

Is law failing to address air pollution? Reflections on international and EU developments

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Air pollution is a major global environmental problem, with various adverse effects on health and the environment. This introductory article provides an overview of related global and regional legal instruments. The article evaluates the legal landscape in terms of its coverage, geographic scope and effectiveness, and concludes that the legal measures currently in place fall far short of providing an adequate response to the problem of air pollution. Thus, there is a clear need to strengthen global and regional cooperation to improve air quality. Such cooperation is likely to take non-binding and flexible forms and involve both wider participation among States and broader engagement of various stakeholders. The informal character of cooperation also makes it possible to experiment with new governance approaches that are difficult to implement within the context of traditional international law.

1 | INTRODUCTION

The atmosphere needs protection in the face of air pollution, ozone depletion and climate change. According to the World Health Organization (WHO), air pollution is 'the biggest environmental risk to health' and 'a public health emergency',¹ responsible for millions of premature deaths annually. Tackling air pollution also has co-benefits for the climate and development issues such as urban sustainable development and energy access.²

Several international and regional agreements aim to reduce emissions of air pollutants. However, the problems associated with air pollution are far from being solved. The current legal and regulatory approaches to air pollution seem inadequate if the negative impacts already witnessed and the risks at stake are considered. Effective air pollution laws and policies require

prompt action and cooperation at global, regional and national levels, reaching across most economic sectors³ and engaging the public.⁴ It is this apparent disconnect between the state of the complex problem and the law – as well as the urgency of the need to address it⁵ – that motivated us to prepare this *RECIEL* special issue.

The aims of this introductory article are threefold. First, the article seeks to provide an overview of existing global and regional legal instruments for atmospheric protection, with a specific focus on air pollution and ozone depletion.⁶ Second, it aims to assess the current state of regulatory approaches to air pollution in terms of their coverage, geographic scope and effectiveness. Third, the article seeks to reflect on the future of global cooperation in this important

³Organisation for Economic Co-operation and Development (OECD), *The Economic Consequences of Air Pollution* (OECD 2016) 18–20.

⁴European Environmental Agency (EEA), 'Air Quality in Europe – 2016 Report', EEA Report No 28/2016 (EEA 2016) 6.

⁵See, for instance, the BreatheLife campaign, which is a global joint campaign led by the WHO, the United Nations Environment Programme (UNEP) and the Climate and Clean Air Coalition (CCAC) to mobilize immediate action to tackle air pollution: <<http://breathelife2030.org/>>.

⁶For an overview of developments in this area, see MW Roberts, 'Finishing the Job: The Montreal Protocol Moves to Phase Down Hydrofluorocarbons' (2017) 26 *Review of European, Comparative and International Environmental Law* 220.

¹World Health Organization (WHO), 'Ambient Air Pollution: A Global Assessment of Exposure and Burden of Disease' (WHO 2016) 11.

²*ibid.*

area of atmospheric protection. The scope of this article, as well as the special issue, covers both international and European Union (EU) law to provide a comprehensive analysis of the *status quo* of air pollution law.

The introductory article is structured as follows. It begins by discussing the sources and impacts of air pollution on human health, the economy and the environment. The article continues with a discussion of the applicability and functionality of customary international law, particularly the principles of international environmental law relevant to air pollution. It then explains that the legal landscape on air pollution is fragmented and consists of myriad different regional instruments, as well as global instruments of a sectoral nature (e.g., those relating to shipping and aviation). The article goes on to show the gaps in the international legal landscape in the coverage of some of the short-lived climate pollutants (SLCPs). Next, the article discusses the EU's approach to air pollution. The article concludes with some thoughts on the future of international law and global cooperation on air pollution.

2 | AIR POLLUTION: SOURCES AND IMPACTS

Air pollution can be defined as the 'introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment'.⁷ Air pollutants include a number of substances, including nitrogen oxides (NO_x), sulphur oxides (SO_x), particulate matter (PM) and heavy metals, particularly mercury and lead. Major sources of outdoor (or ambient) air pollution include inefficient modes of transportation, coal-fired power plants, agricultural sector and waste burning.⁸ Cooking and heating using open fires and simple stoves which burn biomass (wood, animal dung and crop waste) and coal are the major source of indoor air pollution.⁹

The extent of the problem is pervasive as 92 percent of the world's population lives in areas where the air contains levels of pollution that exceed WHO limits.¹⁰ Air pollution impacts are particularly acute in

low- and middle-income countries in Africa, Asia and the Middle East.¹¹ It is estimated, for instance, that 87 percent of premature deaths associated with outdoor air pollution occur in low- and middle-income countries.¹² In 2012, the regions of the Western Pacific and Southeast Asia had the highest numbers of deaths attributable to air pollution (2.8 and 2.3 million, respectively).¹³ While air pollution affects all groups of society, vulnerable populations such as women, children and the elderly are most at risk.

Air pollution is often interconnected with development and equity issues. For example, the use of solid fuels for cooking reflects a lack of access to electricity, which in turn constrains opportunities for study or for engaging in other activities.¹⁴ The negative impacts of air pollution on human health also result in economic losses. In addition, air pollution results in losses in crop yield, thereby affecting food security.

Air pollution has traditionally been framed as a local or regional issue. However, there is growing evidence of the global impacts of air pollution.¹⁵ Local air quality is affected not only by local sources of air pollution but also by atmospheric transport of pollution from distant sources.¹⁶ For instance, it has been estimated that 12 percent (411,100 deaths) of the total of 3.45 million premature deaths associated with PM_{2.5} pollution in 2007 worldwide were related to air pollutants from distant sources.¹⁷ This shows that, in order to be effective, air pollution policies should go beyond local or regional scales.

Air pollution in one region can also have significant impact on the climate in another region. For example, emissions from within Asian nations make the largest contribution to Arctic warming.¹⁸ Furthermore, international trade contributes to the globalization of pollution as many goods – with associated emissions – are produced in one region and consumed in another. Recent research reveals that transboundary health impacts of PM_{2.5} pollution related to international trade are even higher than those associated with long-distance atmospheric transport of pollution.¹⁹

There are also important interlinkages between climate change and air pollution that are still not fully understood.²⁰ Several atmospheric pollutants, such as black carbon, hydrofluorocarbons (HFCs), tropospheric ozone and methane – also known as short-lived climate pollutants – have a warming effect on the climate. Due to their short

¹¹WHO (n 1) 11.

¹²WHO, 'Ambient (Outdoor) Air Quality and Health' (September 2016) <<http://www.who.int/mediacentre/factsheets/fs313/en/>>.

¹³WHO, 'Burden of Disease from Household Air Pollution for 2012: Summary of Results' (WHO 2016) <http://www.who.int/phe/health_topics/outdoorair/databases/FINAL_HAP_AAP_BoD_24March2014.pdf?ua=1>.

¹⁴WHO (n 9).

¹⁵Q Zhang et al, 'Transboundary Health Impacts of Transported Global Air Pollution and International Trade' (2017) 543 *Nature* 705; V Ramanathan and Y Feng, 'Air Pollution, Greenhouse Gases and Climate Change: Global and Regional Perspectives' (2009) 43 *Atmospheric Environment* 37.

¹⁶Zhang et al (n 15).

¹⁷*ibid*.

¹⁸M Sand et al, 'Response of Arctic Temperature to Changes in Emissions of Short-Lived Climate Forcers' (2016) 6 *Nature Climate Change* 286.

¹⁹Zhang et al (n 15).

²⁰ML Melamed, J Schmale and E von Schneidmesser, 'Sustainable Policy: Key Considerations for Air Quality and Climate Change' (2016) 23 *Current Opinion in Environmental Sustainability* 85.

