CLEAN AIR FUND

JOINED-UP ACTION ON AIR POLLUTION & CLIMATE CHANGE

Cheaper, faster and fairer

ACKNOWLEDGEMENTS

This briefing paper was co-authored by the Clean Air Fund and Dalberg Advisors.

CLEAN AIR FUND

Clean Air Fund is a global philanthropic organisation that brings together private and corporate funders — from climate and health to equity and child development — to create a future where everyone breathes clean air.

Dalberg

Dalberg Advisors is a strategy consulting firm that works to build a more inclusive and sustainable world where all people, everywhere, can reach their fullest potential. We partner with and serve communities, governments, and companies providing an innovative mix of services – advisory, investment, research, analytics, and design – to create impact at scale. The Dalberg team was comprised of Gaurav Gupta, Jean-Charles Guinchard, Yohann Sequeira, Bindu Sancheti and Ian Chan.

THE CLEAN AIR FUND IS FUNDED BY:

Bernard van Leer FOUNDATION

Bloomberg Philanthropies

CIFF CHILDREN'S INVESTMENT FUND FOUNDATION

FIA FOUNDATION

IKEA Foundation

Impact on Urban Health

OAK FOUNDATION

the ELMA foundation

CONTENTS

FOREWORD

Governments are missing obvious wins for health, economic efficiency and social justice by not prioritising air quality action alongside solutions to climate change.

Our climate, air pollution and health challenges are interconnected in their causes and consequences, and therefore in their solutions. Outdoor air pollution contributes to over 4.2 million deaths every year, more than malaria, tuberculosis and HIV/AIDS combined. Fossil-fuel combustion accounts for about two-thirds of human exposure to such air pollution and is also the main driver of climate change.

Today, the twin and interconnected global emergencies of climate change and air pollution are unfortunately addressed separately. Because decision makers approach these problems in isolation, they overlook the substantial co-benefits of joined-up action, missing opportunities to reduce greenhouse gas emissions, tackle air pollution, improve public health and boost economic activity.

As this briefing paper shows, factoring in wider savings on healthcare, economic productivity, and inequality reduction gained from improving air quality when deciding climate policies can justify bolder, faster action on air pollution and climate change. Taking this combined approach, acts in the public good, while also offering a positive net return on overall investment.

In the EU, for example, it is estimated that spending €38-40 billion a year to adopt all feasible measures to control both greenhouse gases and air pollution would generate up to €157 billion per annum in health benefits.
We need joined-up action on air pollution and climate change to deliver better returns for all. By capturing this potential, governments can deliver faster, fairer and cheaper climate solutions which lay the foundations for healthier, fairer and more prosperous societies.

We cannot afford to do anything else.

JANE BURSTON
Executive Director
Clean Air Fund

EXECUTIVE SUMMARY

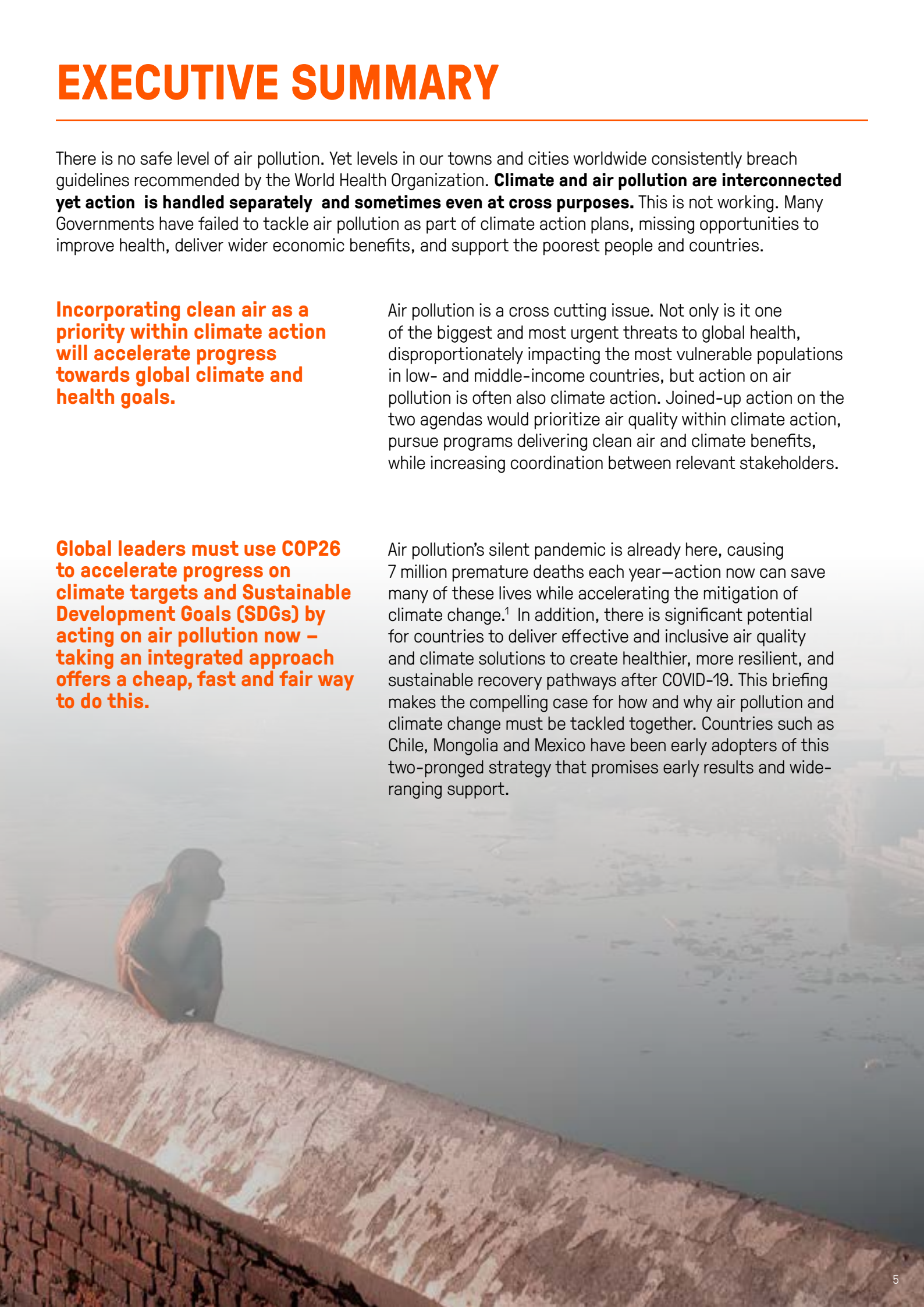
There is no safe level of air pollution. Yet levels in our towns and cities worldwide consistently breach guidelines recommended by the World Health Organization. **Climate and air pollution are interconnected yet action is handled separately and sometimes even at cross purposes.** This is not working. Many Governments have failed to tackle air pollution as part of climate action plans, missing opportunities to improve health, deliver wider economic benefits, and support the poorest people and countries.

Incorporating clean air as a priority within climate action will accelerate progress towards global climate and health goals.

Air pollution is a cross cutting issue. Not only is it one of the biggest and most urgent threats to global health, disproportionately impacting the most vulnerable populations in low- and middle-income countries, but action on air pollution is often also climate action. Joined-up action on the two agendas would prioritize air quality within climate action, pursue programs delivering clean air and climate benefits, while increasing coordination between relevant stakeholders.

Global leaders must use COP26 to accelerate progress on climate targets and Sustainable Development Goals (SDGs) by acting on air pollution now – taking an integrated approach offers a cheap, fast and fair way to do this.

Air pollution's silent pandemic is already here, causing 7 million premature deaths each year—action now can save many of these lives while accelerating the mitigation of climate change.[1] In addition, there is significant potential for countries to deliver effective and inclusive air quality and climate solutions to create healthier, more resilient, and sustainable recovery pathways after COVID-19. This briefing makes the compelling case for how and why air pollution and climate change must be tackled together. Countries such as Chile, Mongolia and Mexico have been early adopters of this two-pronged strategy that promises early results and wide-ranging support.



CHEAPER, FASTER, FAIRER: REALISING THE FULL SYNERGIES BETWEEN CLEAN AIR AND CLIMATE ACTION

Joined-up action on climate and air quality would achieve:

Cheaper, higher-return climate actions thanks to air quality benefits.

Currently, many climate decision-making processes do not account for the savings on health and other co-benefits of cleaner air. This results in powerful climate actions not being initiated as they are considered too costly. By including the co-benefits of air quality in cost-benefit analyses, many measures that had a negative return on investment, now become positive. These additional measures account for an additional 8 gigatonnes of annual carbon removal (from 16 gigatonnes to 24 gigatonnes). Capturing these benefits could accelerate progress in improving air quality and help catalyse the action needed to limit warming to 1.5°C.[2]

Faster results on reducing both global warming and air pollution.

Solutions that deliver climate and air quality co-benefits can save and improve millions of lives and grow economies within a typical political term. The benefits from cleaner air appear much sooner. Actions such as shifting to electric vehicles or shutting down coal plants have important long-term climate mitigation benefits but importantly deliver immediate and more visible clean air benefits. Such actions can build public support for bolder action. Reducing black carbon, a component of PM2.5 (fine particulate matter) and a short-lived climate pollutant (SLCP) that warms the planet, would benefit both global temperatures and the health of populations. The faster results of air pollution benefits contribute significantly to the case for climate investments.

