

Clean Air for All by 2030? Air Quality in the 2030 Agenda and in International Law

Birgit Lode, Philipp Schönberger and Patrick Toussaint*

Air pollution poses one of the greatest human health threats in the twenty-first century, accounting for an estimated 7 million premature deaths annually. In the light of this, global efforts to promote clean air are ever more important and should feature among the key priorities on the agenda of the international community. The universal 2030 Agenda for Sustainable Development, adopted in September 2015 by the United Nations General Assembly, offers an important opportunity to tackle air pollution at a global scale. Stressing the importance of air pollution as a human health hazard, this article examines to what extent air quality is covered by the 17 Sustainable Development Goals (SDGs), and provides an analysis of the added value of the 2030 Agenda vis-à-vis existing international regulatory instruments addressing air pollution. Even though the SDGs do not include a stand-alone goal on air quality, the article concludes that the 2030 Agenda, by establishing clean air as an integral element of the principle of sustainable development, not only constitutes an important contribution to international (hard) law focusing on the atmosphere, but also sets out a much needed complementary pathway of tackling the issue in the absence of a global agreement on air pollution.

INTRODUCTION

For many low- and middle-income countries, air pollution reaching hazardous levels is commonplace. This is not only limited to indoor air pollution,¹ but the situation with respect to outdoor air pollution can also be severe. To give but one example, in November 2015 the United States embassy in Beijing, China reported that the level of fine particulate matter (PM_{2.5}) harmful to human health had exceeded 400 micrograms per cubic

metre (µg/m³)² – more than 17 times the level the World Health Organization (WHO) considers to be safe.³ Both indoor and outdoor air pollution are much less severe in Europe, which has one of the most modern and comprehensive sets of environmental standards in the world. Looking at a time span from the 1970s to the present day, in Europe emissions of specific air pollutants have been reduced significantly.⁴ Yet, even in Europe reducing air pollution remains important. Here, too, air pollutant concentrations are still higher than recommended for the protection of human health, with a significant proportion of Europe's population living in areas, especially cities, where exceedances of air quality standards occur.⁵

It is in the light of this reality that the United Nations Environment Programme's (UNEP) new Governing Council, the United Nations Environment Assembly (UNEA),⁶ at its first session in June 2014 in Nairobi, Kenya, adopted a resolution on air quality, noting that air pollution contributes to 7 million premature deaths each year globally, a burden of disease that, by now, may exceed the burdens of malaria, tuberculosis and AIDS combined. Moreover, it highlighted the need to build upon existing global, regional and sub-regional cooperative efforts on air pollution.⁷ Less than one year later, the WHO's World Health Assembly in May 2015 adopted a resolution addressing the health impact of air

* Corresponding author: Birgit Lode.
Email: birgit.lode@iass-potsdam.de

¹ See WHO, *Burden of Disease from the Joint Effects of Household and Ambient Air Pollution for 2012* (WHO, 2014), found at: <http://www.who.int/phe/health_topics/outdoorair/databases/AP_jointeffect_BoD_results_March2014.pdf>; UNEP, 'Post 2015 Note #3: Human Health and the Environment' (April 2014), found at: <<http://www.unep.org/roap/Portals/96/UNEP-Post-2015-Note-3.pdf>>; J. Lelieveld *et al.*, 'The Contribution of Outdoor Air Pollution Sources to Premature Mortality on a Global Scale', 525:7569 *Nature* (2015), 367.

² See 'Chinese Authorities Boost Smog Alert Level in Beijing', *BBC News* (29 November 2015), found at: <<http://www.bbc.com/news/world-asia-china-34957373>> and T. Phillips, 'Airpocalypse Now: China Pollution Reaching Record Levels', *The Guardian* (9 November 2015).

³ WHO, *Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide: Global Update 2005: Summary of Risk Assessment* (WHO, 2006), found at: <http://apps.who.int/iris/bitstream/10665/69477/1/WHO_SDE_PHE_OEH_06.02_eng.pdf>.

⁴ European Environment Agency (EEA), *The European Environment – State and Outlook 2015: Synthesis Report* (EEA, 2015), at 21.

⁵ EEA, 'Air Pollution', found at: <<http://www.eea.europa.eu/themes/air/intro>>.

⁶ See Change of the Designation of the Governing Council of the United Nations Environment Programme (UNGA Resolution A/RES/67/251, 7 March 2013) which formally changed the designation of UNEP's Governing Council to the 'United Nations Environment Assembly'.

⁷ UNEA Resolution 1/7, Strengthening the Role of the United Nations Environment Programme in Promoting Air Quality, in: Proceedings of the United Nations Environment Assembly of the United Nations Environment Programme at its first session, Annex I (UNEP/EA.1/10, 2 September 2014).

pollution, '[n]oting with deep concern that indoor and outdoor air pollution are both among the leading avoidable causes of disease and death globally, and the world's largest single environmental health risk'.⁸

In view of the fact that this resolution explicitly states that 'air pollution reduction is an integral element of global sustainable development',⁹ it is little surprising that the post-2015 development agenda (the 2030 Agenda), adopted by the United Nations General Assembly (UNGA) in the fall of 2015,¹⁰ contains several targets and indicators addressing the issue of air quality. Hailed by United Nations (UN) Secretary-General Ban Ki-moon as a 'universal, integrated, and transformative vision for a better world',¹¹ this article argues that such a 'better world' may be characterized by successfully tackling one of the most pressing yet frequently neglected challenges humanity faces today – increasingly poor air quality.

The most recent Environmental Outlook published by the Organisation for Economic Co-operation and Development (OECD) suggests that the benefits of making further air pollution reductions in the BRICS (Brazil, Russia, India, China, South Africa) nations could outweigh its costs by 10 : 1 by 2050, while also averting at least 12% of premature deaths worldwide.¹² In addition, such reductions will cut emissions of air pollutants that contribute to climate change, also referred to as short-lived climate pollutants (SLCPs). Among these is black carbon, a particularly strong climate forcer and a major component of soot emissions from diesel vehicles and other sources. Many air pollution reduction measures also reduce greenhouse gases such as carbon dioxide (CO₂), the main driver behind long-term global climate change.¹³

About half a year has passed since the adoption of the 2030 Agenda, time to shed light on the international community's ideas of a 'better world' with respect to clean air and human health. Besides taking an in-depth look at the relevant Sustainable Development Goals (SDGs, or the Goals) and targets announced in

conjunction with the 2030 Agenda, the article will cover the legal nature and enforceability of the commitments entered into. Further, the relationship between the 2030 Agenda and existing legal agreements addressing transboundary air pollution will be investigated, assessing to what extent the 2030 Agenda complements or possibly duplicates those efforts. In conclusion, the article will present arguments to underpin the urgency of global action for air pollution abatement, and to stress the welcome addition the 2030 Agenda offers to the present international law and governance structure.

AIR QUALITY IN THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

BACKGROUND AND STATUS QUO

The development of the SDGs dates back to the year 2011, when Colombia and Guatemala tabled their proposal for consideration at the UN Conference on Sustainable Development (UNCSD, or Rio+20) in Rio de Janeiro, Brazil, in June 2012.¹⁴ At Rio+20, UN Member States agreed on a process for developing a catalogue of SDGs to build on the Millennium Development Goals (MDGs) before their expiration at the end of 2015, and anchored this mandate in the Rio+20 Outcome Document.¹⁵ In addition, the Outcome Document identified 26 priority areas for which goals and indicators could be developed, with air quality listed under the priority areas of health and sustainable cities.

In January 2013, an Open Working Group (OWG) was set up under the UNGA and tasked with developing a proposal.¹⁶ Less than three years later, on 25 September 2015, the UNGA formally adopted the 2030 Agenda for Sustainable Development.¹⁷ With the MDGs expired, the 17 SDGs with their 169 corresponding targets breathe new life into the global development agenda, rendering it more expansive in scope and universal in application. While the goals and targets have now been adopted, the development of indicators for the 169 targets, on which the implementation of the ambitious

⁸ WHO, Health and the Environment: Addressing the Health Impact of Air Pollution (Resolution WHA68.8, 26 May 2015).

⁹ *Ibid.*, at preamble.

¹⁰ Transforming Our World: The 2030 Agenda for Sustainable Development (UNGA Resolution A/RES/70/1, 25 September 2015).

¹¹ United Nations Secretary-General, 'Secretary-General's Remarks at Summit for the Adoption of the Post-2015 Development Agenda' (New York, 25 September 2015), found at: <<http://www.un.org/sg/statements/index.asp?nid=9015>>.

