CLEAN AIR FUND

THE STATE OF GLOBAL AIR QUALITY FUNDING 2023

CLIMATE POLICY INITIATIVE

Clean Air Fund commissioned this report. Thank you to Climate Policy Initiative and everyone who contributed.

ABOUT CLEAN AIR FUND

Clean Air Fund is a global philanthropic organisation that works with governments, funders, businesses and campaigners to create a future where everyone breathes clean air. We fund and partner with organisations across the globe that promote air quality data, build public demand for clean air and drive action. We also influence and support decision makers to act on air pollution.

ABOUT CLIMATE POLICY INITIATIVE

Climate Policy Initiative is an analysis and advisory organization with deep expertise in finance and policy. Our mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change. Climate Policy Initiative has six offices around the world in Brazil, India, Indonesia, the United Kingdom, and the United States.

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FOREWORD

As Chief Scientist at the World Health Organization (WHO), it was my job to anticipate the next big threats to global health.

But the time for anticipating the health crisis caused by air pollution is over: it is already all around us. Over 99% of people around the world are breathing air that exceeds the WHO air quality guidelines, and air pollution causes 7 million premature deaths every year including more than half a million children under five. The diseases caused or exacerbated by air pollution - including heart disease, stroke, asthma, lung cancer, dementia and infections like pneumonia - are increasingly straining health systems and eating up scarce health budgets. This suffering and expense could be avoided by clearing the air. Prevention is better than cure.

In addition to the direct health impacts of dirty air on the lungs, hearts and brains of babies and children, as well as adults young and old, we are increasingly suffering the health impacts of a deteriorating climate. The two issues are of course entangled. The same toxic emissions that heat our planet also toxify the air we breathe.

Dr. Soumya Swaminathan

Former Chief Scientist at World Health Organization (2019-2022), paediatrician and clinical scientist

Climate change is causing extreme weather and fuelling wildfires which further pollute the air and exacerbate the warming of our planet... and on it goes, unless we do something to interrupt this vicious cycle. The worst impacts of air pollution are being felt by the poorest communities, as many of the social and environmental determinants of health affect them negatively, and they are least able to access preventive and curative health services.

I have spent my career linking science with action, and science is telling us to act on these twin crises urgently. While healthcare workers may be at the sharp end, the responsibility to act falls heavily on policy makers, governments and development funders to enable the action we need.

Through this report, the Clean Air Fund has shone a light on what needs attention. It shows where the funding gaps lie — funding to improve outdoor air quality is far too low at just 1% of total international development funding. It sets out the opportunities for international development funders, including multilateral development institutions like the World Bank, and the role of national policy makers and regulators in making clean air a reality.

A combination of COVID-19, the war in Ukraine and soaring global inflation, have left many low- and middle- income countries in the midst of a debt crisis, with the continent of Africa experiencing the worst debt challenges in more than a decade. Funders have to encourage countries to address the climate and health challenge that rising air pollution represents, in ways that are affordable and sustainable. They should facilitate technology transfer and local capacity building, so that development funding can be used to create solutions that are a win both for planetary and human health.

With the clock ticking towards climate calamity, we must tackle climate change and air pollution together urgently. Looking ahead, we have COP28 in December, and in 2024 the WHO's second global air pollution and health conference. Let's use these forums and others like them to really address air pollution finance needs.

The science is clear and there are solutions available to tackle the air pollution and climate crisis synergistically. We need political commitment and practical action, in order to save lives now and protect the next generation. As the world showed during Covid-19, we can solve big problems when we work together in solidarity towards a common mission. The time to address air pollution is now!

"Too often policy makers and donors aim to solve problems one at a time - whether those problems be climate change or health, economic or other crises. But in tackling air pollution, we have a unique opportunity to address several problems simultaneously and advance the sustainable development agenda as a whole.

When governments are enabled to take smart, considered action to clean up our air, they unlock benefits for the climate and for health and economic development. And because air pollution particularly harms the health and development of children, especially in low- and middle-income countries, action for clean air must be central to our commitments to future generations.

It's time for policymakers and funders to raise their ambitions."

Rt. Hon Helen Clark

Former Prime Minister of New Zealand, former Administrator of the United Nations Development Programme (2009-2017), Board Chair of the Partnership for Maternal, Newborn & Child Health (PMNCH)

CONTENTS

GLOSSARY

Outdoor air pollution	Outdoor air pollution, also known as ambient air pollution, refers to the presence of harmful substances and pollutants in the Earth's atmosphere, primarily generated by human activities such as industrial processes, transportation, and energy production. These pollutants – including particulate matter, gases like nitrogen dioxide and sulphur dioxide, ozone, carbon monoxide, and volatile organic compounds – can adversely affect human health, ecosystems, and the environment, leading to various respiratory, cardiovascular, and environmental problems.
Indoor air pollution	Indoor air pollution refers to the presence of harmful pollutants within enclosed spaces, such as homes, workplaces, and buildings, and can negatively impact human health and well-being. These pollutants arise from sources like household cleaning products, tobacco smoke, cooking emissions, building materials, and inadequate ventilation. Prolonged exposure to indoor air pollutants like fine particles, volatile organic compounds, radon, and mould spores can lead to a range of health issues, including respiratory problems, allergies, and other related ailments.
International Development Funders	International development funders include multilateral development banks, bilateral development agencies and governments providing international funding to developing and emerging countries in the form of development aid, concessional and non-concessional loans, as well as grants, for development purposes, including air quality.
Outdoor air quality funding	Finance committed to projects where improvements to outdoor air quality are a primary objective (usually explicitly stated in the project description). This includes projects across various sectors, including transport, energy and health. It also includes funding to air quality monitoring and modelling projects, aimed at filling air quality data gaps.
Funding with air quality co-benefits	Finance committed to projects where improvements to outdoor air quality are a component of a project but are a co-benefit to the investment. The link to outdoor air quality, in this case, may not be explicitly mentioned in project description. This funding category also includes interventions to tackle indoor air pollution.
Outdoor air quality and climate funding	Finance committed to climate mitigation or adaptation projects where improvements to outdoor air quality are explicitly included as a primary objective. Reference to air quality needs to be included in the project description, demonstrating intentionality. This represents the subset of outdoor air quality funding flows which simultaneously address climate change.
Fossil fuel prolonging funding	Finance committed to projects or interventions (i) involving the construction of assets and infrastructure which directly cause air pollution; or (ii) leading to the creation of, or promoting, air polluting activities.
Climate mitigation finance	Resources directed to activities (i) contributing to reducing or avoiding GHG emissions, including gases regulated by the Montreal Protocol; or (ii) maintaining or enhancing GHG sinks and reservoirs.
Climate adaptation finance	Resources directed to activities aimed at reducing the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience.

ABBREVIATIONS

ACBSP	Asia Clean Blue Skies Program
ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
BEST	The Bangladesh Environmental Sustainability and Transformation
BIS	Bank for International Settlements
CAP	Climate Aggregation Platform
CGF	Green Credit Guarantee Fund
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CO	Carbon monoxide
COP	Conference of the Parties
COPD	Chronic obstructive pulmonary disease
DFI	Development finance institution
EBRD	European Bank for Reconstruction and Development
EFSD+	European Fund for Sustainable Development plus
ESG	Environmental, Social and Governance
ESMAP	Energy Sector Management Assistance
EU	European Union
EUR/ €	Euro
GDP	Gross domestic product
GHG	Greenhouse gas
GH2	Green hydrogen
ICIEC	Islamic Corporation for the Insurance of Investment and Export Credit
IFC	International Finance Corporation
JET IP	Just Energy Transition Investment Plan
JETP	Just Energy Transition Partnership
JICA	Japan International Cooperation Agency
JPA	Joint Procurement Agreement
KPI	Key performance indicator
LMICs	Low- and middle-income countries
MDB	Multilateral Development Bank
MIGA	Multilateral Investment Guarantee Agency
MNT	Mongolian Tughrik
MRT	Mass Rapid Transit
NCDs	Noncommunicable diseases
NO	Nitrogen oxide
O_3	Ozone
ODA	Official development assistance
OECD	Organisation for Economic Co-operation and Development
OOF	Other official flows
PBL	Policy-Based Loan
PM	Particulate matter
PVC13	Pneumococcal conjugate vaccine
RBF	Results-based finance

SDGs	Sustainable Development Goals
SEforAll	Sustainable Energy for All
SLBs	Sustainability-linked bonds
SO_2	Sulphur dioxide
TCX	Currency Exchange Fund
THB	Thai baht
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD/$	United States dollar
VOCs	Volatile organic compounds
WBTC	West Bengal Transport Corporation
WHO	World Health Organization
WtE	Waste-to-energy
3R	Reduce-reuse-recycle

EXECUTIVE SUMMARY

The State of Global Air Quality Funding series maps the outdoor air quality funding landscape, presents major trends in international development finance flows and identifies how — and where — donors can maximise their resources. This analysis helps to build transparency and provides an evidence base for policy makers, funders and campaigners.

The goal is to accelerate progress on clean air and arrest the damage that toxic air inflicts on our health, climate and economy.

By investing in clean air, donors can save lives. They can also unlock sustainable development and make a liveable planet possible. From investing in a public transport electrification plan in Kolkata, through to supporting South Africa's transition away from coal-fired power, the report illustrates how donors are already making a difference. Ultimately, these investments pay off, as the USA found: with every $1 spent on air pollution control yielding an estimated $30 in economic benefits.[1]

Despite this, too many international donors are still overlooking and underfunding projects that address toxic air. As this report reveals, only 1% of international development funding ($17.3 billion) and 2% of international public climate finance ($11.6 billion) was expressly committed to targeting air pollution over the last six years for which full data is available.

There are signs that the tide is starting to turn.

The data shows a decline in funding for fossil fuel-prolonging projects since 2019. At its peak that year, some $11.9 billion of international development funding was channelled towards fossil fuel projects, threatening both the clean air cause and the delivery of global climate goals. In 2021, for the first time, international development funding for outdoor air quality projects ($2.3 billion) exceeded funding for fossil fuel-prolonging projects ($1.5 billion).

This growing momentum follows the commitment to phase-down coal-fired power at COP26, among other forums. If this trend is to continue downwards, governments at COP28 need to agree on clear strategies for phasing-out fossil fuels completely and transitioning to cleaner energy sources fairly and equitably.

There are several important funding opportunities that donors should be tapping into. Among other gaps, African countries are being left behind and receive only 5% (or $0.76 billion) of all outdoor air quality funding between 2017 and 2021 despite the continent being home to half of the world's top ten countries with the highest level of air pollution. There are gaps at a city-level too. Accra and Jakarta, for example, are well placed to lead the charge if further climate finance could be mobilised. At a project level, more funding is needed for air quality modelling, measuring and monitoring, which could create greater efficiencies due to better targeting of air quality action, and shore up the public support and political commitment that are necessary for action.

RECOMMENDATIONS FOR FUNDERS

We recommend a substantial increase in the volume of funding for air quality from OECD-DAC donors, whether channelled through multilateral channels or bilaterally. The report urges funders to better incorporate air quality co-benefits into climate and health projects. Priority should be given to increasing grant and concessional finance and to ensuring that funding reaches all countries and regions in need. This is particularly important in the context of the debt distress faced by so many countries that receive international aid.

As the largest funders of outdoor air quality projects, Multilateral Development Banks can play a critical role in substantially increasing the availability of development finance for air quality. There is a particular role in driving this agenda for the World Bank, whose new leader, Ajay Banga, has made access to clean air an explicit part of its remit.

National policy makers and regulators are encouraged to track and report on government spending on air quality to increase transparency and assess progress over time. This includes capital mobilised from other sources for projects with air quality co-benefits. For example, private capital could be attracted at scale through innovative financial vehicles such as Shari'ah-compliant bonds or sukuks and structured finance mechanisms such as securitization.

Ultimately, funders and policy makers need to rewrite the script. They must reassess how they finance climate and air quality projects in tandem if we are to live up to the hopes of the Paris Agreement and Sustainable Development Goals. Only then will we see the funding scale up to match both the size of the opportunity and the scale of this pervasive, global problem.

1. WHY DOES FUNDING AIR QUALITY WORK MATTER

Funding for projects that improve outdoor air quality has the potential to shift the dial globally on human health, climate mitigation and adaptation, and economic development. By investing in clean air projects, funders can more effectively utilize their resources, delivering smart interventions that help deliver multiple Sustainable Development Goals (SDGs) all at once.

Despite these many benefits, and an incredible return of $30 on every $1 invested, air quality remains overlooked by too many international donors. Although the solutions to the air pollution crisis are clear, a number of obstacles stand in the way of addressing it: funding challenges, impediments to policy implementation, and political obstacles. This is especially the case in low-income countries, many of which are also facing down debt distress and the combined effects of climate change, the legacy of the Covid pandemic, and energy and food price shocks resulting from Russia's attack on Ukraine.

This fifth edition of The State of Global Air Quality Funding report provides a snapshot of the outdoor air quality funding landscape between 2015 and 2021. It identifies funding gaps and opportunities, compares funding to address outdoor air pollution with international fossil fuel financing, and outlines the synergies between tackling air pollution and climate change. For the first time, it also explores a range of financial instruments available to funders – but not yet harnessed - which have the potential to incentivise and facilitate more funding towards air quality projects.

The aim of this research is to:

- **Raise awareness** among policymakers, funders and decision-makers to accelerate action for clean air by providing evidence-based analysis of the current outdoor air quality funding landscape.
- **Demonstrate the importance of funding air quality projects** and the opportunities they offer for achieving health, climate and broader development goals.
- **Provide recommendations** to international development funders and policymakers to deliver more effective air quality funding; and to enable air quality funding, at scale.

1.1 COUNTING THE COSTS OF AIR POLLUTION

Air pollution is the largest environmental threat to human health worldwide, causing 7 million[a] premature deaths every year (see Box 1.1).[2] It has far-reaching consequences (see Figure 1.1). Air pollution exacerbates climate change, harms biodiversity and ecosystems, reduces crop yields and workforce productivity, and damages overall economic activity. The impacts of air pollution are also not felt equally: while exposure to particulate pollution, on average, reduces life expectancy by 2.2 years globally,[3] nine out of 10 deaths attributable to outdoor air pollution are in low- and middle-income countries (LMICs).[4] In all countries, marginalised and vulnerable groups including babies, children, older people and people living with chronic diseases, are disproportionately affected.

FIGURE 1.1: THE ADVERSE IMPACTS OF AIR POLLUTION GLOBALLY

7 million premature deaths annually[b,5]	4th most deadly health risk worldwide[6]	**9 out of 10** outdoor air pollution deaths are in LMICs[7]
570,000 deaths of children under 5 per year[c,8]	**$8.1 trillion** in annual global health costs[d,9]	**6.1%** reduction in global GDP[e,10]
Shortens global average life expectancy by **2.2 years**[f,11]	Global crop yield losses of between **3-16%**[g,12]	**1.2 billion** work days lost globally each year.[13]

a This number relates to premature deaths from both outdoor and indoor air pollution, emphasizing the scale of the problem; the figure dates back to 2014 and is, therefore, likely to have grown since, with indications the outdoor component will have increased the most.
b This refers to the combined effects of both outdoor air pollution and indoor air pollution.
c This refers to deaths from respiratory infections attributable to both outdoor air pollution and indoor air pollution.
d This refers to the global health cost, in 2019, of mortality and morbidity caused by exposure to $PM_{2.5}$ air pollution.
e This is the equivalent to (5), $8.1 trillion in global health costs.
f This refers to global loss of average life expectancy from all air pollution.
g This refers to relative global crop losses specifically caused by ozone, for a range of different crops: soy (6-16%), wheat (7-12%) and maize (3-5%).

Air pollution **has considerable negative impacts on economic growth and development**, through workplace absence, reduced productivity and health costs. Studies have shown how, in low-income countries, development gains since 1990 have been diminished by the damage caused by greater total exposure to polluted air.[14] Globally, the cost of health damages from $PM_{2.5}$ air pollution has been estimated as $8.1 trillion in 2019, or 6.1% of global GDP.[15]

Air pollution also has a negative impact on the natural environment. It degrades ecosystems, is a driver of biodiversity loss, and harms vegetation. Air pollution can contribute to the acidification of soils and water bodies, affecting aquatic and marine ecosystems and sensitive species.[16]

Finally, air pollution is inextricably linked to climate change, exacerbating its impacts.[17] Recent events underline the transnational dimensions of the climate crisis and air pollution. For example, the wildfires in Canada caused an increase in harmful pollutants, notably $PM_{2.5}$, reaching levels 10 times higher than WHO guidelines, spilling over the border into the United States and even reaching Europe.[18] Wildfires, which are increasingly the 'new normal', can be attributed to the combination of strong heat and droughts associated with climate change, and are only expected to increase as the world bursts through the 1.5°C warming level. These events also call attention to the airshed nature of air pollution which does not respect national borders and, therefore, demands close coordination among countries, if not regions, to implement effective and efficient solutions.[19]

1.2 AIR POLLUTION: SOURCES AND STATUS

Several human activities contribute to air pollution, including but not limited to: the use of fossil fuels and biomass for electricity generation, transport, industrial processes and household use (such as lighting, cooking and heating); open burning of waste; as well as processes involved in mining, agriculture, waste management, land use change and forestry. Several key air pollutants are shown in Figure 1.2 alongside their major sources.[h, 20]

h $PM_{2.5}$, or fine particulate matter of 2.5 micrometres or less in diameter, is widely considered the most dangerous pollutant, capable of penetrating the lung barriers and entering the blood system, thereby causing cardiovascular and respiratory disease and cancers.

