CLEAN AIR FUND

FROM POLLUTION TO SOLUTION IN SIX AFRICAN CITIES

CONTENTS

FOREWORD

Africa is home to the world's youngest population and the world's fastest growing cities. City planners and policy makers across the continent are addressing the challenges that these demographic trends pose to the creation of an environment in which young people can thrive. As the policy brief, *From Pollution to Solution in Six African Cities* shows, the challenges that flow from rapid urbanisation across the continent are immense, including drastic increases in air pollution and greenhouse gas emissions, which if unchecked will bring disastrous consequences for human and economic health. On the current trajectory, following a 'business as usual' approach means air pollution will collectively cost Accra, Cairo, Johannesburg, Lagos, Nairobi and Yaoundé an estimated $138bn in premature deaths and worker absenteeism over the next two decades.

Now more than ever, governments must utilise the policy levers that deliver the biggest impact. Investments in programmes to clean the air are one such tool. As the analysis in this brief shows, doing so brings positive impacts for public health and for our economies. Across the six cities examined for this study, actions taken today could help save 109,000 lives and $19bn by 2040.

The African Development Bank supports African countries in creating an enabling environment to maximise their potential and effectively contribute to inclusive growth and sustainable development in Africa. It is well understood that tackling poverty, bringing clean water to people everywhere and investing in education are all critical to this objective. Ensuring our citizens can breathe clean air is also a vital, but too often neglected, piece of this puzzle. I urge policy makers across the continent to study these findings closely and to recognise the urgency of taking bold action on clean air to ensure our citizens can live healthy and prosperous lives.

Kevin Urama
Chief Economist, African Development Bank


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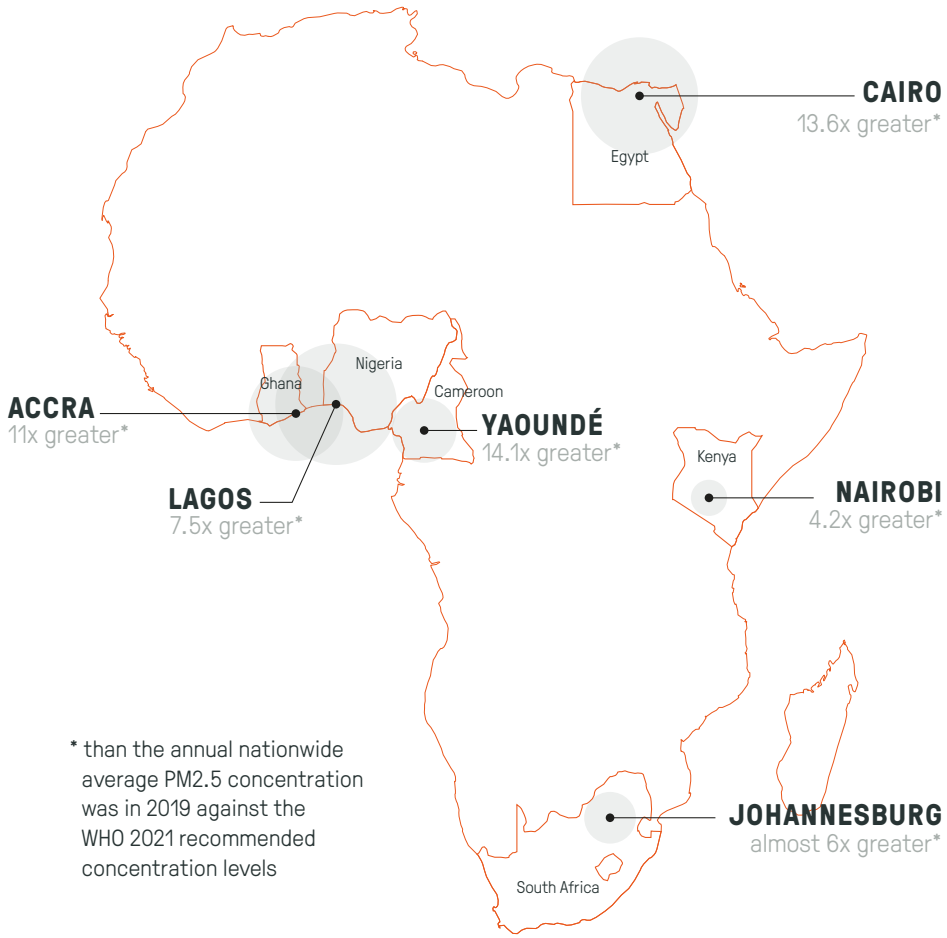
EXECUTIVE SUMMARY