¹² OECD, 'Executive Summary', in: *OECD Environmental Outlook to 2050: The Consequences of Inaction* (OECD, 2012), at 19–33.

¹³ WHO, 'Frequently Asked Questions: Ambient and Household Air Pollution and Health: Update 2014' (WHO, 2014), found at: <http://www.who.int/phe/health_topics/outdoorair/databases/faqs_air_pollution.pdf>. On SLCPs, see the recent report by N. Scovronick, *Reducing Global Health Risks through Mitigation of Short-Lived Climate Pollutants: Scoping Report for Policy-makers* (Climate and Clean Air Coalition (CCAC) and WHO, 2015).

¹⁴ Rio+20: Sustainable Development Goals, Proposal by the Governments of Colombia and Guatemala for Consideration by the Participating Countries (UN Doc. LC/L.3366/Rev.1, 30 August 2011).

¹⁵ The Future We Want (UNGA Resolution A/RES/66/288, 11 September 2012). The parties recognize the 'importance and utility of a set of sustainable development goals, based on Agenda 21 and the Johannesburg Plan of Implementation, which fully respect all the Rio Principles . . . , are consistent with international law, [and] build upon commitments already made. . . . They should be coherent with and integrated into the United Nations development agenda beyond 2015 [and] the development of these goals should not divert focus or effort from the achievement of the Millennium Development Goals.' *Ibid.*, at paragraph 246.

¹⁶ *Ibid.*, at paragraph 248.

¹⁷ UNGA Resolution A/RES/70/1, n. 10 above.

2030 Agenda eventually hinges, is still underway. The final list of indicators, which is anticipated to exceed the number of targets,¹⁸ is set to be formally adopted by the UNGA at its 71st Session in September 2016.¹⁹

A CROSS-SECTORAL ISSUE IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

The crosscutting nature of the issue of air quality is highlighted in UNEA Resolution 1/7, which calls for 'efforts across sectors' and recognizes that poor air quality poses a 'growing challenge in the context of sustainable development, in particular related to health in cities and urban areas'.²⁰ The connection to health and cities is important, since air quality was predominantly discussed under these specific focal areas during the deliberations of the OWG tasked with developing the SDGs.²¹

While there is no stand-alone SDG on air quality included in the 2030 Agenda, the Agenda does contain specific goals in similar domains, namely, for clean water (Goal 6), climate (Goal 13), oceans, seas and marine resources (Goal 14), as well as for terrestrial ecosystems, forests and biodiversity (Goal 15). This is not to signify that the authors of the 2030 Agenda considered safeguarding global air quality an issue of lower priority for sustainable development. Rather, the issue runs through the whole Agenda like a connecting blue ribbon. Air quality has been incorporated into the targets and proposed indicators of the goals for health (Goal 3) and sustainable cities (Goal 11), and at least five additional SDGs contribute either directly or indirectly to securing or improving global air quality without, however, referring to the issue explicitly.

Goal 3 on health expressly addresses air pollution through its corresponding target 3.9, which seeks 'to substantially reduce the numbers of deaths and illnesses from hazardous chemical and air, water and soil pollution and contamination'.²² Similarly, target 11.6 of

Goal 11 on sustainable cities makes express reference to air quality, noting that a commitment by 2030 to reduce the per capita adverse impacts of cities on the environment requires 'special attention to air quality and municipal and other waste management'.²³

In addition, a detailed look at the remaining 15 SDGs reveals that action under at least five of them can be expected to contribute to the reduction of air pollution in one way or another. For example, SDG 7 on sustainable energy, which through its target 7.1 aims at ensuring universal access to affordable, reliable and modern energy services for everyone,²⁴ represents a goal with implicit co-benefits for air quality. According to indicator 7.1.2, progress on the target is to be measured by the percentage of the population primarily relying on clean fuels and technology.²⁵ The WHO indicates that the combustion of kerosene, one of the most heavily used fuels in household consumption, contributes significantly to indoor air pollution,²⁶ and its estimates suggest that around 1.2 billion people light their homes with simple kerosene lamps.²⁷ The promotion of clean energy solutions and a shift away from kerosene and traditional solid fuels thus offer major benefits for curbing air pollution from such sources, including the reduction of associated adverse impacts on human health. Likewise, the other targets under SDG 7 envision an increased uptake of renewable energy, energy efficiency technology, reduced carbon intensity and increased access to clean energy for developing countries.²⁸ Without exception, any efforts towards achieving these targets also have the potential to contribute to reduced levels of air pollution as they either limit or phase out conventional technology based on fossil fuels.

Similar links exist in relation to Goal 12 on sustainable consumption and production, and target 12.4 on sound environmental management of chemicals, including a significant reduction of their release to the air; in rela-

²³ Ibid., Goal 11, target 11.6.

²⁴ Ibid., Goal 7, target 7.1.

²⁵ The original indicator proposed by UNICEF referred to 'non-solid fuels', but this was amended to 'clean fuels' by the Inter-agency and Expert Group on the SDGs (IAEG-SDGs) during its second meeting in Bangkok from 26 to 28 October 2015 on the basis of an amendment proposal by the WHO. See United Nations Statistical Commission: Results of the List of Indicators Reviewed at the Second IAEG-SDG meeting (2 November 2015), found at: <<http://unstats.un.org/sdgs/files/meetings/iaeg-sdgs-meeting-02/Outcomes/Agenda%20Item%204%20-%20Review%20of%20proposed%20indicators%20-%202020%20Nov%202015.pdf>>. At the meeting, Sweden also advanced the argument that the term 'clean fuels' was easier to communicate. Ibid.

²⁶ See N.L. Lam *et al.*, 'Kerosene: A Review of Household Uses and their Hazards in Low- and Middle-Income Countries', 15:6 *Journal of Toxicology and Environmental Health, Part B: Critical Reviews* (2012), 396; and WHO, *WHO Indoor Air Quality Guidelines: Household Fuel Combustion* (WHO, 2014), found at: <http://apps.who.int/iris/bitstream/10665/141496/1/9789241548885_eng.pdf?ua=1>, at 53, Recommendation 4.

²⁷ See WHO, n. 26 above, at 1.

²⁸ UNGA Resolution A/RES/70/1, n. 10 above, Goal 7, targets 7.2, 7.3, 7.a and 7.b, respectively.

¹⁸ At the time of writing, a total of 229 indicators had been developed, with 80 categorized as requiring further work. See United Nations Statistical Commission, Report of the Inter-agency and Expert Group on Sustainable Development Goal Indicators (UN Doc. E/CN.3/2016/2, 17 December 2015).

¹⁹ UNGA Resolution A/RES/70/1, n. 10 above, at paragraph 75.

²⁰ UNEA Resolution 1/7 UNEP/EA.1/10, n. 7 above, at preamble.

²¹ Direct references to air quality and air pollution in the Rio+20 Outcome Document were only included under the thematic areas of sustainable cities and health, UNGA Resolution A/RES/66/288, n. 15 above, at paragraphs 135 and 141, respectively, and formed the basis of discussions of the OWG. The thematic area on transport makes no reference to air quality *per se*, but notes in more general terms that 'environmentally sound, safe and affordable transportation' can make a contribution to health amongst other objectives. Ibid., at paragraph 132.

²² UNGA Resolution A/RES/70/1, n. 10 above, Goal 3, target 3.9.

tion to Goal 2 on food security and sustainable agriculture in terms of emissions of air pollutants from agriculture, especially methane; regarding Goal 13 on climate action and measures to reduce greenhouse gas emissions which have the potential of yielding co-benefits for clean air;²⁹ and in relation to Goal 9 on industry, innovation and infrastructure and target 9.4, which calls for the increased adoption of clean and environmentally sound technologies, including benefits for air quality.

Considering how tightly air quality is interwoven into these different goals and targets in the SDG catalogue, its nature as a connecting blue ribbon running through the whole Agenda becomes clear. It can thus be said that the 2030 Agenda did respond to the call for efforts across sectors with regard to clean air contained in the 2014 UNEA Resolution 1/7 on air quality, as it accurately reflects the priority areas mentioned therein.

MEASURING PROGRESS: INDICATORS FOCUSING ON A SINGLE POLLUTANT?

Currently underway is the development of global SDG indicators, led by the Inter-agency and Expert Group (IAEG-SDGs, or the Group). The indicators are intended to complement the goals and targets and will play a crucial role in measuring progress made by UN Member States in achieving the SDGs by 2030.