FIGURE 1.2: SOURCES OF COMMON OUTDOOR AIR POLLUTANTS GLOBALLY

Ammonia (NH_3)[21]	• Agriculture (manure; slurry; fertilisers) • Transport and vehicles • Landfill and municipal waste • Sewage works • Industrial processes
Carbon Monoxide (CO)[22]	• Fossil fuel combustion • Transport and vehicles
Black carbon[23,24]	• Fossil fuel combustion • Biomass/biofuel combustion • Transport and vehicles • Industrial processes • Waste burning • Fires
Nitrogen Oxides (NOx)[25,26]	• Fossil fuel combustion • Heating • Transport and vehicles • Industrial processes • Agriculture (crop burning and fertilisers)
Sulphur Dioxide (SO_2)[27,28]	• Fossil fuel extraction and combustion • Industrial processes (smelting)
Volatile Organic Compounds (VOCs)[29,30]	• Fossil fuel extraction, processing and combustion • Fuel wood combustion • Industrial processes • Building materials • Household and personal care products (cleaning products; hair sprays)
Particulate Matter (PM)[31,32] The major contributors to which are: ammonia, black carbon, dust, sulphates and nitrates.	• Fossil fuel combustion • Transport and vehicles, from tire and brake wear as well as combustion engine. • Quarrying and construction • Industrial processes • Waste burning • Residential heating • Fires

Political will and regulatory enforcement, together with technological progress and financial support have successfully reduced some air pollutants in high-income countries. For example, in the United Kingdom, emissions of sulphur dioxide (SO_2), nitrogen oxides (NOx), and volatile organic compounds (VOCs) decreased by 93%, 68%, and 71%, respectively, between 1990 and 2015.[33] Similarly, the United States reduced their NOx emissions from 26.9 million tonnes in 1970 to 10.5 million tonnes in 2016 (down approximately 60%),[34] mainly driven by a mix of regulations (emissions standards), technology improvements (cleaner vehicles) and overall economic change (restructuring).[35, 36] In both Europe and North America, the Convention on Long-range Transboundary Air Pollution (CLRTAP) has been instrumental in helping to reduce common air pollutants.

By contrast, studies have shown how pollutants have risen to hazardous levels across South Asian countries, with the composition of pollution sources changing as result of industrial and economic development since 1990.[37] In much of Africa, outdoor air pollution and associated diseases are also on the rise.[38] In particular, nitrogen oxides and ammonia are projected to increase substantially up to 2040 and beyond, driven by increased global demand for agricultural products and energy.[39] Without concerted action and international development assistance, these trends are set to continue, if not worsen.

1.3 WHAT THIS REPORT COVERS

This report analyses funding from international development funders between 2015 and 2021 to projects that work to improve air quality. These funders include multilateral development banks, bilateral development agencies and governments providing funding to low- and middle-income countries in the form of concessional and non-concessional loans, as well as grants. When analysing the breakdown of cumulative investments by sector, geography and financial instrument, the most recent five years for which data is available are used (2017-2021). This is because annual funding flows can be highly variable and, therefore, the intention is to account for the most recent changes observed in the air quality funding landscape.

Specifically, international development funding covers:

1. Official development assistance (ODA);
2. Other official flows (OOF);
3. Flows from other public development funders that are not OECD-DAC members (*e.g.*, the Islamic Development Bank).

The focus of this analysis is international development funding. It does not seek to quantify the crucial financial support for air pollution reduction provided by national and sub-national government budgets, funding which is the cornerstone of addressing the air pollution crisis. This year, outdoor air quality funding from philanthropic foundations is analysed separately.

Table 1.1 presents the different flows assessed in the subsequent analysis. More details about the underlying methodology can be found in the methodology document.

The rationale for differentiating between outdoor air quality funding and funding with outdoor air quality co-benefits is twofold: addressing outdoor air pollution is too often neglected as a development intervention, thereby missing considerable health, economic and climate gains that could otherwise be achieved; funders do, nonetheless, invest in projects that deliver air quality improvements as a co-benefit, without specifically focusing on air quality. Clean Air Fund welcomes this latter spending, however, believes that an explicit focus on the air quality aspects would make for better designed projects that deliver stronger returns on the investment. Taken together, this merits separate analyses for each funding category.

TABLE 1.1: FUNDING FLOWS COVERED IN THE ANALYSIS OF INTERNATIONAL DEVELOPMENT FUNDERS

Funding category	Definition	Example
Outdoor air quality funding (Chapter 2.1)	Finance committed to projects where improvements to outdoor/ambient air quality are a primary objective (usually explicitly stated in the project description). This includes projects across various sectors, including transport, energy and health.	Air pollution prevention programme
Outdoor air quality and climate funding (Chapter 2.2)	Finance committed to climate mitigation or adaptation projects where improvements to outdoor air quality are explicitly included as a primary objective. Reference to air quality needs to be included in the project description, demonstrating intentionality. This represents the subset of outdoor air quality funding flows which simultaneously address climate change.	Bus rapid transit project to reduce greenhouse gas emissions and the adverse health impacts of air pollution
Funding with outdoor air quality co-benefits (Chapter 2.3)	Finance committed to projects where improvements to outdoor/ambient air quality are a co-benefit of the investment. The link to outdoor air quality, in this case, may not be explicitly mentioned in the project description. This includes indoor air quality projects (see Box 2.2).	Wastewater treatment/ management project with methane and/or nitrogen oxide mitigation
Fossil fuel-prolonging funding (Chapter 2.4)	Finance committed to projects or interventions (i) involving the construction of assets and infrastructure which directly cause air pollution; or (ii) leading to the creation of, or promoting, air polluting activities.	Development or expansion of a coal power plant

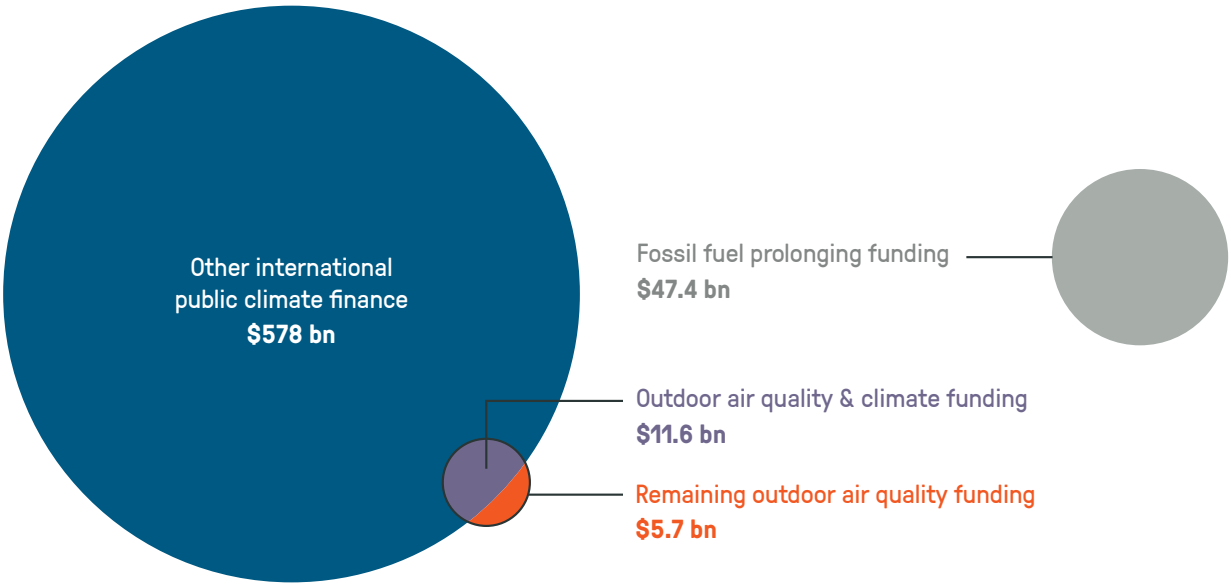
2. HOW MUCH INTERNATIONAL DEVELOPMENT FUNDING IS FLOWING TO AIR QUALITY

Increasingly, international development funders have a climate mandate to mainstream resilient, low-emission development into their interventions. However, air quality is rarely an explicit mandate for international funders. As a result funding for air quality tends to be channelled across a variety of sectors, including agriculture, water, energy, transport, education, environment and health. This funding is largely provided through loans – either at concessional or market rates – supplemented by a smaller proportion of grant funding. In this section we discuss:

1. Outdoor air quality funding, *i.e.*, funding to projects that have outdoor air quality stated as a primary objective;
2. Funding with outdoor air quality co-benefits *i.e.*, funding to projects that do not have a primary outdoor air quality objective, although they still have a positive impact on outdoor air quality.

These flows are then compared to international development funding going to fossil fuel-prolonging projects, as well as total international public climate finance (for climate mitigation and adaptation). The interlinkages between flows committed by international development funders are shown in Figure 2.1.

FIGURE 2.1: INTERLINKAGES BETWEEN OUTDOOR AIR QUALITY FUNDING, OUTDOOR AIR QUALITY AND CLIMATE FUNDING, AND FOSSIL-FUEL PROLONGING INTERNATIONAL DEVELOPMENT FUNDING, 2015-2021



2.1 OUTDOOR AIR QUALITY FUNDING

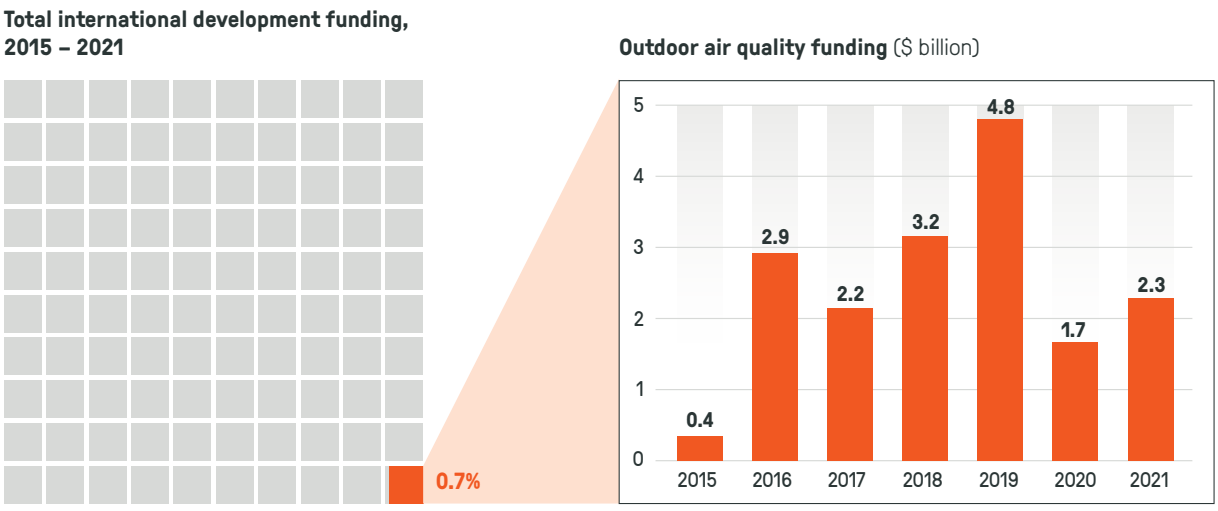
In this section, we analyse the pool of funding committed to projects where improvements to outdoor (ambient) air quality are a primary objective of the investment. Section 2.3 analyses the (larger) pool of funding which delivers improvements to outdoor air quality as a co-benefit of the investment. The approach to categorising projects is outlined in detail in the methodology document.

OUTDOOR AIR QUALITY FUNDING HAS REMAINED LOW IN RECENT YEARS, REPRESENTING, ON AVERAGE, LESS THAN 1% OF TOTAL FLOWS COMMITTED BY INTERNATIONAL DEVELOPMENT FUNDERS.

Between 2015-2021, international development funders committed $17.3 billion to projects focussed on tackling outdoor air pollution.[i] This translates to only $2.5 billion per year, on average.

Despite the potential win-wins for health, climate and many other development objectives (see Section 1.1), on average, outdoor air quality funding accounts for only 0.7% of total commitments by international development funders, which amounted to over $2 trillion (or approximately $334 billion per year) in 2015-2021 (Figure 2.2). In other words, for every $1,000 spent by a development funder, just $7 was spent on tackling outdoor air pollution, while there is evidence that $1 spent on air pollution control can yield $30 in economic benefits.[j, 40]

FIGURE 2.2: OUTDOOR AIR QUALITY FUNDING AS A SHARE OF TOTAL INTERNATIONAL DEVELOPMENT COMMITMENTS, 2015-2021



i In 2022, we were able to track only $13 million of outdoor air quality funding; complete data on 2022 will be available in the next annual iteration of this report.

j In the USA, based on the monetisation of health benefits associated with reduced exposures to pollutants as well as the monetisation of ecological and other welfare benefits; Landrigan et al., 2020. "COVID-19 and clean air: an opportunity for radical change."

For every $1,000 spent by a development funder, just $7 was spent on tackling outdoor air pollution.

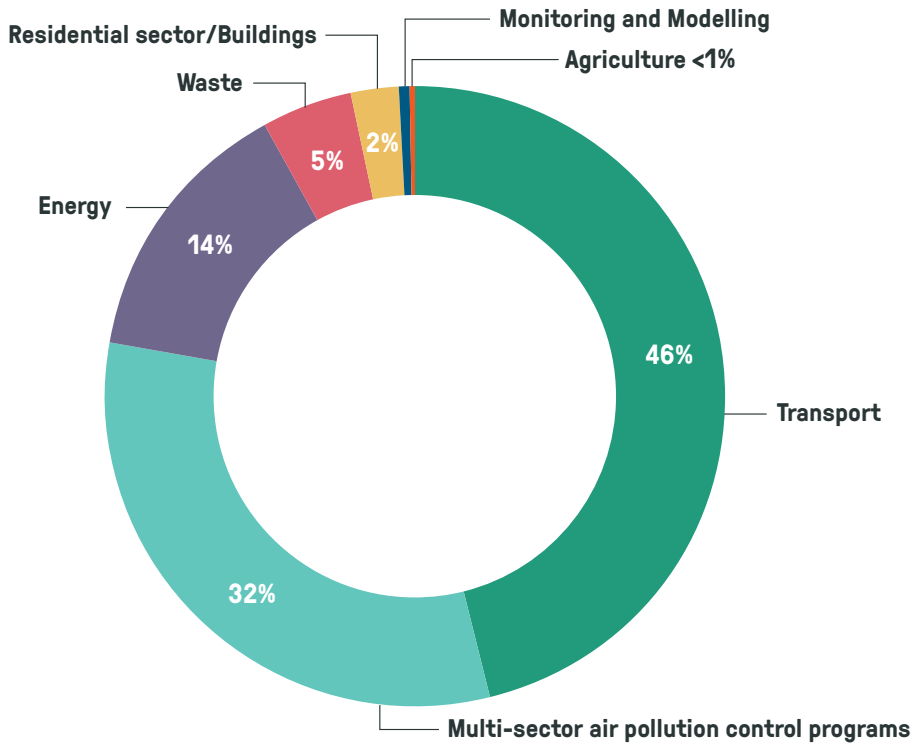
The small scale of annual outdoor air quality funding flows means that trends are easily affected by large individual (infrastructure) projects. Indeed, outdoor air quality funding peaked in 2019, principally due to a large railway project in the Philippines, aimed at alleviating serious traffic congestion and, thereby, mitigate air pollution. Then in 2020 outdoor air quality funding fell by 65%, likely a consequence of the COVID-19 pandemic among other macroeconomic trends. However, 2021 saw an uptick as it rose by 37%. In short, flows can be very variable but consistently fall short of what is needed to tackle the problem.

MOST OUTDOOR AIR QUALITY FUNDING WAS CHANNELLED TO TRANSPORT INVESTMENTS (46%) FOLLOWED BY MULTI-SECTOR AIR POLLUTION CONTROL PROGRAMMES (32%). AIR QUALITY MONITORING & MODELLING RECEIVED LESS THAN 1% OF FUNDING.

Transport projects accounted for most outdoor air quality funding ($6.5 billion, or 46% of the total) in the most recent five years for which data is available. This includes investments in cleaner fuels, electric and hybrid road vehicles, public transport systems and railways (where reducing air pollution is an explicit objective of the project), as well as facilitating more cycling and walking or traffic planning and management.

Large multi-sector air pollution control programmes, mostly in East Asian countries, followed as the next highest recipient of outdoor air quality funding (32%) at $4.5 billion (Figure 2.3). Indeed, the Beijing-Tianjin-Hebei Air Quality Improvement Program alone received approximately 65% ($2.9 billion) of this funding, a major contributor to China's successful "war against pollution."[41] Other important programmes in this bucket of funding include partnerships between development agencies and the WHO to support the prevention of noncommunicable diseases in the context of air pollution.