Air pollution is Africa's silent killer. Each year, air pollution kills more Africans than HIV / AIDS and malaria combined. In addition to the 1 million Africans who die from diseases caused by indoor and outdoor sources of air pollution annually, millions more have to live with its devastating consequences. This problem is worse in cities, where highly polluting activities stunt the health of both their residents and economies. Analysis undertaken for the Clean Air Fund by Dalberg Advisors finds that left unchecked, air pollution will collectively cost **Accra**, **Cairo**, **Johannesburg**, **Lagos**, **Nairobi** and **Yaoundé** an estimated US$138bn in premature deaths and worker absenteeism by 2040, equivalent to 8% of their current combined GDPs.

The continent's rapid urban growth should not come at the expense of the health of its citizens. African cities can choose to put themselves on the path of green growth, in which investments to tackle the major sources of air pollution bring about benefits to worker productivity, national health budgets and help create healthy, equitable and prosperous places to live. African governments are increasingly aware of this challenge. The **Africa Integrated Assessment** outlines the steps needed to reach green growth, but realising this blueprint for Africa requires more comprehensive, coordinated and scaled action. This analysis shows that across the six case study cities, actions taken today could prevent 109,000 premature deaths and prevent the loss of US$19bn by 2040.

Drawing on best-practice case studies from across the African continent, this policy brief lays out recommendations that can help governments unleash green urban economic growth. Investments in good governance and legislation, better air quality monitoring, evidence-based emission reduction policies, effective partnership models and training, and improved access to climate financing are essential to meeting this challenge. These recommendations represent the first step for governments to consider as they design and deliver locally-tailored action.

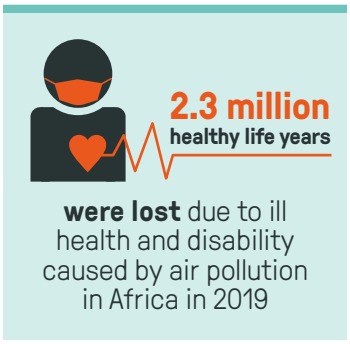
Air pollution knows no boundaries. To achieve the level of change needed to avoid the devastating effects of toxic air, coordination between regional bodies, national governments and city-level government is critical. Now is the time to invest in Africa's capacity and capability to respond to this challenge and work towards a greener, more prosperous future.



1. THE CHALLENGE

Africa's urban air pollution is killing its residents and curbing its growth prospects

Africa's cities are growing fast; **by 2060, over 65% of the continent's population will live in urban areas**. Today, urbanisation across the continent is accompanied by drastic increases in air pollution and greenhouse gas emissions, with disastrous consequences for human and economic health. Each year, toxic air kills more Africans than unsafe water, sanitation and handwashing combined[1]. In addition to the 1 million Africans who die from indoor and outdoor sources[2] of air pollution annually, millions more have to live with its devastating health consequences. The non-fatal health effects of toxic air, including heart disease, lung cancers, stroke and respiratory diseases, prevent people leading healthy and productive lives – **2.3 million healthy life years** (YLDs) were lost due to ill health and disability caused by air pollution in Africa in 2019 alone.



Air pollution threatens the success of Africa's cities. Urbanisation is responsible for almost a third of the **continent's per capita GDP growth**[3], thanks to urban population growth and the higher productivity rates amongst urban firms and workers. However, reduced worker productivity, higher rates of absenteeism and premature deaths due to unhealthy pollution levels threaten to dampen this progress, and undermine the health of national budgets, public services, and private enterprise.