An early draft list of proposed indicators discussed by the IAEG-SDGs suggested that the air-quality-related targets under the Goals for health and sustainable cities, targets 3.9 and 11.6, respectively, would focus on particulate matter (PM)³⁰ as a key indicator of air pollution.³¹ PM is considered one of the primary air pollutants globally responsible for significant adverse health effects,

ranging from aggravated asthma and other respiratory symptoms to increased mortality rates due to cardiovascular and respiratory diseases as well as lung cancer from short- and long-term exposure.³² The WHO estimates that approximately 3% of cardiopulmonary and 5% of lung cancer deaths worldwide are attributable to PM.³³ Furthermore, black carbon, also known as soot, a major component of PM, is of great significance to air quality due to its adverse health effects – in addition to being a very potent climate forcer.³⁴

The proposed draft is not surprising, given that atmospheric concentrations of PM – expressed in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$), and typically measured according to the size classes PM₁₀ and PM_{2.5}³⁵ – are widely used as a yardstick for assessing air quality in a defined geographic region. Nevertheless, the metric is subject to certain limitations. First, not all countries have data on PM concentrations readily available, and ground-level measurements to determine human exposure to PM in residential or commercial areas are carried out only in a limited number of locations and cities. Significant data gaps exist regarding exposure to PM in rural areas, and many developing countries only have the capacity to monitor PM₁₀, which then needs to be transposed into PM_{2.5} levels in order to provide the more human health-relevant metric.³⁶ Second, PM is not the only air pollutant with significant adverse effects on human health. In its 2005 Air Quality Guidelines (AQG), the WHO issued recommendations regarding atmospheric concentration limits for PM, sulphur dioxide (SO₂), nitrogen dioxide (NO₂) and ozone (O₃) – the so-called classical air pollutants.³⁷ Recommendations

³² According to the WHO, fine particulate matter (PM_{2.5}) is considered a stronger risk factor for mortality due to long-term exposure than coarse particulate matter (PM₁₀) and is 'associated with an increase in the long-term risk of cardiopulmonary mortality by 6–13% per 10 $\mu\text{g}/\text{m}^3$ of PM_{2.5}'. WHO, n. 31 above, at 6.

³³ *Ibid.*, at 7.

³⁴ See N.A.H. Janssen *et al.*, *Health Effects of Black Carbon* (WHO, 2012), found at: <http://www.euro.who.int/__data/assets/pdf_file/0004/162535/e96541.pdf>; and UNEP, *Near-Term Climate Protection and Clean Air Benefits: Actions for Controlling Short-Lived Climate Forcers – A UNEP Synthesis Report* (UNEP, 2011), found at: <http://www.unep.org/pdf/Near_Term_Climate_Protection_&_Air_Benefits.pdf>, at 3–5.

³⁵ PM₁₀ and PM_{2.5} describe particulate matter with a mass concentration of particles with a diameter of less than 10 μm and less than 2.5 μm , respectively. The guideline values for PM₁₀ are currently set at an annual mean of 20 $\mu\text{g}/\text{m}^3$ and 10 $\mu\text{g}/\text{m}^3$ for PM_{2.5}; see WHO, *Air Quality Guidelines: Global Update 2005* (WHO, 2006), found at: <http://www.euro.who.int/__data/assets/pdf_file/0005/78638/E90038.pdf?ua=1>, at 279, Table 7.

³⁶ See WHO, n. 1 above, at 14.

³⁷ See WHO, n. 3 above; and WHO, n. 35 above. The strategy to focus on the four 'classical' air pollutants was also advocated by France, Germany and Switzerland in the OWG deliberations in the focus area of sustainable cities and human settlements. See Open Working Group on Sustainable Development Goals, 'Encyclopedia Groupinica: A Compilation of Goals and Targets Suggestions from OWG-10' (2014), found at: <<https://sustainabledevelopment.un.org/content/documents/3698EncyclopediaGroupinica.pdf>>, at 113.

²⁹ For more information, see N. Scovronick, n. 13 above.

³⁰ Particulate matter is a mixture of particles of different masses with varying physical and chemical properties. This mixture typically contains chemical components such as sulphates, nitrates, inorganic ions, metals, particle-bound substances such as polycyclic aromatic hydrocarbons as well as biological components such as allergens and microbial compounds. See WHO Regional Office for Europe (EURO), *Health Effects of Particulate Matter* (WHO, 2013), found at: <http://www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf>, at 2.

³¹ In the list of indicator proposals of 11 August 2015, indicator 11.6.2 expressly referred to PM₁₀ and PM_{2.5} and indicator 3.9.1 referred to WHO Air Quality Guidelines (AQG) values, explained in a background note submitted by the WHO to specifically refer to levels of PM_{2.5}. See United Nations Statistical Commission, List of Indicator Proposals of 11 August 2015 (11 August 2015), found at: <<http://unstats.un.org/sdgs/files/List%20of%20Indicator%20Proposals%2011-8-2015.pdf>>, at 24; and WHO, 'Monitoring Framework for the Post-2015 Health Goals of SDGs: Targets and Indicators' (UN Doc. ESA/STAT/441/2/58A/6, 25 February 2015), found at: <http://unstats.un.org/unsd/post-2015/activities/egm-on-indicator-framework/docs/Background%20note%20by%20WHO-%20Health%20SDG%20Targets%20and%20Indicators_EGM-Feb2015.pdf>, at 4.

with additional guideline values for selected air pollutants also exist for household air pollution, incorporated in the 2010 WHO Indoor Air Quality Guidelines.³⁸ Since household levels of PM tend to be higher than ambient levels of PM, and since they pose the same hazards as their outdoor counterparts, the guideline values for PM contained in the AQG also apply to indoor spaces.³⁹

Various alternative indicators to target 3.9 have been proposed, covering additional air pollutants beyond the traditional four included in the AQG, namely, carbon monoxide (CO) and polycyclic aromatic hydrocarbons, black carbon as a component of PM, as well as ground-level ozone (smog) precursors such as volatile organic compounds (VOC) and methane (CH₄).⁴⁰ Yet, not only would adopting individual indicators for each air pollutant or air pollutant precursor lead to an undue proliferation of indicators in the final framework, but it may simply not be practicable due to the lack of available data for many countries.⁴¹ Instead, the adoption of a single indicator is preferable, capturing those air pollutants with the greatest impacts on human health, for example, by referring to the WHO AQG⁴² or another instrument of similar scope and status.⁴³

MEASURING PROGRESS: INDICATORS FOCUSING ON THE SOURCE AREA OF POLLUTION?

To complete the analysis of the inclusion of air quality in the 2030 Agenda, particular attention needs to be

³⁸ See WHO EURO, *WHO Guidelines for Indoor Air Quality: Selected Pollutants* (WHO, 2010), found at: <http://www.euro.who.int/__data/assets/pdf_file/0009/128169/e94535.pdf>. The selected pollutants include benzene, carbon monoxide (CO), formaldehyde, naphthalene, nitrogen dioxide (NO₂), polycyclic aromatic hydrocarbons, radon, trichloroethylene and tetrachloroethylene in households.

³⁹ *Ibid.*, at 4.

⁴⁰ See WHO, n. 31 above, at 20.

⁴¹ This is in line with the UN Statistical Commission's goal of developing a 'global indicator framework ... with a limited number of indicators'; see United Nations Statistical Commission, Decision 46/101, Data in Support of the Post-2015 Development Agenda, in: Report of the Forty-Sixth Session (UN Doc. E/2015/24-E/CN.3/2015/40, 27 March 2015), Section C, (I)(d).

⁴² The AQG issued by the WHO enjoy widespread recognition as an internationally applied assessment of the health effects of air pollution, based on expert evaluation of current scientific evidence. Nonetheless, it should be noted that although the WHO has legal authority to enact or enforce binding standards, the guidelines are not legally binding. Constitution of the World Health Organization (New York, 22 July 1964; in force 7 April 1948), Article 21; see S. Shubber, 'The Role of WHO in Environmental Pollution Control', 2:4 *Earth Law Journal* (1976), 363, at 372.

⁴³ An explicit reference to the AQG was originally included under indicator 3.9.1 in the list of indicator proposals of 11 August 2015 (see United Nations Statistical Commission, n. 31 above, at 24) but did not survive the second meeting of the IAEG-SDGs in October 2015, and was finally omitted from the IAEG-SDGs indicator report. See United Nations Statistical Commission, n. 18 above, at 29.

paid to the issue of classifying the air pollution in terms of source area, that is, as either indoor or outdoor air pollution.