Fairer and more equitable outcomes

Death rates from air pollution are 4 times higher in low and lower-middle income countries than high income countries. And within these, the poor and vulnerable suffer the most. The quality of the air we breathe mimics the deep inequities in the world, and the poor in all countries suffer inordinately. Low and lower-middle income countries have a PM2.5 concentration that is 2.5 times higher on average than in high income countries. Targeted interventions to improve air quality as part of a just transition will benefit the health and wellbeing of mostly disadvantaged populations. Equity can be promoted by prioritising climate action that also delivers clean air for disadvantaged groups, especially in the world's cities. The improved health and economic outcomes of such action can in turn enhance the resilience of populations and social infrastructure, for example health systems, to climate change.[3] It is evident that people want to experience the benefits of climate action through cleaner air, healthier lives, and more robust and equitable economies – health workers, parents, and children are campaigning for clean air everywhere.

The movement to clean our air is gaining momentum. This is the right time to act.

Every day more health workers, parents, teachers, and children join the campaign for clean air around the globe. From the World Bank to the World Health Organization, air pollution is rising up the political agenda. The importance of cleaner air is clear. The WHO's[4] new tighter guidelines on air pollution indicate that the mounting evidence of the health risks of air pollution has demonstrated the need for urgent action by governments to safeguard their populations. Shifts to zero carbon initiatives will only benefit by being in lockstep with meeting air quality guidelines. Strong leadership from government, state, and non-state actors at the global, national, city and local level is imperative to realise the benefits of clean air in climate action by 2030 and to integrate air quality into climate action plans.

CALL TO ACTION

In order to achieve our Sustainable Development Goals, joined-up solutions are needed to tackle the joined-up threat of climate change and air pollution

WE ARE CALLING ON DECISION-MAKERS TO URGENTLY:

1. Stop all new public investment into high carbon emitting and air polluting fossil fuels.

2. Instead commit additional new funding to support the just transition to clean solutions which include increasing support to low- and middle-income countries, and focusing funding on the communities that need it most.

3. Make action on air pollution an explicit priority in climate action and sustainable development activities and reporting, to deliver higher returns for health, climate, equity, and the economy.

4. Increase the overall share and amount of grant-based assistance for tackling air pollution with climate action and sustainable development programmes, particularly in lower-income countries where air pollution is an overlooked but an escalating emergency.

5. Implement an integrated approach that takes following actions:

   Adopt a new Global Air Quality Convention where global targets informed by WHO ambient air pollution guidelines can be agreed and reported against, shared regional approaches that cross geographical boundaries can be established, and global institutional mechanisms can be strengthened.

   Coordinated national action national mechanisms are needed to support cross-sectoral coordination to embed health considerations and co-benefits across adaptation, mitigation, and sustainable development policy and programmes. At government level, new cross-departmental Air Quality Units should be created with responsibilities and powers across health, climate, energy, waste, agriculture and transport policy.

   Improve policy coherence and indicator alignment across international climate, and sustainable developm ent frameworks to better understand the linked challenges in an integrated manner, and capture multiple benefits that may arise. Improvements in tracking and reporting on spending and results provide data and evidence for costs and benefits of an integrated approach to emission control actions.

CAPITALISING ON THE CLEAN AIR DIVIDEND WITHIN CLIMATE ACTION

We can capture extensive untapped health, equality, and climate benefits by making air quality an explicit priority in our climate action.

Investing in air quality can protect our health and unlock other benefits, mitigating climate change and addressing inequalities. This investment delivers a clean air dividend by boosting productivity and enabling sustainable economic growth. Governments around the world maintain an ambition of a sustainable, greener recovery from the damaging health and economic impacts wrought by the pandemic. In order to deliver this commitment of a healthier, more resilient, and sustainable economy, action is needed to get back on track and meet global climate targets and the Sustainable Development Goals by 2030. Tackling air pollution and climate change in tandem, especially within a zero-carbon agenda, is vital to achieving this ambition.

Links between climate change and air quality

The close interlinkages between the climate and air quality agendas run deep – tackling them in an integrated manner achieves both agendas' objectives. Not only do air pollutants and greenhouse gases share common sources – including the burning of fossil fuels – some air pollutants contribute directly to warming. Short-lived climate pollutants (SLCPs) – including methane, black carbon and tropospheric ozone – contribute to a significant proportion of premature air pollution deaths and have a significantly higher global warming potential. Black carbon, a component of PM2.5, accounts for up to 15% of global warming.[6] While methane, a potent greenhouse gas, is one of the main precursors to ground level ozone, a pollutant that is harmful to human health and crop productivity.

"IT IS TIME FOR GOVERNMENTS AND ALL STAKEHOLDERS IN OUR COMMON FUTURE TO RECOGNISE THAT ACTION ON AIR POLLUTION IS CENTRAL TO MAKING MEANINGFUL PROGRESS TOWARDS MEETING THE SUSTAINABLE DEVELOPMENT GOALS."

- Inger Andersen[5]

We need coordinated action now

Climate change will have disastrous consequences in the decades to come: the estimated 150,000 lives a year lost to climate change today is expected to grow exponentially.[7] Air pollution's silent pandemic, however, has already hit: 7 million people die prematurely because of exposure to air pollution, not to mention the millions more that suffer from severe respiratory diseases, among others, with children bearing much of this burden. [8] Policy changes that seek to improve air quality will impact those policies that seek to limit climate change, and vice versa. While coordinated action can be considered "win-win" in tackling climate change and air pollution, siloed and uncoordinated action can result in negative trade-offs. Both agendas require effective action immediately to control climate change in the long run, and to deliver cleaner air both now and in the future.

Global leadership on air pollution needs to match the level of ambition within the climate change agenda

Tackling air pollution is currently not a global priority, nor a priority for most governments. According to the United Nations Framework Convention on Climate Change (UNFCCC) recent synthesis report on countries' Nationally Determined Contributions (NDCs) under the Paris Agreement, only 7% included SLCPs, with very few countries make tackling air pollution an explicit priority in climate actions in order to maximise the co-benefits.[9] This is indicative of the lack of political priority given to the issue. Air pollution will not become a global priority without global leadership to initiate an agenda for action. Ultimately, a multilateral institutional framework will be needed to oversee the global governance of international air pollution. In the meantime, better integration of air pollution and health considerations should be prioritised within the climate agenda.

People are demanding action.

For many, one positive aspect of the global COVID-19 pandemic was the clearing of smog, revealing blue skies and cleaner air for millions around the world for the first time. This experience brought into sharp focus the centrality of the issue of air pollution to human health, inequalities, and economic life. In addition to health, social, environmental, and economic objectives for air quality,[10] the WHO's September 2021 Air Quality Guidelines include climate objectives as one of the air pollution priorities, calling for clean air action and recognising its close interlinkages with climate change mitigation.

WHAT DOES JOINED-UP ACTION LOOK LIKE?

The international community has long recognised the potential of clean air.

The United Nations Environment Programme (UNEP), for instance, has suggested that climate policies that control air pollution emissions could reduce global warming by 0.5°C, save the lives of 2.4 million people each year, and avoid the loss of 1-4% of maize, rice, soybean, and wheat production annually.[11]

Some momentum is building among political leaders: countries, cities and international organisations have begun to pursue coherent strategies in recent years.

Mexico, Mongolia, and Chile are some of the countries that explicitly adapted their climate change strategies to incorporate air quality goals—with programming that tackled both agendas together, and extensive coordination between relevant stakeholders. C40 launched the Clean Air Cities Declaration with 35 city signatories, highlighting the interconnectedness of the air pollution problem with the climate challenge and the need for cities to integrate top pollution-reducing actions into climate action plans.[12] C40 has developed a framework for cities to integrate air quality management and climate action planning in a way that simultaneously tackles climate change, air pollution and public health issues.[i]

China's integrated approach[13]

In 2015, China revised the Atmospheric Pollution Prevention and Control Law to ensure "cooperative control of atmospheric pollutants and greenhouse gas". This principle was reiterated in the 2018 Three-Year Action Plan for Winning the Blue Sky Defence Battle and the amendment to the Pollution Prevention Law.

These policy actions signify China's shift towards tackling air pollution and greenhouse gases in tandem at the highest level. The 2020 Policies and Actions for Addressing Climate Change stated that the country would aim to achieve industry transformation, improvement of enterprise efficiency and energy structure, and reduction of carbon emission. China has also launched various industry specific policies, highlighting the need for data collection and capacity building.

In 2017, a new policy guideline was issued to stipulate the emission standard for both air pollutants and greenhouse gases for industrial enterprises, including power generation, metallurgy, glass production, etc. The guideline stated the methodology on how enterprises should measure and report their air pollutants' emission and the level of global warming potential. Other similar policies were released on the control of volatile organic compounds (VoCs) as well.

[i] C40 Cities: A Framework for Integrating Air Quality Management and Climate Action Planning (forthcoming).

Climate and Clean Air Coalition: Supporting National Action Planning[14,15,16]

The Climate and Clean Air Coalition is a voluntary partnership of governments, intergovernmental organisations, scientific institutions and other actors, committed to protecting the climate and improving air quality through actions to reduce short-lived climate pollutants.

The coalition's Supporting National Action Planning (SNAP) initiative aims to support the efforts of the Coalition's state partners to scale up action in a coordinated way, including by helping countries assess their mitigation options to respond in a more target and cost-effective manner.

Two countries that have been supported by the initiative are Mexico and Ghana.

In 2020, Mexico stepped up its commitment to tackling both climate change and air pollution with its new National Strategy to Reduce Short-Lived Climate Pollutants, which would reduce black carbon emissions by 53% in 2030, exceeding the target identified in their Nationally Determined Contribution (NDC) in the Paris Agreement. It would also reduce total greenhouse gas emissions by 9% by 2030 primarily through methane emission reductions.