⁷Convention on Long-Range Transboundary Air Pollution (adopted 13 November 1979, entered into force 16 March 1983) 1302 UNTS 217 (CLRTAP) art 1(a). This definition is widely used and has been adopted by the International Law Commission (ILC) in its project on the law of the atmosphere. The word 'energy' in the definition includes radioactive and nuclear emissions as well as heat and light from large cities; however, the ILC has agreed to interpret 'energy' as 'a general concept' in order to follow prior treaty practice and has refrained from mentioning radioactive substances as this would entail interference with States' nuclear energy policies. See S Murase, 'Second Report on Protection of the Atmosphere' UN Doc A/CN.4/681 (2 March 2015) 8–10.

⁸WHO, 'A Global Assessment of Exposure and Burden of Disease: FAQs' <http://www.who.int/phe/health_topics/outdoorair/global-exposure-assessment-faq/en/>.

⁹WHO, 'Household Air Pollution and Health' (February 2016) <<http://www.who.int/mediacentre/factsheets/fs292/en/>>.

¹⁰WHO, 'Ambient and Household Air Pollution and Health' (27 September 2016) <http://www.who.int/phe/health_topics/outdoorair/databases/en/>.

life in the atmosphere, reducing SLCP emissions, especially methane and black carbon, could slow the rate of global warming by 0.5°C as early as 2040.²¹ Focusing on mitigating SLCP emissions therefore presents an attractive means of slowing down global and regional warming in the short term, while at the same time improving local air quality. The interlinkages between climate change and air pollution go beyond SLCPs, and cover other pollutants too. Some air pollutants, such as sulphur dioxide (SO₂), have a cooling effect on the climate and are co-emitted with warming pollutants. Tackling air pollution may therefore unmask the cooling effect and lead to further surface warming.²² This implies that air pollution policies should follow a multi-pollutant approach and take into account both warming and cooling effects on the climate.

3 | INTERNATIONAL LAW ON AIR POLLUTION: AD HOC AND HIGHLY SELECTIVE

International law on (transboundary) air pollution is heavily fragmented. Transboundary air pollution is addressed through a patchwork of regional instruments and frameworks,²³ including the Convention on Long-Range Transboundary Air Pollution (CLRTAP)²⁴ and its protocols, and the Association of Southeast Asian Nations (ASEAN) Agreement on Transboundary Haze Pollution.²⁵ Global legal frameworks also exist with regard to air pollution in the aviation and shipping sectors as well as for specific pollutants such as persistent organic pollutants and mercury.²⁶ The fragmented state of international law on air pollution results in significant gaps in 'geographical coverage, regulated activities, regulated substances and, most importantly, applicable principles and rules'.²⁷

This section explains how different sources of international law relevant to air pollution²⁸ fail to provide a comprehensive legal response to the problem. It starts with an analysis of customary international law – focusing particularly on principles of international environmental law – and continues with an analysis of regional and sectoral legal instruments. It then shows that there are substantive gaps in coverage in the current legal landscape as it relates to air pollution, using the example of SLCPs (black carbon and methane) for illustrative purposes.

3.1 | Principles of no agreement

A number of international environmental law principles apply to air pollution. The law on transboundary air pollution arguably started with the now-classical decision in the *Trail Smelter Arbitration* of 1937/1941 between Canada and the United States, which stated that 'States have a duty to ensure that activities within their jurisdiction and control do not cause transboundary damage'.²⁹ It is now well accepted that the no-harm principle applies to transboundary air pollution between neighbouring countries in cases where a causal link between pollution and effect is clear.³⁰ Furthermore, the no-harm principle extends to areas beyond the limits of national jurisdiction.³¹ There is, however, no agreement as to whether the principle also applies to long-distance air pollution where causal relationships may be more difficult to prove.³²

Other international environmental law principles also apply to air pollution. Several of these have been addressed by the International Law Commission (ILC) as part of its ongoing work on codifying the law on the protection of the atmosphere. In particular, the ILC is considering the following principles: the obligation to protect the atmosphere, environmental impact assessment, sustainable utilization of the atmosphere, equitable and reasonable utilization of the atmosphere, and international cooperation.³³

Principles of international law matter: even though they do not reflect 'behavioural regularities', they show 'attitudinal regularities among states and other international actors'.³⁴ In that sense, principles show 'collective aspirations', which shape the development of law³⁵ and 'serve to frame the debate'.³⁶ However, in and of themselves, principles of international environmental law have limited direct influence on the behaviour of States.³⁷ Although they can influence courts or third-party dispute resolution mechanisms, these principles play a marginal role in international environmental affairs.³⁸ The most significant influence that principles can exercise is through being specified in treaty norms and subsequent treaty body decisions.³⁹ From this perspective, principles of international environmental law are of limited value for air pollution: there is no global legal instrument that offers a common interpretation of the principles as well as detailed and specific rules.

Indeed, it appears that some of the principles of international environmental law are too divisive and sensitive for

²¹UNEP and World Meteorological Organization (WMO), *Integrated Assessment of Black Carbon and Tropospheric Ozone* (2011) 172.

²²Ramanathan and Feng (n 15).

²³The full list of these instruments and frameworks can be found in S Murase, 'First Report on the Protection of the Atmosphere' UN Doc A/CN.4/667 (14 February 2014) 17–19.

²⁴CLRTAP (n 7).

²⁵ASEAN Agreement on Transboundary Haze Pollution (adopted on 10 June 2002, entered into force on 25 November 2003) <http://haze.asean.org/?wpfb_dl=32>.

²⁶These are commonly considered under the cluster of multilateral environmental agreements on chemicals, and thus remain outside the scope of this special issue.

²⁷Murase (n 23) 8.

²⁸Sources of international law relevant to the protection of the atmosphere include global and regional instruments of both a multilateral and a bilateral nature, customary international law, the jurisprudence of international courts and tribunals as well as various non-treaty instruments, domestic legislation and the jurisprudence of domestic courts. See Murase (n 23) 17.

²⁹*ibid* 29.

³⁰*ibid* 35.

³¹*ibid* 37. As specified by the Declaration of the United Nations Conference on the Human Environment in 'Report of the United Nations Conference on the Human Environment' UN Doc A/CONF.48/14/Rev.1 (1972) Principle 21.

³²Murase (n 23) 35.

³³See PH Sand, 'The Discourse on "Protection of the Atmosphere" in the International Law Commission' (2017) *Review of European, Comparative and International Environmental Law* 201.

³⁴D Bodansky, *The Art and Craft of International Environmental Law* (Harvard University Press) 200.

³⁵*ibid*.

³⁶*ibid* 203.

³⁷*ibid* 202–203.

³⁸*ibid*.

