



# POLICY BRIEF

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## Strengthening the Linkages Between Air Pollution and the Sustainable Development Goals

### Main Messages

- 📶 Air pollution is included in the SDGs but it is not clearly highlighted in the SDGs' structure.
- 📶 Air pollution should be highlighted more prominently and systematically, since globally 7 million people a year die prematurely due to poor air quality. Few issues have a more significant impact on human development.
- 📶 Air pollution is explicitly mentioned in 3 of the 17 SDGs (1 target each) but not in a systematic way. Nevertheless, air pollution is closely related to nearly all of the other SDGs, including those on hunger, health, water, energy, growth and jobs, infrastructure, cities, sustainable consumption and production, climate, water, and land, even though these linkages are not specifically mentioned.
- 📶 Part of the reason that these linkages are not visible is that the structure of the SDGs includes and mixes air pollution's causes, effects, and solutions. The SDG structure also emphasizes air pollution as an issue for cities without clearly considering its effects on rural households, crops, vegetation, water, or transboundary impacts.
- 📶 This policy brief presents an easy-to-understand illustration of air pollution's linkages with the SDGs, both stated and unstated.
- 📶 This policy brief makes suggestions to the air pollution community on how to promote the incorporation of air pollution control measures into plans to implement the SDGs at the local, national, regional and global levels.
- 📶 Many elements of SDGs focus on solutions to air pollution, such as sustainable consumption, cities, and transport systems, etc., and clean production. SDGs provide an opportunity to promote more integrated approaches in order to strengthen synergies

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and avoid trade-offs between air pollution control plans and other SDG implementation programs. This will help strengthen sustainability at all levels.

- 📶 It will be particularly important for the air pollution community to recognize air pollution’s interlinkages with the other SDGs since a growing amount of financial, technological and capacity building support is likely to flow to areas that are more visible than clean air in the SDGs.
- 📶 The air pollution community’s extensive knowledge of modelling the impacts of different forms of air pollution could also help the broader development community see how an integrated approach to the SDGs can be operationalized.

## I Introduction

This policy brief analyzes the position of air pollution in the SDGs, and makes recommendations for how air pollution could be better integrated into SDG implementation. The SDGs, with 17 goals, 169 targets, and even more indicators,<sup>1</sup> were criticized by some for having too many goals and lacking a clear sense of priorities.<sup>2</sup> However, this policy brief argues that although air pollution is responsible for 7 million premature deaths per year, it was not well emphasized, suggesting that the SDGs are not as

comprehensive as they seem. Although the SDGs themselves have already been agreed, this policy brief concludes that there is still room to incorporate air pollution more concretely and systematically in the SDG implementation process, especially at the regional, national, and local levels. It is hoped that this policy brief can promote better understanding of the SDGs within the air pollution community, and better understanding of air pollution within the SDG community.

## 2 Air Pollution’s Position in the Formal Structure of SDGs

The structure of the SDGs has three main parts: headline goals, targets, and indicators.<sup>3</sup> With 17 goals, 169 targets, and an even larger number of indicators yet to be decided (229 as of February 2016), the SDGs indeed seem to offer a comprehensive roadmap towards sustainable development. However, an examination of air pollution’s position in the structure shows that it is not well-emphasized. Air pollution is mentioned in three places, but its position is not very prominent and the references are scattered and not systematic.

First, there is no headline goal on air pollution. Certainly, air pollution is related to nearly all of the goals, as will be discussed below. However, the words air pollution or similar terms do not appear in any of the headline goals. The climate change goal (13) could be related to the broader concept of air environment,<sup>4</sup> but it does not directly incorporate non-climate related forms of air pollution.<sup>5</sup> Goal 13 and its targets also do not incorporate climate related air pollution, particularly short-lived climate pollutants (SLCPs) such as and tropospheric ozone (O<sub>3</sub>) and black carbon (BC). This omission is important since

BC is classified by the WHO as a Group I human carcinogen. The latest research suggests that air pollution and climate change should be managed in an integrated fashion, as many of their sources are similar, while some air pollutants, like the SLCPs, also have near-term warming effects on the climate.<sup>6</sup>

Second, air pollution is specifically mentioned in three targets: health (Goal 3), cities (Goal 11), and sustainable consumption and production (SCP) (Goal 12). However, in all three cases, air pollution shares these targets with other issues. No target is solely focused on air pollution. The text of these three targets is presented in Table 1. Of course, since many of these pollutants are interlinked in terms of both causes and effects, it makes sense to address them through integrated approaches which explicitly consider the synergies and trade-offs between the different goals.<sup>7</sup> Integrated approaches are specifically called for in the area of water (Target 6.5) but this is not mentioned in relation to air pollution. So, until concrete implementation plans are developed, it is difficult to see how much they would actually focus on air pollution.