Analysis undertaken by Dalberg Advisors has produced estimates of the economic costs of air pollution across six major African cities for the first time. Building on work from the Clean Air Fund's 2022 report "From Pollution to Solution in African Cities", the latest research extends the previous analysis to quantify the cost of air pollution across the six cities of Accra, Cairo, Johannesburg, Lagos, Nairobi and Yaoundé. The results are striking. Under a "business as usual" scenario, the impact of air pollution due to worker absenteeism and premature mortality will cost cities US$138bn between 2023-2040. Over this period, these direct health effects will cost cities the equivalent of 8% of their combined current GDPs, even before considering the indirect costs to health budgets, agricultural and industrial output, and service disruptions.

Road traffic, unclean cooking/heating fuels, poor waste management, and polluting industrial practices and agricultural techniques are the continent's major contributors to high concentrations of air pollution particles (fine particulate matter or PM2.5). Across the cities studied, PM2.5 levels exceeded WHO recommended guidelines by between 3 - 13 times[4]. By undertaking decisive action to address these major drivers of air pollution, the analysis indicates that 7,400 deaths could be avoided and US$2.6bn could be saved annually by 2040. However, to put cities on the path to green growth, much work remains to be done.

FIGURE 1: THE MAJOR CAUSES OF AIR POLLUTION ACROSS AFRICAN CITIES

Road transport

Biomass fuels

Waste burning

Industrial and power plant emissions

Agricultural slash and burn practices

Dust

Typical Saharan dust from harmattan winds or resuspended dust sources by roadsides

2. PROGRESS TO DATE

> African governments are increasingly aware of the need to take action, but achieving clean economic growth requires more comprehensive and coordinated efforts

Rather than seeing air pollution and climate change as necessary consequences of fossil-fuel dependent development, governments and cities need to embrace a new model of green growth that capitalises on the co-benefits of joined-up action. By reducing particulate pollution, cities can improve public health, lower greenhouse emissions, and drive fair and sustainable economic growth, hence ensuring initial investments pay for themselves many times over.

A number of African governments have begun to integrate action on air pollution within broader development agendas. In 2022, a summary of the first ever **integrated assessment of air pollution and climate change for Africa** was published[5]. Led by a pan-African team of researchers, the Integrated Assessment suggests **37 cost-effective and scientifically-proven measures** to reduce air pollution, ranging from investment in safe walking and cycling infrastructure, to better waste management systems and transitioning to cleaner cooking fuels. Once published in full, the integrated assessment will provide a framework for national and local action against climate change and align countries to the key priorities laid out in **Agenda 2063** and the **Sustainable Development Goals**.

Ten African cities[6] have already committed to improving air quality as signatories of the C40 Clean Air Cities Declaration. By signing this declaration, cities undertake to pursue an ambitious set of measures to meet reduction targets for air pollution that meet or exceed national targets. National- and city-level action has begun to bear fruit, with successful individual initiatives arising across the continent (see Figure 2). These initiatives are focused on four impact areas, ranging from upstream action on regulatory environments to downstream efforts focused on behavioural change.

However, action remains scattered, uncoordinated and limited to pockets of Africa that have sufficient capacity and political will to act. Very few governments have developed comprehensive action plans to respond to the crisis, and there are few regional efforts to identify and act on transboundary solutions (e.g., transnational railways, harmonisation of emission standards). Comprehensive, coordinated and scaled action across all four impact areas is needed to create the conditions for green urban economic growth.

FIGURE 2: SPOTLIGHT ON SUCCESSFUL EFFORTS TO MANAGE AIR POLLUTION LEVELS

DEVELOPMENT AND ADOPTION OF ADEQUATE REGULATORY/ LEGISLATIVE INFRASTRUCTURE

Clean Air Bill (Nairobi): The bill was introduced in 2021, and mandated polluting industries to implement measures to reduce emissions[1]. This legislation is a major pillar of the Climate Action Plan, which aims to contribute to reducing emissions by 23% versus a business-as-usual scenario by 2025, and 66% by 2050[2]. Work towards the bill was supported by Stockholm Environment Institute (SEI), who provided technical expertise to help draft the legislation[3].

INVESTMENTS IN AIR QUALITY MONITORING TO ENABLE EVIDENCE-BASED DECISIONS

Air Quality Monitoring (Johannesburg): The city's metropolitan municipality have partnered with a private air quality monitoring company as part of the 2011 National Climate Change Response Policy[4]. The company have agreed to freely provide data to the South Africa Air Quality Information System (SAAQIS), such that local authorities can make evidence-based decisions on how to mitigate against air pollution.