FIGURE 2.3: OUTDOOR AIR QUALITY FUNDING BY SECTOR, 2017-2021



Looking at projects intended to fill air quality data gaps, funding for Monitoring and Modelling accounted for only $0.08 billion, or 0.5% of the total committed in the most recent five years for which data is available. Funding for evidence generation (including source attribution) is an essential pillar of effective action on air quality, however, it still receives very little international development finance. Research shows that at least 1 billion people live in countries where the national government does not monitor air quality, despite the grave health risk it poses to citizens.[42] Moreover, studies have indicated that air quality monitoring gaps disproportionately impact low-income countries, with figures for Sub-Saharan Africa showing only one monitor per 28 million people.[43]

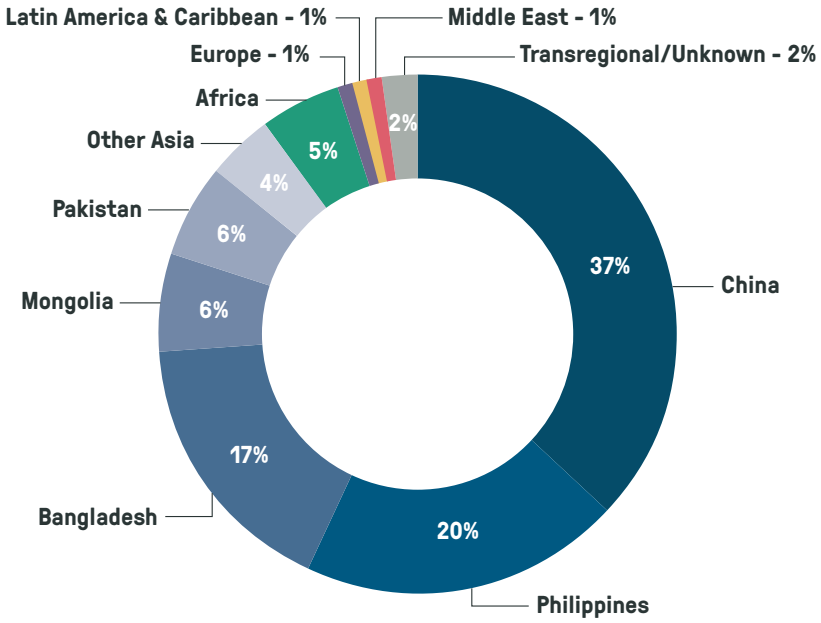
Data and evidence on air pollution are key to successfully managing and addressing the problem. For example, a monitoring programme that reported (and communicated) real-time air quality updates at over 40 American embassies across the world led to substantial reductions in on-site particulate concentration levels, thereby substantially reducing the associated mortality risk for city residents.[44] Investing in understanding the health impacts of air pollution (*e.g.* hospital admissions), correlated against local air pollution data, will also help raise public awareness and mobilise preventive action.

In addition to reducing pollution, various air quality projects – across different sectors – show strong potential for improving gender equality and inclusivity. This is due to differentiated exposures to air pollution – both outdoor and indoor - as a result of gendered division of labour and responsibilities.[45] Of the tracked outdoor air quality funding in the most recent five years for which data is available, 29% was tagged as having some gender targeting component, with a proportionally high prevalence in the transport sector (84% of all gender-tagged air quality finance). Typical examples of a gender-sensitive outdoor air quality project include integrating women-only carriages as part of a wider railway investment to reduce traffic congestion, or ensuring a certain quota of personnel employed at stations are women. This is a new frontier for funders to engage with and, in turn, integrate into project appraisal and monitoring and evaluation processes.

OUTDOOR AIR QUALITY FUNDING WAS HIGHLY CONCENTRATED IN FIVE ASIAN COUNTRIES, TOGETHER RECEIVING 86% OF THE TOTAL. OTHER REGIONS ARE BEING LEFT BEHIND.

In the most recent five years for which data is available, 86% of outdoor air quality funding provided by international development funders, or $12 billion, was concentrated in only five countries: China (37%), Philippines (20%), Bangladesh (17%), Mongolia (6%) and Pakistan (6%) (see Figure 2.4). While these are certainly countries that struggle with poor air quality, other countries with high pollution levels are being left behind. According to one study, the top two countries with the highest population-weighted annual average $PM_{2.5}$ exposure, globally, are India and Nepal;[46] however, these countries each received less than 1% of the total.[k, 47]

FIGURE 2.4: OUTDOOR AIR QUALITY FUNDING BY REGION OF DESTINATION, 2017-2021



k This does not account for outdoor air quality funding committed domestically by national/local governments in these countries; for example, according to the World Bank (2021), in 2020 the Govt. of India set aside $1.7 billion to fight air pollution over the next 5 years, in 42 Indian cities.

The geographical concentration of outdoor air quality funding on a handful of Asian countries is due to the scale of financing provided by the Asian Development Bank (ADB); the Japan International Cooperation Agency (JICA); and the Asian Infrastructure Investment Bank (AIIB) which focus their investments in their own region and together committed 81% of total outdoor air quality funding in the most recent five years for which data is available. Coherent, government-led programs for air quality improvements in these countries also made it possible to attract development funding.

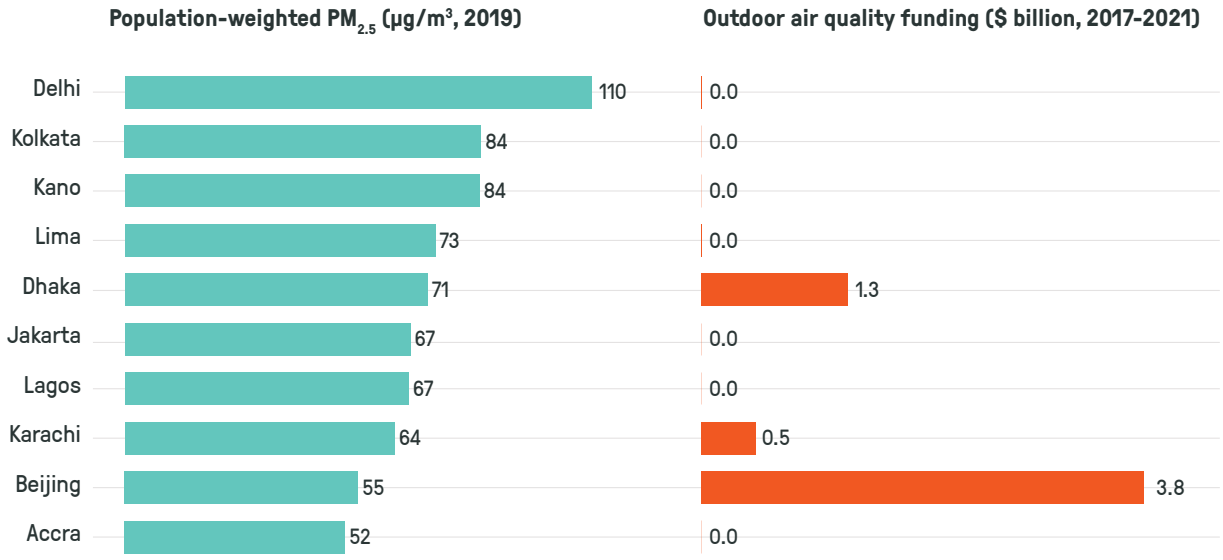
Regions such as Latin America and the Caribbean receive significantly less funding, accounting for only 1% of the total during the same period. African countries received only $0.76 billion outdoor air quality funding, or 5% of the total, despite the fact the continent has five of the top 10 countries with the highest population-weighted annual average $PM_{2.5}$ exposures.[48] There is enormous untapped potential in these regions to save lives, protect babies' and children's health and reduce the burden on health budgets. More international development funders with a mandate to work in these regions are needed in order for a 'levelling-up' to occur. In addition, existing funders working in these regions should begin to integrate outdoor air quality into their investment priorities.

68% OF OUTDOOR AIR QUALITY FUNDING WAS COMMITTED TO SPECIFIC CITY-LEVEL PROJECTS. AS WITH CLIMATE ACTION, CITIES ARE WELL-PLACED TO SPEARHEAD ACTION ON AIR POLLUTION.

The top three cities receiving outdoor air quality funding in the most recent five years for which data is available are: Beijing (27%), Dhaka (9%) and Ulaanbaatar (6%, see Ulaanbaatar case study in Box 3.1).[l] Comparing the most polluted cities globally (by population-weighted annual average $PM_{2.5}$ exposure) with the outdoor air quality funding they received between 2017-2021 reveals large funding gaps (see Figure 2.5), and underlines the fact that most cities are still far from being able to achieve safe levels of $PM_{2.5}$ (equivalent to 5 µg/m^3, as per WHO guidelines). It is important to note, however, that air quality is not only an urban problem: rural areas are both a source of pollutants (via agricultural activity) and can be acutely exposed to high pollutant concentrations (for example, through forest fires or dust storms).

l This only includes air quality projects that could be traced to a specific city, while it is likely that additional funding went to projects at the municipal level.

FIGURE 2.5: TOP 10 CITIES WITH THE HIGHEST POPULATION-WEIGHTED ANNUAL AVERAGE $PM_{2.5}$ EXPOSURES (2019, µg/m³)[m] COMPARED TO OUTDOOR AIR QUALITY FUNDING RECEIVED (2017-2021, $ BILLION)



Note: According to the WHO (2022), annual average $PM_{2.5}$ in Delhi in 2019 was 105 (µg/m3).[49]

As has been the case where climate action proliferates and thereby mobilises further climate finance[n] – city-led action on air pollution is a promising avenue for achieving the goals of the clean air agenda. For example, 10 major African cities recently signed onto the C40 Cities clean air declaration, joining a global cohort of 38 cities committed to improving public health and climate, agreeing to determine baseline levels of air pollution while setting air pollutant reduction targets, within the next two years.[50] Sub-national action on air pollution is especially important in megacities across the world, where poor air quality is often chronic and only set to worsen with expected population growth increasing both concentrations and exposure.[51] Following these commitments, C40 Cities launched a technical assistance program to assist Addis Ababa, Dakar, Durban, Johannesburg, and Lagos on air pollution reduction projects, all cities which received little-to-no outdoor air quality funding in the most recent five years for which data is available.[52]

Such programmes help achieve air quality improvements in regions where financing is lacking, helping to bridge the observed air quality finance gap. A second technical assistance program led by C40 Cities between 2022-2024, funded by the Clean Air Fund, supports several cities in India, Southeast Asia and Latin America, including Delhi and Lima which exhibit high $PM_{2.5}$ exposure (see Figure 2.5).[53]

m Data extracted from HEI, 2022. Air Quality and Health in Cities.
n Please see Cities Climate Finance Leadership Alliance.

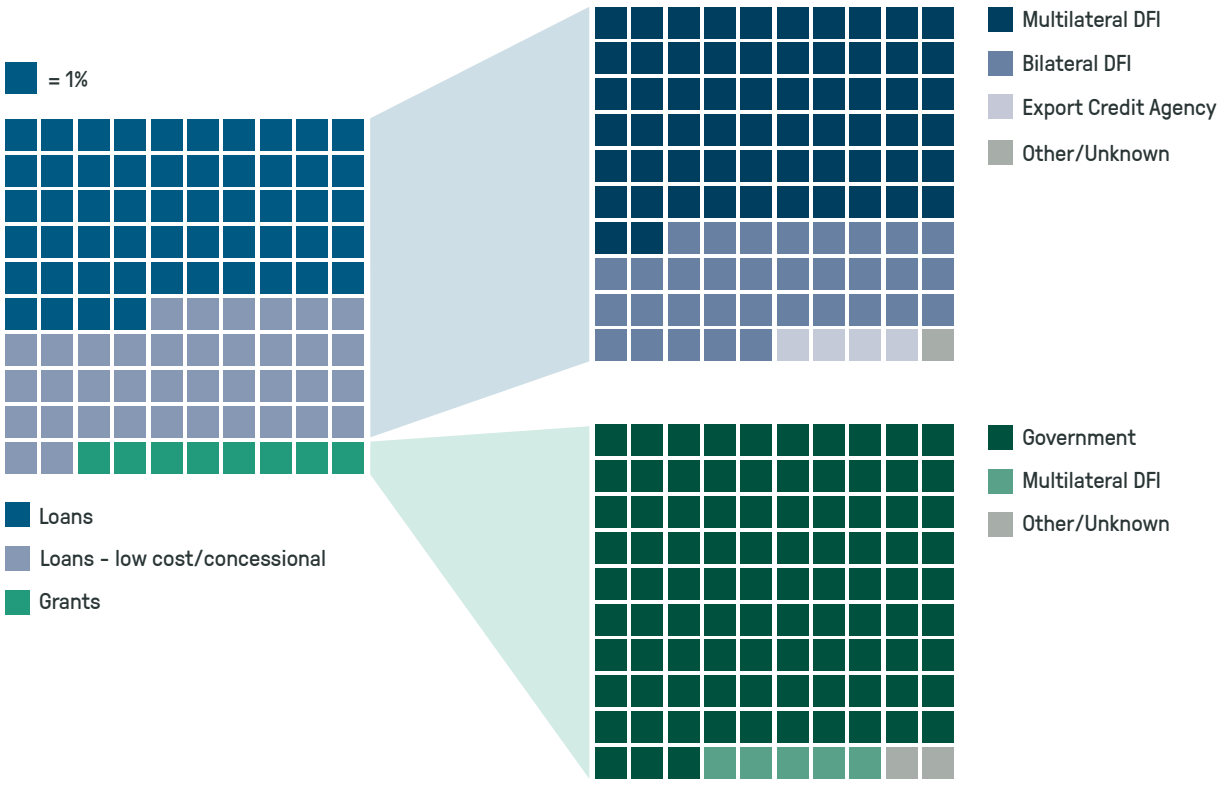
OVER 90% OF OUTDOOR AIR QUALITY FUNDING WAS CHANNELLED VIA LOANS, JUST OVER A THIRD OF WHICH WAS LOW-COST OR CONCESSIONAL. GRANT FUNDING CONSTITUTED ONLY 8% OF OUTDOOR AIR QUALITY FUNDING.

International development funding is largely channelled via loans – which can be low-cost/concessional or market rate – and grants, with some use of equity and risk mitigation instruments, depending on the nature of the investment.

In the most recent five years for which data is available, most outdoor air quality funding was provided in the form of loans (92% of the total, or $12.9 billion), of which $5.3 billion was low-cost/concessional (Figure 2.6). Concessional funding is particularly important for developing economies who may already be suffering from high debt exposure or are in a debt crisis, particularly in the aftermath of the COVID-19 pandemic.[54]

Grants accounted for the remaining 8% of outdoor air quality funding committed in the period, largely from governments (93%). Such funding is a vital resource that can help improve air quality by facilitating capacity building and technical assistance. Technical support programmes are essential to develop local air quality management guidance and action plans, while grant funding could be used to make the health case for action on air pollution by raising awareness. Indeed, action on air pollution is ultimately a public good and may not, otherwise, develop without the catalytic role played by grant funding. On the recipient-side, grants are most favoured since they avoid worsening debt positions (especially for countries with high debt exposure) while also providing a degree of choice for local authorities to determine how to effectively tackle air pollution and where the money is best spent locally.

FIGURE 2.6: OUTDOOR AIR QUALITY FUNDING BY INSTRUMENT AND TYPE OF FUNDER, 2017-2021



Overall, multilateral development finance institutions (DFIs) provided the largest share (51%) of outdoor air quality funding in the most recent five years for which data is available. Bilateral DFIs were the next largest provider (37%) followed by governments (7%). It is important to note that the focus of our analysis is international development funding and does not consider the funding that domestic governments (federal; municipal) allocate towards addressing air pollution within their own territories which is, nonetheless, a key part of the wider air quality funding landscape. For example, EU27 governments together spent $15.6 billion on domestic pollution abatement in 2022 alone.[55] Additionally, philanthropic foundations make an important contribution, in 2021 providing $63.8 million for outdoor air quality projects.[56]

While MDBs already play a significant role (see Table 2.1) relative to other types of funders, the discussions regarding international financial institution (IFI) reform present a unique opportunity to further scale their air quality commitments. Recent debates have focussed on unlocking billions of dollars of callable capital for climate action.[57] If that additional finance does indeed materialise, and if funders can consciously programme air quality concerns within their climate workstreams, the outdoor air quality funding landscape could be transformed in the coming years.

Overall, the number of funders investing in air quality projects has remained limited over time, with the top 10 funders providing 97% of total outdoor air quality funding in the most recent five years for which data is available (Table 2.1).[o] The long-term concentration of funding among a limited number of funders indicates limited engagement with air quality issues by the broad set of international development funders and the need to widen the funding base.

TABLE 2.1: TOP 10 INTERNATIONAL DEVELOPMENT FUNDERS OF OUTDOOR AIR QUALITY PROJECTS, 2017-2021

Ranking	Funder	Outdoor air quality funding ($ million)	Outdoor air quality funding as a % of total int. development finance commitments
1	Japan	5,115	6%
2	Asian Development Bank	5,065	5%
3	Asian Infrastructure Investment Bank	1,246	4%
4	Canada	658	3%
5	Republic of Korea	539	2%
6	World Bank Group	407	0.1%
7	European Bank for Reconstruction and Development	299	1%
8	European Investment Bank	112	0.4%
9	France	93	0.1%
10	USA	64	0.04%
All top 10 funders	**13,597**		

o Similarly, Table 2.2 shows the top 10 funders by spending on projects with outdoor air quality co-benefits.