**Table 1** SDGs which Directly Mention Air Pollution

Goal (Target)	Text
<b>3.9 (Health)</b>	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and <u>air, water and soil pollution</u> and contamination
<b>11.6 (Cities)</b>	By 2030, reduce the adverse per capita environmental impact of cities, including by paying <u>special attention to air quality</u> and municipal and other waste management
<b>12.4 (SCP)</b>	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their lifecycle, in accordance with agreed international frameworks, and significantly reduce their <u>release to air, water and soil</u> in order to minimize their adverse impacts on human health and the environment

Third, air pollution is indirectly related to six other targets, although it is not specifically mentioned in their text. Three of these targets – concerning land and water ecosystems and general pollution (6.3, 6.6, and 15.1) – are influenced by acid deposition, which is caused by air pollution.<sup>8</sup> The text of these targets is shown below in Table 2 below. Two of the targets – relating to industry and cities – focus on solutions which could help to reduce air pollution. Target 9.4 calls for upgrading infrastructure, enhancing resource efficiency, and adopting clean and environmentally sound technologies and processes. Clearly this may include technologies and processes to reduce air pollution, although specific countries and other actors might not necessarily interpret the target

in this way, since air pollution is not mentioned specifically. Target 11.2 calls for sustainable transport systems, which would make important contributions to reducing air pollution, although air pollution is not mentioned specifically. Target 13.2 calls for the integration of climate change measures into national policies, strategies and planning. Theoretically, this could include co-benefit measures such as those recommended by the Climate and Clean Air Coalition (CCAC), which are aimed at simultaneously addressing both air pollution and climate change, by focusing on SLCPs.<sup>9</sup> Formally, however, Goal 13 specifically refers to the UNFCCC, which does not cover most SLCPs.

**Table 2** SDG Targets Related to Air Pollution, but Not Directly Mentioning Air Pollution

Goal (Target)	Text	Air Pollution Relationship
<b>6.3 (Water)</b>	By 2030, <u>improve water quality by reducing pollution</u> , eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	Acid deposition
<b>6.6 (Water)</b>	By 2020, <u>protect and restore water-related ecosystems</u> , including mountains, forests, wetlands, rivers, aquifers and lakes	Acid deposition
<b>9.4 (Industry)</b>	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of <u>clean and environmentally sound technologies and industrial processes</u> , with all countries taking action in accordance with their respective capabilities	Solutions
<b>11.2 (Cities)</b>	By 2030, provide access to safe, affordable, accessible and <u>sustainable transport systems</u> for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	Solutions
<b>13.2 (Climate)</b>	<u>Integrate climate change measures</u> into national policies, strategies and planning	Could consider co-benefits, SLCPs
<b>15.1 (Land)</b>	By 2020, ensure the conservation, <u>restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services</u> , in particular forests, wetlands, mountains and drylands, in line with <u>obligations under international agreements</u>	Acid deposition

Fourth, air pollution is also directly mentioned in only two proposed indicators relating to the two targets which specifically refer to air pollution (under the goals on health and cities) as of the time that research was conducted for this brief. Air pollution could be indirectly

included in one other indicator under the health goal, which is related to water and soil pollution, since air pollution contributes to water and soil pollution through acid deposition.<sup>10</sup> These indicators are presented in Table 3.