As already mentioned, both indoor and outdoor air pollution pose major risks to human health. The WHO notes that indoor (or household) air pollution, in particular, represents the world's largest health risk (7.7% of total mortality), causing around 4.3 million deaths worldwide in 2012.⁴⁴ It may thus come as a surprise that during the development of the 2030 Agenda the issue of indoor air pollution was largely ignored. The original set of indicators proposed for inclusion in the 2030 Agenda made no reference to indoor spaces. While the draft submitted for discussion at the 11th session of the OWG still included the words 'indoor and outdoor air pollution' – wording expressly supported by several UN Member States and civil society organizations⁴⁵ – the reference was deleted at the first meeting of the IAEG-SDGs in June 2015. Instead, the indicator proposal under Goal 3, target 3.9, resulting from the same meeting, solely focused on populations in *urban areas*, effectively excluding rural households where the health impacts of indoor air pollution are considered to be most severe. An alternative proposal, aimed at measuring progress in terms of the number of deaths and cases of disability caused by *both* indoor and outdoor air pollution (as well as water, sanitation and contaminated sites), was disregarded.⁴⁶

At the second meeting of the IAEG-SDGs in October 2015, the Group expressly acknowledged that the indicator initially proposed failed to address the full breadth of the topic described by target 3.9.⁴⁷ Bowing to requests from several States, the Group finally agreed on an indicator set to measure progress on air quality in terms of the mortality rate attributed to *both source areas*, 'household and ambient air pollution'.⁴⁸

By contrast, target 11.6 under Goal 11 focuses solely on ambient air quality in cities (referring to levels of PM₁₀ and PM_{2.5} in its indicator), thereby excluding household air pollution.⁴⁹ It may be argued that in any case

⁴⁴ See WHO, n. 13 above.

⁴⁵ Cyprus, Singapore, United Arab Emirates, as well as the major groups on women, children and youth, indigenous peoples and the following civil society organizations: Partnership on Sustainable, Low Carbon Transport (SLoCat), the Psychology Coalition at the UN and the World Society for the Protection of Animals.

⁴⁶ See United Nations Statistical Commission, n. 31 above, at 24.

⁴⁷ See United Nations Statistical Commission, n. 25 above, at 11.

⁴⁸ See United Nations Statistical Commission, n. 18 above, indicator 3.9.1, at 29.

⁴⁹ *Ibid.*, indicator 11.6.2, at 37. It should be noted that the adoption of this indicator was not free from criticism. Some observers, notably the European Commission (EUROSTAT) and two other stakeholders requested that it should be revised to include further air pollutants beyond PM. For the full list of comments submitted during the three-day online consultation in November 2015, see IAEG-SDGs, 'Open Consultation on Green Indicators', found at: <<http://unstats.un.org/sdgs/iaeg-sdgs/open-consultation-2>>.

indoor air pollution is implicitly covered by Goal 7 on sustainable energy under target 7.1 and indicator 7.1.2, which relate to the use of modern energy and clean fuels in households.⁵⁰ Indeed, a substitution of traditional solid fuels and kerosene used for cooking, heating or lighting in rural households will come with significant benefits for reduced levels of indoor air pollution.⁵¹

AIR QUALITY IN INTERNATIONAL LAW

The challenges air pollution poses to human health and the environment, now addressed by the 2030 Agenda, have been a subject of international affairs for quite some time. As air-polluting substances are not bound by national borders but float freely in the atmosphere, they often cause harm to people and nature far away from where they have been released. As a consequence, the question of how to address both the sources and impacts of air pollution has raised, early on, the need for transboundary solutions.⁵² However, despite 'being the Earth's largest single natural resource',⁵³ the atmosphere is still not governed by a comprehensive legal regime comparable to that of its second-largest resource, that is, the law of the sea.⁵⁴ Instead, the body of international law governing the release of air pollutants into the atmosphere is composed of a multitude of instruments that differ not only with regard to their geographic coverage, but also with regard to the activities and substances they regulate as well as the principles and rules that apply.⁵⁵

In order to assess the benefits, potential pitfalls and duplications of the new 2030 Agenda in relation to air pollution, the following section examines how the issue has been dealt with under international environmental law thus far, and how the 2030 Agenda relates to this 'patchwork'⁵⁶ of rules and instruments.

THE CURRENT WORK OF THE INTERNATIONAL LAW COMMISSION ON THE INTERNATIONAL LAW OF THE ATMOSPHERE

At its 65th session in 2013, the International Law Commission (ILC) decided to include the topic 'protection of the atmosphere' in its programme of work.⁵⁷ Following previous attempts by, among others, the International Law Association, UNEP and the *Institut de Droit International*, to counter the fragmentation of the body of law by identifying crosscutting legal rules and principles applying to the protection of the atmosphere, the ILC has now taken up the topic and appointed a Special Rapporteur to develop a set of draft guidelines by 2020, yet without 'seek[ing] to "fill" gaps in the treaty regimes'.⁵⁸ Expectations that the project could result in the adoption of a comprehensive, unified 'law of the atmosphere' were tempered by a controversial political 'understanding' through which the ILC narrowed the scope of the project in order to avoid any interferences with ongoing political negotiations, among others, in the field of climate change.⁵⁹ According to this 'understanding', the project will not deal with issues concerning the 'liability of States and their nationals, the polluter-pays principle, the precautionary principle, [and] common but differentiated responsibilities' as well as 'specific substances, such as black carbon'.⁶⁰ This exclusion of substantial questions from the project was harshly criticized by scholars⁶¹ and even members of the ILC.⁶² Nevertheless, the first and second report of the Special Rapporteur provide cause for cautious optimism that the project – within the limits of its restricted mandate – will at least characterize 'the broad contours of an international law of atmospheric resources'⁶³ and thereby also examine (most of) the principles of international environmental law applicable to air pollution.

⁵⁰ To the knowledge of the authors this argument was also advanced by Sweden during the IAEG-SDGs deliberations during its second meeting in Bangkok from 26 to 28 October 2015.

⁵¹ The same argument was also advanced by UN-Energy in their written input to the first meeting of the IAEG-SDGs in June 2015; see UN Department of Economic and Social Affairs (DESA), Statistics Division, Statements and Related Inputs Submitted in Writing to the First Meeting of the IAEG-SDGs (UN Doc. ESA/ST/AC.300/6, 5 June 2015), found at: <<http://unstats.un.org/sdgs/files/First%20meeting%20IAEG-SDGs%20-%20June%202015%20-%20Statements%20and%20related%20inputs%20-%20updated%2030%20June%202015.pdf>>, at 27.

⁵² U. Beyerlin and T. Maruhn, *International Environmental Law* (Hart, 2011), at 145.

⁵³ S. Murase, First Report on the Protection of the Atmosphere (UN Doc. A/CN.4/667, 14 February 2014), at 54, paragraph 84.

⁵⁴ P.H. Sand and J.B. Wiener, 'Towards a New International Law of the Atmosphere?', 7:2 *Goettingen Journal of International Law* (2015), 2.

⁵⁵ See S. Murase, n. 53 above, at 8.

⁵⁶ *Ibid.*

⁵⁷ ILC, Report of the Commission to the General Assembly on the Work of its 65th Session (UN Doc. A/68/10, 2013), at 115, paragraph 168.

⁵⁸ *Ibid.*

⁵⁹ *Ibid.*

⁶⁰ *Ibid.*

⁶¹ See P.H. Sand and J.B. Wiener, n. 54 above; I. Plakokefalos, 'International Law Commission and the Topic "Protection of the Atmosphere": Anything New on the Table?' (University of Amsterdam, 2013), found at: <<http://www.sharesproject.nl/international-law-commission-and-the-topic-protection-of-the-atmosphere-anything-new-on-the-table/>>.

⁶² Statement by the Argentine ILC member E. Candiotti, ILC, Summary Record of the 3212th Meeting (UN Doc. A/CN.4/SR.3212, 30 June 2014), at 8; Statement by the Tanzania ILC member C. Peter, ILC, Summary Record of the 3247th Meeting (UN Doc. A/CN.4/SR.3247, 8 June 2015), at 12.

⁶³ See P.H. Sand and J.B. Wiener, n. 54 above, at 24.