Since air quality is a cross-cutting issue – affected by, and affecting, various sectors – there is significant scope for securing buy-in from various stakeholders. However, at the domestic level, it has been observed that, often, air pollution falls between ministerial departments (environment; transport; energy; health) with no clear sense of who should be held accountable for addressing the issue. All relevant ministries – or, in the context of international development funders, all sectoral experts – should collaborate on the topic, rather than working in siloes. By allocating clear responsibilities such that concrete action may be taken across sectors, air quality as a development outcome will no longer be overlooked.

2.2 JOINED-UP ACTION: OUTDOOR AIR QUALITY AND CLIMATE FUNDING

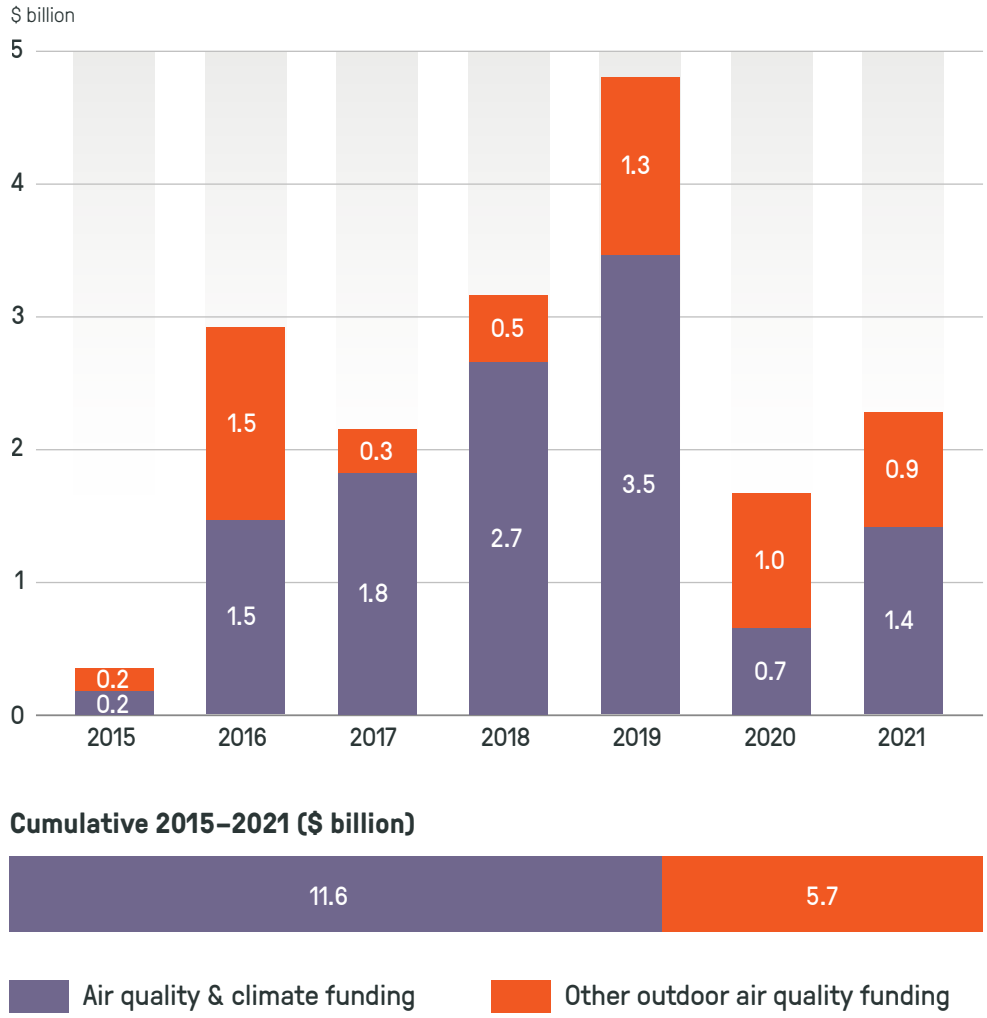
Climate change and air pollution challenges are interconnected in their causes and consequences, and therefore also in their solutions. Indeed, public- and planetary-health are closely related, demanding a holistic policy approach that tackles both issues simultaneously. For that reason, we have analysed outdoor air quality funding committed by international development funders to better understand the extent to which joined-up action on air quality and climate is being programmed into development interventions.

BETWEEN 2015-2021, 67% OF OUTDOOR AIR QUALITY FUNDING ($11.6 BILLION) WENT TO PROJECTS WHICH SIMULTANEOUSLY ADDRESSED CLIMATE CHANGE.

International development funders committed 67% of their outdoor air quality funding ($11.6 billion) to projects which tackled air pollution and climate change simultaneously (Figure 2.7). Such projects cover a range of sectors (especially energy generation and transport) and include policy-oriented interventions to improve planning and management in relation to air pollution and climate change. The remaining 33% (or $5.7 billion) represents outdoor air quality funding which does not have climate benefits, for example, projects focused exclusively on air quality monitoring and measurement, or dust reduction. Looking at year-on-year changes, outdoor air quality and climate funding flows have shown some inconsistency, peaking in 2019 due to the large Philippines railway project mentioned earlier, but then declining in 2020.

Public- and planetary-health are closely related, demanding a holistic policy approach that tackles both issues simultaneously.

FIGURE 2.7. OUTDOOR AIR QUALITY AND CLIMATE FUNDING AS A SHARE OF TOTAL OUTDOOR AIR QUALITY FUNDING, 2015-2021



Some funders are more advanced in terms of ensuring air quality and climate are both programmed into the same intervention, while others have not yet mainstreamed joined-up action across projects nor incorporated this approach within their wider climate mandate.

MOST AIR QUALITY AND CLIMATE FUNDING (95%) WENT TO MITIGATION PROJECTS, AND MAINLY FOR TRANSPORT.

Almost all (95%) outdoor air quality and climate funding was directed to climate mitigation projects (see Figure 2.8), in the most recent five years for which data is available.

Over half of these air quality and climate mitigation funding flows (or $5.4 billion) targeted the transport-sector, primarily via investments in rail and public transportation systems which have a clear and immediate impact on air pollution in the urban context (see Kolkata case study in Box 2.1). The other main aspect of air quality and climate mitigation funding (30% or $2.9 billion) was energy transition components of multi-sector air pollution control programs, including projects under the Climate and Clean Air Coalition.

BOX 2.1: PUBLIC TRANSPORT ELECTRIFICATION PLAN TO ADDRESS AIR POLLUTION AND CLIMATE CHANGE IN KOLKATA (INDIA)

According to the WHO, Kolkata is the 20th most populated city in the world and ranks as the 2nd most polluted city in India. As is the case in many developing countries, the main source of pollution in Kolkata is transportation, especially road transport.

In order to put Kolkata on the road to clean transport, the Energy Sector Management Assistance Program (ESMAP) of the World Bank provided a $250,000 grant to assist the West Bengal Transport Corporation (WBTC) in building a strategic roadmap for electric vehicle transition, including the identification of viable electric transportation options and the assessment of urban air pollution, highlighting key pollution corridors therein. Based on the results of the study, WBTC chose to procure 80 electric buses for Kolkata, leading onto the second phase of ESMAP's program in which grant finance was used to procure electric buses for an additional five cities in the state of West Bengal.

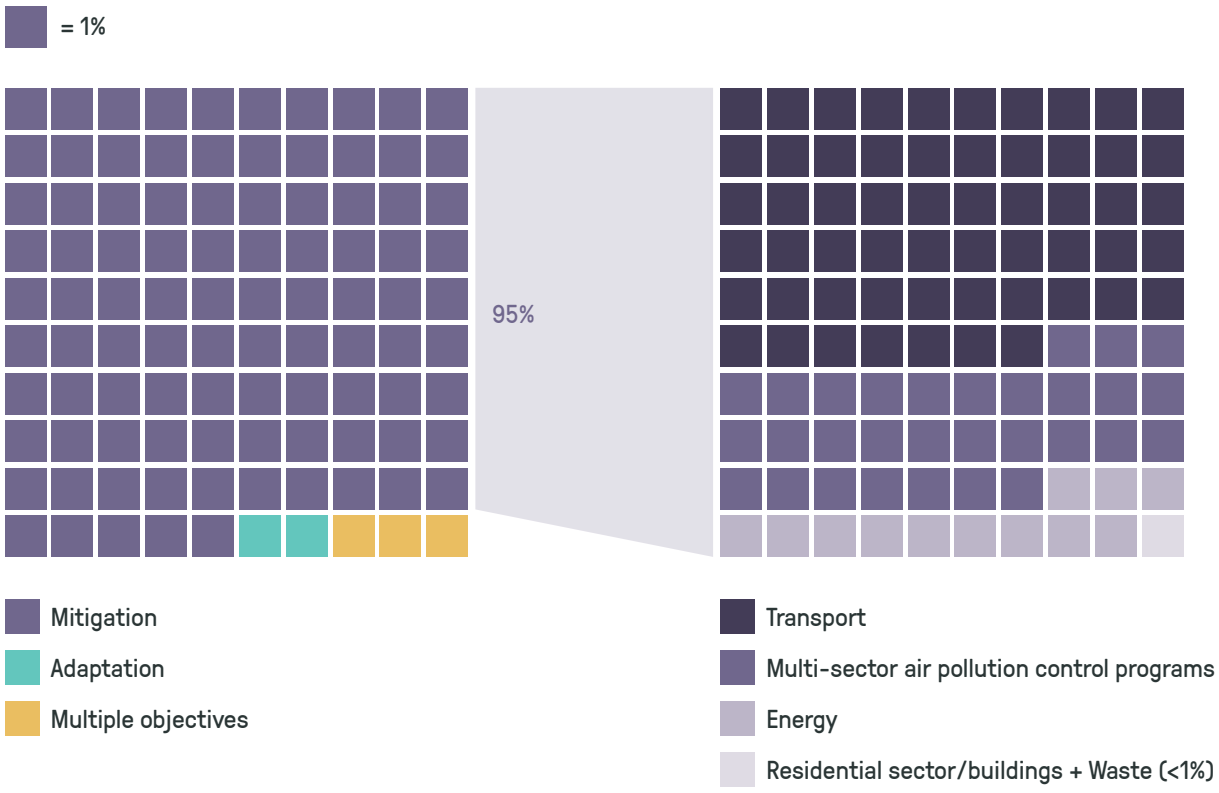
As the WBTC continues its mission to reduce greenhouse gas emissions, converting to an all-electric fleet and installing the necessary charging infrastructure, ESMAP will provide technical assistance related to different financial models for implementing, and scaling, electric bus fleets in Kolkata. The upfront cost of an electric bus in Kolkata is over three times that of a diesel bus. However, the operational costs are much lower, with battery-operated electric buses half as expensive as diesel buses. This particular financial profile – steep upfront costs followed by lower operating costs – demands innovative financing models to facilitate the transition to electric buses, both in Kolkata and other cities facing the same financial barriers.

Overall, the program demonstrated how replacing just 5% of conventional bus fleets with electric buses could yield an expected reduction in CO_2 emissions of 3,094 tons per year, with associated and immediate benefits for air quality and public health in the city. The programme is a successful example of conscious joined-up action on air quality and climate change, with the city government awarded C40 Cities Bloomberg Philanthropies Award for its Low Carbon Commute Transition plan. In Kolkata's case, local ambition to tackle both climate change mitigation and poor air quality interacted to drive forward the electric vehicle transition, drawing on grant-based technical assistance to make clean transport a reality. Drawing on the learnings from this programme, there has been much knowledge exchange with other Indian cities such that they may create similar programmes for transitioning to clean urban transport.

Sources: CCFLA & CPI (2021);[59] ESMAP (2021).[60]

Funding of adaptation projects and those with multiple objectives (both adaptation and mitigation) remained a minor aspect of the air quality and climate funding landscape (2% and 3%, respectively), though there is certainly scope for harnessing nature-based solutions for adaptation to efforts to improve air quality. For example, some plant species have potential to reduce air pollution through natural processes such as bioaccumulation and deposition.[58] Other examples of adaptation which simultaneously improves air quality include projects related to mitigating the risk of climate change-induced forest fires, a significant source of air pollution. Generally, awareness and understanding of the linkages between air quality and adaptation goals are limited and require further exploration.

FIGURE 2.8: PROPORTION OF OUTDOOR AIR QUALITY AND CLIMATE FUNDING BY CLIMATE OBJECTIVE AND MITIGATION SECTOR, 2017-2021



Note: The analysis in this report focuses only on renewable energy projects which directly replace fossil fuel plants as they are the only ones that have a clear positive impact on air quality.

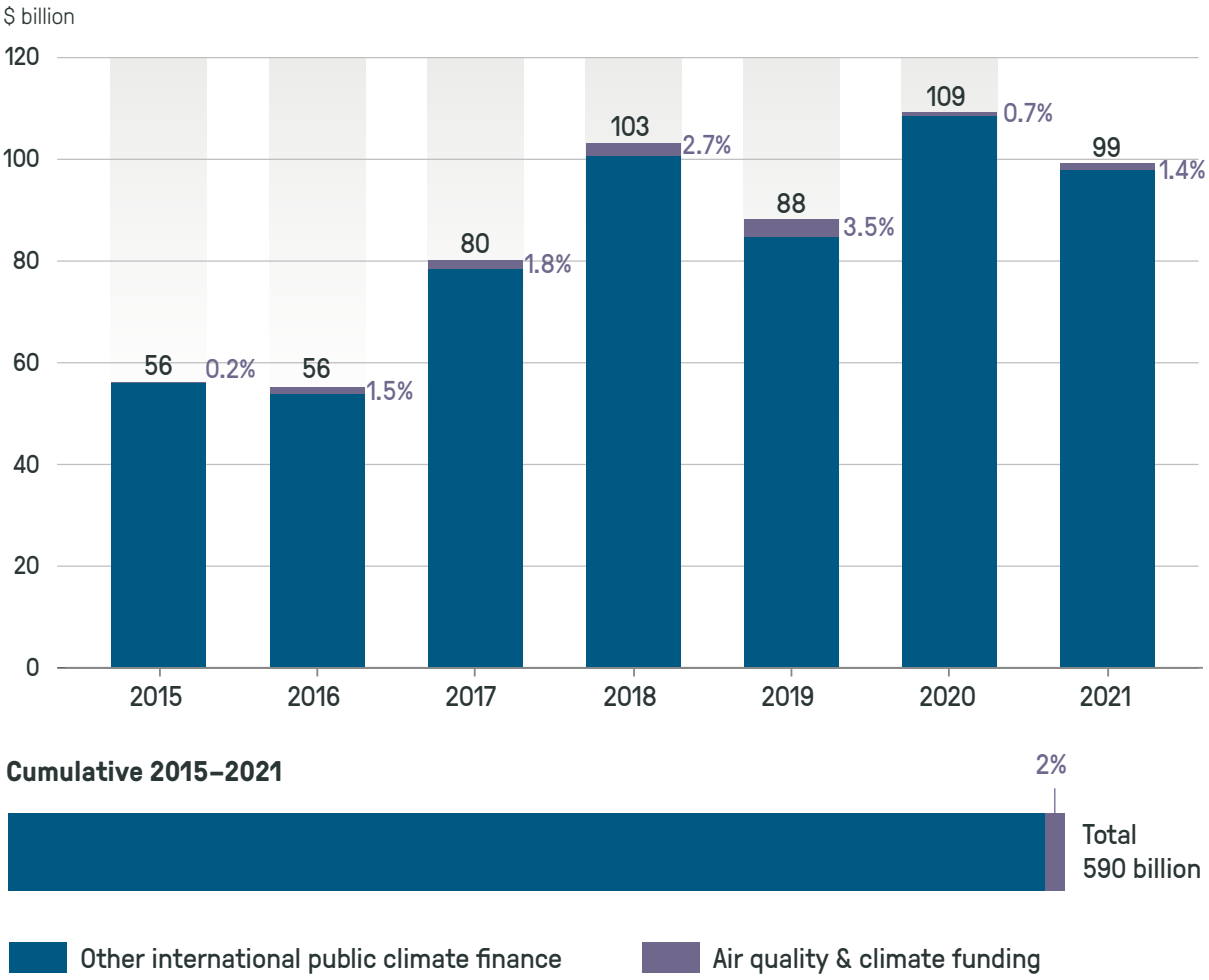
ONLY 2% OF INTERNATIONAL PUBLIC CLIMATE FINANCE EXPLICITLY TACKLES OUTDOOR AIR POLLUTION.

International development funders provide billions of finance each year to climate mitigation and adaptation projects in developing and emerging economies. These commitments have grown over time, reaching a total of $578 billion cumulatively in the period 2015-2021.[p]

p This pertains to international public climate finance to non-OECD countries; 2021 numbers are preliminary.

Looking at total international public climate finance, we see that outdoor air quality and climate funding ($11.6 billion) amounted to only 2% (see Figure 2.9). This means that 98% of these climate finance flows ($578 billion) had no explicit air quality objectives, despite the well-established potential for tackling air pollution and climate change in an integrated manner and, thereby, delivering considerable health, economic and social benefits alongside the climate gains.