EMISSION REDUCTION MEASURES

Transport & health

Car-Free Days (Kigali): The Rwandan government have banned the use of motorised transport for one day each month since 2016, and one day each fortnight since 2017. Studies have found that PM2.5 levels are reduced by 15% on these days[5]. It also has a health aspect as local NGOs use the car free day as an opportunity to provide health check ups including blood pressure screening, as well as sport activities, so that people understand the links between traffic, pollution and their own health.

Industry

Energy Strategy (Morocco): In 2009, Morocco committed to focus investment on wind and solar. By 2020, 37% of installed power capacity came from renewable sources[6], including the world's largest concentrated solar power plant outside Ouarzazate. Their goal is to reduce emissions by 18% from 2022 to 2030.

Biomass Fuels

Electric Cooking Appliances (Addis Ababa): The Ethiopian government has promoted the use of electric cooking appliances since the 1970s. Efforts have intensified since the 2019 National Electrification Program 2.0, leading to 63% of households in Addis baba using electricity for their primary cooking stove[7].

Waste Mgmt.

Waste Pre-Collection (Brazzaville): Since 2014, local authorities have been issuing licences to private companies to provide waste pre-collection services[8]. 71 operators now possess authorisation, and together they are estimated to meet ~30% of the waste collection needs in Brazzaville. Authorized collectors face fewer problem with police and residents and have access to formal disposal sites and an equipment fund.

Agriculture

Composting Facility (Kumasi): Kumasi Compost and Recycling Plant (KCARP) is an agricultural waste treatment plant that has been active since 2020. The plant receives and processes 1,200 tons of waste daily[9], which once composted, can be used be used for crop production and other agricultural purposes.

BEHAVIOURAL CHANGE AND PUBLIC AWARENESS BUILDING

BreatheLife Campaign (Accra): In 2019, Accra became the first African city to join the BreatheLife Campaign[10]. They have used durbars (festive gatherings) as a platform to improve awareness of the importance of switching to clean cookstoves to avoid household smoke. Other cities, such as Nairobi, have also begun to integrate air pollution education into school curricula and community health programmes.

3. RECOMMENDATIONS

> By adopting a comprehensive set of air quality action measures, African governments can generate billions in economic benefits, outweighing the costs of investments several times over

The potential savings from action on air pollution are huge. By adopting five key emission reduction measures[7], our analysis suggests the six case study cities could save as much as US$19.2bn between now and 2040, and prevent over 109,000 premature deaths resulting from air pollution.

Adopting the 5 key emission reduction measures

Save the 6 case study cities **US$19.2bn**

Prevent over **109,000 premature deaths** resulting from air pollution

To achieve this scale of savings and ensure investments deliver results, evidence-based policies are required. However, national governments face significant barriers in identifying, financing, and then successfully implementing and scaling policies. Poor data availability and sharing, lack of coordination between government departments and devolved government and partners are some major barriers to effective action on air pollution. Climate financing barriers and capacity and technical knowledge gaps are also key challenges.

National governments need to overcome these challenges and create the right enabling conditions for success. Below, we lay out the five key areas for national governments to prioritise as part of these efforts. These priorities should be viewed as cross-cutting enablers, designed to create the conditions needed for governments to identify major air pollution causes, develop tailored solutions and implement and enforce measures at the right level of government to deliver measurable reductions in PM2.5.

There is no one-size-fits-all answer to air pollution. Countries have different geographies and climate affecting their major causes of pollution, levels of devolved governments, which impact the policies that can be pursued at the regional versus district and city level, and have made different progress on tackling air pollution to date. All these factors and more will determine which of these recommendations governments should prioritise and which specific policies they go on to implement. The recommendations laid out in this report therefore serve as a first step for governments and regional bodies in setting up the conditions for locally-tailored action.

Governments should not have to work alone to adopt these recommendations. Support from regional bodies (e.g., the African Union (AU) and Regional and Economic Development Communities), external partners, private data providers and the international financing community is essential to ensuring countries are equipped with the financing, tools and knowledge required to meet their goals. Specifically, the AU has an important role to play as a representative of Africa Union countries in international forums, as a convenor of Union members to advance important cross-boundary issues, and as an advocate for clean air across Africa (see below for detail).

