



Solving the Air Pollution Crisis through Green Growth for Health & Environment

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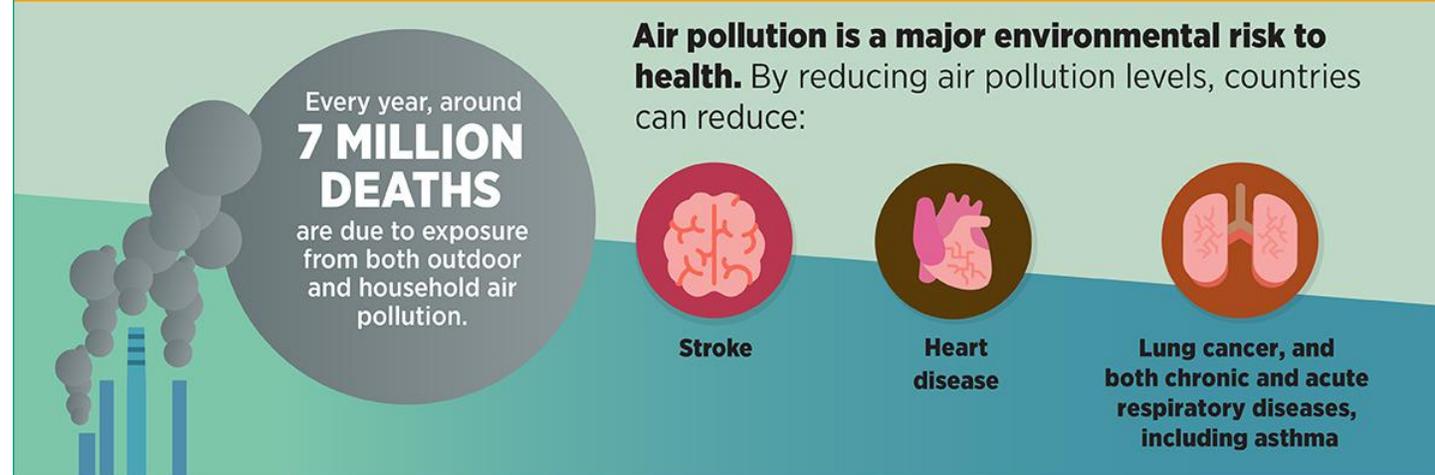
Air Pollution in the Asia Pacific

- In the Republic of Korea, Air Pollution was declared a social disaster to be tackled through emergency laws.
- 92% of Asia and the Pacific's population – about 4 billion people – are exposed to levels of air pollution that pose a significant risk to their health.
- Blue skies are the top priority throughout Asia, from Mongolia to China to Bangkok – but blue skies will also help address the climate crisis.

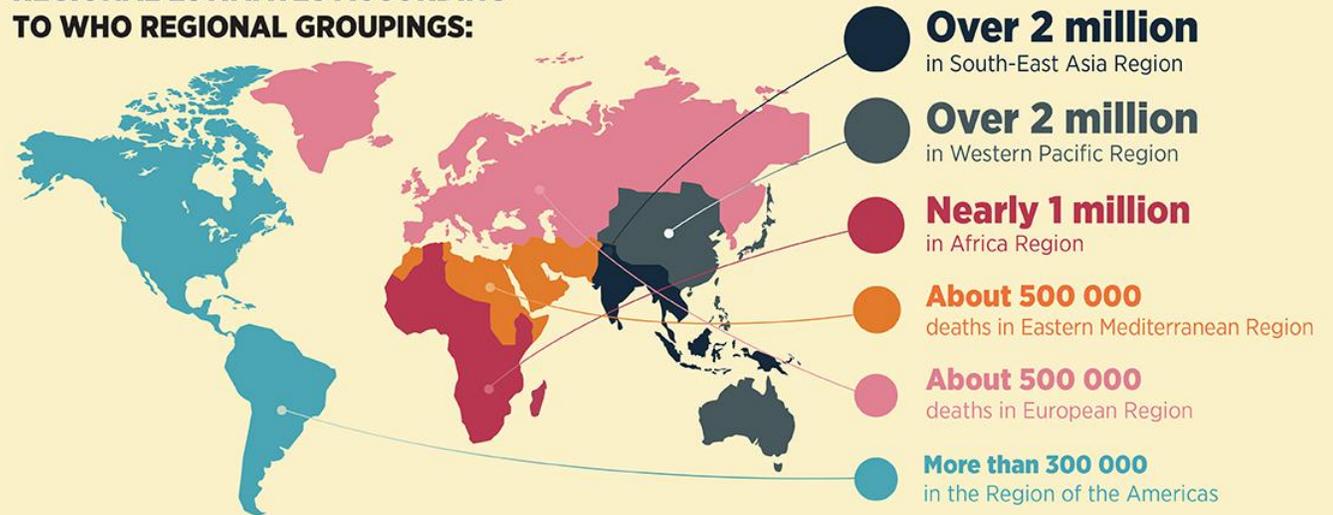
The Air Pollution Crisis

- Every year, an estimated **7 million** people die from illnesses attributable to air pollution.
- Blue skies are the top priority throughout Asia, from Mongolia to China to Bangkok – but blue skies will also help address the climate crisis.
- Combating climate change and meeting the goals of the Paris Agreement **could save around a million lives a year worldwide by 2050** solely through reductions in air pollution.