AIR-QUALITY-RELATED PRINCIPLES OF INTERNATIONAL LAW

Against the backdrop of the large-scale industrialization processes in the twentieth century, air pollution became one of the first environmental questions to be addressed at the international level, namely in the 1941 *Trail Smelter* arbitration⁶⁴ between Canada and the United States.⁶⁵ With the finding that ‘no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another’,⁶⁶ the arbitral tribunal laid the foundations for what came to be known as the principle of ‘no harm’⁶⁷ – a core principle of international environmental law, especially with regard to transboundary pollution.⁶⁸ According to this rule,⁶⁹ which is widely recognized as customary international law,⁷⁰ States are obliged to ensure that emissions of air pollutants within their jurisdiction do not cause environmental damage to other States and to areas beyond national jurisdiction.⁷¹

In the decades following *Trail Smelter*, several other principles evolved in the field of international environmental law,⁷² almost all of which are also applicable to

the emission of polluting substances into the atmosphere; the prevention and the precautionary principles, the principle of sustainable development, the principle of cooperation and the polluter-pays principle, to name just a few. At this point, a detailed reflection on the significance of each of these principles for air pollution is outside the scope of this article. In addition, most of them will be subject to an in-depth analysis by the Special Rapporteur of the ILC.

What can be noted is that international environmental law provides a set of well-established principles that apply to the challenges posed by transboundary air pollution. However, their contribution to effectively addressing the problems associated with air pollution remains rather limited. In their quality as legal principles, they express the consensus of values and priorities of the international community as it currently stands and give guidance to States taking action on environmental issues.⁷³ Yet, unlike rules, principles do not prescribe particular State action or determine legal consequences. Rather, they aim at influencing decision making, at prompting the creation of new norms and at guiding the interpretation of existing rules.⁷⁴ In that sense, in order to be effective, they need to be substantiated through rules agreed upon by States in legally binding international agreements. The following subsections therefore examine the most important of these agreements.

THE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION

The most important international agreement on air pollution to date is the Convention on Long-Range Transboundary Air Pollution (CLRTAP, or the Convention).⁷⁵ It has been ratified by 51 parties,⁷⁶ mostly Member States of the European Union, and other European States, but also including Canada, the United States and a number of republics of the former Soviet Union. The Convention aims at reducing, preventing and controlling transboundary air pollution from new and existing sources.⁷⁷ The multilateral instrument was adopted in

⁶⁴ *Trail Smelter (United States v. Canada) Arbitration*, [1938/1941] 13 RIAA 1905.

⁶⁵ See U. Beyerlin and T. Marauhn, n. 52 above, at 145.

⁶⁶ *Trail Smelter Arbitration*, n. 64 above, at 1965.

⁶⁷ The principle is sometimes called ‘responsibility not to cause environmental damage’, see P. Sands and J. Peel, *Principles of International Environmental Law* (Cambridge University Press, 2012), at 190. It is also known as the *sic utere tuo maxime*; see J. Brunnée, ‘Sic utere tuo ut alienum non laedas’, in: R. Wolfrum (ed.), *Max Planck Encyclopedia of Public International Law* (Oxford University Press, 2012), 188.

⁶⁸ For more details on the relevance of the principle for transboundary pollution, see C. Redgwell, ‘Transboundary Pollution: Principles, Policy and Practice’, in: S. Jayakumar et al. (eds.), *Transboundary Pollution: Evolving Issues of International Law and Policy* (Edward Elgar, 2015), 11, at 13.

⁶⁹ The formulations vary across treaties, resolutions and judgements; see P. Sands and J. Peel, n. 67 above, at 195–200. For transboundary air pollution, see International Law Association (ILA), 1982 Montreal Rules of International Law Applicable to Transfrontier Pollution (60th Report, 1982), Article 3(1). However, the ILA referred the issue of long-range transboundary air pollution to a separate (though ultimately inconclusive) committee in 1982–1996.

⁷⁰ The duty to prevent transboundary environmental harm was confirmed as a [customary] ‘part of the corpus of international law’ by the International Court of Justice in its 1996 advisory opinion on nuclear weapons, and in the 1997 *Gabčíkovo-Nagymaros* case. See P. Sands and J. Peel, n. 67 above, at 196; U. Beyerlin and T. Marauhn, n. 52 above, at 40.

⁷¹ The extension to ‘areas beyond national jurisdiction’ was introduced by Principle 21 of the Stockholm Declaration on the Human Environment, found in: Report of the UN Conference on the Human Environment (UN Doc. A/CONF.48/14, 16 June 1972); it was later confirmed in Principle 2 of the Rio Declaration on Environment and Development, found in: Report of the UN Conference on Environment and Development (UN Doc. A/CONF.151/26/Rev.1 (Vol. I), 14 June 1992), Annex.

⁷² For a complete overview, see P. Sands and J. Peel, n. 67 above, at 187–235.

⁷³ See P. Sands and J. Peel, n. 67 above, at 188–190; U. Beyerlin and T. Marauhn, n. 52 above, at 37.

⁷⁴ U. Beyerlin, ‘Different Types of Norms in International Environmental Law: Policies, Principles, and Rules’, in: D. Bodansky, J. Brunnée and E. Hey (eds.), *The Oxford Handbook of International Law* (Oxford University Press, 2007), 425.

⁷⁵ Convention on Long-Range Transboundary Air Pollution (Geneva, 13 November 1979; in force 16 March 1983) (‘CLRTAP’).

⁷⁶ For the status of ratification, see <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-1&chapter=27&lang=en>.

⁷⁷ CLRTAP, n. 75 above, Article 2; J. Sliggers and W. Kakebeeke (eds.), *Clearing the Air: 25 Years of the Convention on Long-Range Transboundary Air Pollution* (UN Economic Commission for Europe (UNECE), 2004); A. Boyle, ‘Transboundary Air Pollution: A Tale of Two Paradigms’, in: S. Jayakumar et al., n. 68 above, 233, at 256.

1979 in response to the discovery of the phenomenon of 'acid rain' in Europe and North America, and came into force in 1983.⁷⁸ Comparable to the United Nations Framework Convention on Climate Change (UNFCCC), the Convention itself does not set concrete reduction commitments but rather establishes a procedural framework for cooperation⁷⁹ that facilitates the development of effective policies, strategies and measures for addressing the issue.⁸⁰

The collective efforts to combat air pollution under the CLRTAP have been fleshed out by eight protocols.⁸¹ The pollutants addressed therein are SO₂,⁸² NO_x⁸³ and VOCs,⁸⁴ persistent organic pollutants (POPs),⁸⁵ the heavy metals lead, cadmium and mercury,⁸⁶ as well as ammonia (NH₃).⁸⁷

The most recent protocol adopted under the CLRTAP is the 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone (Gothenburg Protocol). In contrast to previous protocols, it does not focus on a single substance or problem, but employs a range of mechanisms to reduce atmospheric emissions of NO_x, SO₂, VOCs and NH₃ in order to address their far-reaching environmental effects.⁸⁸ The Protocol was amended in 2012 to include national emission reduction commitments of particulate matter (PM₁₀ and PM_{2.5}).⁸⁹ Although the amendment has not yet entered

into force (for all but Annex I of the Protocol),⁹⁰ its adoption marks an important step in global air pollution policy as it is the first legally binding international agreement to address PM, including, in particular, black carbon.⁹¹

State cooperation under the CLRTAP has been widely perceived as a success, not only with regard to the East–West membership during the Cold War, but also due to its increasingly sophisticated approach, combining reduction efforts for different substances in a 'multi-effect protocol',⁹² establishing a critical loads approach⁹³ and introducing compliance mechanisms. Remarkable reductions in acidification, lead pollution and POPs have been achieved, serving as a best practice example for other international efforts and agreements in the field of air pollution abatement.⁹⁴ However, it must be noted that the geographic scope of the Convention is regional and does not include any emerging economies where, as mentioned before, air pollution has become a major problem.

THE ASEAN HAZE AGREEMENT

Another instrument of regional coverage worth mentioning which, at least to some extent, is comparable to the CLRTAP, was established in 2002 in South East Asia, where haze caused by forest fires is a major concern. At that time, the Member States of the Association of Southeast Asian Nations (ASEAN) signed the Agreement on Transboundary Haze Pollution⁹⁵ (ASEAN Haze Agreement). The agreement is a binding treaty under international law with the objective to prevent and monitor haze from forest fires by obliging States to cooperate, exchange information, facilitate

⁷⁸ See U. Beyerlin and T. Maruhn, n. 52 above, at 149.

⁷⁹ Under CLRTAP, n. 75 above, Articles 3–8, States commit to exchange information, consultation, research and monitoring.