³⁹*ibid* 203.

intergovernmental discussion. This is illustrated by the ILC's decision to exclude several important principles from the scope of its work, namely the following: 'the liability of States and their nationals, the polluter-pays-principle, the precautionary principle, common but differentiated responsibilities, and the transfer of funds and technology to developing countries, including intellectual property rights'.⁴⁰

In particular, States have been reluctant to apply the concept of State liability for transboundary harm to air pollution. This is illustrated not only by the discussions in the ILC, but also by the examples of CLRTAP and the ASEAN Agreement on Transboundary Haze Pollution. For instance, Article 8(f) of the CLRTAP specifically notes that the 'present Convention does not contain a rule on State liability as to damage'. Furthermore, the definition of transboundary air pollution was vaguely phrased to avoid pinpointing specific sources of pollution.⁴¹ The same holds for the ASEAN Agreement on Transboundary Haze Pollution: the treaty contains no specific provisions on State responsibility and/or compensation for transboundary haze pollution.⁴² The exclusion of State liability from intergovernmental discussion is not unique to air pollution: the Paris Agreement on climate change similarly does not provide a legal basis for State liability and compensation for loss and damage occurring as a result of climate change. Instead, the Agreement opts for soft language on 'cooperation and facilitation to enhance understanding, action and support' on early warning systems, emergency preparedness, risk assessment and management, risk insurance and other related areas.⁴³

Another potentially problematic principle is that of common but differentiated responsibilities. Among the legal frameworks on air pollution, discussion of the differing capacities of countries to address air pollution has so far received relatively limited attention. Yet, the question is important in the light of the regional and especially global effects of air pollution. For instance, SLCP emissions are already significant in large developing countries: China's share of global emissions of black carbon is estimated as the highest (20–24 percent between 1990 and 2007),⁴⁴ followed by India (about 10 percent).⁴⁵ The question remains as to how to reconcile the common responsibility to protect the atmosphere with the differing capacities of countries to reduce black carbon emissions and the various development priorities they face. The draft ILC guidelines refer to the special situation and needs of developing countries, but stop short of spelling out what that implies in respect of the obligations of countries to protect the atmosphere.

Furthermore, the ILC has explicitly excluded the principle of common but differentiated responsibilities and the related question of the provision of assistance to developing countries from the scope of its work.

As for regional agreements, a differentiated approach to responsibilities has not been a priority for the CLRTAP regime, as its parties historically comprised a relatively homogenous set of countries in terms of development. In addition, its model, in which the burden of emissions reductions is divided among countries on the basis of the cost-effectiveness of actions, can serve as an example of differentiated responsibilities. The expansion of the CLRTAP regime to Eastern Europe, the Caucasus and Central Asia has raised the question of accommodating the differing capacities of new members to reduce their emissions. This issue arguably remains unresolved as new members have been slow to join protocols that contain binding commitments, despite the availability of flexibilities in schedules to meet those obligations.⁴⁶ The ASEAN Agreement on Transboundary Haze Pollution acknowledges that cooperation and coordination among its parties to prevent and monitor transboundary haze pollution takes place 'in accordance with their respective needs, capabilities and situations'.⁴⁷ However, this provision is not specified any further.

All these examples show that the discussion around the interpretation of the principle of common but differentiated responsibilities is in its infancy in international law on air pollution. By way of comparison, within the climate change and ozone regimes, the discussion has been much more extensive, although a resolution is not yet in sight. The principle of common but differentiated responsibilities and respective capabilities has, for instance, been integral to the international climate regime, and its interpretation has evolved over time from a strict approach to differentiating between groupings of countries to the more flexible and nuanced approach reflected in the architecture of the Paris Agreement.⁴⁸ Similarly, the principle of common but differentiated responsibilities plays a prominent role in the ozone regime, including the recent Kigali amendment to the Montreal Protocol.⁴⁹ As Mark Roberts explains, under the amendment, the schedule for phasing down HFCs requires developed countries to take earlier action while allowing more time for developing countries to meet their commitments.⁵⁰ In addition, the Montreal Protocol imposes an obligation on developed countries to provide technology transfer and financial resources to developing countries to enable them to meet their commitments.⁵¹

In sum, customary international law, and in particular the principles of international environmental law, is relevant to air pollution.

⁴⁰Sand (n 33).

⁴¹A Byrne, 'Trouble in the Air: Recent Developments under the 1979 Convention on Long-Range Transboundary Air Pollution' (2017) *Review of European, Comparative and International Environmental Law* 210.

⁴²S Alam and L Nurhidayah, 'The International Law on Transboundary Haze Pollution: What Can We Learn from the Southeast Asia Region?' (2017) *Review of European, Comparative and International Environmental Law* 243.

⁴³Paris Agreement (adopted 15 December 2015, entered into force 4 November 2016) 55 ILM 740 art 8; and UNFCCC 'Decision 1/CP.21, Adoption of the Paris Agreement' UN Doc FCCC/CP/2015/10/Add.1 (29 January 2016) para 51.

⁴⁴UNEP, *The Climate and Environmental Benefits of Controlling SLCPs in P.R. China* (UNEP 2015) 11.

⁴⁵L Sloss, 'Black Carbon Emissions in India' (IEA Clean Coal Centre 2012) 10.

⁴⁶Byrne (n 41).

⁴⁷ASEAN Agreement on Transboundary Haze Pollution (n 25) art 3(2).

⁴⁸See, for instance, J Brunnée and C Streck, 'The UNFCCC as a Negotiation Forum: Towards Common but More Differentiated Responsibilities' (2013) 13 *Climate Policy* 589; L Rajamani, 'Ambition and Differentiation in the 2015 Paris Agreement: Interpretative Possibilities and Underlying Politics' (2016) 65 *International and Comparative Law Quarterly* 493.

⁴⁹Roberts (n 6).

⁵⁰ibid.

⁵¹ibid.

Some of the principles of international environmental law are acknowledged in multilateral environmental agreements and also discussed in the ILC's project on codifying the law on atmospheric protection. These principles include the no-harm principle, the requirement for an environmental impact assessment, the need for the sustainable use of natural resources and international cooperation. Due to their sensitive nature, other principles, such as State liability and the principle of common but differentiated responsibilities, are rarely included in international legal instruments on air pollution. In any case, without a body of legal norms specifying their interpretation and implementation, the effect of these principles remains limited.

3.2 | Limitations of regional and sectoral approaches

Transboundary air pollution is addressed through a patchwork of regional instruments,⁵² most notably in the EU (see Section 4), the United Nations (UN) Economic Commission for Europe (UNECE) region and Southeast Asia. Regional action has also been taken in Latin America and the Caribbean,⁵³ Africa⁵⁴ and South Asia,⁵⁵ but such action is of a soft law nature and does not involve legally binding commitments.⁵⁶ Most of the world is, therefore, not covered by international hard law to address air pollution. Furthermore, existing regional treaties on air pollution have significant gaps in terms of their coverage of countries as well as pollutants and/or pollution sources. Aside from regional approaches, there are sectoral frameworks covering air pollution in respect of international shipping and aviation.

This section explains the limitations of regional and sectoral agreements and approaches in tackling air pollution globally, focusing on the CLRTAP and its protocols, and the ASEAN Agreement on Transboundary Haze Pollution. The measures to address air pollution in international shipping and aviation are also briefly discussed.

The CLRTAP is a framework convention that defines regional cooperation on air pollution among countries situated in the UNECE region.⁵⁷ It is complemented by a series of protocols setting national

emissions reduction targets for specific pollutants. The CLRTAP regime has evolved from addressing single pollutants (e.g., SO₂) and single problems (e.g., acid rain), to providing for a more comprehensive approach.⁵⁸ The Convention's Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone is a multi-pollutant, multi-effect instrument that sets targets for the reduction of emissions of sulphur, NO_x, ammonia, volatile organic compounds and fine PM. Its emissions ceilings are defined on the basis of critical levels, reflecting the effects on health and on the environment of exposure to pollutant concentrations in the atmosphere. Emission reductions are then divided among countries on the basis of their health and environmental impacts as well as cost-effectiveness. In meeting their commitments, countries are encouraged to use best available techniques.⁵⁹

A series of amendments to the protocols of the Convention were recently adopted. These amendments strengthen and extend the targets to 2020 and beyond, and add new pollutants.⁶⁰ For instance, the Gothenburg Protocol was amended to include emissions reduction targets for fine PM. Overall, the CLRTAP and its protocols form the most detailed regional regime concerning air pollution, and the Convention has been praised for its past effectiveness in reducing SO₂ emissions in particular.⁶¹