**Table 3 SDG Indicators Related to Air Pollution**

Target	Indicators
<b>3.9 (Under Health) By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination</b>	<ul style="list-style-type: none"> <li>• 3.9.1. Mortality rate attributed to <u>household and ambient air pollution</u>. (directly mentioned)</li> <li>• 3.9.2. Mortality rate attributed to “<u>hazardous chemicals, water and soil pollution and contamination</u>” (indirect – for example related to acid rain)</li> </ul>
<b>11.6 (Under Cities) By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management</b>	<ul style="list-style-type: none"> <li>• 11.6.2. Annual mean levels of <u>fine particulate matter (i.e. PM<sub>2.5</sub> and PM<sub>10</sub>)</u> in cities (population weighted) (directly mentioned)</li> </ul>

Moreover, it is important to note that the goals and targets only discuss air pollution in general. They do not refer to any specific pollutants such as sulfur oxides (SO<sub>x</sub>), nitrous oxides (NO<sub>x</sub>), particulate matter (PM), volatile organic compounds (VOCs), heavy metals, etc., all of which may have adverse effects on health, water, land, and cities. This is different from the approach generally taken by the air pollution community which generally focuses on specific pollutants and their diverse causes and effects. The broader approach taken by the SDGs has two main advantages. First, it avoids an overly narrow focus on a single pollutant, which may not have the same

prioritization everywhere. Second, by taking this holistic view, it enables a potentially more efficient and effective integrated approach focusing on multiple pollutants.<sup>11</sup>

This issue is illustrated by the proposed indicators. One of the indicators, 11.6.2, refers specifically to only one pollutant, PM. Certainly PM is now a priority in many cities around the world. But it is not the only air pollution problem, and efforts to reduce PM by itself may be less effective and less cost-efficient than a more integrated approach addressing multiple pollutants simultaneously.

### 3 Broad Linkage between Air Pollution and the SDGs in Substance

Other SDGs and targets are broadly linked to air pollution in substance, even though these linkages are not explicitly mentioned in the text. These are outlined below in Table 4. Poor people are often especially exposed to air pollution,<sup>12</sup> so in this sense, reducing air pollution will contribute to Goal 1 (poverty), and Goal 10 (inequality). In particular, women from poor families suffer from indoor air pollution from cookstoves, so measures to address this would contribute to greater gender equality (Goal 5). Air pollution reduces crop yields and agricultural productivity,<sup>13</sup> so reducing air pollution would contribute to Goal 2 (reducing

hunger). Education is a cross-cutting goal, since it would contribute to all of the other goal areas, and it could also contribute to reducing air pollution. The energy goal (7) includes both renewable energy and energy efficiency, both of which would reduce air pollution. Targets under Goals 8, 9, and 12 on growth and employment, infrastructure, and SCP broadly call for cleaner production methods and technologies as well as improved resource efficiency and decoupling economic growth from environmental degradation. All of these would contribute to reducing air pollution from industry, which is specifically mentioned in Target 12.4,

but not in the other targets under Goal 12. Goal 16 is also very broad, covering peace, inclusivity, justice, better institutions, rule of law, equal access to justice, and greater accountability. Any of these elements

could encourage stronger laws and policies to reduce air pollution, as well as enhance implementation of existing laws and policies.

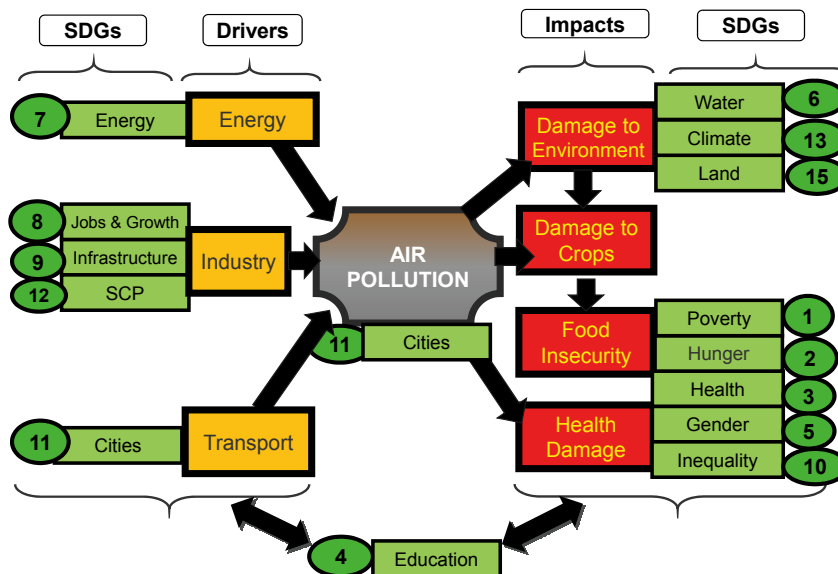
**Table 4 Broad Linkages between Air Pollution and SDGs**