PRIORITIES FOR NATIONAL GOVERNMENTS

PRIORITY 1: DEVELOP COHERENT GOVERNANCE MECHANISMS AND EFFECTIVE LEGISLATION

- Produce national integrated air quality management and climate action plans that clearly describe the necessary tasks, owners and implementation timeframe for a comprehensive set of measures on air pollution (e.g. **South African National Framework for Air Quality Management**). Create cross-cutting forums to refer back to and update these plans to ensure their effective use and success.

- Develop nationally-led governance mechanisms that give clear air pollution mandates and targets to different levels of government (e.g., government departments, country districts, city councils) and the necessary forums/roundtables to encourage partnership and collaboration between departments (e.g. **Nairobi City Air Quality Working Group**).

- At the city-level, implement **C40's integrated planning framework** to help cities develop air quality management plans (AQMPs) that help them simultaneously meet climate, air quality and health goals and subsequently try to adopt city-legislation to enshrine air quality management plans into law (e.g. **Nairobi AQMP, Greater Accra Metropolitan Area AQMP**, **Johannesburg AQMP**).

- Consider establishing or expanding political and non-political government appointments for air quality at both the national and district/city level. This will serve to: i) ensure the topic is prioritized in national, district and city-level forums; ii) designate responsibility for a cross-cutting approach to air pollution, charged with liaising across health, environmental, and economic departments; iii) create a dedicated, specialist capacity for prospective external partners and investors to liaise and collaborate with.

PRIORITY 2: FACILITATE DATA MANAGEMENT AND EVIDENCE-BASED DECISION-MAKING

- At the city level, close knowledge and data gaps through investments in the **deployment of low-cost, low maintenance air quality (AQ) monitoring devices to augment data from reference grade monitors** (e.g. **Kampala air quality monitoring system)** and improve accessibility to real-time and historical data for decision-making. Ensure devices are located across all neighbourhoods to ensure resulting measures are equitable and go to areas of greatest need.

- Conduct ground-level pollution attribution and emission accounting exercises within cities to understand the main causes of air pollution across energy, transport, industrial and power production, agriculture, and waste management (e.g., **South African National Atmospheric Emission Inventory**), and subsequently develop appropriate policies to address them. (e.g., **Yaoundé Urban Mobility Plan**). Where there are technical or capacity gaps to undertake these exercises, explore external support (e.g., **C40 cities Air Quality Technical Assistance Program**, **The Clean Air Catalyst in Nairobi**).

- Encourage data-sharing between AQ monitoring networks, health databases and decision-makers to ensure all levels of governments have the necessary data to deliver coordinated, evidence-based decision-making. As countries develop their AQ capacities, governments should serve as the central repository and/or owner of AQ datasets to ensure knowledge is as close to decision-making as possible (e.g. **South African Air Quality Information System**).

PRIORITY 3: FOSTER PRODUCTIVE PARTNERSHIP MODELS

- Establish regular roundtable discussions between different government departments and external partners (e.g., research institutes) to educate and inform each other of the linkages between air pollution, health, economy, climate change, etc., and help break down siloed approaches to air pollution challenges between departments(e.g., **Nairobi city multi-stakeholder source awareness workshop**; **Kigali air quality conference**; **Ghanian led roundtable at Africa Climate week 2019**; **AU and EUMETSAT air quality monitoring webinar**).

- Work with NGOs and other international partners to de-risk investments in AQ improvements through the provision of funding for small-scale pilots to test the efficacy of interventions. Continue to collaborate with these partners to ensure proven AQ initiatives move beyond pilot-phase to city-wide and even national action (e.g., **AFD funding of Yaoundé Urban Mobility plan via MobiliseYourCity partnership**).

- Work with partners/advisors to help address technical gaps and provide relevant trainings to both national and district/city-level leaders (e.g., **Environmental Compliance Initiative (ECI)**, **Stockholm Environment Institute (SEI); Legal Response Initiative**).

