plan(s)?	[National/regional/local or NA]
	Emergency planning requirements for dangerous AQ levels	
	If any legal AAQS, is there any obligation on the state relating to them (listed here or otherwise)?	
	Further information	[e.g. if any air quality planning with no legal requirements]
Legal link between air quality standards and decision-making on projects	Eg permits	
Monitoring requirements	Legal requirement to monitor	
	Further information	[If yes, siting requirements?] [Note if any monitoring with no legal requirements]
Legal rights to information on air quality + duty to inform	Public right to air quality data (including general right to environmental information)	
	Duty on state to disseminate AQ information (including any breach of AAQS)	
	Information alert threshold (i.e. public alert of risky AQ levels)	
	Any publicly available website showing current state of AQ	[insert details]
Legal rights to access to justice (linked directly to air quality)		
Public participation requirements	In setting AAQS	
	In devising AQ plans or actions	
	In monitoring AQ	
Legal role of environmental regulator in relation to air quality standards		

Enforcement mechanisms	Criminal	
	Civil	
	Administrative	
	Bespoke enforcement mechanism	
	Multi-level governance mechanism (eg EU Commission)	
	Other	[If yes to any, include link to legislation]
Legally mandated policy coordination for air quality		
Other		[Any other legal trends or notable/inspiring aspects?]

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