Goal	Linkage
<b>1. Poverty</b>	<ul style="list-style-type: none"> <li>Poor people tend to suffer more from air pollution. (Target 1.4: equal rights to natural resources -- like clean air; Target 1.5: build resilience, reduce vulnerability to environmental shocks)</li> </ul>
<b>2. Hunger</b>	<ul style="list-style-type: none"> <li>Air pollution reduces crop yields and agricultural productivity.</li> </ul>
<b>4. Education</b>	<ul style="list-style-type: none"> <li>Education contributes to reducing air pollution and its effects.</li> </ul>
<b>5. Gender equality</b>	<ul style="list-style-type: none"> <li>In some countries, women suffer more from air pollution, especially indoor air pollution from cook stoves.</li> </ul>
<b>7. Energy</b>	<ul style="list-style-type: none"> <li>Renewable energy (Target 7.2), energy efficiency (7.3), R&amp;D (7.a), and sustainable energy infrastructure (7.b.) are expected to reduce air pollution.</li> <li>Energy access (7.1) could increase air pollution if not implemented sustainably.</li> </ul>
<b>8. Growth &amp; employment</b>	<ul style="list-style-type: none"> <li>Target 8.4 calls for improved resource efficiency and decoupling economic growth from environmental degradation. This would contribute to reducing air pollution.</li> </ul>
<b>9. Infrastructure</b>	<ul style="list-style-type: none"> <li>Targets 9.1, 9.2, and 9.4 call for industrialization and infrastructure to be "sustainable, with increased resource use efficiency and greater adoption of clean and environmentally sound technologies." This would contribute to reducing air pollution.</li> </ul>
<b>10. Inequality</b>	<ul style="list-style-type: none"> <li>Poor people tend to suffer more from air pollution. So reducing air pollution would reduce inequality.</li> </ul>
<b>12. SCP</b>	<ul style="list-style-type: none"> <li>Sustainable production would help reduce air pollution (all targets).</li> <li>Removal of fossil fuel subsidies (Target 12.c) would help to reduce air pollution.</li> </ul>
<b>16. Peace, inclusivity, justice, institutions</b>	<ul style="list-style-type: none"> <li>Promoting the rule of law and equal access to justice (16.3) and development of effective, accountable, and transparent institutions at all levels (16.6) could help to strengthen air pollution-related laws and policies and improve their enforcement.</li> </ul>

Therefore, broadly speaking, air pollution is related in some way to all but one of the SDGs as outlined in Tables 1-4. Oceans (Goal 14) are generally not highlighted as being related to air pollution, although they are very important for climate change. Goal 17, on means of implementation and partnerships, is not discussed here since it is related to all of the goals.

and impacts of air pollution. Figure 1 illustrates this classification scheme, along with their relationships with specific SDG areas, and it maps the linkages, with all related SDG areas, including direct, indirect, and broad. Goal 11 on cities is the only one which directly mentions actual air pollution levels, although without linking to drivers or impacts. Goal 4, on education, may contribute to solutions as well as understanding the nature of sources and impacts.

These linkages can be broadly classified into drivers



**Figure 1** Relation of SDGs to Air Pollution's Drivers and Impacts

The main drivers of air pollution are generally considered to be energy, industry, and transport.<sup>14</sup> Thus, the headline goals influencing the drivers are mainly the ones related to energy, industry, production, and infrastructure (Goals 7, 8, 9, 12), as well as the sustainable transport target under the goal on cities (11.2).

The drivers then point to major solutions, such as renewable energy and energy efficiency, cleaner production for industry, sustainable consumption and production, and sustainable transport. Thus, some targets under the driver-related goals are, in turn, related to solutions. The energy goal (7) promotes renewable energy and energy efficiency, and clean energy research and development, which would reduce air pollution from energy production. Three goals (8, 9, and 12) promote sustainable and cleaner production processes in industry and infrastructure, especially focusing on resource efficiency (8.4, 9.4), which would reduce emissions from industry, another major source of air pollution. Goal 12 is on SCP, and activities under most of these targets could reduce air pollution. The goal on cities (11) includes a target promoting sustainable transportation, which could also significantly reduce air pollution when implemented.