- Develop a national public education and communication strategy to help inform citizens about the effects of air pollution on health. This will likely require multi-pronged communication strategies involving different public and private bodies, as well as locally-tailored action (e.g., **WHO pilot training for Ghanian health workers**; **digital billboards with PM2.5 reporting in Nairobi; Partnership between SEI Africa, Athletics Kenya and World Athletics**).

PRIORITY 4: ENSURE ACCESS AND ELIGIBILITY TO CLIMATE FINANCING

- Integrate Air Quality measures within Nationally Determined Contributions (NDCs). Include reporting on the climate and health co-benefits of air quality interventions (e.g. **Zimbabwe NDC**, **Nigeria NDC**), and quantify the financing gap within air pollution efforts to help underscore the need for air quality specific financing .

- Move towards national government budgets with dedicated funds for air quality management, and use part of funding to establish necessary government capacity to establish governance and enforcement mechanisms needed for effective national action plans.

- (Linked to Priority 1) Establish a central liaison within government to serve as the go-to contact point for all prospective financers of AQ investment. This group, made up of dedicated air quality experts, can help build strong working relationships and consistent engagement with international donors/financers across all air quality interventions (e.g., transport, industry, energy).

- (Linked to Priority 1) Enshrine air quality targets into district/city law (depending on level of devolved government) to demonstrate long-term political will for AQ actions to prospective financers (e.g. **Nairobi Clean Air Bill, South Africa Air Quality act**).

- (Linked to Priority 2) Work with international donors / investors to identify the data and evidence required to meet criteria for major climate funds, and invest in necessary AQ monitoring devices and infrastructure accordingly.

- (Linked to Priority 3) Prioritise applications to climate finance funds with feasible eligibility criteria and accompanying technical support to help develop green credentials of planned investments (e.g., **Ecobank Sustainable Finance Framework**; **AFD-EU Sunref facility**; **Egyptian Pollution Abatement Project**).

PRIORITY 5: INVEST IN TRAINING AND CLOSE TECHNICAL KNOWLEDGE GAPS

- (Linked to Priority 3): Identify and collaborate partners/ advisors to provide relevant and tailored trainings to existing national and city-level experts (e.g., **Environmental Regulatory Training Programmes**, **CCAC Institutional Strengthening Support programme**, **Climate Law Trainings**)

- Increase offering of atmospheric sciences degrees at leading national educational institutes and integration of air-quality topics into existing related courses (e.g., urban and regional planning, public and global health courses, nursing science)

- Help establish country scholarship programmes (in collaboration with partner universities and sponsors) to provide funded degrees and fellowships in relevant disciplines at leading international universities (e.g., atmospheric science, environmental economics, environmental law)

- Seek out international research grants to establish regional research and training centers focused on environmental and occupational health. Consider partnering with foreign universities for cross-learning and training purposes (e.g., **Eastern Africa GEOHealth Hub headquartered by Addis Ababa University and Columbia University**)

PRORITY 6: MAXIMISE HEALTH BENEFITS

- Governments and cities, with support from funders, should use air quality data and support health research to advance understanding of the health impacts of air pollution, especially on babies and children, and the associated avoidable costs to health systems, communities and people most affected. Ensure air quality interventions are designed to maximise health benefits.

ROLE OF THE AFRICAN UNION

AS A REPRESENTATIVE IN INTERNATIONAL FORUMS, THE AU CAN WORK TO:

- Seek the necessary funds to establish regional climate finance bodies responsible for working on behalf of members to secure climate financing for national and district/city-level priorities. Work with relevant partner groups to establish these finance bodies (e.g., East African Community (EAC), Southern African Development Community (SADC))
- Encourage international financing bodies to establish specific funds to finance air quality monitoring capacity and home-grown air quality expertise. This will help countries develop their domestic capacity to develop emission reduction measures and fulfill the necessary data prerequisites for more major climate funding.
- Urge the international financing community (e.g., **Green Climate Fund (GCF)**, **Climate Investment Funds (CIFs)**, **Global Environment Facility (GEF)**) to relax data and evidence required by Member States to meet accessibility criteria for major climate funds.

As a convenor of member states, the AU, in partnership with regional bodies, can work to:

- Harmonize national laws and regulations with complex cross-boundary implications (e.g., push for standardized maximum ages of imported vehicles and harmonized regional **vehicle emission** and **fuel standards**; impose continent-wide exports bans on catalytic convertors at ports) and support regional efforts for clean cross-boundary infrastructure (e.g., such as LPG transportation, **renewable energy sharing agreements** and **railways**).