FIGURE 2.9: JOINED-UP OUTDOOR AIR QUALITY AND CLIMATE FUNDING AS A SHARE OF TOTAL INTERNATIONAL PUBLIC CLIMATE FINANCE, 2015-2021



It is critical to fully account for and track the benefits of climate interventions on air quality. Monitoring local air quality benefits – particularly in relation to health – can help to deliver a more comprehensive understanding of the effects of global climate interventions, allowing for more informed decision-making and resource prioritisation. Furthermore, tracking the benefits of improved air quality can help to ensure that interventions achieve their intended outcomes and that any unintended negative consequences are identified and addressed. Indeed, while there are many synergies between the two issues, there are also potential trade-offs: for example, short-lived (sulphate) aerosol emissions which pollute air have been shown to have a cooling effect, counteracting global warming.[61] Accounting for trade-offs, as well as synergies, can further help international development funders to determine what is an optimal use of public money.

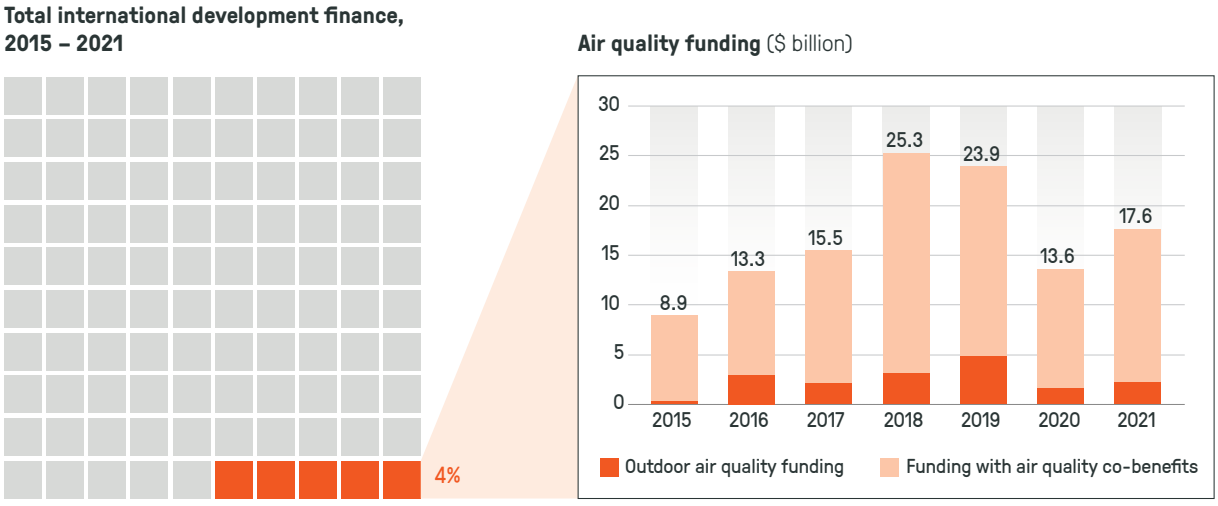
2.3 FUNDING WITH OUTDOOR AIR QUALITY CO-BENEFITS

While the pool of funding that is explicitly working to improve outdoor air quality is limited, there is a larger bucket of international development finance which delivers outdoor air quality improvements as a co-benefit of the investment. Such funding flows are substantial compared to the dedicated outdoor air quality funding discussed in Section 2.1.[q]

BETWEEN 2015-2021, INTERNATIONAL DEVELOPMENT FUNDERS COMMITTED $101 BILLION TO PROJECTS WHICH DELIVERED OUTDOOR AIR QUALITY CO-BENEFITS.

This translates to approximately $14 billion per year, on average, or almost six times more than dedicated outdoor air quality funding. At 4% of total international development funding committed in the period, funding with outdoor air quality co-benefits constitutes a more significant share of the international development funding landscape. However, there is still much room for improvement: 96% of international development funding is air quality-agnostic, meaning that air quality outcomes continue to be overlooked, or undervalued, in many development interventions.

FIGURE 2.10: FUNDING WITH OUTDOOR AIR QUALITY CO-BENEFITS AS A SHARE OF TOTAL INTERNATIONAL DEVELOPMENT COMMITMENTS, 2015-2021



Funders are not fully, if at all, accounting for the air quality benefits their development interventions are capable of yielding. If they did, the cost-benefit equation would be noticeably more favourable, providing further impetus to approve this work. In other words, the orange outdoor air quality funding bars in the figure above could – and should – be larger, were funders to account for the outdoor air quality benefits of their projects. Acknowledging that existing interventions across energy and transport, among other sectors, yield outdoor air quality benefits, and therefore deliver positive (local and national) health outcomes in the short-to-medium term, will improve project planning and appraisal. Importantly it will also catalyse more funds from stakeholders concerned with other outcomes – for example, health – who, otherwise, may not have had an incentive to finance the project.

q See methodology for the approach to categorizing projects.

BOX 2.2: INDOOR AIR POLLUTION

Projects that tackle indoor air pollution are accounted for within **Funding with Outdoor Air Quality Co-benefits** in this report. The State of Global Air Quality Funding report series is purposefully focused on outdoor, or ambient, air quality and, its international development funding. This is because outdoor air pollution – as a specific development intervention area – is widely overlooked or falls between sectoral/governmental departments. Clean Air Fund want to draw attention to that reality. Moreover, the SEforAll Energizing Finance series has dedicated analyses on indoor air pollution, tracking financial commitments to clean cooking projects in so-called High-Impact Countries. Clean Air Fund, nonetheless, recognise the relationship between outdoor and indoor air pollution (put simply, what is indoor makes its way outdoor) and therefore tracks and terms funding to tackle the latter as 'funding which delivers outdoor air quality co-benefits.'

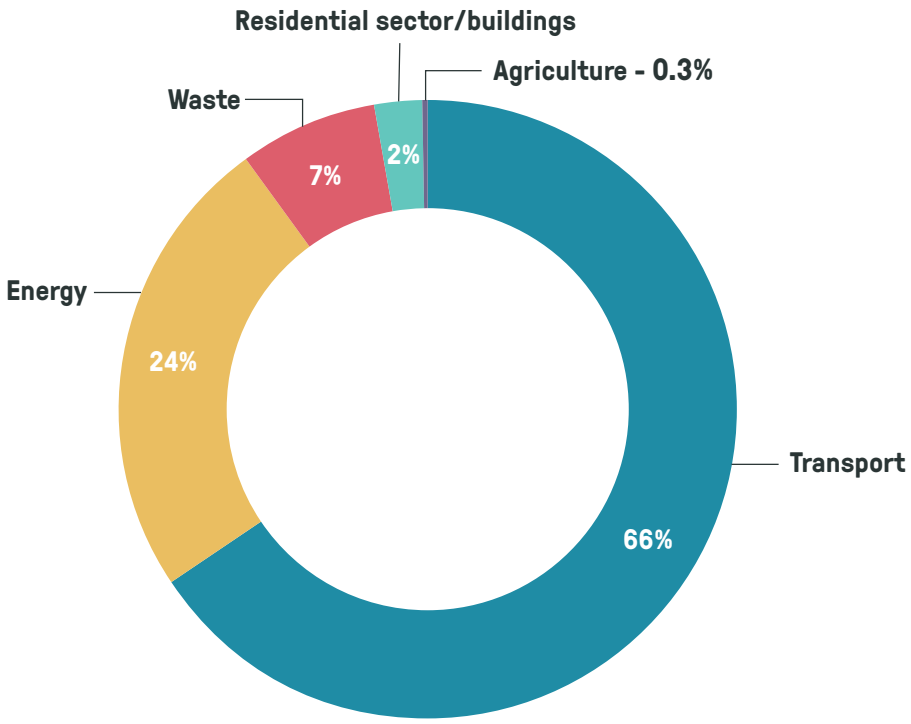
Around $277 million of funding dedicated to reducing indoor air pollution was tracked in the period 2015-2021.

MOST FUNDING WITH OUTDOOR AIR QUALITY CO-BENEFITS IS FOR THE TRANSPORT SECTOR (66%) FOLLOWED BY ENERGY (24%). WASTE AND AGRICULTURE RECEIVE RELATIVELY LOW FUNDING DESPITE CONTRIBUTING TO AIR POLLUTION.

In the most recent five years for which data is available, the transport sector received the majority of international development funding with outdoor air quality co-benefits (66%, or $54 billion), primarily from the implementation of new road and rail networks. Energy investments followed as the next main source of outdoor air quality co-benefits (24%, or $20 billion), almost all of which ($19.2 billion) was for pollution control and increased energy efficiency in energy and industrial processes (Figure 2.11).[r]

r It should be noted that the analysis in this report focuses only on renewable energy projects which directly replace fossil fuel plants as they are the only ones that have a clear positive impact on air quality. For more details please see the methodology document.

FIGURE 2.11: FUNDING WITH OUTDOOR AIR QUALITY CO-BENEFITS BY SECTOR, 2017-2021



As is the case with dedicated outdoor air quality funding (Section 2.1), minimal funding with outdoor air quality co-benefits was committed to the agriculture sector (only 0.3% of the total) despite its importance to air quality. Indeed, food waste, land-use change, crop burning, and livestock emissions are all significant contributors to air pollution (see Figure 1.2), despite the existence of solutions to help mitigate the problem – for example, improvements to livestock production and manure management, or sustainable land management techniques. Similarly, the waste sector accounted for only 7% of total funding with outdoor air quality co-benefits, or $6 billion, despite its contribution to air pollution and the potential for improving air quality via better waste management (see Greater Malé case study, Box 3.2) and improved wastewater treatment. International development funders should reconsider their strategies for both sectors – agriculture and waste – especially given the potential overlap with climate change mitigation in relation to methane.

Similar to Figure 2.4, the top four countries[s] that receive funding with outdoor air quality co-benefits were all in Asia, with India being the top recipient, at 21% of the total between 2017-2021. As is the case with dedicated outdoor air quality funding, funding with outdoor air quality co-benefits is largely provided by a small number of the same funders, with the top 10 providing 85% of the total in the most recent five years for which data is available (see Table 2.2).

s India, Philippines, Indonesia, Bangladesh.

Air quality outcomes continue to be overlooked, or undervalued, in many development interventions.

TABLE 2.2: TOP 10 INTERNATIONAL DEVELOPMENT FUNDERS OF PROJECTS DELIVERING OUTDOOR AIR QUALITY CO-BENEFITS, 2017-2021

Ranking	Funder	Funding with outdoor air quality co-benefits ($ million)	Funding with outdoor air quality co-benefits as a % of total int. development finance commitments
1	Asian Development Bank	17,792	16%
2	European Investment Bank	13,235	42%
3	Japan	7,598	8%
4	Inter-American Development Bank	5,953	8%
5	China[t]	5,548	Unknown[u]
6	European Bank for Reconstruction and Development	5,193	13%
7	World Bank Group	5,106	2%
8	Asian Infrastructure Investment Bank	4,156	14%
9	Germany	2,675	2%
10	France	1,981	3%
All top 10 funders		**69,237**	

t Investment from Chinese IDFs presented in this table represents an underestimation, due to the limited availability of project-level data.

u China does not report to OECD CRS.

2.4 FOSSIL FUEL-PROLONGING FUNDING

FOR THE FIRST TIME IN 2021, INTERNATIONAL DEVELOPMENT FUNDERS PROVIDED MORE FUNDING TO OUTDOOR AIR QUALITY PROJECTS THAN FOSSIL FUEL-PROLONGING PROJECTS

When reviewing the data over the period 2015-2021, international development funders committed $47.4 billion to projects that prolonged the use of fossil fuels. This was almost three times the amount committed to outdoor air quality projects in the same period ($17.3 billion). This threatens both the clean air agenda and global climate goals, with consequent health impacts in recipient countries. Most of this fossil-fuel prolonging funding was channelled towards oil and fossil gas[v] extraction/production (64%), followed by fossil gas power and heat generating assets (15%) (see Figure 2.12).

Significantly, however, the data shows a declining trend in funding for fossil fuel-prolonging projects since 2019. In 2021, for the first time, outdoor air quality funding ($2.3 billion) exceeded investments in fossil fuel-prolonging projects ($1.5 billion). This decline comes from substantially less financial commitments for oil and gas production and extraction ($4.1 billion in 2020 versus $0.6 billion in 2021) as well as an 88% drop in fossil gas investments between 2020 and 2021.

While it is too early to know whether this trend has continued in 2022,[w] this downward trajectory might at least in part reflect the joint commitment of 34 countries and five public finance institutions to stop international public finance for fossil fuels by the end of 2022,[62] or growing momentum following COP26 when parties to the UNFCCC agreed to phase-down coal-fired power.

However, one study cautions that many exclusion policies have loopholes which could facilitate continued public funding of fossil fuels,[63] a reality at odds with the immediate need to reach safe levels of $PM_{2.5}$.

Further, it should also be noted that our data refers only to direct commitments made by (public) international development funders in low and middle income countries. When looking at the global fossil fuel markets, however, total investments seem to have bounced back up after the industry was hit by the COVID-19 pandemic, reaching nearly $900 billion in 2021 and over $950 billion in 2022.[64] In addition to direct investments in new fossil fuel assets, the industry also continued to receive considerable support through subsidies, which reached almost $700 billion in 2021.[65] It will be important to continue to track all of these data points, and to hold governments to account for commitments on fossil fuels.

v More commonly known as 'natural gas', which erroneously conveys it as a harmless (natural) fuel source.
w Latest data reported to the OECD CRS is for 2021. Data for 2022 will be published in mid-2024.

FIGURE 2.12: ANNUAL INTERNATIONAL DEVELOPMENT FUNDING TO OUTDOOR AIR QUALITY PROJECTS COMPARED TO FOSSIL FUEL-PROLONGING PROJECTS, 2015-2021

Moving away from fossil fuels is critical for mitigating the worst effects of climate change and improving air quality and public health outcomes. On the other hand, transitioning to cleaner energy sources can be difficult for affected workers and communities, particularly in developing countries where fossil fuels continue to play an essential role in their economies (see Box 2.3). The upcoming COP28 conference will discuss effective strategies for phasing-out fossil fuels and transitioning to cleaner energy sources fairly and equitably, with a specific Health Day and climate-health ministerial. This is a first-of-its-kind discussion in COP history and presents an opportunity to put air quality and pollution control under the spotlight as a key action area, until now neglected within the UNFCCC negotiations.

The upcoming climate-health ministerial at COP28 presents an opportunity to put air quality and pollution control under the spotlight, until now neglected within the UNFCCC.

BOX 2.3: JUST ENERGY TRANSITION PARTNERSHIPS: ENERGY TRANSITION AND HEALTH CO-BENEFITS

Just Energy Transition Partnerships (JETPs) are a nascent financing cooperation mechanism between international development funders (governments, MDBs and DFIs) and heavily coal-dependent emerging economies to help them achieve a just energy transition; ensuring training and alternative job creation for affected workers. Since these partnerships seek to reduce GHG emissions, they could also offer scope – and finance – for integrating explicit air quality objectives into national transition plans.

The first JETP was announced at COP26 for South Africa, the largest carbon emitter in Africa (18% of GHG total emissions of the continent in 2019). The UK, the US, France, Germany and the EU agreed to deploy $8.5 billion in a first tranche of grants, concessional policy loans, sovereign loans, and investments in the private sector. Other countries set to benefit from JETPs include India, Indonesia, Vietnam and Senegal.

In South Africa, coal dependence continues to be very high and directly impacts poor air quality in the country (in 2019, South Africa had an annual average population-weighted exposure to $PM_{2.5}$ of 29 µg/m3; that is, six times above WHO recommendations). Despite the strong potential for solar energy development in the country (Department of Mineral Resources and Energy, South Africa), coal still accounted for 72% of the total energy supply in 2020.[66]

The $8.5 billion financing package for South Africa is only the first step to achieving a just energy transition in the country. In November 2022, at COP27 in Sharm-el-Sheikh, South Africa presented its Just Energy Transition Investment Plan (JET IP), requiring $98 billion in the period 2023-2027. It lays out three priority investment sectors - electricity, new energy vehicles, and green hydrogen (GH_2) – and a cross-cutting investment in the development of national skills, to ensure capacity and expertise in relation to clean energy.

There is currently no evidence that South Africa's JETP has quantified and monetised the public health co-benefits it is likely to generate. Such health benefits would first and foremost affect the communities who live near coal mines and power plants and, therefore, would also implicitly constitute equity benefits. Since donors are interested in achieving health and equity benefits in their development interventions, fully accounting for the co-benefits of JETPs is essential to catalyse more funding. Additionally, effectively communicating the short-term health gains of JETPs can help to generate buy-in amongst political leaders and affected communities.

3. TAPPING INTO THE POTENTIAL OF DIFFERENT FINANCIAL INSTRUMENTS FOR AIR QUALITY

As discussed in Chapter 2, funding for projects tackling outdoor air pollution in low and middle income countries needs to be scaled up. This encompasses both projects centred around outdoor air quality objectives, as well as those with outdoor air quality co-benefits (see Section 1.3). While projects such as air pollution control programs or funding for air pollution monitoring and modelling do not provide the necessary returns to attract private investors (and are therefore likely to rely almost exclusively on public capital), projects that improve outdoor air quality in many sectors (*e.g.*, energy and transport) are already able to attract large shares of private funding. These projects include, for example, renewable power plants to replace fossil fuel electricity generation assets; clean transport vehicles and related infrastructures; and energy efficiency measures in buildings and industrial processes. For these projects, public resources should focus on de-risking investments for private investors especially in low and middle income countries where real and perceived risks are comparatively high.