AIR POLLUTION – THE SILENT KILLER



REGIONAL ESTIMATES ACCORDING TO WHO REGIONAL GROUPINGS:



CLEAN AIR FOR HEALTH

#AirPollution





POLLUTION

The World's Largest Environmental Threat to Health

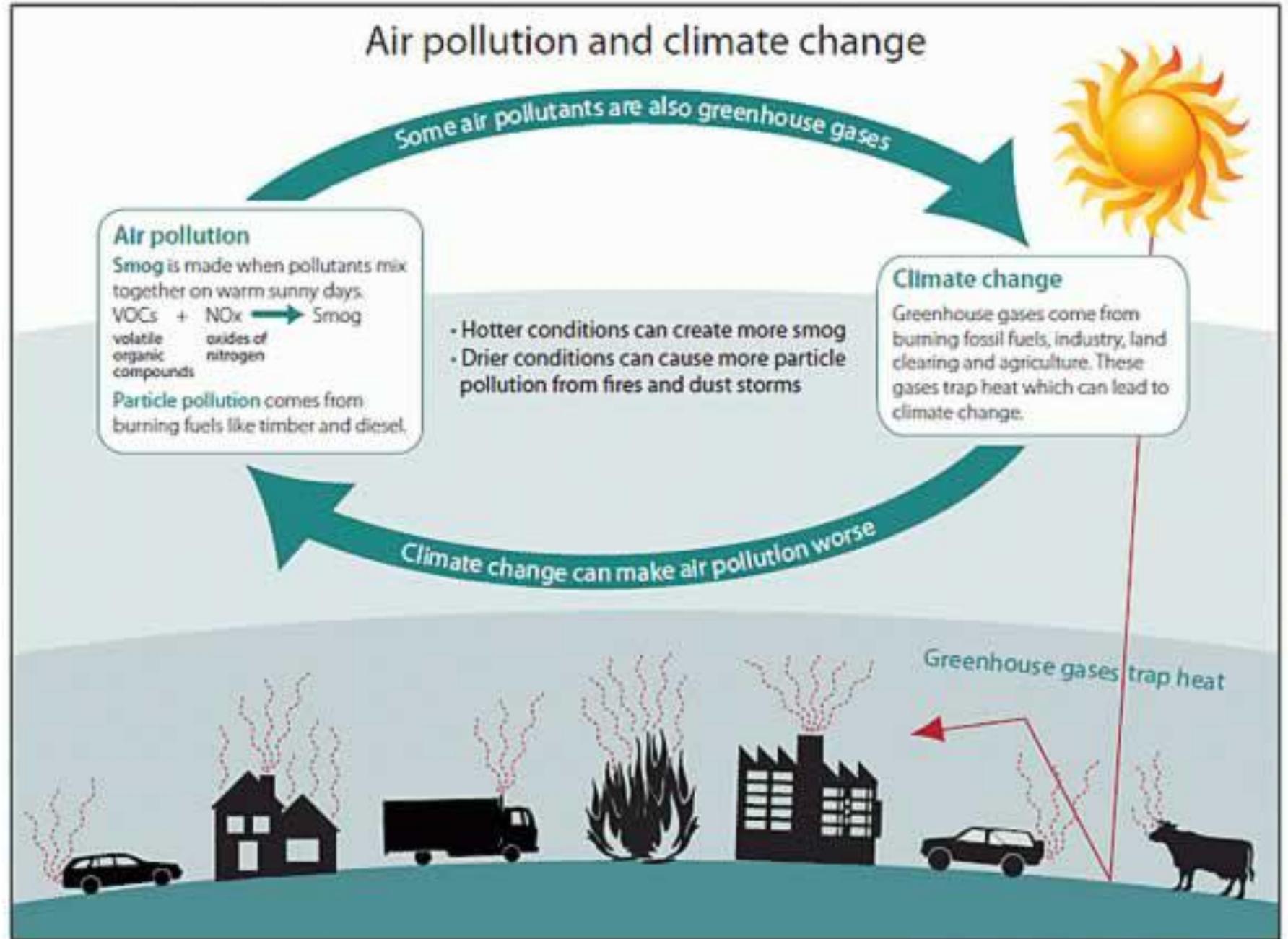
**POLLUTION
KILLS
THE POOR
AND THE
VULNERABLE.**

92% of deaths

occur in low- and middle-income countries. Children are most affected.