This builds on Mexico's 2015 Climate Change Mid-Century Strategy which incorporated extensive greenhouse gas and air pollution emission targets, including for SLCPs like black carbon, methane and HFCs. The strategy also modelled the trajectory of carbon reduction laid out in their NDCs. The government recognised that controlling emissions would be beneficial to both climate change mitigation and health. The strategy focused on high-level regulatory actions like the regulation of air pollutant sources, and their classification by emission magnitude, global warming potential, and mitigation cost.

Ghana also has recognised the strategic importance of acting on air pollution and climate together. In 2020, Ghana became the first country in the world to include air pollution, in the form of black carbon, in their National Greenhouse Gas Inventory submitted to the UNFCCC. And in 2018, Ghana published a National Action Plan to Mitigate SLCPs which identifies measures that both improve air quality and help to mitigate against climate change.

Given that climate change and air pollution are interdependent, countries can enhance their climate action plans by including air pollution actions in their NDCs and climate action plans on

i. reducing emissions of SLCPs, including methane and black carbon
ii. including air pollutants in emissions inventories, and
iii. targeting policies that tackle both climate change and air pollution.

Chile has recognised the significance of including holistic targets that improve air quality and health along with climate mitigation.

One of Chile's priority steps was to revise its NDC to include commitments of reducing black carbon by 25% by 2030 compared to 2016 levels.[17] This was a key step to adding air quality as one of the country's climate change agenda's priorities. A few other countries have followed suit, recognising the link between action on air pollution and climate change. For example, the UK's updated NDC explicitly recognises the need to "support decarbonisation approaches that strive to improve air quality and minimise adverse impacts on human health, balanced with action to achieve reductions in carbon emissions."[18] However, more countries need to revise their NDCs to ensure the issue of air pollution is addressed within the context of climate change – we join the WHO[19] in calling for NDCs to include standalone reduction targets for air pollution and SLCPs

Cities also have a leading role to play in preventing the climate crisis and improving air quality. Research from C40 and BuroHappold, shows that if all C40 cities achieved clean transport, buildings and industry, alongside a decarbonised grid, PM2.5 concentrations would fall by 49% on average and greenhouse gas emissions would fall by 87% on average.[20]

Climate actions that deliver air quality benefits come in many forms. TThe actions required should be tailored to each country and sector context. Figure 1 highlights actions that are most observed within countries that deliver air quality benefits through climate action.

Figure 1: Actions that tackle both climate change and air pollution[21]

	ACTIONS
Energy	Renewable energy: Nuclear, wind, solar or tidal energy, shifting from fossil fuel-fired power plants
	Improvements in the energy efficiency of buildings through retrofits, and higher standards for new buildings
	Incorporating black carbon and other air pollutants into Nationally Determined Contributions (NDC) in addition to greenhouse gases
Transportation	Low emission electric cars
	Clean energy-based hydrogen fuel-cell cars
	Transportation demand management enhancing transportation network efficiency
Residential	Shift to cleaner cookstoves and heating devices using clean fuels like low carbon sourced electricity
	Clean-burning biomass stoves
Heating	Ground and air source heat pumps
	Replacement and retrofitting of heat-only boiler to improve combustion efficiency
Agriculture	Reduction of nitrogen input in the agricultural systems
	Reduction of slash and burn and other form of agricultural burning
	Intermittent aeration of continuously flooded rice paddies
	Farm-scale anaerobic digestion of manure from cattle and pigs
	Liquid manure management
	Feed changes for dairy and non-dairy cattle
Waste Management	Efficient waste management systems, especially around municipal solid waste
	Upgrade of primary wastewater treatment systems to secondary/tertiary treatment with gas recovery and overflow control
	Recycle, compost, anaerobic digestion, and landfill gas collection of municipal waste
Industrial Production	Replacement of traditional brick kilns with vertical shaft kilns and Hoffman kilns

This briefing highlights how incorporating air quality as a priority into the climate change agenda can make climate action cheaper, faster, and fairer

It is time for governments and all stakeholders in our common future to recognise that action on air pollution is central to meaningful progress towards meeting the Paris Agreement commitments and the SDGs.

I. CHEAPER

Joined-up action on air pollution and climate change could accelerate progress towards limiting global warming to 1.5°C by 2030. Incorporating air quality benefits into climate action cost-benefit analyses makes additional solutions affordable, opening the path to limiting global warming to 1.5°C instead of 2°C.[22,23]

Air pollution and climate change share a number of common causes and offer potential for cost synergies, but governments are currently missing a trick, as many climate decision-making processes do not currently account for the health, economic and social co-benefits of cleaner air. This results in powerful climate actions not being initiated as they are considered too costly. Taking these additional benefits into consideration can help trigger significant additional climate mitigation. The resulting potential, up to 8 gigatonnes of CO2e[ii] per year, could significantly accelerate progress towards limiting global warming.

COMMON CAUSES AND POTENTIAL FOR SYNERGIES

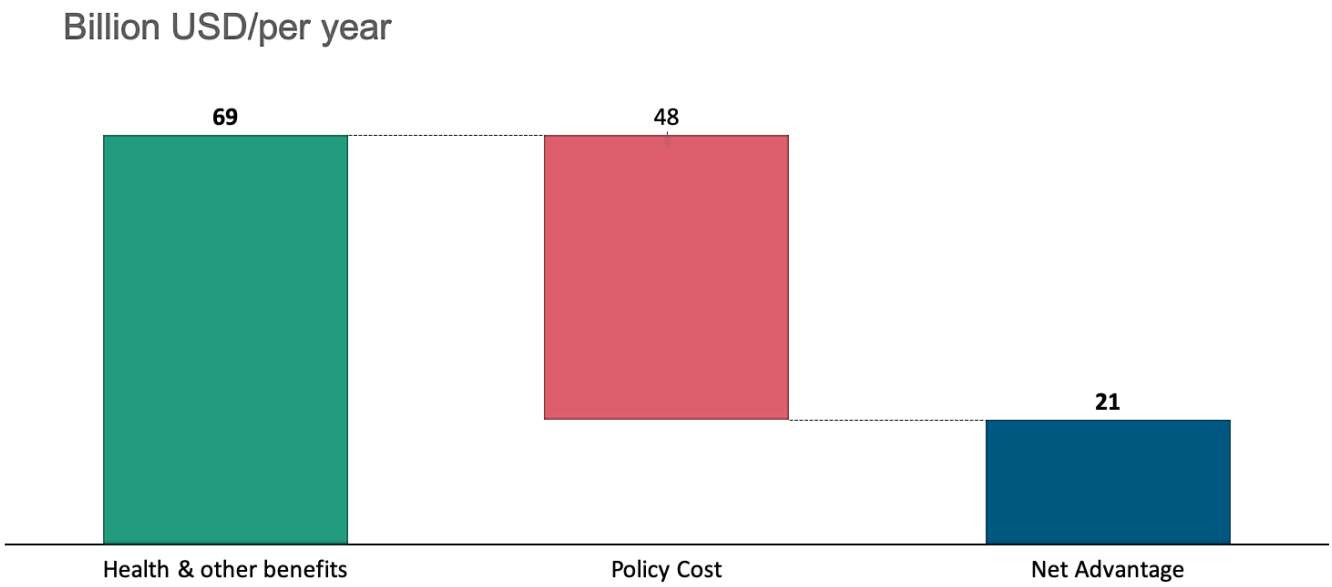
The common causes of air pollution and climate change can be tackled together, providing additional co-benefits and offering greater cost-effectiveness than a siloed approach. The average abatement cost per tonne of CO2e could be cut by as much as 5-18% by 2050 through the implementation of initiatives common to both agendas.[24] Similarly, air pollutant emissions could be reduced by 20–40% as compared to the current level and trend of emission.[25] This would translate into greater cost effectiveness: joint action can reduce the total cost, as a share of GDP, of controlling air pollution by 50% in 2050.[26]

The cost effectiveness of prioritising actions that generate both climate and air quality benefits take advantage of the overlap in their sources. By laying down greenhouse gases and air pollutants emission standards for industrial activities, governments can make a measurable difference in air pollution at low administrative cost. Similarly, factories could improve the energy efficiency of facilities, retrofit their equipment, and control emissions at little extra cost. These economical activities would benefit both the climate and clean air agenda.

Any initial costs of incorporating air pollution as a priority within climate action could be offset by benefits generated through clean air. The incorporation of air quality as a climate priority would lead to additional policy costs in new infrastructure, regulation, and programmatic activities however, it is expected to deliver a net positive economic outcome as outlined in Figure 2. In the EU case study highlighted below, air quality improvements deliver benefits worth over $69 billion, while estimated costs stand at around $48 billion. These benefits largely pertain to health benefits from averted premature deaths.[27] However, adoption remains a challenge as several countries suffer significant funding and capacity gaps and encounter challenges in the access to and maintenance of air monitoring equipment.[28] Clean air's benefits need to be incorporated into climate action assessments and priorities so as to incentivize investments and scaled-up action.

[ii] CO2e or carbon dioxide equivalent, is a metric measure used to compare emissions from various greenhouse gases as a function of their global warming potential.