Scaling up air quality funding globally, will require a holistic approach, including suitable policy and regulatory environments; a pipeline of bankable projects across sectors; and the design of specific financial instruments. This section looks at this last element, exploring the role of public financial institutions and specifically, international development funders in the design and use of different financial instruments for air quality projects. Deploying a diverse range of financial instruments – so far largely untapped for air quality projects - could promote a more effective use of public resources to de-risk investments and unlock private capital in those sectors that present attractive returns on investments. At the same time, it would free up public resources to be redirected towards air pollution control programs and air pollution monitoring and modelling projects where the private sector is expected to play a limited role.

This section provides a review of financial instruments available to funders, grouped below and described in detail in Annex I:

- More traditional project-level financial instruments *i.e.*, grants, debt and equity;
- Secondary capital market instruments;
- Results-based financial instruments;
- Structured finance mechanisms;
- Risk mitigation instruments.

If deployed together effectively, with enabling policy environments (*e.g.*, effective standards, regulation and enforcement) and suitable incentives, these financial instruments can multiply the benefits of air quality improvements, while at the same time creating new business and revenue stream opportunities for the private sector.

As shown in Table 3.1, some of these (*e.g.*, grants and debt instruments) have been widely used by international development funders (see Section 2.1) but could be used in a more targeted way to catalyse private capital. Other more complex instruments, such as secondary capital market instruments and structured finance mechanisms, hold the potential to mobilise considerable additional capital by tapping into large capital pools such as institutional investors. These instruments are yet to become well established in less advanced financial markets, and in many cases they have not been used to finance dedicated air quality projects.

Smarter use of a diverse range of financial instruments will help more funding from government, international development funders and private investors to flow into air quality projects, delivering major economic, social and health benefits.

TABLE 3.1: SUMMARY OF INSTRUMENTS ANALYSED, BARRIERS ADDRESSED AND USE FOR DEDICATED AIR QUALITY PROJECTS SO FAR

Category	Barriers addressed	Instrument	Use for dedicated air quality projects
Grants, debt and equity	• Lack of short-term finance • Lack of long-term finance • Administrative risk • Technology risk • Limited technical capacity	Grants	Used
		Debt	Used
		Equity	Used
Secondary capital market instruments	• Lack of long-term finance • Refinancing risk • Currency risk • Insufficient project size • Lack of data/ information	Green bonds	Proposed
		Social bonds	Not used
		Sustainability bonds	Not used
		Sovereign bonds	Used
		Green sukuk	Not used
Results-based finance instruments	• Lack of short-term finance • Lack of long-term finance • Refinancing risk • Counterparty risk • Technology risk • Lack of data/ information	Results-based funding	Used
		Carbon finance	Not used
		Environmental impact bonds	Not used
		Sustainability-linked bonds	Not used
Structured finance mechanisms	• Lack of long-term finance • Refinancing risk • Currency risk • Counterparty risk • Insufficient project size • Lack of data/ information	Aggregation	Not used
		Securitization	Not used
		Pooled procurement	Not used
Risk mitigation instruments	• Currency risk • Political risk • Regulatory risk • Administrative risk • Counterparty risk • Technology risk • Environmental risk • Lack of physical infrastructure	Currency hedging instruments	Not used
		Guarantees	Used
		Insurance products	Used

For each of these instruments we have:

- Assessed the potential to address one or more barriers hindering investments in developing and emerging markets. These barriers are categorized and described in Annex II;
- Looked at whether they have already been used for air quality projects and/or projects with outdoor air quality co-benefits, providing examples when applicable;
- Investigated their potential to attract private capital and scale up outdoor air quality funding in developing and emerging countries.

Our analysis shows that a wide variety of financial instruments that could make finance more available for air quality are not being utilised. In many developing countries, the implementation and uptake of some of these instruments has been slow or delayed, due to the low maturity of local financial markets, ineffective or unsuitable regulatory environments, limited experience of local financial institutions, and lack of bankable project pipelines, among others. Other instruments are already being used to finance projects with outdoor air quality benefits (although without any explicit mention of air quality objectives). In these cases, a more explicit link to clean air objectives and impacts could be made, and, going a step further, similar vehicles could be designed around specific air quality outcomes (*e.g.*, clean air bonds).

Grants play an important role, for example, in testing new technologies and products, capacity building and technical assistance.

3.1 GRANTS, DEBT AND EQUITY

Grants, debt and equity have been widely used by funders for financing air quality projects. These financial instruments can be particularly relevant in developing countries where public capital markets are not yet advanced. While not intrinsically innovative, these instruments can be used in a more targeted way and more effectively to address specific barriers and risks, and attract additional capital at different stages of project development across sectors.

For example, grants play an important role in testing new technologies and products; helping to build nascent markets; and providing access to affordable capital in the early stages of project development. They can be used to fund essential early-stage non-commercial activities, such as research and development, and testing of new technologies and products to reduce air pollution. For example, the EU Horizon 2020 research and innovation program provided grant funding to support the development of innovative solutions for improving outdoor air quality, including €1.2 million to the German company Green City Solutions, which develops innovative mossy biotech fine dust filters to reduce air pollution in cities, and €50,000 to the Swedish company Insplorion, which patented a new low-cost, highly sensitive sensor technology to detect urban air pollutants such as NOx, CO, SO_2 and O_3.[67, 68]Grants also play a key role in funding capacity-building and technical assistance programs. However, as projects and technologies mature and risk-return profiles of projects become more attractive, grants should be avoided so that commercial (private) capital is not crowded out.

Concessional and non-concessional financing can be used in combination in **blended finance structures** to reduce risks for private investors and lower the overall cost of financing. These structures generally combine concessional finance provided by development finance institutions and/or philanthropic foundations, with private commercial capital. In some blended finance structures, for example, development finance institutions can provide a portion of funding to absorb any losses incurred by a project or they can take junior or subordinated positions to reduce risks for private investors holding senior debt and equity positions in case of financial default. Blended finance structures facilitate access to frontier markets and sectors which would otherwise perceived be too risky for private investors. While development funders already utilise blended finance structures,[x, 69] they could allocate higher proportions of their total funding to these structures and create internal incentives for increasing the share of private funding mobilised through these transactions, by making mobilisation targets a core performance indicator. More blended finance transactions could also be designed more explicitly around the objective of reducing outdoor air pollution.

International development funders are also well positioned to provide debt financing through **on-lending structures** in developing countries. In such instances, financing from development funders is not provided directly to projects but instead to local public financial institutions in the form of credit lines, usually in combination with technical assistance or support. As a result, the local financial institutions are able to develop the necessary internal capacity to disburse funds to projects. Thanks to the concessional funding and support provided by the DFI, the end customers/project developers are able to access finance at more favourable terms than in the local market. Development funders can require that local financial institutions use the funds provided to support only certain types of projects or sectors, usually with the intention of achieving specific development objectives and impacts. Credit lines could, for example, be more explicitly tied to air quality objectives.

3.2 SECONDARY CAPITAL MARKET INSTRUMENTS

Secondary capital market instruments analysed in this report include **green bond and sukuks, social bonds, sustainability bonds** and **sovereign bonds**.[y] These are debt instruments which can be exchanged in the secondary capital markets and can provide access to large capital pools, such as institutional investors, seeking stable and predictable returns on their investments. Besides representing a large capital pool (with over $87 trillion in assets under management in 2018/2019), institutional investors usually provide long-term, patient capital which can support projects throughout their lifetime.

At the end of 2022, the green bonds market had reached $2.2 trillion, with almost $490 billion new green bonds issued in 2022 alone. Although picking up only recently, at the end of 2022, the social and sustainability bond markets had already reached over $650 billion each (see Table 3.1).[70]

x A group of 10 development finance institutions reported to have financed a total project volume of over $13.4 billion using blended finance, out of which $4.6 billion was leveraged from the private sector.

y Please see Annex I for definitions of each financial instrument.

TABLE 3.2: SIZE OF THE GREEN, SOCIAL AND SUSTAINABILITY BONDS MARKETS AT THE END OF 2022

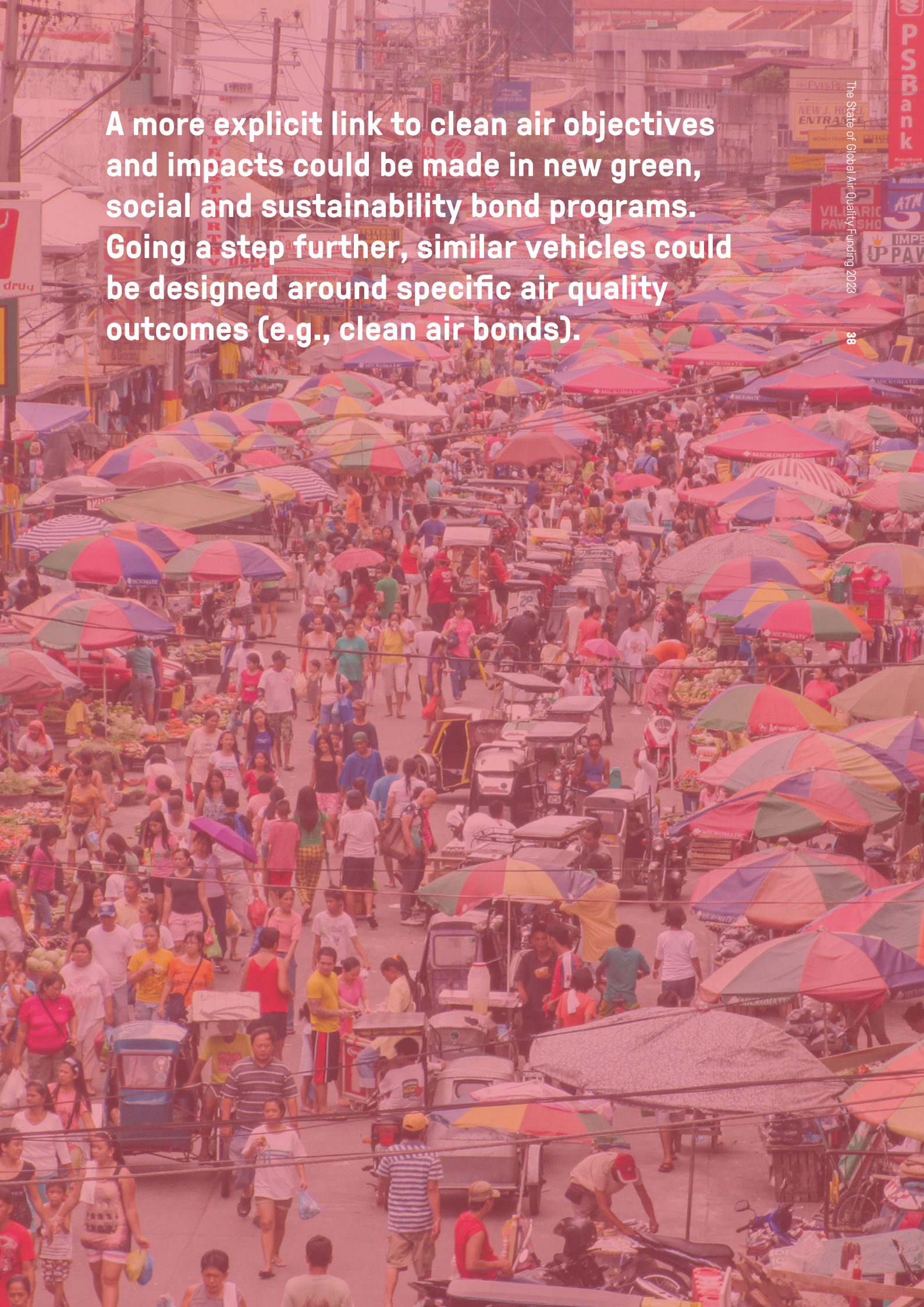
	Green	Social	Sustainability
Total size of market (cumulative)	$2.2 trillion	$653.6 billion	$682.0 billion
Number of issuers	2,456	772	507
Number of countries	85	43	57
Number of currencies	49	42	41

Source: CBI

By pooling together several different projects, secondary capital market instruments offer larger ticket sizes and diversified investment opportunities, reducing the overall risk for investors. In addition, they can be effective in raising capital for already operating assets thus helping to reduce refinancing risk. Bonds can be issued by a variety of actors, including by local governments and municipalities, and if issued in local currency, they can also lower currency risk.

As air quality projects have environmental, social and climate benefits, they can be financed through green bond and sukuks, social bonds and sustainability bonds. Existing bonds already cover several solutions which have a direct positive impact on air quality, such as clean energy and urban transport projects. However, air quality benefits and objectives could be better and more explicitly integrated into the design of new green, social and sustainability bond programs. For example, the Global Green Bond Initiative, led by a consortium of European development finance institutions to support the development of credible green bond frameworks and markets in developing countries, in its currently conceptualisation does not aim to explicitly tackle air pollution, even though many underlying assets are likely to lead to air quality improvements.[71] Similar opportunities to create a more explicit link to air quality objectives exist within the $3.5 billion Asian Green Bond Fund, launched at the beginning of 2022 by the Bank for International Settlements (BIS) to help finance investments in green projects in the Asia and Pacific region.[72]

Bonds specifically dedicated to air quality improvements have recently started to emerge. In 2019, the Breathe Better Bond Initiative was proposed by the International Finance Corporation (IFC) under the Global Innovation Lab for Climate Finance (the Lab) to raise financing for projects that reduce both air pollution and greenhouse gas emissions in cities.[73] Although this did not reach pilot phase, it represents one of the first attempts to create dedicated bond structures with explicit clean air objectives. More recently, the Asian Development Bank (ADB) has also started to conceptualize the issuance of the first Clean Air Bonds in China.[74]



A more explicit link to clean air objectives and impacts could be made in new green, social and sustainability bond programs. Going a step further, similar vehicles could be designed around specific air quality outcomes (e.g., clean air bonds).

Given the public-good nature of air quality projects and the leading role national governments play in driving national clean air agendas, sovereign bonds represent a further vehicle to raise funds for air quality projects from the public and financial institutions (in either local or foreign currency). Sovereign bonds have been issued to finance public transport projects with air quality benefits in various countries. For example, in 2020 the Government of Thailand issued two sovereign bonds for a total of THB 30 billion (or $980 million) to finance the construction of the Bangkok MRT (Mass Rapid Transit) Orange line.[75] While these projects have clear benefits for air quality, government in developing countries could be more overt that they are issuing sovereign bonds to raise capital for national spending programs specifically aimed at tackling air pollution.

3.3 RESULTS-BASED FINANCE INSTRUMENTS

Results-based finance (RBF) instruments include results-based (or conditional) funding, carbon finance, environmental impact bonds and sustainability-linked bonds. While different in their implementation, all of these instruments make financing contingent on the ability of projects to achieve certain climate, environmental or sustainability outcomes such as amount of GHG emissions avoided or energy savings obtained. In the context of air quality, the outcomes could include reduction in $PM_{2.5}$, PM_{10}, and other air pollutants below certain pre-determined levels. As such, RBF instruments provide a flexible and innovative financing mechanism that can support efforts to improve air quality in different contexts. By incentivizing the achievement of specific air pollution reduction outcomes, RBF can drive real and measurable improvements in air quality.

With **results-based (or KPI-linked) funding**, financing terms are linked to the delivery of predetermined outputs or outcomes.[z] For example, these instruments can apply more favourable interest rates if certain results have been achieved or delay disbursements until predetermined KPIs have been verified. By making funding conditional to performance and having results verified by an independent third party, results-based funding reduces counterparty risk and the need for data gathering upfront.

z Outputs are the direct results produced by the project that are identifiable and measurable (*e.g.*, megawatts of clean energy produced). Outcomes are the changes in an environment that are affected by project outputs (*e.g.*, a project that plants trees might be seeking to reduce soil erosion as an outcome).

Results-based lending and grants have been widely used to finance projects with air quality objectives and co-benefits. For example, in 2019 the Asian Development Bank (ADB) approved a $300 million results-based lending programme to continue financing air quality the greater Beijing–Tianjin–Hebei region in China. The programme aims to accelerate the shift from coal to biogas from agriculture waste for rural household energy use, and encourage private sector participation. By the end of June 2021 – date of the last progress update – the project had led to the reduction of emissions of 900,000 tons of CO_2, 5,621 tons of SO_2, 1,805 tons of $PM_{2.5}$, and 2,252 tons of NOx.[76, 77] ADB is not the only international development funder that has used RBF for air quality. In 2022 the World Bank closed a six-year $500 million program for results in the Chinese region of Jing-Jin-Ji, a programme aimed at reducing air pollution and carbon emissions through increasing energy efficiency and clean energy, with a focus on coal reduction targets.[78]

RBF has also been used to finance off-grid solar projects and clean cooking solutions in rural areas of developing countries, where the risks associated with limited credit history of rural households are comparatively higher. Among other initiatives, the Universal Energy Facility is a multi-donor results-based finance facility that provides financing for verified energy connections across five countries in Africa, including solar home systems and clean cooking solutions, which reduce indoor air pollution.[79]

Another type of results-based finance mechanism is **carbon finance**, which enables operators of climate mitigation projects to monetize carbon emissions avoided. Companies can reduce their carbon footprint by investing in sustainable projects, such as renewable energy, and earn credits that can be sold on voluntary (or compliance) carbon markets to counterparties looking to offset their own carbon emissions. Proceeds from carbon credit sales increase the economic viability of climate projects and allow them to secure up-front investment or fund long-term operations. While focused on climate mitigation outcomes, carbon finance also leads to improvements in air quality by realising co-benefits in terms of reduction of air pollutants.

