



AMBIENT AIR QUALITY LEGISLATION: A comprehensive approach and recommendations for Vietnam

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Air quality deterioration is becoming a global concern due to its serious impacts on human health and the ecological environment. In order to support countries in developing and improving their legal system on air quality, the United Nations Environment Programme (UNEP) has published the Guide on Ambient Air Quality Legislation, 2023 [1]. This document has high orientation value and suggests principles and elements to consider in the process of developing or amending air quality legislation. This article introduces and analyses important contents of the above Guide, thereby providing some recommendations suitable to the context of Vietnam.

1. GLOBAL CONTEXT OF AIR QUALITY LEGISLATION

Air pollution is a transboundary and global issue, but there is currently no comprehensive international treaty that mandates ambient air quality standards (AAQS). However, many regions and nations have enacted regional or national legislation to control and improve air quality.

In Europe, the European Union (EU) is one of pioneers in developing a legal system on air quality with a tight legal framework, typically the Cleaner Air For Europe (CAFE) Directive 2008/50/EC[3]. This Directive not only specifies the AAQS but also establishes a mechanism for monitoring, reporting, public consultation and access to justice, creating a strong legal foundation for member countries to fulfil their obligations to protect the air environment.

In developing regions, soft law agreements play an important role in coordinating regional cooperation. For example, in Africa, regional policy frameworks such as the Lusaka Agreement (South), the Nairobi Agreement (East), and the Abidjan Agreement (Central-West) promote harmonization of AAQS and sharing of monitoring data. In Latin America and the Caribbean, the Regional Action Plan on Air Quality (2022) is also being implemented. In Asia, the Acid Deposition Monitoring Network in East Asia (EANET) has been expanded to include transboundary air pollution.

Another important pillar of global air quality governance is the WHO Global Air Quality Guidelines (WHO AQGs) updated in 2021. Although not legally binding, the AQGs provide a valuable scientific basis for countries to internalize or refer to in the process of developing national standards. Threshold values in the AQGs are based on medical and epidemiological evidence, aiming to protect public health at the optimal level. The AQGs 2021 specifically emphasize key pollutants such as $PM_{2.5}$, PM_{10} , NO_2 , SO_2 , CO and O_3 - and recommend their gradual application according to practical conditions of each country [2].

In addition, many countries have enacted separate laws or integrated regulations on air pollution into environmental laws, demonstrating the trend of considering clean air as a human right. The historic decision of the United Nations General Assembly (UNGA) in July 2022 officially recognized the human right to a clean, healthy and sustainable environment [5]. This decision not only enhances the political and legal status of the air pollution issue but also creates a basis for individuals and organizations to request the State to fulfil its obligations to protect the air environment.

The COVID-19 pandemic has further highlighted the link between air quality and public health. Several studies have shown that areas with high air pollution have higher COVID-19 mortality rates due to prolonged exposure that weakens the respiratory system. In addition, the lockdown measures during the pandemic have demonstrated that improving air quality is possible with coordinated policy and strong political will.

In general, the current global context is opening up favourable opportunities for countries, including Vietnam, to build a strong legal framework, based on principles of the rule of law, science and environmental justice. The Guide of the UNEP 2023 is developed in that context, as a strategic document to support the process of transforming awareness into specific legislative action [1].



2. NATIONAL LEGISLATIVE FOUNDATION: CORE ELEMENTS

An effective legal system on ambient air quality (AAQ) cannot stop at setting technical parameters, but needs to be structured on a comprehensive legislative foundation, including clear objectives, solid scientific basis, effective promulgation and enforcement mechanisms, as well as ensuring full participation of stakeholders. Accordingly, six core elements are necessary to develop and operate an effective legal system in this field.

First, laws or national policies on air quality should clearly define directional goals, not only limited to reducing pollution concentrations, but also aiming at protecting public health, ensuring environmental justice and realizing the human right to clean air. These goals should be specified through quantitative commitments or implementation roadmaps. International experience shows that the Clean Air Conservation Act 2022 of South Korea targets a 30% reduction in transport emissions by 2030, while the EU Directive 2008/50/EC sets both mandatory legal values and recommended target values. In Vietnam, the Law on Environmental Protection 2020 has mentioned air quality as a state management content, but still lacks specific quantitative commitments, making implementation unoriented and difficult to quantify effectiveness.