The main impacts of air pollution can be divided into damages to the environment (including climate

change) and human health.<sup>15</sup> Acid deposition is one result of air pollution, which impacts fresh water, soil, vegetation, and human health. Ambient air pollution also damages crops, which in turn negatively affects food security.<sup>16</sup> Thus, the SDGs related to environmental damages are naturally the goals on water, climate, and land (6, 13, and 15), and the health goal (3) directly relates to health damages from air pollution. Air pollution damage to crops will reduce crop yields, negatively affecting food security (Goal 2 on hunger). The social goals related to poverty (1), gender (5), and inequality (10), would be negatively affected by health and food security impacts of air pollution.

Achievement of some targets, particularly relating to economic growth and infrastructure, could risk increasing air pollution if measures aimed at achieving the corresponding targets are not implemented concurrently. The energy and industry related goals also have targets to expand energy access, economic growth, infrastructure, and industrialization, although related targets call for these to be implemented sustainably. Air pollution could increase if these SDG targets are not implemented sustainably—for example, if the target to expand energy access was pursued by expanding the use of fossil fuels without pollution reduction technologies or instead of renewable energy.

A major limitation of the SDGs' view of air pollution is that it may be too narrowly focused on cities. Certainly air pollution in cities is a priority, especially in Asian megacities, but this overlooks the broader nature of the problem. Rural areas are also affected by negative impacts of both indoor and outdoor air pollution on public health and crop yields. Air pollution also crosses political boundaries and is increasingly regional and hemispheric.<sup>17</sup>

This analysis also shows that the SDG structure mixes up goals, means, drivers, problems, and solutions. On paper, the SDGs are clearly divided into goals and means. But from the standpoint of air pollution, drivers and solutions are sometimes combined together into the same goal areas. For example, the energy goal (7) includes expanded energy access, which could increase air pollution, as well as renewable energy and energy efficiency, which are solutions. The goal on cities (11) includes a measure of air pollution (air quality), references to impacts, and some specific solutions such as sustainable transport, but others, such as renewable energy, are not mentioned in this context. So it is apparent that in the SDGs, the interlinkages between goals and means as well as between different goal areas are very complex. It was probably not feasible for governments to address this complexity during the SDG negotiations, but now in the implementation phase, it is necessary to map these out, especially for important areas like air pollution, which otherwise could be at risk of falling through the cracks.

Overall, this analysis demonstrates that air pollution is related in a broad sense to nearly all of the SDGs, in terms of drivers, impacts, and solutions, even though direct references to air pollution are very few. Thus, it is very important to implement SDGs in a holistic manner to avoid the situation where the achievement of some targets undermines the achievement of others.

Therefore, a key implication of this policy brief is that air pollution should be part of a broader integrated approach. The air pollution community has already moved in this direction by promoting a multi- or co-benefits approach, for instance, through the CCAC as mentioned above.<sup>18</sup> A key advantage of this approach is an emphasis on concrete solutions, but its scope is still limited to linkages between air pollution and climate mitigation. The analysis here suggests that the approach could be expanded to a broader range of areas. Figure 1, for example, suggests that these could include cleaner production methods for industry as well as more sustainable consumption through lifestyle changes.

The integrated approach of the SDGs could give environment ministries an entry point to strengthen cooperation with industry and other ministries on air pollution issues, especially in areas such as cleaner production methods for industry, energy efficiency, renewable energy, sustainable transport, as well as more sustainable consumption through lifestyle changes. Many of these areas, particularly those relating to cleaner production for industry, energy, and transport, are not under environment ministries, which are generally in charge of air pollution issues.

The air pollution community has significant potential to contribute to an integrated approach to the SDGs. There is already a considerable body of data and monitoring capacity and integrated modelling approaches to analyse varied drivers, impacts, and solutions. For example, IIASA's Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) model can calculate the least cost mitigation strategies integrating measures for both air pollution and climate change.<sup>19</sup> There is also more targeted research on health and crop impacts of air pollution which could contribute to Goal 3 on health and Goal 2 on food and agriculture.<sup>20</sup>

## 4 Recommendations and Way Forward

Although the SDGs have already been decided, there are still opportunities for the air pollution community to influence and contribute to their future implementation. This includes not only efforts to raise the profile of air pollution directly, but also, the SDGs provide an opportunity to the air pollution community to become more involved in processes covering related policy areas. Four concrete avenues for possible action are outlined below.