Sustainability-linked bonds are structured as performance-based contracts, where investors pay only if measurable and verified environmental outcomes are achieved, including the reduction of air pollution.

Sustainability-linked bonds (SLBs) are a new class of financial instruments that tie the cost of borrowing to the achievement of sustainability/ ESG goals. Unlike green, social and sustainability bonds (discussed in Section 3.2) which are linked to a specific use of proceeds, sustainability-linked bonds are linked to the achievement of sustainability targets set by issuers. Normally, the issuer of a SLB commits to certain sustainability performance targets. If those targets are met, the issuer is rewarded with a lower interest rate on the bonds. As such, SLBs encourage companies to operate in a more sustainable way, while also providing investors with a financial incentive to support sustainable investments. The performance targets can include a range of sustainability-related metrics, such as reducing GHG emissions or increasing renewable energy use. In the context of air quality, SBLs could be used to accelerate air quality improvements, for example, by requiring the issuing company to pay a higher interest rate if it does not meet certain air quality targets set by an independent verifier.

While SLBs aims to incentivise issuers to achieve sustainability goals or targets, environmental impact bonds are designed to fund specific environmental projects and interventions that have measurable benefits. They are structured as performance-based contracts, where investors pay only if measurable and verified environmental outcomes are achieved, including the reduction of air pollution.

3.4 STRUCTURED FINANCE MECHANISMS

Structured finance mechanisms, including aggregation and securitization, can help to increase the ticket size of investments and reduce the costs and complexity of administrative and due diligence processes, thus facilitating the mobilisation of long-term, patient institutional capital.

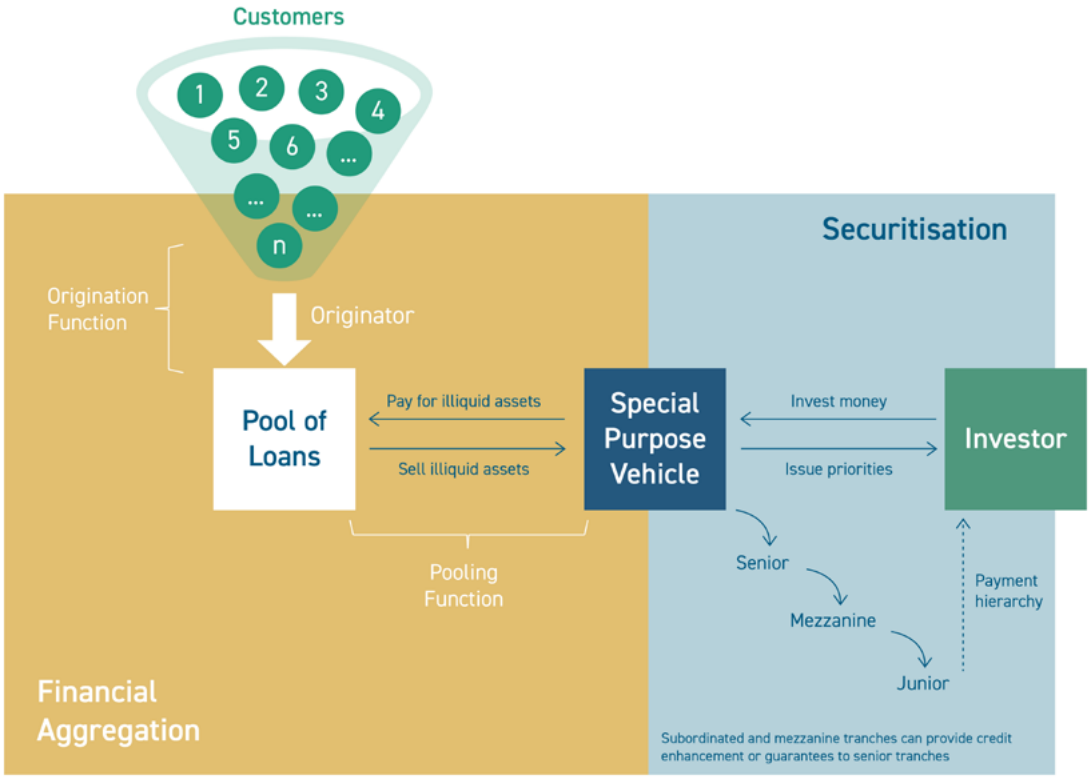
Through **aggregation**, small-scale projects with similar contractual terms and characteristics can be bundled together to increase the overall size and diversification of an investment, and increase attractiveness for commercial investors. However, aggregation is only possible when enough small projects generating cash flow streams exist to be bundled together in the first place.

A prerequisite for aggregation is the standardisation of contractual agreements (such as power purchase agreement, or operation and maintenance agreement). Standard contracts can reduce the time and resources investors need to carry out due diligence processes and limit the need for advanced local legal expertise to draft several new contracts from scratch.

Once bundled together, **securitization** further divides projects into different financial tranches, each with a different risk-returns profile, and matches each tranche with specific investors' preferences. This in turns reduces the overall cost of capital. Although complex, securitization helps to expand the capital pool a project can tap into and reduces refinancing risk. In particular, a securitization can be defined as "green" when the underlying cash flows relate to low-carbon projects or assets or where the proceeds are earmarked to invest in low-carbon projects or assets.[80] As such, they could be used to finance projects and technologies that explicitly help to reduce air pollution. However, it is possible that there may not be enough appetite in secondary capital markets for clean air projects even after bundling, unless a clear business/revenue model is presented or concessional funding from the public sector is available.

The UNDP's Climate Aggregation Platform (CAP) provides an example of financial aggregation and securitization used to scale up finance for small-scale, low-carbon energy assets in developing countries (Figure 3.1).[81, 82] While many of these assets certainly lead to air quality co-benefits, air pollution reduction is not mentioned as a key focus area or objective of the platform.

FIGURE 3.1: FINANCIAL AGGREGATION AND SECURITIZATION PROCESS



Source: UNDP.[83]

Finally, through **pooled procurement**, organisations can combine their finances, expertise, and knowledge to negotiate better prices and contract terms from suppliers, and they share the benefits and risks of the procurement process. Purchasing in bulk can help to overcome financing barriers associated with high transaction costs and can make procurement more affordable. Counterparty risk can also decrease as the creditworthiness of organisations that participate in the pool is improved. Pooled procurement is commonly used in public procurement. Public procurement is particularly useful where markets need to be created for a public good, such as air quality.

For example, the European Union's Joint Procurement Agreement (JPA) is a collaboration between EU member countries to collectively purchase goods and services for their national healthcare systems. It covers a range of medical products, such as vaccines, medicines, and medical devices, and during the COVID-19 pandemic it has proved instrumental in providing timely access to critical medical supplies.[84] A similar pooled procurement mechanism could be established at a country and/or regional level to procure air quality monitoring equipment and services. Under this mechanism, different institutions can pool their resources and expertise to procure the most advanced and cost-effective air quality monitoring equipment available. This reduces costs, eliminates duplication, and ensures that all institutions have access to the same high-quality air quality monitoring data.

3.5 RISK MITIGATION INSTRUMENTS

Risk mitigation (or credit enhancement) instruments include currency hedging instruments (*i.e.*, currency forwards,[aa] futures,[ab] swaps[ac] and options[ad]), guarantees and insurance products. These instruments are generally used to reduce specific risks and improve the overall return-profile of projects and can be effective in mobilising additional private capital in developing countries where investors' risk perception is comparatively higher, including for air quality projects. Nevertheless, mobilising private capital towards new areas can be difficult even when risk mitigation instruments are used.

Currency hedging instruments help to manage the currency exchange risk for lenders, thereby reducing the market risk associated with currency mismatches. As a result, borrowers in developing and emerging countries have better access to long-term financing in local currencies (rather than in hard currency such as EUR or USD).

The Currency Exchange Fund (or TCX) was established in 2007 by a group of donors and multilateral financial institutions to provide currently hedging instruments for over 100 currencies covering most developing countries. In 2021 alone, TCX de-risked $1.4 billion of new development finance investments.[85]

aa A currency forward is a private and customizable agreement between two parties that sets a fixed foreign currency exchange rate for a transaction, set for a specified future date.
ab Currency futures are futures contracts for currencies that specify the price of exchanging one currency for another at a future date. Unlike forwards, futures have standardized terms and are traded on an exchange, where prices are settled on a daily basis until the end of the contract.
ac Currency swaps are foreign exchange transactions that involve trading principal and interest in one currency for the same in another currency. They are used to convert hard currency loan payments into local currency obligations
ad Options are derivatives of underlying securities which offer the holder the right, but not the obligation, to buy or sell an amount of one currency for another at a given future date, for a pre-arranged exchange rate.

By reducing certain risks and improving the overall return-profile of projects, instruments such as currency hedging instruments and guarantees can mobilise additional private capital for air quality projects in developing countries.

Guarantees insert a third party into a legal agreement to provide an extra layer of protection for the beneficiary. They can help overcome a wide range of barriers related to political, credit and counterparty risks, by enhancing the creditworthiness of otherwise risky investments, while at the same time reducing the costs of capital – one of the major barriers for mobilizing private investments.[86] Depending on their design, **insurance products** can also cover a variety of risks including, protecting against losses arising from war, terrorism or civil disturbance (political risk insurance), and property damage or theft (property insurance).

Guarantees and insurance have been widely used for projects with air quality objectives and co-benefits by development finance instructions such as the Multilateral Investment Guarantee Agency (MIGA) and the Islamic Corporation for the Insurance of Investment and Export Credit (ICIEC) and could be scaled or reformed.[87] For example, in 2022, MIGA approved a €17 million political risk insurance for the Zrenjanin Wastewater Treatment Plant in Serbia. In 2023, a € 20.8 million political risk insurance was also approved by MIGA's board for a Bus Rapid Transit (BRT) in Dakar, expected to reduce air pollution in the city.[88]

In 2022, ICIEC introduced its Green Sukuk Insurance Policy, providing insurance coverage to Sukuk issuers in developing countries to increase their credit ratings and attract private capital. A seven-year breach of contract and political risk insurance was granted to the UAE company Alcazar Energy for its $68 million equity investment in the 200 MW Benban Solar Complex in the Egyptian city of Aswan.[89]

At the end of 2022, a new €6.1 billion guarantee program was approved under the European Fund for Sustainable Development plus (EFSD+), which – although not explicitly referring to air pollution – will cover several solutions in Sub-Saharan Africa, Latin American and Asia Pacific with air quality co-benefits including urban mobility and energy efficient buildings.[90]

BOX 3.1: POLICY-BASED FUNDING TO SUPPORT THE ULAANBAATAR AIR QUALITY IMPROVEMENT PROGRAM (MONGOLIA)

Mongolia's capital, Ulaanbaatar is one of the most polluted cities in the world, and the most polluted city in Mongolia. In 2022, the average $PM_{2.5}$ concentration was eleven times higher than the daily WHO recommended limits.[91] However, outdoor air quality improved significantly in recent years thanks to a government push. In 2018 when the average $PM_{2.5}$ concentration was almost 40 times higher than the daily WHO recommended limits, the government implemented the National Program for Reducing Air and Environmental Pollution to run until 2025 and aimed at improving public health and living standards in the country. The Mongolian government has committed to broader environmental improvements in the country, including backing the Green City Action Plan for the City of Ulaanbaatar developed between the local municipality and EBRD in 2019, that includes air quality as one of the four strategic objectives.

Progress was also made possible through adequate financing. The Asian Development Bank (ADB) supported the Mongolian government through a $290.8 million Policy-Based Loan (PBL) for the implementation of the Ulaanbaatar Air Quality Improvement Program. Policy-based lending is usually made available by MDBs to countries to support the implementation of policy and institutional reform programs. In this case, funding was specifically linked with air pollution reduction measures including, but not limited to, air quality monitoring, communication and awareness, improvements to clean heating supply and operationalizing a green financing mechanism.

The financing started in 2018 with a first $130 million loan targeting urgent measures to reduce air pollution such as phasing-out raw coal burning practices in households (Phase 1). This first phase proved particularly successful for improving air quality, with the average $PM_{2.5}$ concentration in the winter months between November 2019 and February 2020 being 51% lower than in 2016-2017. While it will take time to measure the long-term health benefits for young children and pregnant women from replacing raw coal, at the end of 2018, the government had allocated MNT 985 million to administer pneumococcal conjugate vaccine (PVC13) to 40,000 children and mitigate some of the worst health impacts of air pollution.[92]

Phase 2 of program focused on embedding air pollution reduction strategies developed under Phase 1 into Mongolia's legal and regulatory framework. It included a $160 million loan and an additional $750,000 for technical assistance that allowed further development of new piloting technologies and renewable fuel sources to operate in the long run, with a community and gender lens. For instance, the Ulaanbaatar municipality created affordable night-time heating tariffs for low-income populations.

By placing air quality at the core of the local agenda, the Mongolian government was able to attract other funding. For example, the World Bank deployed an additional $12 million in 2019, after a first $27 million loan in 2012 to support the Ulaanbaatar Clean Air Project, and is financing other outdoor air quality projects in Asia.[93] Moreover, ADB launched last year the Asia Clean Blue Skies Program (ACBSP) to scale up investments in outdoor air quality improvement projects in Asia and the Pacific.[94] The Ulaanbaatar Air Quality Improvement Program is a successful case where the combination of strong governmental commitment and funding from international development finance agencies led to considerable improvements in air quality to boost public health and living standards. Other international development funders should join the movement to meet both air quality and climate objectives.

BOX 3.2: WASTE-TO-ENERGY PROJECT IN THE GREATER MALÉ REGION (MALDIVES)

The Maldives is a remote island state in the North-East Indian ocean, composed of 80% coral islands. The country is highly vulnerable to climate risk and does not have much land where it can dispose of and treat waste. The Greater Malé capital region and its 32 outer islands suffer from severe environmental pollution, mainly due to the 10-hectare dumpsite on Thilafushi island where 830 tons of solid waste are dumped or burned every day. Established in 1992, this site still has no pollution control measures. It harms air quality, affecting the population's health, and threatening the local economy, specifically fisheries and tourism.[95]

To tackle this problem, in 2019, the Government of Maldives launched the $151 million Greater Malé Waste-To-Energy Project, aiming at establishing a sustainable regional solid waste management system. It includes developing treatment, recycling, and disposal infrastructure, strengthening institutional capacities for sustainable solid waste services delivery and environmental monitoring, and improving public awareness on WtE (waste-to-energy) and 3R (reduce-reuse-recycle).

Financing was approved in 2020, and was largely provided by the Asian Development Bank, through a $38 million concessional loan and a $35 million grant. Asian Infrastructure Investment Bank (AIIB) co-financed a $40 million loan. Other financial support came from Japan Fund for the Joint Crediting Mechanism[ae] (grant of $10 million) and the Government of Maldives ($28 million). An additional $500,000 grant from the ADB supports the reinforcement of the Ministry of Environment and the Environmental Protection Agency that supervise WtE operations.

The project specifically includes the implementation of a huge WtE facility, with a 15-year operation and maintenance contract. It will integrate solid waste treatment lines (capacity of 500 tons per day), an air pollution control system, and a landfill for safe disposal of air pollution control residues. While the plant is not operational yet, site preparations have already started. Moreover, all facilities include emissions and air quality monitoring to best control outdoor pollution.

Overall, the project aims not only to reduce GHG emissions and improve outdoor air quality, but also to strengthen climate change resilience of the Greater Malé region. Indeed, the project is designed to reduce exposure to natural disaster and rising sea levels risks, incorporating features such as flood-proof mechanical and electrical equipment. Close cooperation between international development funders is allowing the tackling of climate change and air quality at the same time in vulnerable regions.

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ae A single donor trust fund established in 2014 and managed by ADB.

BOX 3.3: CREDIT GUARANTEE FUND FOR POLLUTION CONTROL UNDER THE BANGLADESH ENVIRONMENTAL SUSTAINABILITY AND TRANSFORMATION (BEST) PROJECT

In the wake of rapid economic development and population growth, Bangladesh has witnessed severe degradation of its environment quality and ecosystems, particularly with regard to air quality. The Department of Environment estimated that, in 2017-2018, the main sources of $PM_{2.5}$ pollution in the capital, Dhaka, were industry (largely brick kilns), construction and vehicles. The World Bank also estimated that, in 2015, air and water pollution together cost $6.5 billion in urban areas, and $1.4 billion in Dhaka alone, equivalent to 3.4% of the country's GDP in 2015. This compares to $2.4 billion of air quality finance committed to Bangladesh in the seven years between 2015 and 2021.