Figure 2: Cost-benefit analysis of the EU incorporating air quality as a climate priority, estimation for 2030[29]



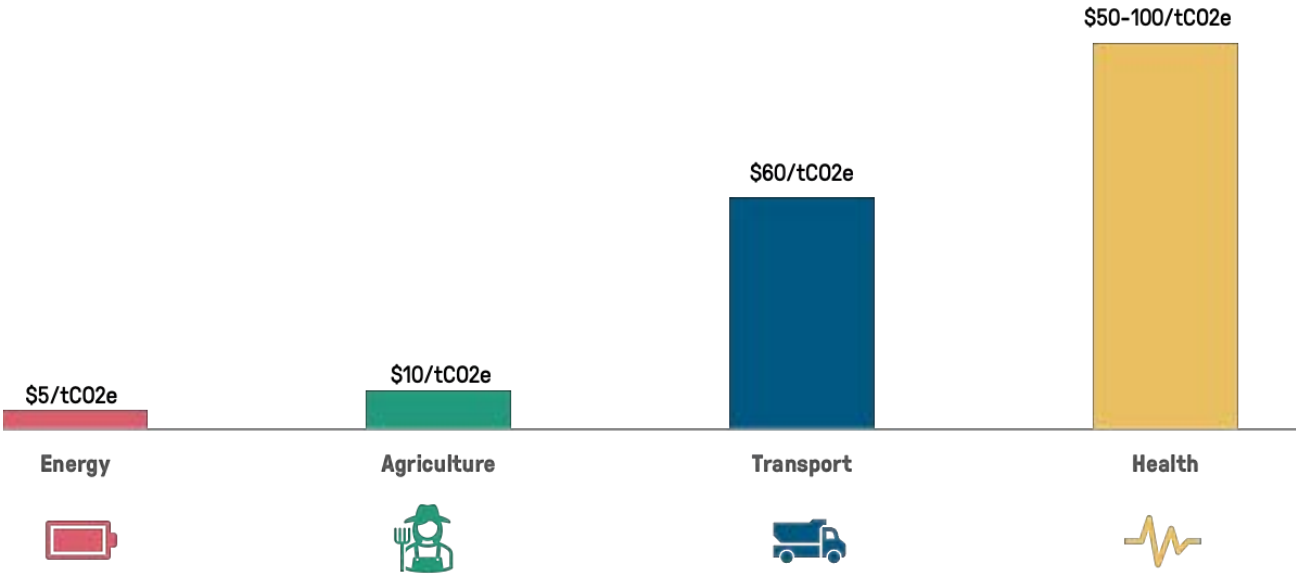
EU health benefits thorough an integrated approach[30]

The EU has used scientific modelling to inform their emission control strategies for air pollutants and greenhouse gases. The initiative EC4MACS aims to quantify the co-benefits of tackling air pollutants and greenhouse gases for member countries to prioritize the emission control strategy.

The model measured the impact of potential strategies by comparing the level of emission and other outcomes with that from existing regulations to inform the gap with the policy target set out by the EU. It is estimated that by spending €38-40 billion per year to adopt all feasible technologies to control both greenhouse gases and air pollution, the health benefits generated could range from €25–157 billion per year. The EC4MACS has contributed to the policy proposal for the EU Energy and Climate Package, Roadmap for moving to a low-carbon economy in 2050.

Figure 3 demonstrates the cumulative benefits from including air quality as a climate priority. These multi-year and multi-tiered benefits should be incorporated into climate abatement calculations. Traditional climate abatement curves focus on the direct economic and financial costs and benefits, whereas the true return on investment is significantly higher:

Figure 3: Estimated value of co-benefits from improved air quality[31]



Increased energy security and reduced volatility,especially for energy importing countries.

Prevention of loss of millions of tonnes of staple crops by reducing tropospheric ozone concentrations.

Rural development through activities that avoid deforestation and forest degradation.

Shifts to public transport, and increased use of cleaner transport.

Prevention of premature deaths, poor health, absenteeism, and loss of productivity.

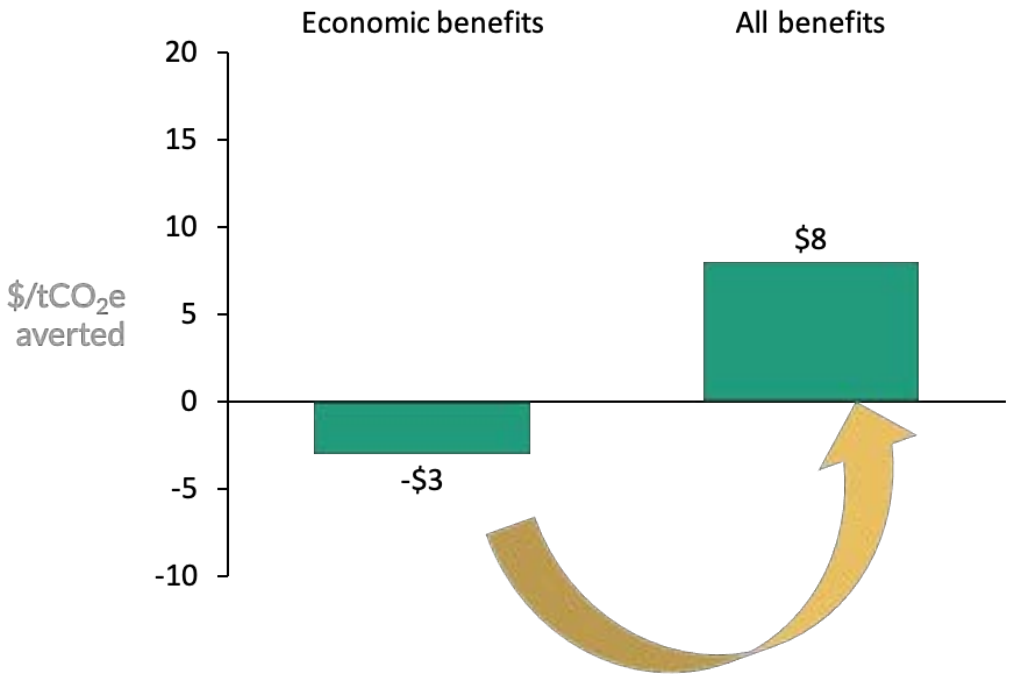
Across South Korea, India, and China alone, the potential monetary value of health benefits from averted air pollution ranges from 0.2-0.9% of their projected GDP in 2050.

AIR QUALITY BENEFITS MAKING ADDITIONAL CLIMATE ACTION AFFORDABLE

Governments are missing a trick by not joining up action on air pollution and climate change: many climate decision-making processes do not account for the savings for health and other co-benefits of cleaner air, which results in powerful climate actions not being initiated as they are considered too costly.

For example, reducing deforestation from slash and burn agriculture, investing in offshore wind, and recycling waste could become economically net positive actions if all benefits are considered. In the example below, solely considering the financial costs and benefits of the policy would mean that the activity of reducing deforestation from slash and burn agriculture is unprofitable, costing a net amount of $3 per tonne of CO2e abated. However, when taking a more macro-approach and considering a broader range of benefits including averted air pollution, improved health, and the avoidance of rural degradation, the action would be profitable, enjoying a net benefit of $8 per tonne of abated CO2e.[32]

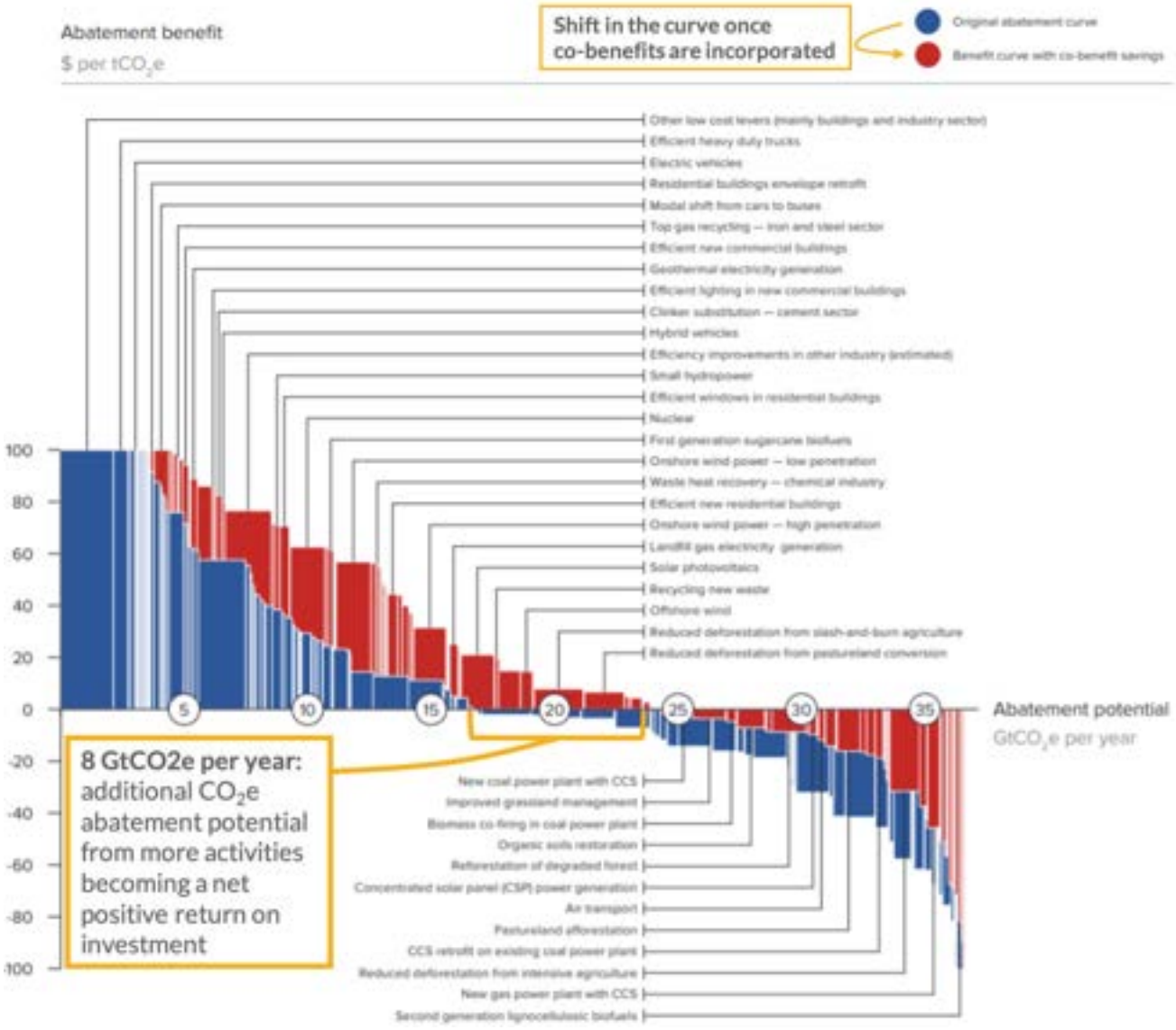
Figure 4: Cost-benefit analysis of reducing deforestation through slash-and burn[33]



Including air quality upsides in climate cost-benefit analyses can help trigger significant additional climate mitigation.