However, despite its many innovations, there are serious gaps in the geographical coverage of the CLRTAP regime that make it less effective than it has the potential to be.⁶² For instance, the 2012 amendments to the Gothenburg Protocol have still not entered into force, pending ratification by two-thirds of its parties. As of June 2017, the Protocol had 26 parties, and only Slovakia, Sweden and the United States had ratified the amendment.⁶³ In fact, many countries that are members of the UNECE region – which now amounts to 56 countries – are not parties to the Protocol. Incorporation of the commitments set in the amended Gothenburg Protocol into the recently adopted Directive 2016/2284⁶⁴ (the national emissions ceiling or 'NEC' Directive), however, implies that the Protocol's amendments will apply to EU Member States regardless of whether they enter into force or not.⁶⁵

Efforts are also underway to expand the CLRTAP regime beyond Western Europe and North America in the form of the establishment of a coordinating group to promote further action in the countries of Eastern Europe, the Caucasus and Central Asia. However, this has

⁵²The full list of instruments can be found in Murase (n 23) 17–19.

⁵³The Regional Action Plan for Intergovernmental Cooperation on Air Pollution for Latin America and the Caribbean was adopted by the decision by the 19th Meeting of the Forum of Ministers of Environment for Latin America and the Caribbean in 2014. It is a voluntary guide for the development of national action plans. See <<http://www.ccacoalition.org/en/resources/regional-action-plan-intergovernmental-cooperation-air-pollution-latin-america-and>>.

⁵⁴This includes the Eastern Africa Regional Framework Agreement on Air Pollution, the Southern African Development Community Regional Policy Framework on Air Pollution, the West and Central Africa Regional Framework Agreement on Air Pollution and the North African Framework Agreement on Air Pollution. See UNEP, 'Laws to Regulate Air Pollution and Protect Earth's Atmosphere' (UNEP 2015).

⁵⁵For instance, the Malé Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia (adopted 22 April 1998) <<http://www.rrcap.ait.asia/male>>.

⁵⁶B Lode, P Schönberger and P Toussaint, 'Clean Air for All by 2030? Air Quality in the 2030 Agenda and in International Law' (2016) 25 *Review of European, Comparative and International Environmental Law* 27, 35.

⁵⁷For more on the history and elements of the CLRTAP regime, see A Byrne, 'The 1979 Convention on Long-Range Transboundary Air Pollution: Assessing its Effectiveness as a Multilateral Environmental Regime after 35 Years' (2015) 4 *Transnational Environmental Law* 37; and Byrne (n 41).

⁵⁸P Sands and J Peel, *Principles of International Environmental Law* (Cambridge University Press 2012) 257.

⁵⁹Relevant guidance was adopted in 2015. See UNECE 'Guidance Document on Control Techniques for Emissions of Sulphur, NO_x, VOC, and Particulate Matter (Including PM₁₀, PM_{2.5} and Black Carbon) from Stationary Sources' UN Doc EB/ECE.EB.AIR.117 (23 January 2015).

⁶⁰Byrne (n 41).

⁶¹*ibid.*

⁶²*ibid.*

⁶³See <<https://www.unece.org/env/lrtap/welcome.html>>.

⁶⁴Directive 2016/2284/EU on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC [2016] OJ L344/1 (NEC Directive).

⁶⁵Byrne (n 41).

not been a great success thus far.⁶⁶ Byrne speculates that it is likely 'that in the short to medium term (for the next 20 years) the Eastern UNECE region will remain outside the scope of the Protocols'.⁶⁷ Difficulties in expanding the geographical reach of the CLRTAP regime illustrate the poor prospects for replicating the CLRTAP model in other regions or building on its model to develop a global treaty on air pollution.

Another major regional agreement discussed in the special issue is the ASEAN Agreement on Transboundary Haze Pollution.⁶⁸ The Agreement, which was adopted in 2002, was developed as a regional response to haze pollution from land and forest fires, and all ASEAN members have now ratified it. However, Alam and Nurhidayah suggest that the Agreement's effectiveness is limited by the ASEAN Charter under whose umbrella it exists: the Charter provides for non-interference by member States into each other's affairs.⁶⁹ This creates barriers to incorporating the obligations stemming from the Agreement on Transboundary Haze Pollution in domestic legislation, in particular if they relate to sanctions or liability for transboundary environmental harm.⁷⁰ The Agreement is different from the CLRTAP regime in that sense, as it does not set national targets for emission reductions, and instead can best be described as a regime for cooperation and prevention. It lacks provisions for State liability and a non-compliance system, prompting Alam and Nurhidayah to call it 'a somewhat toothless instrument of limited enforceability'.⁷¹ As far as air pollution sources are concerned, the Agreement addresses a specific source of pollution – land and forest fires – but it does not cover the entire range of sources. For instance, it does not cover other anthropogenic emissions from combustion engines, household and industrial solid fuel combustion.

A sectoral approach to air pollution is discussed in Kopela's contribution on international shipping.⁷² The International Maritime Organization (IMO) has adopted several regulations aiming at mitigating air pollution from international shipping: for instance, Annex VI to the MARPOL Convention contains emission control limits for specific pollutants, including SO_x, NO_x, PM and volatile organic compounds.⁷³ There are, however, significant challenges in monitoring compliance and in enforcing existing emissions standards.⁷⁴ Furthermore, there is strong opposition to the strengthening of existing regulations on the part of some IMO members who prefer 'soft' measures, for instance in the form of guidance.⁷⁵ In Kopela's view, such soft forms are less effective and often ignored.⁷⁶ Developing

new standards can also be a slow process, as illustrated by the example of regulating black carbon emissions. The slowness of the IMO has prompted unilateral and regional initiatives as well as private self-regulation schemes and standards, thereby increasing costs and complexity.⁷⁷

Another key sector from the perspective of air pollution is international aviation. Commercial aviation is expected to double in the next 20 years,⁷⁸ and emissions of air pollutants are also expected to increase.⁷⁹ However, at present, international law does not comprehensively address air pollution caused by aviation.⁸⁰ The International Civil Aviation Organization (ICAO), which is a specialized UN agency dealing with air transportation, has so far not introduced any direct regulatory measures to tackle air pollution.⁸¹ The Chicago Convention on International Civil Aviation,⁸² which led to the establishment of the ICAO, does not explicitly address the issue of environmental protection. However, in 1983 the ICAO Council established the Committee on Aviation Environmental Protection as a technical committee to assist the Council in addressing the environmental impact of aviation. In particular, the Committee assists the Council in developing International Standards and Recommended Practices,⁸³ which are included in the annexes to the Chicago Convention. Among these is the standard on aircraft engine emissions, which covers smoke (black carbon) and gaseous emissions of hydrocarbons, carbon monoxide and NO_x.⁸⁴ The ICAO is currently working on initiatives to improve local air quality, as well as developing air pollution mitigation measures.⁸⁵ However, in the face of the unprecedented growth in the aviation sector that is anticipated, the current regulatory approaches are inadequate to respond and control air pollution caused by aviation. There remains a need to address air pollution issues comprehensively; therefore, the ICAO – as the main sectoral organization – needs to strengthen its efforts in this area.

⁶⁶ibid.

⁶⁷ibid.

⁶⁸Alam and Nurhidayah (n 42).

⁶⁹ibid.

⁷⁰ibid.

⁷¹ibid.

⁷²S Kopela, 'Making Ships Cleaner: Reduction of Air Pollution from International Shipping' (2017) *Review of European, Comparative and International Environmental Law* 231.