First, implementation of the SDGs will be overseen by the High Level Political Forum (HLPF). The process for conducting the HLPF's review of the implementation of SDGs is still being developed, but there are expected to be special segments on specific topics, and there will be space for side events. Air pollution could be a featured cross-cutting issue for one of these segments or side events. The themes are already being discussed,<sup>21</sup> and one of them – “making cities sustainable and building productive capacities” – would be a good candidate, since air pollution is directly addressed by Goal 11 on cities, and a focus on productive capacities (related to Goals 8, 9, and 12) would enable a discussion on cleaner production methods that could reduce air pollution emissions. The other two – “ensuring food security on a safe planet,” and “empowering people and ensuring inclusiveness” – are not as directly related to air pollution, but air pollution could be linked to these discussions since reducing air pollution would help crop yields and food security.

Second, various other global (non-air pollution) frameworks and policy processes will address SDGs, including the United Nations Economic and Social Council (ECOSOC) and its regional commissions and other UN and non-UN organizations. The air pollution community could make efforts to put air pollution on the agenda of these processes in the context of SDGs. There could also be an effort to contribute to the Global Sustainable Development Report, which will be an important input into global SDG discussions, from the point of view of air pollution. The First United Nations Environment Assembly (UNEA) discussed

SDGs and their linkage with the environment and adopted Resolution 1/7 on “Strengthening the role of the United Nations Environment Programme in promoting air quality,” but air quality was not directly linked to the SDGs in Resolution 1/7 since the Open Working Group's proposal for SDGs had not yet been adopted by the General Assembly.<sup>22</sup> The Joint Communique of the G7 Toyama Environment Ministers Meeting in May, 2016 referred to air pollution mainly in the context of co-benefits with climate change rather than with SDGs more broadly.<sup>23</sup>

Third, the actual implementation of SDGs will take place at the national and subnational levels, and through actions of individual stakeholders. National and subnational governments, or even individual stakeholders, may also develop their own tailored indicators. The air pollution community could become involved in these processes in countries and regions where air pollution is a priority, and encourage the incorporation of air pollution considerations into indicators and implementation plans of national and subnational governments and other stakeholders. National and local governments are still in the initial stages of thinking about SDGs, and some may want to give more of a priority to air pollution. In particular, it will be very helpful if air pollution control measures could be more strongly integrated into national and subnational plans and policies, especially those for implementing SDGs.

Fourth, there may also still be time to influence the indicator development process, if it continues to be delayed. In particular, indicators related to air pollution could be considered for some targets in Table 2.

These recommendations could be implemented by existing air pollution-related cooperation frameworks, for example, by treaties such as the Convention on Long Range Transboundary Air Pollution (LRTAP) and the ASEAN Agreement on Transboundary Haze Pollution, and other various regional and subregional cooperation frameworks such as the Male Declaration, Acid Deposition Monitoring Network in East Asia



(EANET), etc., partnerships such as Clean Air Asia (CAA), the CCAC, Asian Co-benefits Partnership and others. These frameworks should consider more concrete cooperation between air pollution and SDG frameworks, and they should address the topic of SDGs in their internal discussions and activities. Action could also be taken by interested policymakers, research institutes, non-governmental organizations, or other stakeholders.

To be sure, the international community has prioritized air pollution in a number of international agreements, and the first UNEA highlighted air pollution as a global priority.<sup>24</sup> The main efforts on international cooperation on air pollution will still be made in existing air pollution-related cooperation frameworks which are outside of the SDG frameworks.

SDGs will not replace these existing frameworks. However, the scale of funding that will be available for air pollution related actions is not clear.

Finally, the SDGs will define the global development agenda – including funding priorities – until 2030, so for the foreseeable future, they will be the main focus of the global environment and development communities, including multilateral development banks and other international organizations. Therefore, the air pollution community may be able to secure more funding if it can link air pollution more closely to the SDGs. Otherwise, since air pollution is not prominently highlighted in the SDGs, there is a risk that global attention and funding could gravitate towards other priorities.