In addition, a mandatory requirement in the process of developing air quality standards is the use of reliable scientific evidence and epidemiological data. WHO has published the global Air Quality Guidelines 2021 (AQGs), which update the safety thresholds for six major pollutants such as $PM_{2.5}$, NO_2 , SO_2 , O_3 , CO and PM_{10} . Countries are recommended to internalize them according to a roadmap appropriate to national conditions. Referencing these recommendations should become a legal obligation in the process of establishing or amending national technical regulations. In Vietnam, current thresholds specified in QCVN 05:2013/BTNMT on $PM_{2.5}$ are still 5 times higher than WHO recommendations [7], indicating a significant gap between the current legal framework and international scientific standards.

In terms of legal form, AAQ standards should be issued through documents with high legal value such as laws, decrees instead of existing only in non-binding technical regulations or action plans. This is to ensure enforcement, as a basis for sanctioning violations and create a foundation for judicial or

administrative tools. Many countries such as South Africa, Israel and Mexico have enacted specific laws on clean air, which clearly stipulate the scope of application, mandatory parameters, and enforcement mechanisms [4]. Vietnam currently mainly regulates pollution thresholds through the technical regulations system (QCVN), which is not legally effective enough to prosecute violations. Therefore, integrating AAQ standards into the main legal system or developing a separate law on clean air is a necessary direction.

Along with that, defining responsibilities among levels of authority and functional agencies is also a core element. Countries need to clearly define the authority to issue standards, the agency responsible for monitoring, and the forms of inter-sectoral coordination. The US model with the Clean Air Act, which gives the authority to set standards to the federal Environmental Protection Agency (EPA), but allows states to apply more stringent regulations, is a typical example [4]. In Vietnam, the responsibility for managing air quality is still dispersed: the Ministry of Agriculture and Environment plays a focal role, but monitoring capacity depends largely on local authorities and data is not effectively shared among sectors such as transportation, industry and trade, and health.

An important and indispensable principle is transparency and public participation. The Aarhus Convention has established three basic rights of people in the environmental field: right of access to information, right of consultation and right of access to justice [4]. The legal system on AAQ needs to ensure the publication of real-time air quality data, organize public consultations during the policy making process, and create favourable conditions for people and civil society to file lawsuits or report if the air quality is violated. Although some platforms providing AQI have appeared in Vietnam, the data system is still inconsistent, incomplete and the ability of people to independently monitor is limited.

Finally, legislation needs to demonstrate a clear commitment to protecting vulnerable populations such as children, the elderly, pregnant women, and those living in areas of chronic high pollution. This requires a legal system that is not only universal, but also incorporates elements of environmental justice, through provisions that prioritize actions, require social impact assessments in environmental policies, and collect data disaggregated by gender, age, and geographic location. This is an important step in ensuring that no one is left behind in the governance of air quality.



In summary, six elements mentioned above are the basic legal foundation that every country needs to consider when developing a legal system on ambient air quality. Designing policies based on these elements will contribute to improving enforcement, enhancing accountability and realizing the right to live in a clean environment for all citizens.

3. MONITORING, ENFORCEMENT AND COMPLIANCE

Establishing air quality standards is only one part of the legal framework for protecting the air environment. A legal system that is to be effective in practice needs to have reliable monitoring mechanisms, effective sanctions and strong enforcement capabilities, while also creating favourable conditions for citizens and civil society to participate in monitoring the implementation process.

Monitoring - the foundation of law enforcement: The air quality monitoring system is the first and most important element in assessing the level of compliance with the established standards. Monitoring must be designed in a scientific, transparent and early warning manner, including continuous measurements at fixed stations and instant measurement methods (mobile, satellite, low-cost sensors). Measurement data must cover key areas such as densely populated urban areas, industrial zones, and pollution “hotspots” and must be frequent enough to reflect real-time developments. The monitoring system serves not only a technical purpose but also has legal value, as a basis for identifying violations, assessing results of action plans, and establishing obligations for polluters.

Air quality zoning and improvement plans: An important mechanism for ensuring legal compliance is air quality zoning - identifying areas that exceed pollution thresholds and where specific management measures can be applied. The legal system should clearly define the responsibility for developing and implementing air quality improvement plans for each classified area.

Sanctions and enforcement mechanisms: One of the biggest weaknesses in enforcement of environmental legislation in many countries is the lack of strong sanctions and the lack of practical enforcement capabilities. In some countries, serious air polluting activities such as open burning of waste, operating industrial equipment without dust collection systems, or vehicles with excessive emissions are often handled only with administrative fines, which are not enough of a deterrent. Currently, laws of many countries are

expanding sanctions by allowing civil or environmental lawsuits against public authorities when they fail to protect air quality; Establishing criminal liability for persistent excess emissions (Germany, Japan); Applying economic sanctions such as pollution taxes, emission pricing, or closing facilities if they do not meet technical standards [4,9].