⁷³ibid.

⁷⁴ibid.

⁷⁵ibid.

⁷⁶ibid.

⁷⁷ibid.

⁷⁸International Civil Aviation Organization (ICAO), *Global Air Transport Outlook to 2030 and Trends to 2040* (2013); and the International Air Transport Association (IATA), *20 Year Passenger Forecast* (2017).

⁷⁹The main aircraft engine emission pollutants are carbon dioxide, NO_x, SO_x, PM, soot, unburned hydrocarbons and carbon monoxide. European Aviation Safety Agency (EASA), EEA and EUROCONTR, *European Aviation Environmental Report 2016* (2016) 20.

⁸⁰P Sikorska, 'The Need for Legal Regulation of Global Emissions from the Aviation Industry in the Context of Emerging Aerospace Vehicles' (2015) 1 *International Comparative Jurisprudence* 133, 134.

⁸¹In 2016, the ICAO member States agreed on a global market-based measure to control carbon emissions from international aviation known as the Carbon Offsetting and Reduction Scheme for International Aviation. The scheme applies only to carbon dioxide. ICAO 'Assembly Resolutions A39-2, Consolidated Statement of Continuing ICAO Policies and Practices Related to Environmental Protection – Climate Change'.

⁸²Convention on International Civil Aviation (adopted 7 December 1944, entered into force 4 April 1947) 15 UNTS 295 Annex 16 (Chicago Convention).

⁸³ibid art 37. See further <<https://www.icao.int/ENVIRONMENTAL-PROTECTION/Pages/CAEAT.aspx>>.

⁸⁴Chicago Convention (n 82) Annex 16/II, Part III.

⁸⁵ICAO, 'Contaminants from Aircraft Engine Emissions' <<https://www.icao.int/environmental-protection/Pages/Contaminants.aspx>>.

3.3 | Air pollution and climate change: a grey area of international environmental law?⁸⁶

There are numerous links between air pollution and climate change policies,⁸⁷ but these are poorly integrated into international law and there is little acknowledgement of potential synergies. Recently, greater attention has been paid to SLCPs, some of which contribute to both air pollution and global warming. Reducing emissions of black carbon and methane is particularly important where SLCPs are concerned, but international law does not provide clear answers as to how such emissions are to be regulated.

Methane emissions have traditionally been covered by the UN climate change regime and are part of national reports. The Kyoto Protocol includes methane in its basket of six greenhouse gases; however, the geographical reach of its mitigation actions is limited. The Paris Agreement, in which there is greater participation in relation to climate change mitigation, does not specify which greenhouse gases it covers. It is based on a bottom-up approach to mitigation where individual countries define the action they will take and report on it through nationally determined contributions (NDCs), in which potentially any greenhouse gas or substance can be included. In fact, in their intended NDCs many countries included methane,⁸⁸ several mentioned SLCPs and some countries such as Mexico and Chile specifically mentioned black carbon.⁸⁹ At the same time, the dominant focus of the UN climate change regime has been on reducing carbon dioxide emissions while less attention has been given to methane, and black carbon (considered as an aerosol and not as a greenhouse gas) has hardly been discussed at all.

Black carbon emissions are most comprehensively covered in the Northern hemisphere. Through its 2012 amendments, the Gothenburg Protocol to the CLRTAP includes emissions reduction targets for fine PM, of which black carbon is a component. Although the black carbon component is not specified, parties are encouraged to report on its current emissions and emissions projections. However, as noted above, the 2012 amendments have not yet entered into force. In addition, action on black carbon (and methane) has been taken by the Arctic Council through the adoption of the Framework for Action on Enhanced Black Carbon and Methane Emission Reductions and, more recently, of a first collective regional goal for reducing black carbon emissions. The outputs of the Arctic Council are not legally binding. There is also an ongoing discussion – which is progressing extremely slowly – on potential regulation of black carbon emissions in international shipping under the IMO.⁹⁰ In sum, there is a clear gap in the regulation of black carbon emissions, as

no legal frameworks of global reach are currently in place to cover this pollutant.

In the absence of global regulation, other initiatives have filled the void. One example is the Climate and Clean Air Coalition (CCAC), which is a government-led voluntary initiative focusing specifically on SLCPs. Its main activities include awareness raising, capacity building and improving scientific understanding. As such, the CCAC does not engage in lawmaking activities.

4 | EU LAW ON AIR POLLUTION: INSUFFICIENT AND POORLY IMPLEMENTED

The EU's air policy is in line with the applicable international instruments and conventions. The policy aims at both the implementation of the international obligations in the field of air pollution and integration of these requirements into policies on sectors including industry, energy, transport and agriculture. Overall, the EU's air policy is a rather well-established and coherent area of environmental policy.⁹¹ EU air policy and law have undergone significant revision in recent years, which has resulted in a decrease in emissions of anthropogenic air pollutants and measurable improvements in air quality.

Despite the progress made, many Europeans are still suffering from unlawful levels of air pollution. Air pollution is the number one environmental cause of deaths in the EU, causing more than 400,000 premature deaths each year.⁹² European air pollution is also particularly detrimental to ecosystems and biodiversity, especially through eutrophication.⁹³ In the EU, the key legislation and the required regulatory framework are already in place. The EU's air policy is thus not underachieving due to a lack of rules, but rather because of poor implementation and compliance.⁹⁴ According to the European Commission, a 'better match' must be ensured between source controls, ceilings and ambient air quality standards to ensure effective compliance.⁹⁵

The EU's current air pollution policy was launched by the 2005 Thematic Strategy on air pollution,⁹⁶ although EU air policy as such dates back to the 1970s. The Thematic Strategy established the regulatory approach aiming to deliver achievement of the targets set, particularly those in the EU's Sixth Environmental Action Programme. In

⁸⁶This section draws on Y Yamineva and K Kulovesi, 'Keeping the Arctic White: The Legal and Governance Landscape for Reducing Short-Lived Climate Pollutants in the Arctic Region and Opportunities for its Future Development' (2017) (forthcoming).

⁸⁷Melamed et al (n 20).

⁸⁸UNFCCC Secretariat, 'Synthesis Report on the Aggregate Effect of the Intended Nationally Determined Contributions' (2015) UN Doc FCCC/CP/2015/7 (30 October 2015).

⁸⁹CCAC Secretariat and Institute for Governance and Sustainable Development, 'INDC SLCP Summaries' (2015) <<http://www.ccacoalition.org/en/news/15-countries-address-slcps-and-air-pollution-part-their-indcs>>.

⁹⁰Kopela (n 72).

⁹¹EEA (n 4) at 9. See also Commission (EU), 'Executive Summary of the Impact Assessment, Accompanying Document to the Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. A Clean Air Programme for Europe' SWD(2013) 532 final 2.

⁹²EEA (n 4) 60. See also Commission (n 91) 2–3.

⁹³*ibid.*

⁹⁴See also Case C-404/13, *The Queen, on the Application of ClientEarth v The Secretary of State for the Environment, Food and Rural Affairs*, ECLI:EU:C:2014:2382. This case was heard by the Court of Justice of the European Union (CJEU) and centred around the implementation of EU air quality standards and national discretion as regards implementation deadlines. The CJEU ruled that limit values that are in place to protect human health impose an obligation to achieve a certain result, i.e., Member States must take all measures necessary to secure compliance by the deadline, and that this deadline can only be postponed when acute compliance problems exist (notwithstanding the implementation of appropriate pollution abatement measures).

⁹⁵Commission (n 91) 3.