In response to the deterioration in environmental quality, the Bangladesh Environmental Sustainability and Transformation (BEST) project, supported by the World Bank, has focused on strengthening environmental management capacity and increasing private sector participation in green investments. The latter component involved exploration of innovative green financing mechanisms and public-private partnerships to mobilise private finance.[96]

BEST includes a specific air pollution control segment, built on a $170 million Green Credit Guarantee Fund (CGF), funding for which is split between the World Bank, AFD and the private sector (approximately 70%). The CGF is intended to support investments in pollution reduction, whether directly (*i.e.*, air quality funding) or indirectly (*i.e.,* funding with outdoor air quality co-benefits), focusing on the brick kiln sector as well as municipal waste management, clean cookstoves (biogas) and rooftop solar systems. The project is expected to reduce the health risks associated with outdoor air pollution for low-income populations and women.

The innovative financing aspect of the CGF is in its provision of credit guarantees to incentivise private actors to finance investments in direct and indirect control of air pollution. By guaranteeing projects, international development funders are able to take on the risks inherent to green projects and which would, otherwise, deter private actors from investing. What is more, if there is no default, the international development funder does not actually lose money and therefore can reallocate that portion of capital for other projects or purposes. In short, credit guarantees are an innovative instrument through which international development funders can catalyse private finance for air pollution control projects. Though still nascent in the outdoor air quality funding landscape, they have been successfully used in other (green) sectors and offer high potential for crowding in the much-needed private finance to tackle the air quality crisis, globally, but particularly in developing countries.

4. RECOMMENDATIONS

Between 2015-2021, international development funders committed $17.3 billion (approximately $2.5 billion per year, on average) to projects that purposely work to improve outdoor air quality. This equates to under 1% of the total international development funding committed during the same period. During the same period, international development funders committed $47.4 billion to fossil fuel-prolonging projects, which is almost three times the amount dedicated to tackling outdoor air quality.

Despite the limited pool of dedicated outdoor air quality funding, international development funders nonetheless channelled an additional $101 billion to projects which delivered outdoor air quality improvements as a co-benefit of the intervention. While these projects are certainly beneficial for the clean air agenda, the lack of conscious programming into project design and delivery suggests that, for the most part, air quality outcomes continue to be overlooked or undervalued in most development interventions.

Between 2015-2021, outdoor air quality funding from international development funders was mainly provided in the form of loans and grants, with limited use of equity and risk mitigation instruments. In the current global macroeconomic context, limited public resources need to respond to several different priorities in developing countries, including food and energy crises, climate emergency response, and health and poverty reduction. It is therefore imperative to (i) deploy available capital efficiently, (ii) improve the risk-return profile of projects, (iii) leverage the synergies between climate action, air quality and the SDGs, and (iv) mobilise additional private capital.

Various financial instruments are available to international development funders (discussed in Section 3): some have already been widely used for other types of development projects (many of which have air quality co-benefits), such as climate mitigation and adaptation interventions; others are being specifically tested for dedicated air quality projects. Making fuller use of the diverse financial toolbox can expand the capital base available for cleaning our air.

Based on the current global outdoor air quality funding landscape, we developed the following recommendations for international development funders and policymakers to deliver **more** and **effective** air quality funding and to **enable** air quality funding, at scale.

MULTILATERAL DEVELOPMENT BANKS

- As the largest funders of outdoor air quality projects, MDBs can play a critical role in substantially increasing the availability of development finance for air quality. There is a particular role in driving this agenda for the World Bank, whose new leader has made access to clean air an explicit part of its remit. In particular, the World Bank are encouraged to convene other MDBs and development finance institutions to agree on new measures to ensure that projects targeting outdoor air quality do not fall between the gaps of sector-focused funding such as climate, energy, or transport projects.
- Increase the flows of financing for projects with air quality co-benefits by partnering with private and public investors with complementary risk tolerance and capacities to bring in new sources of finance and reduce the risks for private investors. As a priority, promote the use of blended finance structures combining concessional, impact-focused, and private capital.
- In addition, expand financial mechanisms that improve funding to regional and city governments, such as structured finance which can better match project risks with investors' preferences, increase project ticket size, and broaden the overall capital pool; thirdly, provide debt capital to local financial institutions through on-lending structures.
- Tailor financial instruments and strategies to effectively tackle specific investment barriers and risks. Among others: (i) provide targeted risk mitigation instruments to reduce political and regulatory risks; (ii) increase the provision of grants and concessional debt to test new technologies and fund research and development; (iii) lead on the issuance of tailored bonds and sukuks.
- Work with partner countries to understand and address some of the specific barriers experienced in accessing funding for air quality projects and take a proactive role in pushing air quality up on governments' agendas in order to stimulate demand for funding.

OECD-DAC COUNTRY DONORS AND OTHER DEVELOPMENT FINANCE INSTITUTIONS

Governments on the OECD-DAC donor list and the wider group of development finance institutions are critical sources of financing to the international system. Currently only a very small portion of the significant budgets that OECD-DAC donors contribute to development projects, climate finance or global health directly targets air quality projects, resulting in missed opportunities to fully realise the potential co-benefits of these investments. We are calling on OECD-DAC country donors to:

- Substantially increase the volume of outdoor air quality funding, whether channelled through multilateral or bilateral channels and better incorporate air quality co-benefits into climate and health projects. Priority should be given to: (i) increasing grant and concessional finance; (ii) ensuring funding reaches all countries and regions in need; (iii) channelling more funding to air quality modelling, measuring and monitoring projects; (iv) recalibrating investment strategies to ensure key sectors such as agriculture and waste are not left behind.
- Fully account for all benefits (health, climate and development) that can be delivered through air quality interventions, mainstreaming this into project appraisals and associated cost-benefit analysis to properly assess the development potential of an intervention.
- Invest in capacity building and training programs specifically tailored to air quality management practitioners in low- and middle-income countries.
- Make grant funding available to governments to strengthen their domestic policy and regulatory frameworks for air quality.
- Through engagement with the governance and funding of MDBs, push the international finance system to better fund air quality, and other projects with air quality co-benefits. Encourage the use of blended finance structures to crowd in investors with complementary risk tolerances, and participate in funding consortiums via bilateral government funding arms. Encourage MDBs to innovatively fund air quality projects, to raise awareness with creditor governments of the multiple co-benefits of air quality lending, and to lend to sub-national entities (city and regional governments) where the burden of and responsibility for air quality often lie.
- End funding of new fossil fuel prolonging activities while significantly upscaling investments in new clean technology and energy. Despite increased political momentum to phase out fossil fuels, development funding to fossil fuel-prolonging projects continues, jeopardising the clean air agenda, global climate goals, and development objectives more generally. Existing fossil fuel project funding should be phased out swiftly, with the priority placed on investing in a just, clean transition.

OECD

- Introduce a specific OECD-DAC marker for air quality and wider reforms to better capture and incentivise both the funding and coding of projects as air quality projects. End funding of new fossil fuel prolonging activities while significantly upscaling investments in new clean technology and energy. Despite increased political momentum to phase out fossil fuels, development funding to fossil fuel-prolonging projects continues, jeopardising the clean air agenda, global climate goals, and development objectives more generally. Existing fossil fuel project funding should be phased out swiftly, with the priority placed on investing in a just, clean transition.

NATIONAL POLICYMAKERS AND REGULATORS

- Track and report on government spending on air quality, including additional capital mobilized from other sources, to increase transparency and assess progress over time.
- Track and report on the air quality impacts of government spending on emission-relevant sectors such as energy, transport, agriculture, and waste management.
- Conduct pre- and post-implementation measurement and evaluation, sharing the findings, learnings and best practices from air quality interventions.
- Provide government guarantees for projects with explicit air quality benefits, to reduce specific political and regulatory risks for investors.
- Support the creation of market instruments to channel institutional capital towards green and sustainable assets which have positive impacts on air quality, including by: (i) adopting internationally aligned standards and frameworks for green, social and sustainability bonds; (ii) revising investment regulations for institutional investors; and (iii) promoting the adoption of sustainability mandates for investors.

International development funders and policymakers working to achieve specific SDGs must realise, and leverage, the synergies offered through air quality interventions. The following goals are particularly relevant. Given the importance of synergies, especially between air quality, health and climate funding, Clean Air Fund and CPI remain committed to helping further advance this field.

	**Food and nutrition security:** air pollution puts SDG 2 (Zero hunger) in jeopardy, given its negative impacts on crop production. Funders with a mandate to achieve this SDG should take a preventive – rather than reactive – approach, channelling funding to air quality projects in key sectors (for example, agriculture) which can help tackle the causes – rather than symptoms - of food insecurity.
	**Health:** given the multiple negative impacts of air pollution on human health, and the potential gains in terms of reduced health costs, funders with a focus on advancing SDG 3 (Good health and well-being) should place air quality at the centre of their investment strategies.
	**Urban development:** SDG 11 (Sustainable cities and communities) cannot be achieved without efforts to meet the WHO's recommended guidelines for safe levels of $PM_{2.5}$. Funders with an urban lens should mainstream air q cality outcomes into their projects, capitalising on the opportunities for dynamic sub-national action on air pollution both within and between cities.
 	**Gender and inequality:** SDG 5 (Gender equality) and SDG 10 (Reduced inequalities) also cannot be achieved without tackling air pollution, given the documented higher exposure of more vulnerable groups and the gender-bias therein. Funders with a mandate to reduce inequalities can build capacity on air quality issues, ensuring their interventions factor in air quality as a key development outcome.
  	**Climate change and biodiversity:** achieving SDG 13 (Climate action), SDG 14 (Life below water) and SDG 15 (Life on land) are all closely connected to achieving safe levels of air quality. As this report has emphasised throughout, joined-up action on air quality and climate change promises cost-effective, faster and fairer results using the same resources, with positive spillover effects for multiple development areas. Funders with an explicit climate mandate should commit now to an explicit air quality mandate, a natural evolution given the overlap between the two.

5. ANNEX I: CATEGORISATION OF FINANCIAL INSTRUMENTS

Table A1 provides an overview of the financial instruments analysed in Chapter 3 of the report. The categorisation of instruments used here builds on previous work done by Climate Policy Initiative on climate finance in Africa and for the buildings sector.[97]

TABLE A1: CATEGORISATION AND DEFINITIONS OF FINANCIAL INSTRUMENTS ANALYSED IN CHAPTER 3

Category	Instrument	Description
Secondary capital market instruments	Green bonds	Green bonds are fixed income securities whose proceeds are earmarked to finance or refinance climate and environmental projects, assets or business activities.
	Social bonds	Social bonds are fixed income securities whose proceeds are earmarked to finance or refinance social projects or activities that achieve positive social outcomes and/or address a social issue.
	Sustainability bonds	Sustainability bonds are fixed income securities whose proceeds are earmarked to finance or refinance a combination of green and social projects or activities.
	Sovereign bonds	Sovereign bonds are debt securities issued by a national government to raise funds to finance various projects and spending programs, bridge budget deficits, or meet other financial obligations.
	Green sukuk	Green sukuks are Shariah-compliant financial certificates similar to green bonds where instead of interests, investors receive an agreed share of the profits generated by the pool of underlying assets, which are partially owned by investors.
Results-based finance instruments	Results-based funding	Results-based (or conditional) funding is a broad term used here to include any type of payment-by-results mechanisms (either output-based or outcome-based), where funds are disbursed by investors only after the project has achieved certain predetermined results, irrespective of how these were achieved. Results are usually verified by an independent auditor.
	Carbon finance	Carbon finance is a type of results-based finance mechanism which involve contracts to trade emission reductions on carbon markets in the form of quotas or carbon credits (*e.g.*, Certified Emission Reduction [CER]). Emission reductions are usually verified by a third-party auditor.
	Environmental impact bonds	An environmental impact bond (EIB) is a pay-for-success innovative financing instrument where financial returns on the investment are directly tied to the ability of the project to deliver successful environmental outcomes.
	Sustainability-linked bonds	Sustainability-linked bonds are debt instruments where the issuer commits to certain sustainability/ ESG performance targets. If those targets are met, the issuer is rewarded with a lower interest rate on the bonds.

Category	Instrument	Description
Structured finance mechanisms	Aggregation	Process of bundling two or more projects together into one transaction
	Securitization	Procedure where an issuer designs a marketable financial instrument by merging or pooling various financial assets into one group. The new, securitized, financial instrument is then divided into different tranches, each of which consists of individual assets grouped according to various factors (*e.g.*, type of loan, maturity date, interest rates, remaining principal).
	Pooled procurement	Pooled procurement is a process of jointly procuring goods or services by a group of organisations or buyers to achieve economies of scale, cost savings, and increased bargaining power.
Risk mitigation instruments	Currency hedging instruments	Derivative instruments used to offset the risk posed by specific foreign exchange positions.
	Guarantees	Credit-enhancement tools entailing the promise of performance to a beneficiary in the event that the party who would normally provide a service or good fails to do so. They can come in form of partial guarantees where a third party covers a part or percentage of a loss/default or full guarantees where a third party covers the entire amount of the loss/default.
	Insurance products	Direct agreement between an insurance provider and a policy holder providing financial compensation in the instance of an event that might result in loss or damage of assets.

6. ANNEX II: CATEGORISATION OF BARRIERS TO INVESTMENTS

Table A2 below provides an overview of the risks and barriers hindering investments in low- and middle-income countries. The categorisation of barriers used here builds on previous work done by Climate Policy Initiative on climate finance in Africa.[98]

TABLE A2: CATEGORISATION AND DEFINITIONS OF BARRIERS TO INVESTMENTS IN LOW- AND MIDDLE-INCOME

Category	Barrier	Description
Financial barriers	Lack of early-stage finance	Lack of or limited access to early-stage capital (*e.g.*, equity, construction finance, and working capital)
	Lack of long-term finance	Lack of or limited access to long-term debt and/or patient equity, which can limit projects' ability to sustain activities throughout their lifetime, buy out equity investments, or refinance debt investments
	Re-financing risk	Borrower's inability to replace an existing obligation with new capital when the maturity of existing loans is shorter than the lifetime of the project
	Currency risk	Volatile foreign exchange rates arising when a project has revenues in local currency and loan payments in a hard currency (*e.g.*, USD or EUR) impacting the ability to repay debt obligations
Governance barriers	Political risk	Adverse political events which impact macroeconomic environment (*e.g.*, central bank policy, currency inconvertibility) or the ease of doing business (*e.g.*, turnover of key personnel, corruption, breach of contracts, property expropriation, war, civil disturbance)
	Regulatory risk	Unanticipated changes in legal or regulatory policies such as financial sector regulations (*e.g.*, securities law), incentive programs (*e.g.*, feed-in-tariffs), perpetration of unfavourable regulations/incentives (fossil fuel subsidies), grid interconnection regulations, permitting process, and taxation
	Administrative risk	Delays due to corruption, permitting delays, denial or repeal, and forced relocation

Category	Barrier	Description
Project barriers	Counterparty risk	Credit and default by a counterparty in a financial transaction (*e.g.*, the power off-taker in a renewable energy project or customers with low creditworthiness)
	Technology risk	Use of nascent or untested technologies (*e.g.*, CCS, hydrogen, and EV infrastructure) often involving higher cost of deployment
	Insufficient project size	Inability to capitalize on economies of scale, high transaction, and start-up costs due to the small ticket size making projects unattractive for large investors
	Environmental risk	Damages to assets or disruptions in value chains caused by extreme weather events and long-term shifts in climate patterns (climate-related risk), and/or losses in biodiversity and ecosystem services upon which businesses and society rely (nature-related risk)
Barriers related to enabling skills and infrastructure	Lack of data/ information	Limited information on comparable investments, informal or unaudited financial records, and lack of transparency/ data on climate related disclosure, making it difficult to conduct due diligence
	Limited technical capacity	Limited technical and engineering capacity for upstream and downstream activities (*e.g.*, lack of experienced EPC contractors to install a system, or O&M contractors to maintain the system long-term) and financial sector execution (*e.g.*, limited credit culture, inexperienced bank personnel)
	Lack of physical infrastructure	Limited availability of raw materials and physical infrastructures needed to deliver project outputs (*e.g.*, electrical transmission and distribution infrastructure, charging infrastructure for EVs, and roads to efficiently transport smallholder produce)

7. ANNEX III: INTERNATIONAL DEVELOPMENT FUNDING TO AIR QUALITY BY SECTOR

Table A3 provides a breakdown of air quality funding by top 10 international development funders, broken down by sector. This includes both outdoor air quality funding and funding with outdoor air quality co-benefits.

TABLE A3. AIR QUALITY FUNDING BY TOP 10 INTERNATIONAL DEVELOPMENT FUNDERS BY SECTOR, 2017-2021 ($ MILLION)

Funder	Multi-sector air pollution control programs	Monitoring and Modelling	Transport	Energy	Agriculture	Waste	Residential Sector / Buildings	Total
Asian Development Bank	2,003	-	16,258	3,097	1	732	736	22,857
European Investment Bank	-	-	9,491	3,092	-	584	180	13,347
Japan	0.05	-	11,444	733	1	535	-	12,713
Inter-American Development Bank	0.2	0.5	1,896	3,510	0.3	548	-	5,955
China	-	-	5,548	-	-	-	-	5,548
World Bank Group	407	-	1,989	2,468	-	297	337	5,513
European Bank for Reconstruction and Development	-	-	3,908	809	105	291	379	5,492
Asian Infrastructure Investment Bank	1,246	-	3,263	675	-	218	-	5,402
Germany	11	-	279	2,286	4	31	78	2,697
France	76	-	1,248	650	-	100	-	2,074

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