If governments globally were to take all climate actions that have a net economic benefit when considering financial costs and benefits without air quality benefits, this would abate about 16 gigatonnes of CO2eper year.[34] Incorporating air quality co-benefits into these calculations makes more activities net positive, increasing abatement potential to about 24 gigatonnes of CO2e per year. The figure below displays New Climate Economy's (NCE) update to traditional climate abatement curves at the global level, highlighting how the net benefits of climate actions (in blue) increase for most actions when considering the health and other co-benefits from reduced air pollution (updated benefits curve in red). These co-benefits are based on a range of reports, and are also corroborated by Vandyck et al in their article in Nature where they outline how the commitments to the Paris Agreement to act on climate change would reduce enough air pollution by 2030 to save 71,000-99,000 lives or even up to 178-346,000 lives with more ambitious action.[35] They found that the health, and agriculture co-benefits, could offset the costs of meeting Paris Agreement commitments.

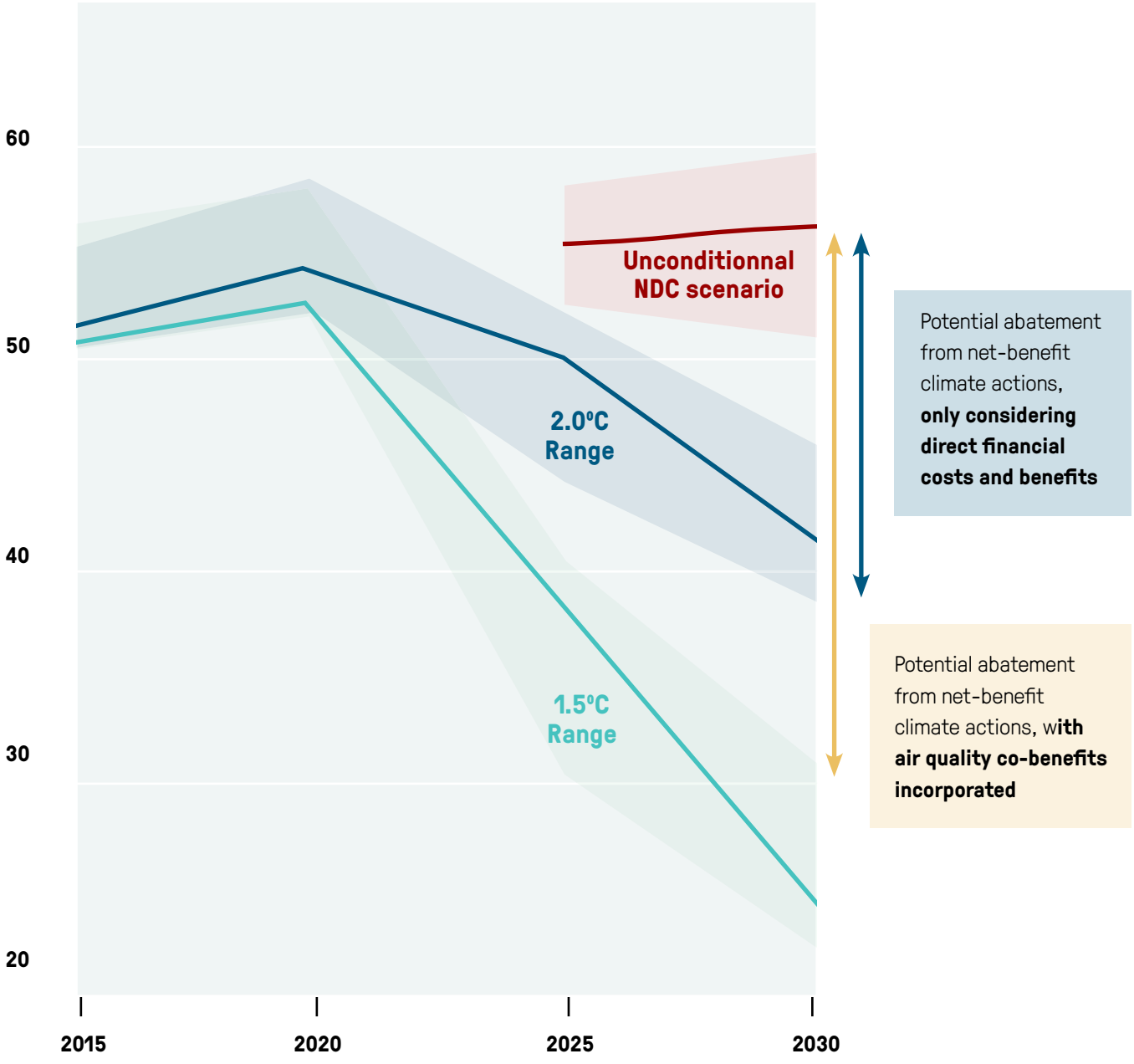
Figure 5: Climate abatement curve integrating public benefits[36]



The potential of joined-up action makes limiting global warming to 1.5°C more affordable.

The increase in CO2e abatement potential is significant. As outlined in the figure below, reducing 2030 emissions by 16 gigatonnes accelerates progress towards limiting global warming to 2°C. With air quality benefits considered, the abatement potential increases to 24 gigatonnes, which significantly accelerates progress towards 1.5 °C. It is essential that policymakers, working with other stakeholders including the private sector, take into account measures that are shown to provide co-benefits acting in the public good, bringing wider benefits to society as a whole. This analysis serves to highlight the scale of global potential from joined-up action—while the results would hinge on countries taking all the actions outlined by the NCE that are net positive, these are climate change mitigation activities that would generate net positive returns overall. Given that these activities would have a positive financial payoff, as well as hundreds of thousands of lives saved and climate change disasters averted, there is a strong business case for joined-up action making climate action more affordable.

Figure 6: Joined-up action could help limit global warming to 1.5°C



JOINED-UP ACTION TO AVOID UNINTENDED CONSEQUENCES AND REINFORCE POLICY COHERENCE

Uncoordinated air pollution and climate change policies can also lead to severe unintended consequences.

Some actions to mitigate climate change emissions may reduce greenhouse gas emissions but replace these with air pollution emissions. For instance, switching from petrol to diesel vehicles reduced CO2 emissions, but led to an increase in nitrogen oxides (NOx), air pollutants that are toxic and affect human health. Shifting from fossil fuels to higher blends of biofuels (>15%) can also increase NOx and volatile organic compounds (VOC) emissions. The higher uptake of biomass to replace natural gas and promote renewable energy led to an increase in VOC, solid PM, and carbon monoxide (CO) decreasing urban air quality. Some pollutants including nitrates and sulphates can have a cooling effect—however, their extensive health consequences do necessitate action.

A more integrated approach will help measure gains from policy coherence.

The minimal attention given to tackling air pollution, or linking climate action to better health outcomes, indicates the incoherence and inefficiency of international policy goals. Achieving policy coherence is essential for policy goals that entail a global dimension, such as tackling air pollution, climate action, and improving global health. International policies need to be increasingly effective, coordinated and complete. A more integrated approach to international policy frameworks, such as the United Nations Convention on Climate Change (UNFCCC), and the Sustainable Development Goals Framework (SDGs), is needed. In the case of tackling air pollution, it would enable policy alignment with curbing high carbon emitting and air polluting fossil fuels, together with reducing the health problems made worse by air pollution. Aligned policy solutions can be translated into quantifiable targets, and meaningful indicators to monitor impact and progress.

No stakeholder acting on air pollution or climate change should do so in isolation. It is vital that stakeholders strike a balance and consider the broader impacts, especially when there may be a payoff between the two agendas.

II. FASTER

Clean air within weeks; climate results within years. We don't need lockdowns during a pandemic to deliver clean air. Action to create clean air can save and improve thousands of lives and grow economies within a typical political term, while also generating long-term climate results.

Prioritising air quality improvements within climate action would deliver quicker climate, health, and economic results—key to building political momentum and popular support. While ground-level ozone and black carbon last from a few hours to weeks respectively, and methane lasts in the atmosphere for up to 12 years, CO2 can last for 300-1,000 years. Although these air pollutants last in the atmosphere for much less time than CO2,[37] they collectively cause 40-45% of global warming.[38] Prioritising clean air climate actions would facilitate immediate and tangible results, reducing near-term warming, averting premature deaths and improving quality of life. Air quality improvements will also boost economies and accelerate growth.

QUICKER HEALTH, ECONOMIC AND CLIMATE RESULTS

Clean air itself would have immediate visible and tangible benefits that can build popular support and contribute to short-term objectives. Clean air offers an opportunity to create short-term change. This is not only in the immediate interest of political leaders but can deliver large benefits on investments that encourage financing into longer term programming. Immediate and extensive health benefits are an added advantage. London's Ultra-Low Emissions Zone saw improvement in air pollutant concentrations within three years. In particular, NO2 pollution levels were observed to have come down in the areas surrounding schools, promising improvement in the lives of thousands of children. Figure 7 shows a timeline of benefits of reduced air pollution.