⁹⁶Commission (EU), 'Thematic Strategy on Air Pollution' (Communication) COM(2005) 446 final.

this context, and pursuant to its internal air policy, the EU agreed to 'achieve levels of air quality that do not give rise to significant negative impacts on, and risks to, human health and the environment'.⁹⁷ The EU legislative framework on air pollution follows a twin-track approach, as it can be roughly divided into instruments that deal with air quality standards and instruments that deal with sources of air pollution.⁹⁸ The key legislative instruments on air pollution within the EU are Directive 2008/50/EC⁹⁹ (the ambient air quality or 'AAQ' Directive) and the NEC Directive. In addition, source-specific legislation is in place to address, for example, industrial emissions, road and off-road vehicle emissions, and fuel quality standards.¹⁰⁰ The legislative framework also fulfils the EU's obligations under international conventions such as the CLRTAP.

The majority of the earlier EU legislation on air quality has now been codified under the current AAQ Directive, which has been in force since 2010. The overall purpose of the Directive is to define and establish objectives for ambient air quality that avoid, prevent or reduce harm to human health and the environment as a whole. The AAQ Directive sets limits for the concentrations of a variety of pollutants in the air.¹⁰¹ The Directive also contains provisions covering the assessment of the ambient air quality in Member States on the basis of common methods and criteria, the maintenance of ambient air quality where it is good and its improvement in other cases, and the promotion of cooperation between the Member States.¹⁰²

The revised NEC Directive establishes strict national emission reduction commitments for pollutants¹⁰³ responsible for acidification, eutrophication and ground-level ozone pollution. The Directive requires the drawing up, adoption and implementation of national air pollution control programmes, and the monitoring and reporting of emissions of the pollutants covered by the Directive.¹⁰⁴ Unlike its predecessor, the new NEC Directive also covers black carbon. While the Directive does not set national emission reduction commitments for black carbon, it requires Member States to 'prioritize' emission reduction measures for black carbon when taking action on PM.¹⁰⁵ The Directive accordingly incorporates the language on black carbon from the 2012 amendments to the Gothenburg Protocol. The

proposal for the NEC Directive also included methane emissions, but following persistent opposition from the European Council, methane was eventually removed from the Directive's scope, because of 'possible overlaps with commitments related to greenhouse gas emission reduction targets'.¹⁰⁶

The EU's targets and rules regarding air quality are significantly impaired due to poor implementation and poor compliance with the existing regulatory framework. The EU's air quality standards suffer from widespread non-compliance, and there are also significant variations in the stringency with which different Member States apply air quality standards.¹⁰⁷ In 2013, the European Commission proposed a Clean Air Policy Package¹⁰⁸ for Europe. This builds on the framework established by the Thematic Strategy, but principally aims at achieving full compliance with existing air quality legislation by 2020. The revision of the NEC Directive was one of the main legislative improvements brought forward by the Clean Air Policy Package. It was quite clear that the standards laid down in the AAQ Directive were insufficient in relation to the WHO's air quality guidelines and that the AAQ Directive also required revision. However, the Package ultimately did not introduce any changes to the Directive, as further tightening of the existing EU air quality standards was considered to be ineffective if introduced before substantial cuts in air pollution from the main sources would become a reality. In addition, as the Member States are already struggling with the implementation of the existing requirements, making the regulatory framework even tighter would be unlikely to make meeting air quality objectives any easier.¹⁰⁹ Therefore, the Clean Air Policy Package focused on setting stricter and more detailed emission limits through the revised NEC Directive and on achieving compliance with existing air quality standards by 2020.¹¹⁰

However, despite the positive achievements of the Clean Air Policy Package, EU air policy remains inefficient and unsatisfactory in relation to impacts on air quality, and this is not solely due to weak implementation and compliance. Even if existing legislation were to be implemented in full, very significant negative impacts on public health and the environment would continue to be suffered within the EU. Air pollution is projected to decline further in future years, but beyond 2030 only slow progress can be expected.¹¹¹ Furthermore, while the revised NEC Directive is definitely a step in the

⁹⁷The objective was established by the Sixth Environmental Action Programme, see Article 7 of Decision No 1600/2002/EC of the European Parliament and of the Council laying down the Sixth Community Environment Action Programme [2002] OJ L242/1. The objective was confirmed again in the 7th Environment Action Programme, see paragraph 28(d) of 'Priority objective 1' under 'Thematic Priorities' in the Annex to Decision No 1386/2013/EU of the European Parliament and of the Council on a General Union Environment Action Programme to 2020 'Living Well, within the Limits of our Planet' [2013] OJ L354/171.

⁹⁸Jans and H Vedder, *European Environmental Law: After Lisbon* (Europa Law Publishing 2012) 419.

⁹⁹Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe [2008] OJ L152/1 (AAQ Directive).

¹⁰⁰Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC [1998] OJ L350/58.

¹⁰¹AAQ Directive (n 99) art 5; see also Section A of Annex II of the Directive.

¹⁰²*Ibid* art 1. See also Jans and Vedder (n 98) 419–420.

¹⁰³The pollutants covered by the Directive are SO₂, NO_x, non-methane volatile organic compounds, ammonia and fine PM. See NEC Directive (n 64) art 1.

¹⁰⁴*Ibid* art 1 and 6.

¹⁰⁵*Ibid* art 6(2)(c).

¹⁰⁶Council (EU), Proposal for a Directive of the European Parliament and of the Council on the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC, 29 May 2015, Interinstitutional File: 2013/0443 (COD). The industrial farming lobby was particularly active in getting methane removed from the draft Directive. See also A Lazarus, 'Clearing the Air: A Critical Guide to the New National Emission Ceilings Directive' (European Environmental Bureau 2017) 17–18.

¹⁰⁷Commission (EU), 'A Clean Air Programme for Europe' (Communication) COM(2013) 918 final 2. As of October 2016, the Commission had begun infringement proceedings against 19 of the 28 Member States, amounting to a total of 29 sets of ongoing infringement proceedings. C Nagl, J Schneider and P Thiele, 'Implementation of the Ambient Air Quality Directive' (Policy Department A: Economic and Scientific Policy 2016) 11. See also Jans and Vedder (n 98) 422.

¹⁰⁸Commission (n 107).

¹⁰⁹See, e.g., *ibid* 4; Commission (EU), 'Questions and Answers on the EU Clean Air Policy Package' (18 December 2013) 3.

¹¹⁰Lazarus (n 106) 34; Commission (n 107) 3.

¹¹¹Commission (n 107) 5. See also EEA, 'Air Pollution' (15 November 2016) <<https://www.eea.europa.eu/soer-2015/europe/air>>.

right direction, the Directive introduced particular flexibilities to help Member States to comply with their national emission reduction commitments. These flexibilities are controversial, as they could undermine the new ambition level introduced by the revised NEC Directive.¹¹²

Furthermore, in her contribution to the special issue, Čavoški argues that the poor performance of the EU's air policy could also be negatively affected by regulatory choices made in *other* policy sectors. In Čavoški's view, the overriding interest in reducing carbon dioxide emissions in the context of EU climate policy has led to a disconnect between the regulatory approaches to air quality and vehicle emission standards, which, she explains, has led to too little regulatory attention being paid to other dangerous vehicle emissions such as emissions of NO_x and PM. The Volkswagen emissions scandal ('Dieselgate')¹¹³ perfectly illustrates the problems that may arise as a result of a lack of appropriate regulatory attention. In 2015, the US Environmental Protection Agency found that Volkswagen had intentionally programmed turbocharged direct injection diesel engines to detect when they were being tested, changing the performance accordingly to improve results as regards the vehicles' output of NO_x. Although both the United States and Europe have set increasingly demanding standards, the US authorities have been more concerned about NO_x than carbon dioxide emissions. The opposite is true in Europe, as EU environmental policy favours carbon dioxide reductions. Diesel vehicles are only produced by European manufacturers, which means that this policy also provided domestic producers with an important competitive advantage. Because of this regulatory imbalance, Volkswagen's cars emitted up to 40 times the level of nitrous oxide permissible in the United States. Therefore, the 'quick adoption of diesel automobiles in Europe is a fascinating case study that involves preference changes and imitation of a general technology, perhaps unintended consequences of emissions standards, industrial and trade protection policies'.¹¹⁴