Rights of citizens and the role of civil society: A core element of clean air governance is ensuring the role of social monitoring and criticism. Legal mechanisms should affirm rights of citizens to access real-time air quality data; to receive early warnings when pollution exceeds thresholds; to comment to draft policies and action plans; and to file complaints, lawsuits or compensation claims when directly affected by air pollution.

4. SOME RECOMMENDATIONS FOR VIETNAM

Air quality is the result of a combination of many factors from traffic, industrial, construction, agricultural emissions to natural conditions such as climate and terrain. Therefore, air quality management cannot be placed solely on the shoulders of a specialized environmental agency, but requires multi-sectoral, inter-regional and inter-level coordination, with clear responsibilities and unified management mechanisms.

One of the biggest challenges today is the phenomenon of “institutional fragmentation” when each sector, each local authority implements individual policies without coordination, leading to overlap, gaps or even policy conflicts. Many countries have established national or metropolitan-level interdisciplinary councils to coordinate clean air policies. For example, Mexico established a National Air Policy Coordination Committee with the participation of ministries and sectors such as environment, energy, transport, health and finance. In India, a new Air Quality Management in National Capital Region and Adjoining Areas Act (2021) has established an intergovernmental body with monitoring, coordination, and enforcement powers for neighbouring states. These models show that coordination is not just an administrative process, but also requires a clear legal framework to define responsibilities, financial mechanisms, data sharing, and conflict resolution.

In Vietnam, the Law on Environmental Protection 2020 has made progress in clearly defining responsibilities between central and local authorities in air protection, requiring pollution control planning, and encouraging the use of economic instruments. However, the current coordination mechanism is



still limited, mainly voluntary, lacking mandatory regulations on information sharing, and specific assignment of responsibilities among ministries and sectors, as well as local authorities with sources and impacts of transboundary pollution. The lack of a coordinating agency with independent legal authority makes it difficult for clean air policies to achieve consistency and synchronization across the system.

Based on analysis from the Guide of the UNEP and management practices in Vietnam, this article proposes some key recommendations to improve ambient air quality legislation and institutions:

Firstly, Vietnam needs to soon internalize WHO recommendations on air quality standards, especially for PM_{2.5}, according to a roadmap suitable to economic and technical conditions of each region [2,7]. Adjustments to QCVNs need to be made publicly, with independent scientific consultation and linked to policy impact assessments, in order to create a solid legal basis for pollution control plans and sanctions for violations.

Secondly, it is necessary to upgrade the legal status of AAQ standards from the level of technical regulations to binding regulations in higher-level legal documents such as decrees, specialized laws or integrate into the Law on Environmental Protection. This will ensure enforcement and create a foundation for determining legal obligations of the State, enterprises and other emission entities [6].

Thirdly, establish a modern, synchronous and open national air quality monitoring network. Data should be collected according to unified technical standards, updated in real time, made public on digital platforms, and interconnected among sectors, local authorities and communities. In addition to the fixed station system, it is necessary to encourage the deployment of mobile sensors, citizen science and digital platforms for people to participate in monitoring [8].

Fourthly, establish a central-level inter-sectoral clean air policy coordination agency, with representatives from the Ministry of Agriculture and Environment, the Ministry of Health, the Ministry of Construction, etc., and key provinces and cities [6]. This agency should be empowered to propose, monitor, and evaluate the implementation of clean air plans at the local level, and have an independent budget to implement cross-sectoral initiatives.

Fifthly, need to enhance the role of the public and civil society in enforcing the air quality legislation. Legislation needs to clearly stipulate the right to access real-time environmental information, the

right to participate in giving opinions on policies and action plans, as well as the right to sue or request compensation if affected by air pollution. The environmental complaint-denunciation-mediation mechanism also needs to be designed in accordance with characteristics of the air sector which is pervasive, has unclear sources, but has far-reaching and long-lasting impacts.

Finally, the development of air quality legislation needs to incorporate the principle of environmental justice protecting vulnerable groups, ensuring fair distribution of benefits and costs in pollution management, and encouraging the development of market-based policy instruments (environmental taxes, emission credits, clean air funds, etc.) to create long-term motivation for changing emission behaviour.

Institutional coordination and regulatory improvement are prerequisites for translating technical standards into tangible results: cleaner air, improved public health, and a transparent and efficient regulatory ecosystem. As a developing country heavily impacted by air pollution, Vietnam should consider this a policy priority in the coming period ■

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