London's Ultra-Low Emission Zone[39]

In London, the Ultra-Low Emission Zone (ULEZ), a measure to control both greenhouse gases and air pollutants, has shown immediate results and been well-received by locals. The ULEZ disincentivises high-emission vehicles by charging a toll in select busy areas.

The London Air Quality Impact Evaluation found that greenhouse gas and air pollution levels within the densely populated ULEZ led to a reduction of NO2 by 44% and PM2.5 by 27% between 2017 to 2020; CO2 emissions fell by 6%.

The ULEZ has greatly benefited children. The number of state schools suffering from excessive levels of NO2 pollution has been brought down by 97%, from 455 schools in 2016 to 14 in 2019.

The demonstrable success of the program has in turn encouraged greater popular support. A 2021 survey ahead of London's mayor election showed that the majority of respondents (51%) said they supported an expansion of the ULEZ, with only 33% opposing it. Most citizens (68%) also thought that higher-polluting vehicles should pay more when travelling through the capital.

Figure 7: Timeline of benefits from air quality improvements

EVENTS	IMPACT	TIME TO IMPACT
Effect of smoking ban on the general population in Irish pubs	13%mortality reduction: 26% reduction in ischemic heart disease, 32% reduction in stroke, 38% in COPD	Starting at week 1
Alternative transport strategies to control congestion during the Olympic games	Decreased clinic, emergency department visits and hospitalisations for childhood asthma	17 Days
Steel mill closure	Decreased respiratory symptoms, school absenteeism, daily mortality, premature births	Weeks
Using alternative flued gas or electric home heaters instead of unflued gas heaters	Asthmatic symptoms improved	4 Weeks
Effect of smoking ban on workers in Irish pubs	Decreased wheeze, dyspnea, cough, phlegm, irritated eyes, painful throat, nasal itch, runny nose and sneeze	1 Month
Factory emissions and travel restrictions during the Olympic games	Improved lung function (healthy and asthmatic adults), fewer asthma-related physician visits, less cardiovascular mortality	2 Months
Copper smelters strike	Decrease in mortality by 2.5%	8.5 Months
Switching to clean cook stoves	Higher birthweights, gestational age at delivery, less perinatal mortality	Pregnancy Term
Excitement of air quality improvement act leading to decrease in fine particulate matter	Life expectancy gains 7 months	10 Years

Air pollution damages the economy—cleaner air would provide much-needed growth and boost our capacity to invest on climate solution. Air pollution costs the Indian economy $95 billion a year, 3% of the country's GDP.[40] Its impact is manifold: an unhealthy workforce, resulting in increased absenteeism and reduced productivity; unclean air that lowers consumer spending; and the economic impact of millions dying of pollution-related causes (1.7 million in India alone). Air pollution can no longer be seen merely as an inevitable by-product of economic growth. With improvements in technology and greater scientific understanding, it has become evident that tackling air pollution itself can boost business and grow economies. In India, for instance, achieving safe air quality levels has the potential to produce the equivalent of half of the country's tax base or 150% of its health budget.

Reducing short-lived climate pollutants will create near-term climate results. Measures to reduce SLCPs can slow global warming by as much as 0.6°C by 2050, given the relatively short time they spend in the atmosphere.[41] Without significant reductions in SLCP emissions alongside CO2, global warming is likely to overshoot 2°C by 2050,[42] increasing the potential of passing "tipping point" thresholds.

VISIBLE RESULTS THAT GARNER POPULAR SUPPORT

Image: www.cnn.com[44]

Action on both air pollution and climate change has sizeable public support in many parts of the world. For example, UNDP's survey, the People's Climate Vote, showed that 64% of global respondents believe that climate change is an emergency. According to a Clean Air Fund survey in India and Nigeria, 90% of respondents wanted to see air quality improvements in their area. In China, policymakers have succeeded in responding to public demand, lowering the fine particle pollution in Beijing in 2017 by 25% from the 2013 baseline. This resulted in a significant rise in the level of public satisfaction with environmental action: from 42% in 2015 to 64% in 2017.[43]

Action that leads to tangible and quicker results are likely to increase public support, which can build political momentum and spur a virtuous cycle of action.

III. FAIRER

Death rates from air pollution are 4 times higher in low and lower-middle income countries than high income countries. And within these, the poor and vulnerable suffer the most. Tackling air pollution within climate action will improve social and economic equity if disadvantaged communities are explicitly targeted for air quality improvement in the design of clean air policies.

Globally, air pollution disproportionately affects the poor, elderly, children, women, and other vulnerable populations. Countries in the Global South have the highest levels of air pollution, with PM2.5 concentrations being 2.5 times higher in low-income countries on average than in their high-income counterparts.[45] Within Global North countries, the poor, vulnerable communities and minorities suffer the most. These inequalities have fatal consequences. Figure 8 show death rates from air pollution are 4 times higher in low and lower-middle income countries compared to high-income countries. Within the United States, African Americans are three times more likely to die from air pollution than others.[46] The impact of air pollution, a silent pandemic, reflects many of the inequalities that have come to light during COVID-19, which has affected the most vulnerable to the greatest extent.

Figure 8: Correlation between GDP per capita and average PM2.5 concentration, 2018[47,48]

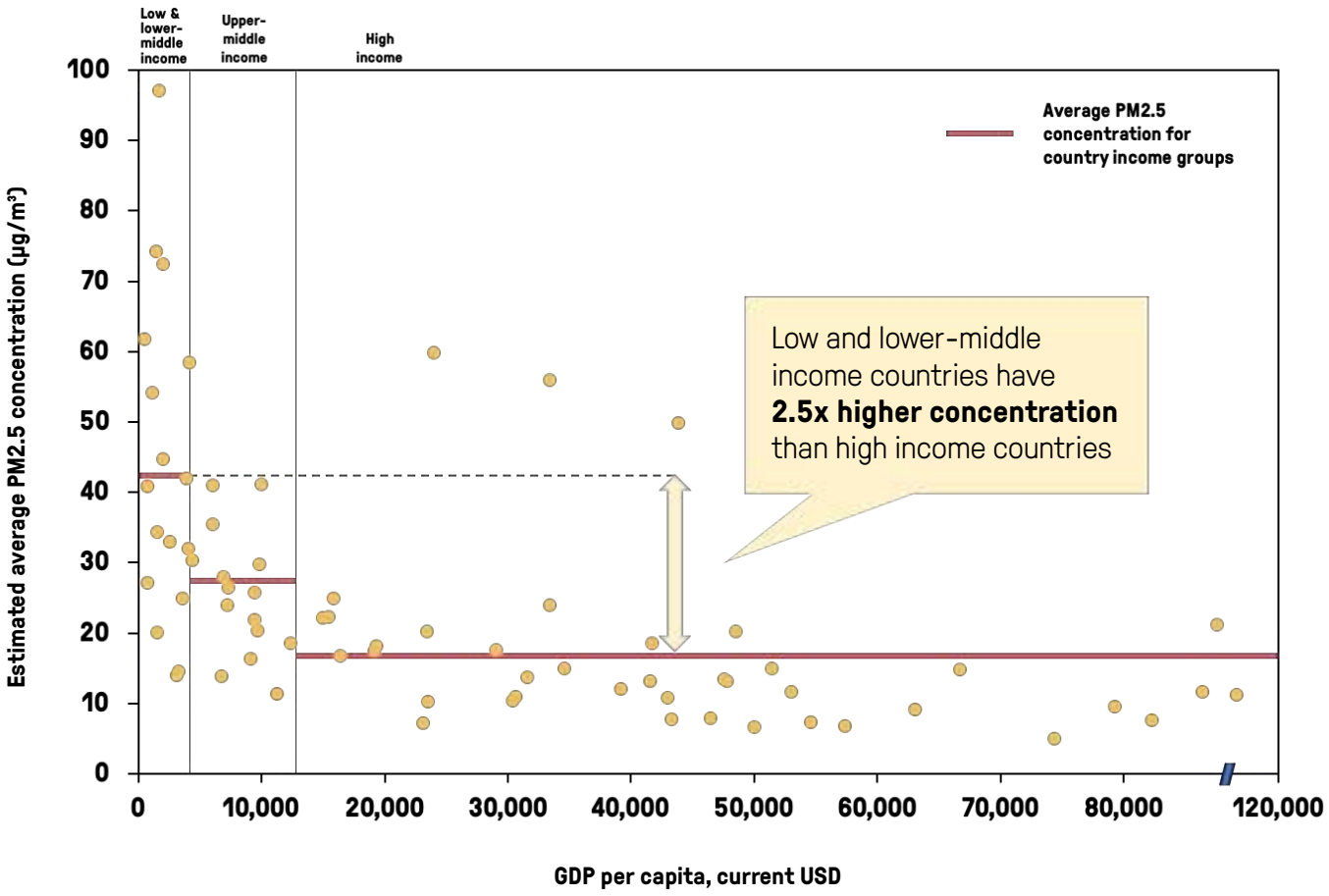
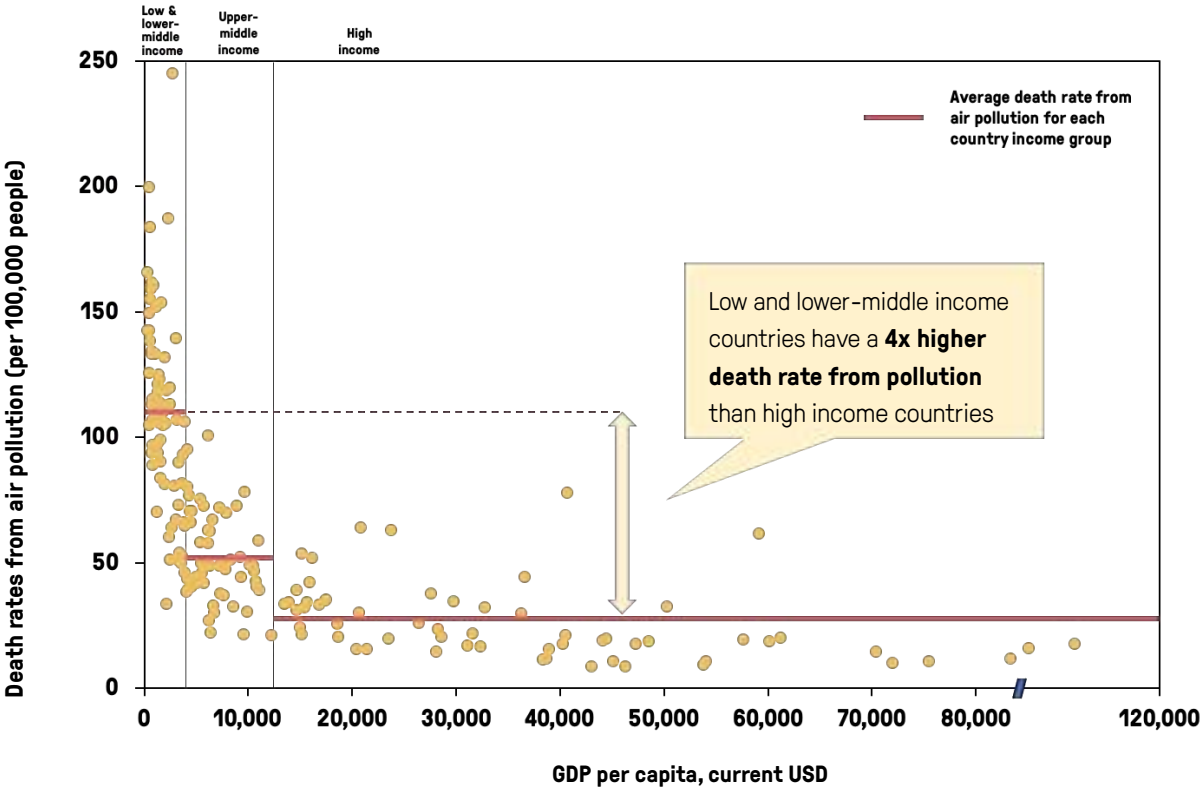