⁸⁰ UNECE, *Strategies and Policies for Air Pollution Abatement* (UN Doc. ECE/EB.AIR/123, 2013); U. Beyerlin and T. Maruhn, n. 52 above, at 140; A. Boyle, n. 77 above, at 256.

⁸¹ The first such protocol provides the financing for monitoring and evaluating the transmission of air pollutants, see Protocol on Long-Term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (Geneva, 28 September 1984; in force 28 January 1988). The following seven Protocols aim at reducing and banning atmospheric emissions of specific air pollutants by establishing reduction targets and timetables.

⁸² Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent (Helsinki, 8 July 1985; in force 2 September 1987); Protocol on Further Reduction of Sulphur Emissions (Oslo, 14 June 1994; in force 5 August 1998).

⁸³ Protocol Concerning the Control of Nitrogen Oxides or their Transboundary Fluxes (Sofia, 31 October 1988; in force 14 February 1991).

⁸⁴ Protocol Concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes (Geneva, 18 November 1991; in force 29 September 1997).

⁸⁵ Protocol on Organic Pollutants (Aarhus, 24 June 1998; in force 23 October 2003).

⁸⁶ Protocol on Heavy Metals (Aarhus, 24 June 1998; in force 29 December 2003).

⁸⁷ Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone (Gothenburg, 30 November 1999; in force 17 May 2005) ('Gothenburg Protocol').

⁸⁸ See UNECE, n. 80 above, at 18; P. Sands and J. Peel, n. 67 above, at 257.

⁸⁹ 1999 Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone to the Convention on Long-Range Transboundary Air Pollution, as Amended on 4 May 2012 (UN Doc. ECE/EB.Air/114, 6 May 2013).

⁹⁰ The amendment has not yet entered into force, except for Annex I of the Protocol which sets out the definitions of critical loads and critical levels and which was amended through a decision by the Executive Body of the CLRTAP that requires no ratification by the Parties (EB Decision 2012/1, Amendment of Annex I to the 1999 Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone, UN Doc. ECE/EB.AIR/111/Add.1, 2012). In accordance with Article 13.4 of the Protocol, the amendment of Annex I was communicated to all parties to the Protocol on 7 March 2013 and entered into force on 5 June 2013. For the status of ratification, see <http://www.unece.org/env/lrtap/multi_h1.html>.

⁹¹ In the European Union, however, limit values for PM had already been established by the Directive 2008/50/EC of 21 May 2008 on Ambient Air Quality and Cleaner Air for Europe, [2008] OJ L152/1.

⁹² The Gothenburg Protocol simultaneously addresses SO₂, NO_x, VOCs and NH₃; therefore, it is also called a 'multi-effect protocol'. A. Byrne, 'The 1979 Convention on Long-Range Transboundary Air Pollution: Assessing its Effectiveness as a Multilateral Environmental Regime after 35 Years', 4:1 *Transnational Environmental Law* (2015), 37, at 49.

⁹³ *Ibid.*, at 47.

⁹⁴ *Ibid.*, at 57 and 64; P. Sands and J. Peel, n. 67 above, at 246–247; A. Boyle, n. 77 above, at 257.

⁹⁵ ASEAN Agreement on Transboundary Haze Pollution (Kuala Lumpur, 10 June 2002; in force 10 November 2003).

research, and monitor and prevent fires at the national level.⁹⁶ Yet, despite having a positive influence on national legislation,⁹⁷ the agreement has fallen short of expectations with regard to constituting an effective means for addressing the problem.⁹⁸ First of all, Indonesia, where the vast majority of forest fires arise, did not ratify the agreement until October 2014. Thus, progress was thwarted during the first 11 years of the agreement.⁹⁹ Moreover, even after Indonesia's accession to the treaty, the instrument has failed to catalyse effective action, as demonstrated by one of the most severe haze episodes from fires in the history of Indonesia in the fall of 2015.¹⁰⁰ Unlike the CLRTAP, the ASEAN Haze Agreement was never substantiated through protocols and programmes 'that would give it some bite'.¹⁰¹ Adhering to the 'ASEAN Way',¹⁰² the language of the agreement's provisions is very weak, implementation is left to national authorities and the instrument does not provide for a compliance mechanism.¹⁰³

OTHER INTERNATIONAL AGREEMENTS ON AIR POLLUTION

The CLRTAP and the ASEAN Haze Agreement are two major 'patches' of an international treaty practice on air pollution which has been adequately described as a 'patchwork'¹⁰⁴ of numerous instruments, covering very specific aspects of the problem.¹⁰⁵ Bilateral agreements are few,¹⁰⁶ underscoring the regional and global character of the problem. Besides the two major agreements highlighted above, the remaining multilateral instruments can be roughly divided into three groups. First, some agreements address specific substances, as do for instance the recently adopted Minamata Convention on Mercury (which has yet to enter into force)¹⁰⁷ and the Stockholm Convention on POPs.¹⁰⁸ A second set of multi-

lateral treaties focuses on air pollution from the transport sector, namely, from ships,¹⁰⁹ aircraft¹¹⁰ and motor vehicles.¹¹¹ Finally, within the European Union, where air pollution has increasingly become a subject of Community legislation, several directives establish uniform rules with regard to national emission ceilings,¹¹² wheeled vehicles,¹¹³ industrial emissions¹¹⁴ and air quality standards.¹¹⁵

Additional efforts directed at a regional regulation of the issue include those taken under the auspices of UNEP in South Asia,¹¹⁶ East Africa,¹¹⁷ South Africa,¹¹⁸ and West and Central Africa.¹¹⁹ Yet, all of them merely constitute political declarations and policy frameworks with a soft law character, and none of them has resulted in a legally binding treaty to date.

COMPLETING THE PICTURE: SDGS CONCERNING AIR QUALITY

ADDED VALUE OF THE SDGS CONCERNING AIR QUALITY

The review of existing environmental agreements on air pollution has shown that, so far, the issue has primarily been addressed on a regional level. Under the CLRTAP, a multilateral regime has been established that

⁹⁶ Ibid., Articles 2–17.

⁹⁷ L.M. Syarif, 'Evaluating the (In)effectiveness of ASEAN Cooperation against Transboundary Air Pollution', in: S. Jayakumar *et al.*, n. 68 above, 295, at 325.

⁹⁸ Ibid.; A. Boyle, n. 77 above, at 259; N. Nurhidaya, S. Alam and Z. Lipman, 'The Influence of International Law upon ASEAN Approaches in Addressing Transboundary Haze Pollution in Southeast Asia', 37:2 *Contemporary Southeast Asia* (2015), 183, at 200.

⁹⁹ See <http://haze.asean.org/?page_id=187>.

¹⁰⁰ G. Monbiot, 'Indonesia is Burning', *The Guardian* (30 October 2015).

¹⁰¹ See A. Boyle, n. 77 above, at 259.

¹⁰² See N. Nurhidaya *et al.*, n. 98 above, at 184, 189 and 203.

¹⁰³ For more details on the strengths and weaknesses of the agreement, see L.M. Syarif, n. 97 above.

¹⁰⁴ See S. Murase, n. 53 above, at 8.

¹⁰⁵ For an overview, see *ibid.*, at 17–20.

¹⁰⁶ The first report of Special Rapporteur S. Murase lists a total of seven bilateral agreements concerning air pollution; see *ibid.*, at 19.

¹⁰⁷ Minamata Convention on Mercury (Kumamoto, 10 October 2013; not yet in force).

¹⁰⁸ Stockholm Convention on Persistent Organic Pollutants (Stockholm, 22 May 2001; in force 17 May 2004), Annex C.

¹⁰⁹ Protocol 1997 (Annex VI – Regulation for the Prevention of Air Pollution from Ships; in force 19 May 2005), International Convention for the Prevention of Pollution from Ships (London, 1973, as amended by Protocol 1978 relating thereto; in force 2 October 1983).

¹¹⁰ Convention on International Civil Aviation (Chicago, 7 December 1944; in force 4 April 1947), International Standards and Recommended Practices, Annex 16 on Environmental Protection.

¹¹¹ Agreement Concerning the Establishment of Global Technical Regulations for Wheeled Vehicles, Equipment and Parts which Can Be Fitted and/or Used on Wheeled Vehicles (Geneva, 25 June 1998; in force 25 August 2000).

¹¹² Directive 2001/81/EC of 28 October 2001 on National Emission Ceilings for Certain Atmospheric Pollutants, [2001] OJ L309/22.