The best intentions do not always produce the best results. Governing complex environmental challenges such as climate change in a multi-level political system with overlapping needs and interests comes with a significant downside if a well-designed regulatory framework fails to effectively integrate other environmental objectives, such as the European air quality objectives. Even when major greenhouse gases originate from the same sources as air pollutants, many Member States' climate mitigation policies are quite separate from their air quality policies and ignore the interconnection between them. A coordinated abatement strategy could provide an effective means of securing benefits for both policy areas.¹¹⁵

5 | A STORY OF FAILURE OR OF HOPE? THE FUTURE OF GLOBAL COOPERATION ON AIR POLLUTION

The previous sections suggest that there are significant problems with existing legal approaches to tackling air pollution at the international and EU levels.

International law does not provide a comprehensive response to air pollution. First, customary international law in the form of principles of international environmental law only has limited value. States do not necessarily agree on the way in which these principles should be interpreted in relation to air pollution. The ILC's ongoing work on codifying the law of the atmosphere may provide further clarity on the way in which existing principles of international environmental law may be applied to meet the challenge of air pollution. However, as discussed above, the ILC decided to exclude from consideration certain other principles of great significance, such as the principles of State responsibility and common but differentiated responsibilities. The same sentiment towards State responsibility is reflected in regional agreements such as the CLRTAP and the ASEAN Agreement on Transboundary Haze Pollution. Although the ILC project on codifying the law on atmospheric protection offered an opportunity to develop a more holistic approach to air pollution, the ILC has not taken full advantage of this opportunity. The initial assessment that codifying the law on atmospheric protection was just 'a legal question rather than a political issue'¹¹⁶ turned out to be erroneous.

Second, principles of international law gain their full functionality when they are operationalized in treaties and other legal instruments. Thus far, not a single treaty of global significance on air pollution is in existence. Several commentators have called for a global approach to air pollution either by developing a global air pollution treaty or by widening the geographic base of existing regional frameworks.¹¹⁷ For instance, United Nations Environment Programme (UNEP) contemplated the accession of States from outside the UNECE region to the CLRTAP and its protocols.¹¹⁸ However, many experts agree that in the short term it is unlikely that a global framework on air pollution will emerge through the development of a new treaty or by widening the geographic scope of existing treaties.¹¹⁹

The previous sections have also shown that regional approaches have significant gaps, in terms both of the countries and of the pollutants or pollution sources that are covered, and that these regional approaches show weak implementation and poor compliance with existing rules. Furthermore, the network of regional arrangements in place does not address the global impacts of air pollution, including climate impacts and intercontinental air pollution. Pollutant-based approaches also make it impossible to take an integrated response to air pollution and to take into account the multiple effects of air

¹¹²See, for instance, Lazarus (n 106) 17, 24–25.

¹¹³Dieselgate is discussed in detail in A Čavoški, 'The Unintended Consequences of EU Law and Policy on Air Pollution' (2017) *Review of European, Comparative and International Environmental Law* 255.

¹¹⁴E Miravete, M Moral and J Thurk, 'Innovation, Emissions Policy, and Competitive Advantage in the Diffusion of European Diesel Automobiles' (2015) <<http://voxeu.org/article/diffusion-european-diesel-automobiles>>.

¹¹⁵Nagl et al (n 107) 63.

¹¹⁶As was suggested at the start of the ILC's work. See Murase (n 23) at 7.

¹¹⁷See, for instance, T Holloway, A Fiore and M Galanter Hastings, 'Intercontinental Transport of Air Pollution: Will Emerging Science Lead to a New Hemispheric Treaty?' (2003) 37 *Environmental Science and Technology* 4535; UNEP (n 54).

¹¹⁸UNEP (n 54) 7.

¹¹⁹Stockholm Environment Institute, 'Atmospheric Pollution: Developing a Global Approach' (Stockholm Environment Institute 2010); PH Sand and JB Wiener, 'Towards a New International Law of the Atmosphere?' (2016) 7 *Goettingen Journal of International Law* 195, 197.

pollutants. Moreover, there is currently no strategic policy oversight of air pollution at the global level, which makes it difficult both to balance air pollution against other normative priorities and to build synergies with the policy domains of climate change and health.

The lack of a holistic approach to air pollution in international law and the apparent lack of appetite among States for its development does not imply that the future of global cooperation on air pollution is bleak. In fact, there is some evidence to the contrary. Air pollution has featured prominently on the domestic policy agendas of several countries.¹²⁰ Similarly, more attention has been drawn to air pollution at the global level, as evidenced by the extensive discussion of the issue by UNEP¹²¹ and the activities of international organizations, such as the BreatheLife campaign. There is, therefore, a clear willingness among States and multiple stakeholders to cooperate on air pollution globally.¹²²

However, such cooperation is likely to follow non-treaty-based approaches, and take the form of soft law or governance approaches of a non-legal nature. Non-treaty-based approaches to global cooperation on air pollution can take several shapes, including the following: (i) a framework document adopted under an international organization without a requirement for national acceptance; (ii) a collection of framework documents coordinated by several organizations; (iii) a work programme under an international organization; (iv) a global platform for knowledge exchange and capacity building; and/or (v) a regularly convened global forum. These formats of global cooperation reflect more general tendencies in international law – and especially international environmental law – towards non-legally binding, non-punitive and facilitative approaches.¹²³ The recently concluded Paris Agreement is a clear example of these trends: its binding requirements are of a procedural nature, while its substantive commitments are defined at the national level. In the EU context, the role of non-regulatory approaches to air pollution has also been raised as non-regulatory support measures are considered necessary to enhance capacity and cooperation at all levels of governance.¹²⁴

This does not mean that non-treaty-based approaches to global cooperation are unproblematic. Their effectiveness is unclear because, as distinct from treaty-based law, they are not accompanied by detailed non-compliance and enforcement procedures. The various institutions involved may have limited levels of financing, administrative support and infrastructure and this may hinder their capacity to implement the soft law norms they create or to perform the governance function assigned to them. If soft law is developed outside of traditional treaty structures, this further raises the question of an accountability deficit due to the 'circumvention of formalities under international and/or domestic procedures'.¹²⁵

At the same time, in the absence of a realistic prospect for developing a global treaty on air pollution, non-treaty-based approaches remain the second-best option. Their use will help build a common understanding among countries of the state of the problem, its impacts and potential solutions, and may therefore pave the way for international norms of a hard law nature in the future. Indeed, non-treaty-based approaches in the form of soft law and governance initiatives coexist and actively interact with traditional law¹²⁶ and can fill the gaps that traditional structures are too slow or unable to fill. Furthermore, non-treaty-based approaches have significant advantages in themselves as they are more flexible and adaptable than the approaches offered by traditional international law.¹²⁷ Non-treaty-based approaches may even be built on a more solid consensus among stakeholders, including those beyond States.¹²⁸ This is the case because they typically speak to a much wider group of actors than national governments and thus have the capacity to inspire action on and responsibility for better air quality among businesses, cities, subnational governments and citizens.