Figure 9: Death rates from air pollution, 2017[49]



The disproportionate impact on the vulnerable and the poor stems from the higher exposure and susceptibility to air pollution along with the lower adaptive capacity to handle its fatal consequences.

- **Higher exposure:** Poorer and more vulnerable groups live and work in areas with higher pollution. They also have less accessibility to newer and cleaner technologies like clean cookstoves.

- **Higher susceptibility:** People from poorer backgrounds are more likely to be in poorer health and suffer disproportionately from exposure to air pollution. In India, poor people are 9 times more susceptible to die from air pollution than the higher income groups.[50]

- **Lower adaptive capacity:** Adapting to air pollution requires moving home and switching jobs away from highly polluted areas—a luxury that many can't afford. These same people are the ones that will likely have limited access to healthcare and ability to manage the health impacts that they face.

Air pollution is continuing the worsen.

Low and lower-middle income countries in Asia and Africa will face the worst impact with air pollution levels tripling by 2050.[51] Many of these countries have economic growth strategies dependent on the burning of fossil fuels. Lagos, for example, is predicted to become the world's largest city by 2100 - industrial expansion and soaring transportation needs will cause levels of PM2.5 to rise.[52]

Despite air pollution reflecting global inequalities, investments in policies to tackle air pollution has been limited.

Between 2015 and 2020, just 5% of official development funding was spent on improving air quality in Africa, despite deaths attributable to air pollution having risen by 31% over the last 10 years.[53] Overall, total official development funding on air quality in 2019 was less than 1% of total funding, with just $1,429 million spent funding on projects with both the primary objective of reducing air pollution, and those with improving air quality as a secondary benefit. Of this funding, 90% was loans, while only 10% was grants. Early development interventions to support the adoption of low carbon infrastructure are crucial to minimise the public health impacts of air pollution.[54]

"Ghana believes that clean air can bring about major health benefits in addition to contributing to our climate change mitigation objectives. That's why funding to clean air matters"

– Peter Dery, Director of the Environment Division in the Ministry of Environment, Science Technology and Innovation[55]

Investments in cleaner air through climate action can save and improve lives of the most vulnerable if policies are implemented consciously targeting the most impacted.

Reducing air pollution through climate action would deliver air quality benefits in the short term that could improve the health and wellbeing of those currently suffering the most. Although climate injustices can only be addressed with long-term solutions, action to enhance air quality can deliver short-term equity improvements:

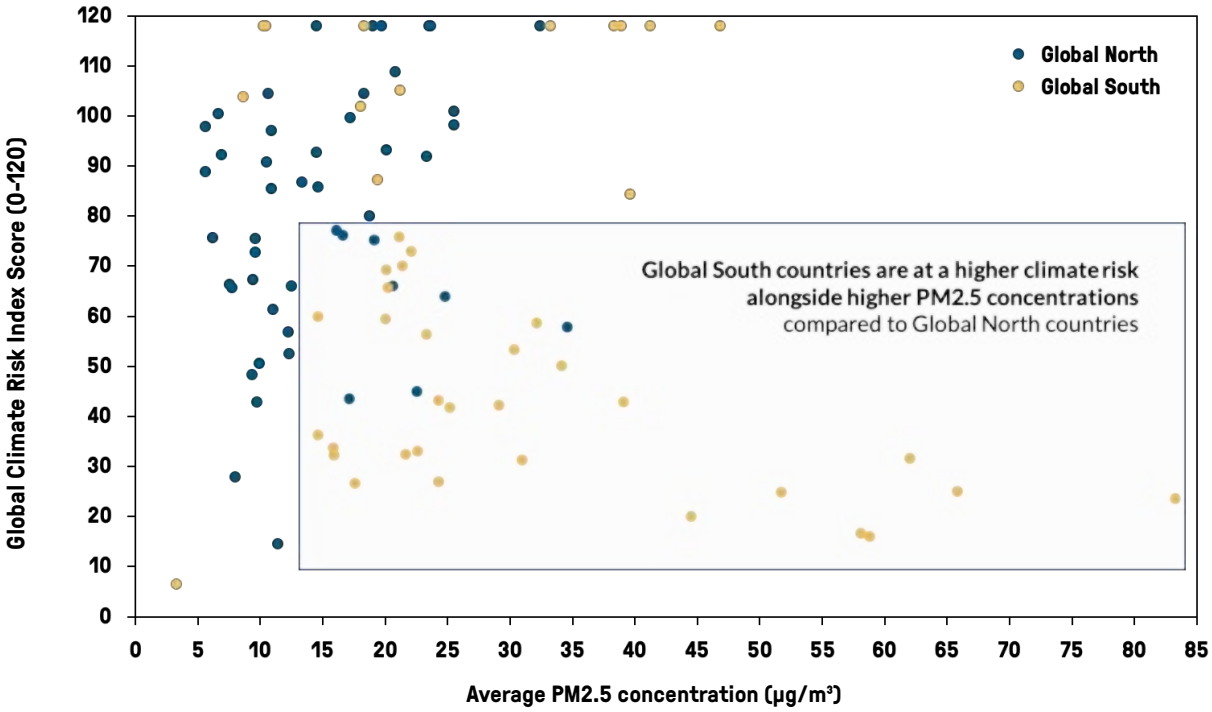
Health: 0.4–2.8 million premature deaths, the lion's share of which are seen among impoverished and marginalized people, can be averted in developing countries.[56] While developed countries, with their stronger health systems and improved quality of life, may see less dramatic results, disadvantaged communities within these countries are certain to enjoy improved health and productivity, reducing broader inequalities if policies are formulated to intentionally tackle the impact on those hardest hit by air pollution

Economic benefits: Clean air can improve labour productivity, decrease health expenditure, and improve agricultural crop yields. Some 65% of people earning <$1.90/ day work in agriculture and ozone reduction can improve agricultural yields greatly by reducing the loss of crops by 4%-10%.[57,58]

These inequalities don't operate in isolation—there exists an overlap of those who suffer from air pollution and those at the greatest risk of climate change impacts.

Most countries that have high air pollution concentrations also suffer a higher climate risk, with countries in the Global South more likely to be impacted by both.[59] Additionally, vulnerable populations in these countries most exposed to air pollution and likely to suffer its consequences disproportionately are also the people most threatened by climate change.

Figure 10: Correlation between the Global Climate Risk Index Score and average PM2.5 concentrations, 2019[60,61]



Joined-up action can help the most vulnerable be less susceptible to climate hazards and increase their ability to cope with climate change's impacts.

At similar levels of exposure to climate risks, people in poverty are more susceptible to damage from climate change, especially considering their fragile and limited assets. Even if we assume equal exposure and susceptibility to climate-related disasters for disadvantaged groups, their rate of recovery is hindered by the lack of human, community, and public resources, in turn bringing down their coping ability. Cleaner air can help these communities attain short term gains, reduce their susceptibility and enhance their adaptive capacity through strengthened health systems.