¹¹³ Directive 2007/46/EC of 5 September 2007 Establishing a Framework for the Approval of Motor Vehicles, [2007] OJ L263/1.

¹¹⁴ Directive 2010/75/EU of 24 November 2010 on Industrial Emissions, [2010] OJ L334/17.

¹¹⁵ Directive 2008/50/EC, n. 91 above.

¹¹⁶ Malé Declaration on Control and Prevention of Air Pollution and its likely Transboundary Effects for South Asia (Malé, 20 March 1998), found at: <https://thimaaveshi.files.wordpress.com/2009/10/male-declaration_98.pdf>.

¹¹⁷ Nairobi Agreement (2008) – Eastern Africa Regional Framework Agreement on Air Pollution (Nairobi, 23 October 2008), found at: <http://www.sei-international.org/gapforum/regions/East_Africa/Eastern_Africa_Air_Pollution_Agreement.pdf>.

¹¹⁸ Lusaka Agreement (2008) Southern African Development Community (SADC) Regional Policy Framework on Air Pollution (Lusaka, 7 March 2008), found at: <http://www.unep.org/urban_environment/PDFs/SADC-LusakaAgreement.pdf>.

¹¹⁹ Abidjan Agreement (2009) – West and Central Africa Regional Framework Agreement on Air Pollution (Abidjan, 22 July 2009), found at: <http://www.unep.org/urban_environment/PDFs/BAQ09_AgreementEn.pdf>.

comprises many countries of the northern hemisphere and has led to specific reduction commitments, whereas other attempts to date have not resulted in concrete obligations to reduce the release of air pollutants to the atmosphere. Against this background, questions arise as to the relationship between the air-quality-related Goals in the 2030 Agenda and the existing legal framework, especially the CLRTAP, and the extent to which the respective SDGs can add value to effectively address the global challenge of air pollution in the future.

Adopted by the UNGA, the 2030 Agenda is a non-binding resolution. From an international law perspective, the SDGs framework included therein thus constitutes a mere political declaration. And indeed, States have not expressed their willingness to be bound by an international obligation with legal force when they signed the resolution containing the 2030 Agenda. Therefore, any failure to achieve the set Agenda remains without legal consequences at the international level. Nonetheless, with regard to the global challenge of air pollution, the SDGs can make several important contributions to international (hard) law focusing on the atmosphere, and beyond.

DIFFERENT SCOPES OF PROTECTION: SDGS, CLRTAP AND THE ASEAN HAZE AGREEMENT

The most obvious advantage of the 2030 Agenda over the existing legal instruments lies in its geographic scope. As soft law instruments generally tend to be more inclusive, the SDGs were adopted unanimously by the UNGA and thus apply to all 193 UN Member States. The CLRTAP, by contrast, remains a regional regime, unable to satisfy the 'urgent need' for global answers to a global problem.¹²⁰ When the issue of hemispheric pollution became more prominent in the 1990s, attempts were undertaken to open the Convention to States outside the UN Economic Commission for Europe, in particular, countries in East Asia.¹²¹ Several commentators have highlighted the need for expansion,¹²² however, concerns about legal implications and protracted

negotiations have impeded a geographic expansion thus far.¹²³ Similarly, the ASEAN Haze Agreement only covers a region comprising 10 countries in South East Asia. In this respect, the SDGs represent a valuable complement to the present legal architecture by taking the issue to the international level, and by requesting *all* nations to take effective action to reduce emissions of air pollutants.

Moreover, regarding their content it is important to note that even though all of the frameworks presented above broadly address the challenge of air pollution, the substances covered by the SDGs, the CLRTAP and the ASEAN Haze Agreement are neither identical, nor do they coincide with respect to their foci on different causes of the problem. While, as presently formulated, the relevant SDG indicators that address air quality refer directly to PM and only indirectly to other air pollutants,¹²⁴ to date, the CLRTAP and its protocols primarily cover gaseous substances.¹²⁵ The ASEAN Haze Agreement, in turn, does not focus on specific pollutants, but aims at combating forest fires as one specific source of air pollution. To better understand how the 2030 Agenda and existing legal instruments are related, it is necessary to take a more detailed look at the substances covered.

As explained above, SDG 11 addresses air quality in terms of PM concentration, a central indicator to measure the level of air pollution. As mentioned before, high PM concentrations, which include the hazardous pollutant black carbon, are associated with adverse health effects. Actions to reduce the concentration of PM thus not only contribute to more sustainable cities, but also provide important benefits for human health under Goal 3. Yet, in addition to PM, various other air pollutants affect human health – especially in cities – which, for pragmatic reasons, were not included in the respective indicator. As a result, the scope of SDG 11 is restricted to the PM aspect of air pollution. In turn, Goal 3 and its respective indicator refer to air pollution in broad terms and do not draw upon a specific polluting substance. However, since the objective of Goal 3 lies in improving and safeguarding human health, it can be assumed that,

¹²⁰ GAP Forum, 'Atmospheric Pollution: Developing a Global Approach', Discussion Paper 2 (Stockholm Environment Institute, 2010), found at: <<http://www.sei-international.org/gapforum/reports/discussionpaper1.pdf>>.

¹²¹ UNECE, Possibilities for Opening the Convention (UN Doc. ECE/EB.AIR/2006/8, 29 September 2006), found at: <<http://www.unece.org/fileadmin/DAM/env/documents/2006/eb/EB/ece.e-b.air.2006.8.e.pdf>>; A. Byrne, n. 92 above, at 57.

¹²² S. Marsden and E. Brandon, *Transboundary Environmental Governance in Asia* (Edward Elgar, 2015), at 232. Brachtl discusses the geographic expansion of the Convention as one of three options to arrive at a global air pollution regime; M. Brachtl, 'Capitalizing on the Success of the Long-Range Transboundary Air Pollution (LRTAP) Regime to Address Global Transboundary Air Pollution', in: L.E. Suskind and W.R. Moomaw (eds.), *XVI Papers on International Environmental Negotiation* (PON Books, 2005), 1, at 1–3.

¹²³ The 2012 Amendment to the Gothenburg Protocol and the 2012 Amendment to the 1998 Aarhus Protocol on Heavy Metals introduced some flexibilities, which could facilitate the future accession of countries in Eastern Europe, the Caucasus and central Asia. However, the Amendments have been ratified by only one and three States respectively, and are hence far from entering into force. See <http://www.unece.org/env/lrtap/multi_h1.html> and <http://www.unece.org/env/lrtap/hm_h1.html>.

¹²⁴ Direct references to PM are currently only included in indicator 11.6.2 to Goal 11. See previous discussion and United Nations Statistical Commission, n. 18 above, indicator 11.6.2, at 37.

¹²⁵ The only exception are heavy metals addressed in the Aarhus Protocol on Heavy Metals, n. 86 above, which often concentrate in particles of PM_{2.5} or even PM₁₀.

at least indirectly, all air pollutants with detrimental health effects fall within its scope.

The CLRTAP, on the other hand, until recently focused on gaseous pollutants and did not explicitly deal with PM.¹²⁶ This may be due to the fact that the early protocols to the CLRTAP concentrated primarily on the environmental impacts of acidifying pollutants, while potential health effects received adequate attention in the protocols only after the year 2000.¹²⁷ Taking into account that the 2030 Agenda emphasizes PM (expressly so in the indicators to Goal 11), while the Gothenburg Protocol deals with the other three 'classical air pollutants' (SO₂, NO_x and ground-level ozone¹²⁸), the efforts complement instead of duplicate each other. Moreover, even though the Gothenburg Protocol's amended version of 2012 now includes PM, so that, once in force, PM would become an area where the SDGs and the CLRTAP overlap, one needs to bear in mind that to date only Sweden has ratified this amendment.¹²⁹

The CLRTAP can thus be regarded as a valuable instrument contributing to the achievement of SDGs 3 and 11. Furthermore, as it addresses various air pollutants not included in the SDG indicators, continuous implementation of the Convention is set to make a significant contribution to improving the air quality in the regions of its Member States. Furthermore, while the most recent amendment to the Gothenburg Protocol still lacks the necessary quorum of ratifications and thus legal force, the 2030 Agenda already calls upon States to take effective action to reduce PM emissions, including black carbon, as stated in indicator 11.6.2 for Goal 11.