AS AN ADVOCATE FOR CLEAN AIR, THE AU CAN WORK TO:

- Act as a continental platform to raise awareness and drive action on air pollution among policy makers and continue to prioritise the topics at key continental forums (e.g., Africa Climate Week, Middle East and North Africa Climate week, African Ministerial Conference on the Environment (AMCEN), Conference of Parties (COP))
- Recognise air pollution as a major burden of disease within AU strategic plans, including health strategies, and formally commit the continent to action

4. CONCLUSION

> A joined-up response across all levels of government is required to ensure the full benefits of action on air pollution are realised

No country, city, or individual remains untouched by the health, climate, and economic consequences of air pollution. The analysis of six African cities drives home the high price of inaction – premature deaths, economic losses, and increased GHG emissions. However, it also highlights the immense opportunity for countries ready to take decisive action. Investing today will yield enormous economic, health, and climate benefits in the future.

For too long, this critical issue has been overlooked, but AU member governments must take urgent action now. The priorities outlined in this report serve as a starting point for further collaboration and progress. Air pollution knows no borders – only through partnership, coordination, and a shared commitment across all levels of government can we ensure Africa's green growth.

ENDNOTES

1 Africa defined as member countries of the African Union. Air pollution includes deaths attributable to ambient air pollution sources (383,000), indoor air pollution from use of solid fuels (697,000) and ambient ozone pollution (11,000). 733,000 deaths attributable to unsafe water, sanitation and handwashing over the same period.

2 Outdoor air pollution also commonly referred to as ambient air pollution.

3 Equivalent to approximately 29% of the average annual per capita GDP growth across Africa between 2001 and 2020.

4 The WHO's air quality guidelines for annual PM2.5 concentration (μ g/m3) is 5. Amongst study cities, Nigeria exceeded guidelines the most (by 14 times – 70 μ g/m3) and Kenya the least (by 4 times – 21 μ g/m3). For the other countries, Egypt exceeded the limit by almost 14 times (67.9 μ g/m3), South Africa exceeded the limit by almost 6 times (28.7 μ g/m3), Ghana exceeded the limit by about 11 times (54 μ g/m3), and Cameroon exceeded the limit by about 7 times (33 μ g/m3).

5 "Integrated Assessment of Air Pollution and Climate Change for Sustainable Development in Africa - Summary for Decision Makers" was published November 2022. Full publication is forthcoming.

6 Ten cities include: Abidjan, Accra, Addis Ababa, Dakar, Ekurhuleni, Freetown, Johannesburg, Lagos, Nairobi, Tshwane, Durban

7 Five intervention scenarios comprise: 1) 25% reduction in Road transport; 2) Switch to cleaner industrial technologies, 3) Deploy clean cooking appliances and alternative fuel sources for household energy requirement, 4) Implement support systems to switch from slash-and burn to sustainable land-clearing practices; 5) Implement integrated waste management systems that improve waste collection, prevent open burning and improve incineration practices

FIGURE 2 SOURCES:

1 Nairobi City County, **Air Quality Bill**, 2021

2 Nairobi City County, **Climate Action Plan 2020-2050**, 2022

3 Stockholm Environment Institute, **Legislation for clean air in Kenya**, 2022

4 Government of South Africa, **National Climate Change Response White Paper**, 2011

5 Kalisa, E et al., **From car-free days to pollution-free cities**, 2021

6 Deutsche Welle, **Small Morrocco punches above its weight on renewables**, 2022

7 MECS/EnDev, **Ethiopia eCooking Market Assessment**, 2022

8 GRET, **Brazzaville informal waste collection operators**, 2017

9 KCARP, **About Us**, 2023

10 BreatheLife, **Accra is first African city to join the BreatheLife Campaign**, 2020

CLEAN AIR FUND

The Clean Air Fund (UK) is registered in England with company number 11766712 and charity number 118369.
Registered address: 20 St Thomas Street, London, SE1 9RS.

info@cleanairfund.org

www.cleanairfund.org

@cleanairfund