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• **Endnotes**

- <sup>1</sup> The number of indicators was not finalized at the time this policy brief was written.
- <sup>2</sup> Easterly, William, 2015, “The SDGs Should Stand for Senseless, Dreamy, Garbled,” *Foreign Policy*, September 28, [http://foreignpolicy.com/2015/09/28/the-sdgs-are-utopian-and-worthless-mdgs-development-rise-of-the-rest/?wp\\_login\\_redirect=0](http://foreignpolicy.com/2015/09/28/the-sdgs-are-utopian-and-worthless-mdgs-development-rise-of-the-rest/?wp_login_redirect=0); Economist, 2015, “The 169 Commandments: The Proposed Sustainable Development Goals Would Be Worse than Useless,” *Economist*, March 28, <http://www.economist.com/news/leaders/21647286-proposed-sustainable-development-goals-would-be-worse-useless-169-commandments>; Kenny, Charles, 2015, “From MDGs to SDGs: Have We Lost the Plot?” Center for Global Development, May 27, <http://www.cgdev.org/publication/mdgs-sdgs-have-we-lost-plot>.
- <sup>3</sup> See the United Nations Sustainable Development Knowledge Platform website for details of the SDGs: <https://sustainabledevelopment.un.org/>.
- <sup>4</sup> For example, see UNEP, 2012, *Global Environment Outlook 5: Environment for the Future We Want*, (Nairobi, Kenya: United Nations Environment Programme); and UNEP, 2007, *Global Environment Outlook 4: Environment for Development* (Nairobi, Kenya: United Nations Environment Programme).
- <sup>5</sup> WHO, 2014, “7 Million Premature Deaths Annually Linked to Air Pollution,” *Press Release*, March 25.
- <sup>6</sup> E.g. see UNEP, 2011, *Near-Term Climate Protection and Clean Air Benefits: Actions for Controlling Short-Lived Climate Forcers*, (Nairobi, Kenya: United Nations Environment Programme (UNEP)). [http://www.unep.org/pdf/Near\\_Term\\_Climate\\_Protection\\_&\\_Air\\_Benefits.pdf](http://www.unep.org/pdf/Near_Term_Climate_Protection_&_Air_Benefits.pdf).
- <sup>7</sup> See Shivakoti, B.R., Magnus Bengtsson, Eric Zusman, Ikuho Miyazawa, and Ilona Aleksiuaitė, 2015, “Placing Water at the Core of the Sustainable Development Goals (SDGs): Why an Integrated Perspective Is Needed,” IGES Policy Brief, no. 31 (January), Hayama, Japan, doi:10.1177/0022146515584605.
- <sup>8</sup> For information about the link between air pollution and acid rain see the websites of the US Environmental Protection Agency (<https://www.epa.gov/acid-rain>), the Acid Deposition Monitoring Network in East Asia (<http://www.eanet.asia/>). Information about the Convention on Long-range Transboundary Air Pollution (LRTAP), the major European Treaty which addresses acid rain, can be found in Sliggers, Johan, and Willem Kakebeeke, eds., 2004, *Clearing the Air: 25 Years of the Convention on Long-Range Transboundary Air Pollution* (New York and Geneva: United Nations Economic Commission for Europe). <http://www.unece.org/fileadmin/DAM/env/lrtap/ExecutiveBody/BOOKscreen.pdf>.
- <sup>9</sup> See the CCAC website at <http://www.ccacoalition.org/en>. Also see Asian Co-benefits Partnership, 2016, “Asian Co-Benefits Partnership (ACP) White Paper 2016: Putting Co-Benefits into Practice -- Case Studies from Asia,” Ministry of Environment, Japan, and Institute for Global Environmental Strategies, <http://pub.iges.or.jp/modules/envirolib/view.php?docid=6298>; and Asian Co-benefits Partnership, 2014, “Asian Co-Benefits Partnership (ACP) White Paper 2014: Bringing Development and Climate Together in Asia,” Ministry of Environment, Japan, and Institute for Global Environmental Strategies, <http://pub.iges.or.jp/modules/envirolib/view.php?docid=5082>.
- <sup>10</sup> Indicators were still under discussion by the UN Statistical Commission and subject to approval by the UN General Assembly at the time that research for this brief was conducted. The indicators described here are from the metadata as of Jan. 18, 2016, published on the UNSC website: <http://unstats.un.org/sdgs/iaeg-sdgs/metadata-compilation/>.