Several international organizations have the ability to play a significant role in advancing the global agenda on air pollution, notably UNEP, the WHO and the World Meteorological Organization (WMO). UNEP has already been paying more attention to air pollution¹²⁹ and has encouraged governments to take action to improve air quality.¹³⁰ However, further strengthening of UNEP's role is dependent on resources and on the institutionalization of the issue in its work programme.¹³¹ The WMO is instrumental in improving air quality monitoring and data collection especially in developing countries where air quality and emission data remains unavailable or scarce. The WHO has also been active in raising awareness about the impacts of poor air quality on health. Global cooperation on air pollution may also be enhanced through the framework of the Sustainable Development Goals (SDGs). Addressing air pollution is interconnected with achieving several SDGs, in particular health (Goal 3),

¹²⁰For example, China has been fighting urban air pollution: see Z Lijian, T Xie and J Tang, 'How China's New Air Law Aims to Curb Pollution', *China Dialogue* (30 December 2015). In countries like the United Kingdom and France, environmental nongovernmental organizations have been active in bringing court cases against their governments for failure to address air pollution: see 'Government Seeks Clear Air Plan Delay', *BBC News* (24 April 2017); ClientEarth, 'Highest Legal Authority in France Orders Government to Clean Up Air Pollution' (13 July 2017) <<https://www.clientearth.org/highest-legal-authority-france-orders-government-clean-air-pollution/>>.

¹²¹United Nations Environment Assembly of the United Nations Environment Programme, 'Resolution 1/7: Strengthening the Role of the United Nations Environment Programme in Promoting Air Quality' UN Doc UNEP/EA.2/6 (8 March 2016).

¹²²For instance, the CCAC has been able to secure the support of 54 countries, 17 international organizations and 45 nongovernmental organizations since its establishment in 2012. See the CCAC website <<http://www.ccacoalition.org/en>>.

¹²³For instance, Pauwelyn, Wessel and Wouters observe a surge in various regulatory schemes beyond intergovernmental approaches across the realms of health, finance, security and the environment. Such international lawmaking is informal in terms of outputs (guidelines, best practices), process (networks or loosely organized fora) and actors (multiple stakeholders). See J Pauwelyn, RA Wessel and J Wouters (eds), *Informal International Lawmaking* (Oxford University Press 2012).

¹²⁴In the EU, a range of non-regulatory measures are presented to support policy implementation, targeting, in particular, the urban, agriculture and international dimensions. These measures include enhancing the local and regional air quality management toolbox through new public-oriented indicators in an urban context. Commission (n 107) 6, 9.

¹²⁵J Pauwelyn, 'Informal International Lawmaking: Framing the Concept and Research Questions' in J Pauwelyn et al (n 123) 15.

¹²⁶RA Wessel, 'International Governmental Organizations as Non-State Actors' in M Noortmann, A Reisch and Cedric Ryngaert (eds), *Non-State Actors in International Law* (Hart 2015) 185.

¹²⁷J Pauwelyn, RA Wessel and J Wouters, 'When Structures Become Shackles: Stagnation and Dynamics in International Lawmaking' (2014) 25 *European Journal of International Law* 733.

¹²⁸*ibid.*

¹²⁹In 2015–2016, UNEP undertook a number of activities on awareness raising, scientific assessment, capacity building and cooperation. See Resolution 1/7 (n 121).

¹³⁰*ibid.*

¹³¹*ibid.*

sustainable cities (Goal 11), sustainable energy (Goal 7) and climate change (Goal 13). In fact, clean air has been incorporated in several targets and indicators for achieving the SDGs.¹³² Covering all UN member States, the SDGs framework elevates the issue of air pollution from a national/regional level to the global level.¹³³ Importantly, its indicators cover PM pollution which is not covered by any global treaty.¹³⁴ The framework promotes the mainstreaming of air quality into national development strategies and plans, and in that sense follows a proactive rather than a reactive approach to specific emissions.¹³⁵

The key characteristic of future cooperation on air pollution is likely to be that it will have a non-binding and flexible nature. Such an approach would provide for broad participation among States and allow for the engagement of nongovernmental stakeholders including international organizations, civil society, private sector and cities. The informal character of such cooperation would also allow for the testing of new governance approaches and for experimentation, which would be difficult to implement within the rigid structures of traditional international law.¹³⁶ A cooperative arrangement could have a network structure linking to existing regional and global arrangements of both a legal and a non-legal nature: the various institutions and organizations would remain autonomous and themselves define their specific contributions.¹³⁷ At the same time, it is important to ensure that such an arrangement provides a holistic response through a single interface, meaning that the various actors can confer to discuss their experiences and decide upon the general direction to be taken in respect of further action on air pollution.

Several elements demand inclusion in the scope of future global cooperation on air pollution. First, there is a clear need to strengthen the knowledge base on air pollution and its global effects through scientific assessments and collaboration. Part of the challenge is that of improving data collection and monitoring, particularly in developing countries. Hence, capacity-building activities are essential and may eventually lead to coordinated reporting. Second, there is a

wealth of experience with air pollution policies that countries can share with each other with a view to mutual learning, exchange of best practices and the highlighting of policy failures. Some countries will also need assistance in national policy development. Third, global cooperation on air pollution also calls for some type of policy dialogue on how to address the global impacts of air pollution.

6 | CONCLUSIONS

In summary, the traditional legal approaches currently available under international law do not provide a comprehensive response to air pollution. The current legal landscape has developed on an ad hoc basis and as a result there are serious gaps in geographical and pollutant/pollution source coverage. Furthermore, international law does not address the global impacts of air pollution. At the same time, developing a global treaty on air pollution seems unlikely in the near future. At EU level, the legal framework also fails to guarantee improved air quality due to problems of low ambition and poor implementation and compliance. That said, there is hope for strengthened global cooperation to tackle the persistent air pollution crisis as the issue is rising high in national and global policy agendas. Such cooperation is likely, however, to be of a non-binding, facilitative and flexible nature.

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¹³²UN Statistical Commission 'Revised List of Global Sustainable Development Goal Indicators. Annex III to Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators' UN Doc E/CN.3/2017/2 (15 December 2016).

¹³³Lode et al. (n 56) 36.

¹³⁴ibid.

¹³⁵ibid 38.

¹³⁶For instance, experimentalist governance has been suggested as an appropriate mode of governance to deal with novel challenges and uncertainty as it relies on participatory and collaborative processes and open framing of problems and solutions as well as iterative learning and reflection. See CF Sabel and J Zeitlin, 'Experimentalist Governance' in D Levi-Faur (ed), *The Oxford Handbook of Governance* (Oxford University Press 2012) 169; G De Búrca, RO Keohane and CF Sabel, 'Global Experimentalist Governance' (2014) 44 *British Journal of Political Science* 477.

¹³⁷There are recent examples of such arrangements at the global level. For instance, the CCAC brings together States, intergovernmental organizations, the private sector, research institutions and civil society. It operates through 11 initiatives focusing on key areas of SLCP action, where specific activities are defined by partners of the Coalition, including awareness raising, capacity building and knowledge exchange. At the same time, the CCAC is led by governments, which meet in a high-level assembly to discuss the strategic direction of the Coalition's work. See <<http://www.ccacoalition.org/en>>. Other examples in the area of international environmental governance include the Strategic Approach to International Chemicals Management, which is a policy framework for chemical safety with multi-stakeholder involvement; and the Collaborative Partnership on Forests, which is a voluntary partnership of international organizations involved in activities related to sustainable forest management. See <<http://www.saicm.org/>> and <<http://www.cpfweb.org/73947/en/>>.

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