Reducing susceptibility: Air pollution affects productivity – it has been linked to higher frequencies of low birth weight, associated with higher health care costs and reduced earnings in life,[62] and elevated ozone concentrations have been associated with reduced productivity of farm workers in California.[63] Large-scale health improvements from clean air would greatly improve the health and quality of life of individuals, enhance productivity, and accelerate economic growth. Around $225 billion can be saved annually in labour costs lost to air-related health problems,[64] and studies show that individual productivity increases by about 5% when AQI levels are good (0-50) compared to when they are unhealthy (150-200).[65]

Given the increase in climate-related issues we are inevitably to experience in the future, clean air could ensure fewer inequalities and a more level playing field.

Improving adaptive capacity: Clean air can contribute to strengthening health system resilience.[66] Clean air creates an enabling environment, especially in cities, for better climate adaptation policies. Some 16% of deaths in the most polluted cities can be averted by a mere 100 µg/m3 decrease of PM10 concentration in the air.[67] In Hong Kong, for instance, a 45% decrease in ambient sulphur dioxide concentration led to a decrease in mortality by 2.1%.[68]

Case Study 5: Bangladesh's cookstove action plan[69,70,71]

The Government of Bangladesh's Country Action Plan for Clean Cookstoves (CAP) has targets for reaching 30 million households with cleaner cookstoves by 2030. More than 41% of households in Bangladesh still depend on firewood as the main cooking fuel. This results in a disproportionate impact on women, girls, and children; indoor air pollution causes 5% of all female deaths in developing countries.

In Bangladesh, women are the primary cooks, spending approximately 30% of their day cooking. Indoor air pollution kills 49,000 people in Bangladesh annually, accounting for 25% of total air pollution-related deaths. Uneducated women and young children face 4 times higher exposure to indoor air pollution than high-income households. CAP aims for cleaner air for all by (i) identifying the key barriers to the large-scale adoption of clean cookstoves and fuels (ii) analysing the desired outcomes if these barriers are removed and (iii) designing potential intervention options and mechanisms for quick and effective action.

“

Social justice and equity are core aspects of climate-resilient development pathways that aim to limit global warming to 1.5°C as they address challenges and inevitable trade-offs, widen opportunities, and ensure that options, visions, and values are deliberated, between and within countries and communities, without making the poor and disadvantaged worse off.

”

- IPCC, 2019[72]

CONCLUSIONS

Clean air needs to be incorporated as a priority within climate action.

Now is the best time to act, building on the momentum of climate action, and capitalising on air quality gains during COVID-19 lockdowns. This briefing has outlined how treating the two agendas in a joined-up manner would be a more efficient and profitable use of capital that generates short and long term health, socioeconomic and climate benefits. Several countries have started to capture these benefits consciously. It's now time to make this a global effort, bringing collective action on the silent pandemic of air pollution, while increasing action to mitigate climate change.

ENDNOTES

1 WHO, Air pollution (2021); note: includes outdoor and indoor air pollution.
2 UNEP, Emissions Gap Report (2019)
3 WHO, Strengthening Health Resilience to Climate Change
4 WHO, Global Air Quality Guidelines (2021)
5 Clean Air Fund, State of Global Air Quality Funding (2021)
6 Science for Environment Policy, Air pollution and climate change (2010)
7 WHO, Climate change (2021)
8 WHO, Air pollution (2021)
9 UNFCCC, NDC Synthesis Report (2021)
10 WHO, Global Air Quality Guidelines (2021)
11 UNEP, WMO, Integrated Assessment of Black Carbon and Tropospheric Ozone (2011)
12 C40, Toward a Healthier World: Connecting the dots between climate, air quality and health (2019); C40, 35 Cities Unite To Clean The Air Their Citizens Breathe, Protecting The Health Of Millions (2019)
13 China, Atmospheric Pollution Prevention and Control Law (2018); China, Policies and Actions for Addressing Climate Change (2019); China MEE, Guideline for the removal of pollutant in industrial process (2017)
14 SSEMARNAT, Mexico's Climate Change Mid-Century Strategy (2016); CCAC, Mexico launches National Strategy to Reduce Short-Lived Climate Pollutants for climate change, air quality and human health (2020)
15 CCAC, Mexico (2021)
16 CCAC,SNAP initiative
17 CCAC, Chile increases climate change ambition with targets that simultaneously improve air quality and health (2020))
18 UNFCCC, United Kingdom of Great Britain and Northern Ireland's Nationally Determined Contribution (2020)
19 WHO, COP26 Special Report on Climate Change and Health (2021)
20 C40, Burohappold, Toward a healthier world: Connecting the dots between climate, air quality and health (2019)
21 Compiled from studies reviewed for this report.
22 New Climate Economy, Better Growth, Better Climate (2016); note: these numbers are intended to be indicative of scale rather than definitive.
23 UNEP, Emissions Gap Report (2019)
24 Peter Rafaj et al, Air quality and health implications of 1.5 °C–2 °C climate pathways under considerations of ageing population: a multi-model scenario analysis (2021)
25 Zhang et al, Evaluating co-benefits of energy efficiency and air pollution abatement in China's cement industry (2015); H Qian et al,Air pollution reduction and climate co-benefits in China's industries (2021)
26 Peter Rafaj et al, Air quality and health implications of 1.5 °C–2 °C climate pathways under considerations of ageing population: a multi-model scenario analysis (2021)
27 EC4MACS, Baseline Projections of Greenhouse Gases and Air Pollutants in the European Union up to 2030 (2013)
28 UNEP, Actions on Air Quality (2021)
29 EC4MACS, Baseline Projections of Greenhouse Gases and Air Pollutants in the European Union up to 2030 (2013)
30 EC4MACS, Baseline Projections of Greenhouse Gases and Air Pollutants in the European Union up to 2030 (2013)
31 New Climate Economy, Quantifying the multiple benefits from low-carbon actions in a greenhouse gas abatement cost curve framework (2016)

[32] New Climate Economy, Better Growth, Better Climate (2016)
[33] New Climate Economy, Better Growth, Better Climate (2016)
[34] New Climate Economy, Quantifying the multiple benefits from low-carbon actions in a greenhouse gas abatement cost curve framework (2016)
[35] Toon Vandyck et al, nature, Air quality co-benefits for human health and agriculture counterbalance costs to meet Paris Agreement pledges (2018)
[36] New Climate Economy, Better Growth, Better Climate (2016); note: these numbers are intended to be indicative of scale rather than definitive.
[37] CCAC,What are short-lived climate pollutants?
[38] CCAC, rimer on Short-Lived Climate Pollutants
[39] Mayor of London, Air quality in London (2020); Intelligent Transport, London's poor air quality revealed by City Hall analysis (2021); Air Quality News, Majority of Londoners support ULEZ expansion (2021)
[40] CAF, Air pollution and its impact on business (2021)
[41] WRI, Strengthening Nationally Determined Contributions to Catalyze Actions that Reduce Short-Lived Climate Pollutants (2018)
[42] Shindell et al, A climate policy pathway for near- and long-term benefits (2017)
[43] UNEP, A review of 20 years' air pollution control in Beijing (2019)
[44] Image: https://edition.cnn.com/2020/03/31/asia/coronavirus-lockdown-impact-pollution-india-intl-hnk/index.html
[45] Dalberg Analysis based on World Bank, GDP per capital (2020) and IQAir, World Air Quality Report (2018)
[46] M.S. Qian Di et al, Air Pollution and Mortality in the Medicare Population (2017)
[47] World Bank, GDP per capital (2020)
[48] IQAir, World Air Quality Report (2018)
[49] Our world in data, Air pollution (2017)
[50] Zoë Chafe, Sourangsu Chowdhury, A deadly double dose for India's poor (2021)
[51] Earthzine, Study Shows Overall Air Quality to Worsen by 2050 (2012)
[52] Kemper & Chaudhuri (2020)Air pollution: A silent killer in Lagos. World Bank Blogs.
[53] Clean Air Fund, State of Global Air Quality Funding (2021)
[54] Clean Air Fund, State of Global Air Quality Funding (2021)
[55] Peter Dery, The State of Global Air Quality Funding - Unlocking a clean air dividend (2021)
[56] UNEP, Integrated Assessment of Black Carbon and Tropospheric Ozone (2011)
[57] World Bank Group, Who are the Poor in the Developing World? (2016)
[58] Tai et al, Threat to future global food security from climate change and ozone air pollution (2014)
[59] The countries ranking highest are the ones most impacted by extreme weather events.
[60] Germanwatch, Global Climate Risk Index (2021)
[61] IQAir, World Air Quality Report (2019)
[62] The Quarterly Journal of Economics, From the Cradle to the Labour Market (2007)
[63] Brookings, We Are What We Breathe: The Impacts of Air Pollution on Employment and Productivity (2011)
[64] C40, Why clean air is vital for your city's health and prosperity (2019)
[65] Harvard Business Review, Air Pollution is making office workers less productive (2016)
[66] WHO, Strengthening Health Resilience to Climate Change
[67] Schraufnagel et al, Health Benefits of Air Pollution Reduction (2019)
[68] Schraufnagel et al, Health Benefits of Air Pollution Reduction (2019)
[69] Government of the People's Republic of Bangladesh, Country Action Plan for Clean Cookstoves (2013)
[70] AQLI, Death Toll from Air Pollution Sees Alarming Rise in Bangladesh (2020)
[71] J-PAL, Demand for non-traditional cookstoves in Bangladesh (2014)
[72] IPCC, Global Warming of 1.5°C, 2019

CLEAN AIR FUND

DISCLAIMER

The statements and figures quoted in this report are from the best available data and/or from third party sources. The analysis provided in this report is intended for informational purposes only. All views expressed in this report are the Clean Air Fund's and do not represent the opinions of any affiliated partner or entity.

info@cleanairfund.org

www.cleanairfund.org

@cleanairfund

The Clean Air Fund (UK) is registered in England with company number 11766712 and charity number 118369. Registered address: 7 Clifford Street, London, UK, W1S 2FT.