- <sup>11</sup> See Sliggers and Kakebeeke 2004; Dominici, Francesca, Roger D Peng, Christopher D Barr, and Michelle L Bell, 2010, “Protecting Human Health from Air Pollution: Shifting from a Single-Pollutant to a Multipollutant Approach.” *Epidemiology* (Cambridge, Mass.) 21 (2): 187–94. doi:10.1097/EDE.0b013e3181cc86e8.
- <sup>12</sup> E.g. Gordon, Stephen B, Nigel G Bruce, Jonathan Grigg, Patricia L Hibberd, Om P Kurmi, Kin-bong Hubert Lam, Kevin Mortimer, et al., 2014, “Respiratory Risks from Household Air Pollution in Low and Middle Income Countries,” *The Lancet. Respiratory Medicine* 2 (10): 823–60. doi:10.1016/S2213-2600(14)70168-7, <http://www.sciencedirect.com/science/article/pii/S2213260014701687>.
- <sup>13</sup> For example, see Nawahda, Amin, Ken Yamashita, Ohara Toshimasa, Junichi Kurokawa, and Kazuyo Yamaji, 2013, “Evaluation of the Effect of Surface Ozone on Main Crops in East Asia: 2000, 2005, and 2020,” *Water, Air & Soil Pollution* 224 (5); and Avnery, Shiri, Denise L. Mauzerall, Junfeng Liu, and Larry W. Horowitz, 2011, “Global Crop Yield Reductions due to Surface Ozone Exposure: 1. Year 2000 Crop Production Losses and Economic Damage,” *Atmospheric Environment* 45 (13): 2284–96.
- <sup>14</sup> See UNEP, 2007, *Global Environment Outlook 4* (Nairobi, Kenya: United Nations Environment Programme).
- <sup>15</sup> Working Group on Effects of the Convention on Long-range Transboundary Air Pollution, No Date, *Impacts of Air Pollution on Ecosystems, Human Health and Materials Under Different Gothenburg Protocol Scenarios*, [http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/n\\_14\\_Report\\_WGE.pdf](http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/n_14_Report_WGE.pdf).
- <sup>16</sup> Nawahda, et. al. 2013.
- <sup>17</sup> Task force on Hemispheric Transport of Air Pollution, 2010, *Hemispheric Transport of Air Pollution 2010 – Part D: Answers to Policy Relevant Science Questions. Air pollution Studies No. 20* (Geneva: United Nations Economic Commission for Europe).
- <sup>18</sup> See CCAC’s website at <http://www.ccacoalition.org/en>; and Asian Co-benefits Partnership, 2016, “Asian Co-Benefits Partnership (ACP) White Paper 2016: Putting Co-Benefits into Practice -- Case Studies from Asia,” <http://pub.iges.or.jp/modules/envirolib/view.php?docid=6298>.
- <sup>19</sup> Amann, Markus, Imrich Bertok, Jens Borcken-Kleefeld, Janusz Cofala, Chris Heyes, Lena Höglund-Isaksson, Zbigniew Klimont, et al., 2011, “Cost-Effective Control of Air Quality and Greenhouse Gases in Europe: Modeling and Policy Applications,” *Environmental Modelling & Software* 26 (12): 1489–1501. doi:10.1016/j.envsoft.2011.07.012.
- <sup>20</sup> See notes 11 and 12 above.
- <sup>21</sup> IISD, 2016, News: Co-Facilitators Issue Zero Draft on 2030 Agenda Follow-up, Sustainable Development Policy & Practice, May 6, <http://sd.iisd.org/news/co-facilitators-issue-zero-draft-on-2030-agenda-follow-up/>.
- <sup>22</sup> UNEA of UNEP, 2014, *Proceedings of the United Nations Environment Assembly of the United Nations Environment Programme at its First Session*, Sept. 2, UNEP/EA.1/10, [http://www.unep.org/unea1/UNEA\\_Proceedings.asp](http://www.unep.org/unea1/UNEA_Proceedings.asp).
- <sup>23</sup> The Joint Communique of the G7 Toyama Environment Ministers Meeting on May 15-16, 2016 is available at <http://www.env.go.jp/press/files/jp/102871.pdf>.
- <sup>24</sup> See United Nations Environment Assembly of the United Nations Environment Programme, *Proceedings of the United Nations Environment Assembly of the United Nations Environment Programme*, September 2, 2014, UNEP/EA.1/10.

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