The ASEAN Haze Agreement on the other hand, as already mentioned, does not address specific pollutants. 'Haze' or 'smoke' from combustion of biomass is composed of a variety of substances ranging from gaseous pollutants to PM. As to the added value of the ASEAN Haze Agreement, any progress of its parties towards ending air pollution from forest fires in the region will constitute a considerable contribution to the achievement of the 2030 Agenda in the region – not only with respect to its air-quality-related Goals, but also regard-

ing those on sustainable industry, innovation and infrastructure (Goal 9), sustainable consumption and production (Goal 12), climate action (Goal 13)¹³⁰ and biodiversity (Goal 15). One should bear in mind that forest fires are only one of many sources of air pollution. Emissions of PM and gaseous substances resulting from combustion engines, household and industrial solid-fuel combustion as well as other anthropogenic sources are not covered by the ASEAN Haze Agreement. In this sense, the 2030 Agenda also broadens the scope of action to tackle the challenge of air pollution in the region of the ASEAN States.

DIFFERENT APPROACHES: SDGS, CLRTAP AND THE ASEAN HAZE AGREEMENT

Apart from their geographic scope and the type of pollutants and sources they address, several other fundamental differences between the 2030 Agenda and international agreements addressing the issue of air quality are worth highlighting.

As a 'soft law' instrument, the 2030 Agenda differs substantially from the 'hard law' CLRTAP in terms of compliance and enforcement mechanisms. First, the Convention includes mechanisms aimed at ensuring that the parties to the Convention fulfil their obligations. Second, as the CLRTAP constitutes a legally binding international agreement, generally speaking, the failure of State parties to comply with their obligations under the Convention and its protocols results in legal responsibility, and their inaction may be subject to international dispute settlement, including through the International Court of Justice (ICJ).¹³¹ While the Convention itself does not contain provisions on compliance,¹³² the protocols adopted since 1994 have included a non-compliance procedure.¹³³ In 1997, an Implementation Committee in charge of reviewing compliance by parties was established, making recommendations to the Executive Body of the Convention.¹³⁴ The 2030 Agenda lacks comparable institutional arrangements for

¹²⁶ Except for the Protocol on Heavy Metals, *ibid.*

¹²⁷ WHO, *Health Risks of Particulate Matter from Long-Range Transboundary Air Pollution* (WHO, 2006), at 1.

¹²⁸ The 1999 Gothenburg Protocol does not deal with ground-level ozone directly, but addresses NO_x and VOCs, which are important precursors of ground-level ozone; see Gothenburg Protocol, n. 87 above, preamble, paragraph 23; E. von Schneidmeyer *et al.*, 'Ground-Level Ozone – A Neglected Problem', IASS Policy Brief (Institute for Advanced Sustainability Studies, 2015), at 3.

¹²⁹ It should be noted that the EU has already included emissions of PM in its emission inventory reports under the CLRTAP, despite not yet having ratified the amendment of the Gothenburg Protocol. See EEA, European Union emission inventory report 1990–2013 under the UNECE Convention on Long-Range Transboundary Air Pollution (LRTAP) (EEA Technical Report No. 8/2015), at 8 and 17, found at: < <http://www.eea.europa.eu/publications/lrtap-emission-inventory-report> >.

¹³⁰ Forest fires release large amounts of carbon dioxide (CO₂). During the fires in Indonesia in 2015, the CO₂ emissions exceeded Germany's total annual emissions; see C. Mooney, 'How Indonesia's Gigantic Fires are Making Global Warming Worse', *The Washington Post* (15 October 2015).

¹³¹ Protocol on Further Reduction of Sulphur Emissions, n. 82 above, Article 12; Protocol on Organic Pollutants, n. 85 above, Article 12; Gothenburg Protocol, n. 87 above, Article 11.

¹³² See C. Redgwell, n. 68 above, at 43.

¹³³ Protocol on Further Reduction of Sulphur Emissions, n. 82 above, Article 7; Protocol on Heavy Metals, n. 86 above, Article 9; Protocol on Organic Pollutants, n. 85 above, Article 11; Gothenburg Protocol, n. 87 above, Article 9.

¹³⁴ Decision 1997/2 Concerning the Implementation Committee (UN Doc. ECE/EB.AIR/53, Annex III), as amended by Decision 2012/25 on Improving the Functioning of the Implementation Committee (UN Doc. ECE/EB.AIR/113/Add1).

enforcement and compliance. Moreover, as a State's failure to achieve the SDGs does not constitute a breach of international law, existing international dispute settlement mechanisms such as the ICJ cannot be called upon either. Thus, there is no sanction regime to force States to comply with the 2030 Agenda. Instead, it builds upon voluntary commitments of the Member States and a monitoring, reporting and review mechanism to stimulate State action and review the progress made.

Another important characteristic of the 2030 Agenda is its proactive approach. While legally binding instruments such as the CLRTAP are rather reactive in nature and focus on the omission or prevention of a particular behaviour, namely, the release of pollutants into the atmosphere, under the SDG framework States agree to take action, and commit themselves to work towards the achievement of a common agenda centred on the principle of sustainable development. Under the 2030 Agenda, implementation will depend on voluntary initiatives taken at the national level, responding to specific national circumstances and levels of development. Through this 'bottom-up' approach, the international community succeeded in establishing an agenda that is much more ambitious than what could realistically have been achieved in negotiations for a legally binding agreement. Finally, with the SDGs a more inclusive process was initiated, assuring that no State is 'left behind'.¹³⁵

CONCLUSION

Are we thus on the right track towards a 'better world', with clean(er) air for everybody by the year 2030? In any case, the recent UNEA and WHO resolutions, together with the 2030 Agenda succeeded in underpinning the urgency of global action for air pollution abatement. Even though the SDGs' language in many places could have been more ambitious and more concrete, their universal nature as well as their awareness-raising function, coupled with the fact that air pollution now indeed constitutes an integral element of the principle of sustainable development, make the 2030 Agenda a very welcome addition to the present international environmental law and governance structure.

One may argue that the 2030 Agenda merely constitutes a non-binding soft law framework with no proper enforcement and compliance mechanism. Yet, the discussions in preparation for the 21st Conference of the Parties (COP21) to the UNFCCC in December 2015, which culminated in the adoption of the Paris Agreement, many of which happened in parallel with the negotiations of the SDG framework, revealed the difficulty behind the task of concluding a global, legally binding agreement on complex environmental issues –

especially when it comes to the protection of a common good, the global atmosphere. Thus, unlike in the field of climate change, although urgently needed,¹³⁶ a global agreement on air pollution is still a distant reality.¹³⁷

Against this background, the air-quality-related Goals in the 2030 Agenda constitute an important addition to existing international agreements on air pollution. The international community has acknowledged the global scope of the issue – and that of PM exposure in particular – and recognized that clean air forms an integral part of the principle of sustainable development.¹³⁸ As a global agenda for action, the SDGs are an inclusive soft law instrument demanding action and cooperation by all nations, and in this regard they may even pave the way for a future legally binding international agreement on air pollution, a law of the atmosphere.

Birgit Lode is a postdoctoral researcher at the Institute for Advanced Sustainability Studies (IASS) in Potsdam, Germany, where she directs the 'Environmental Law and Institutions for Air, Climate, and Sustainability' (ELIAS) project. She is a regular guest lecturer at the Law Faculties of the University of Potsdam and Technische Universität Dresden, Germany.

Philipp Schönberger is a former ELIAS team member. He holds a BA in International Relations from Technische Universität Dresden and is currently enrolled at the Law Faculty of Humboldt University, Berlin, Germany.

Patrick Toussaint is an ELIAS project scientist. He holds an LLM from University College London, and a Master of Environmental Technology and International Affairs, jointly awarded by the Diplomatic Academy of Vienna and the Vienna University of Technology, Austria.

¹³⁵ UNGA Resolution A/RES/70/1, n. 10 above, at preamble.

¹³⁶ See GAP Forum, n. 120 above. Generally on the need for a global agreement on air pollution, see S. Marsden and E. Brandon, n. 122 above, at 232; M. Bracht, n. 122 above, at 1–3.

¹³⁷ As Sand and Wiener point out, the atmospheric commons continues to be regulated by a fragmented 'regime complex'; P.H. Sand and J.B. Wiener, n. 54 above, at 2 and 4.

¹³⁸ For an earlier assessment of this important principle of international law, see, e.g., B. Lode, 'Die internationale Finanz-Corporation: Nachhaltige Entwicklung im Rahmen der Förderung Privater Unternehmen', 19 *Schriften zum Transnationalen Wirtschaftsrecht* (2012), 384.