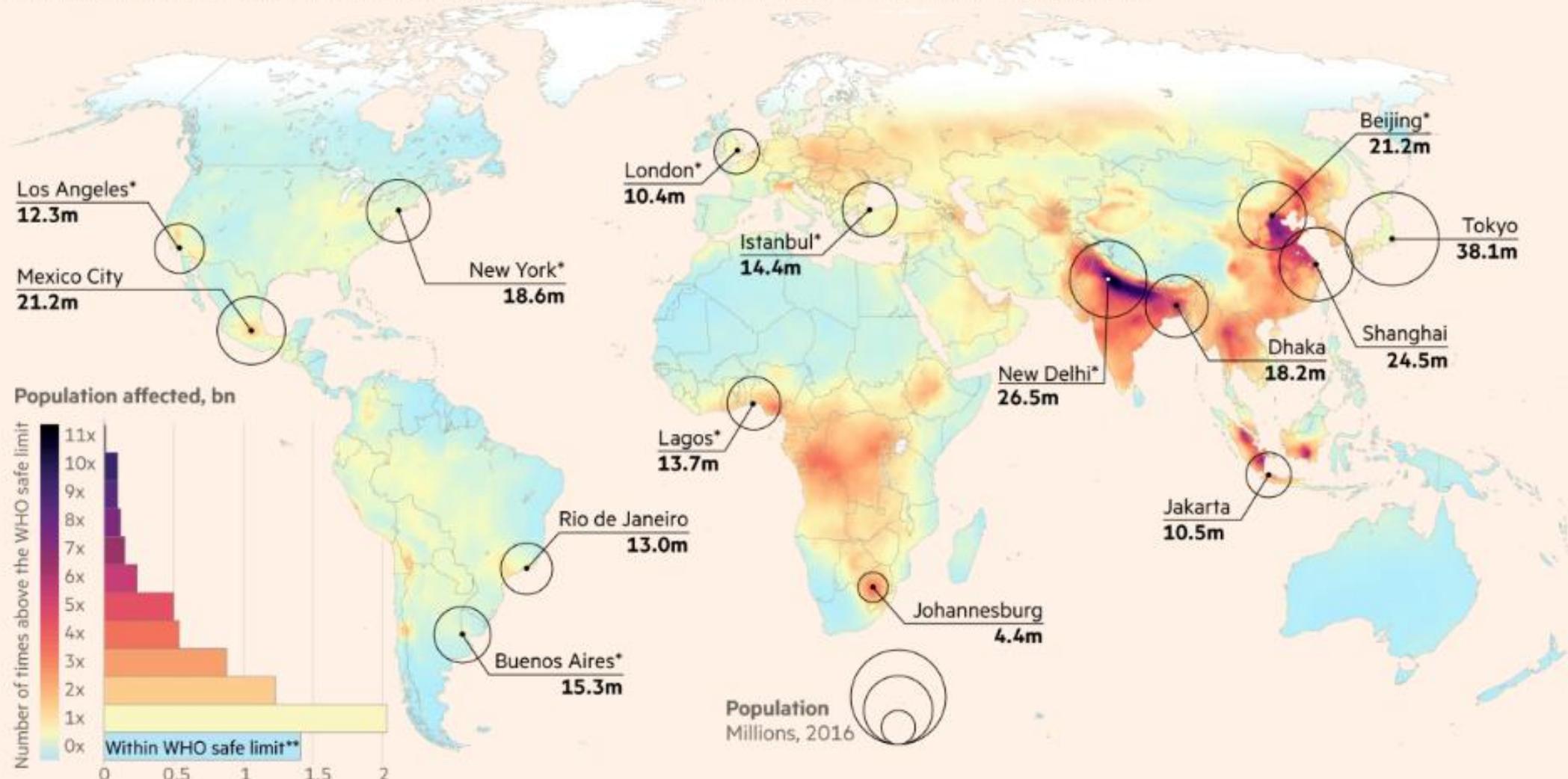


Maintaining good air quality in the longer-term is inextricably linked to ambitious climate action



With incumbent growth models, air quality is worsening in most Asian cities in the past decade

8 in 10 people in the world are breathing polluted air above the WHO's safe limit



Sources: Nasa Socioeconomic Data and Applications Center; UN; European Commission, Joint Research Centre

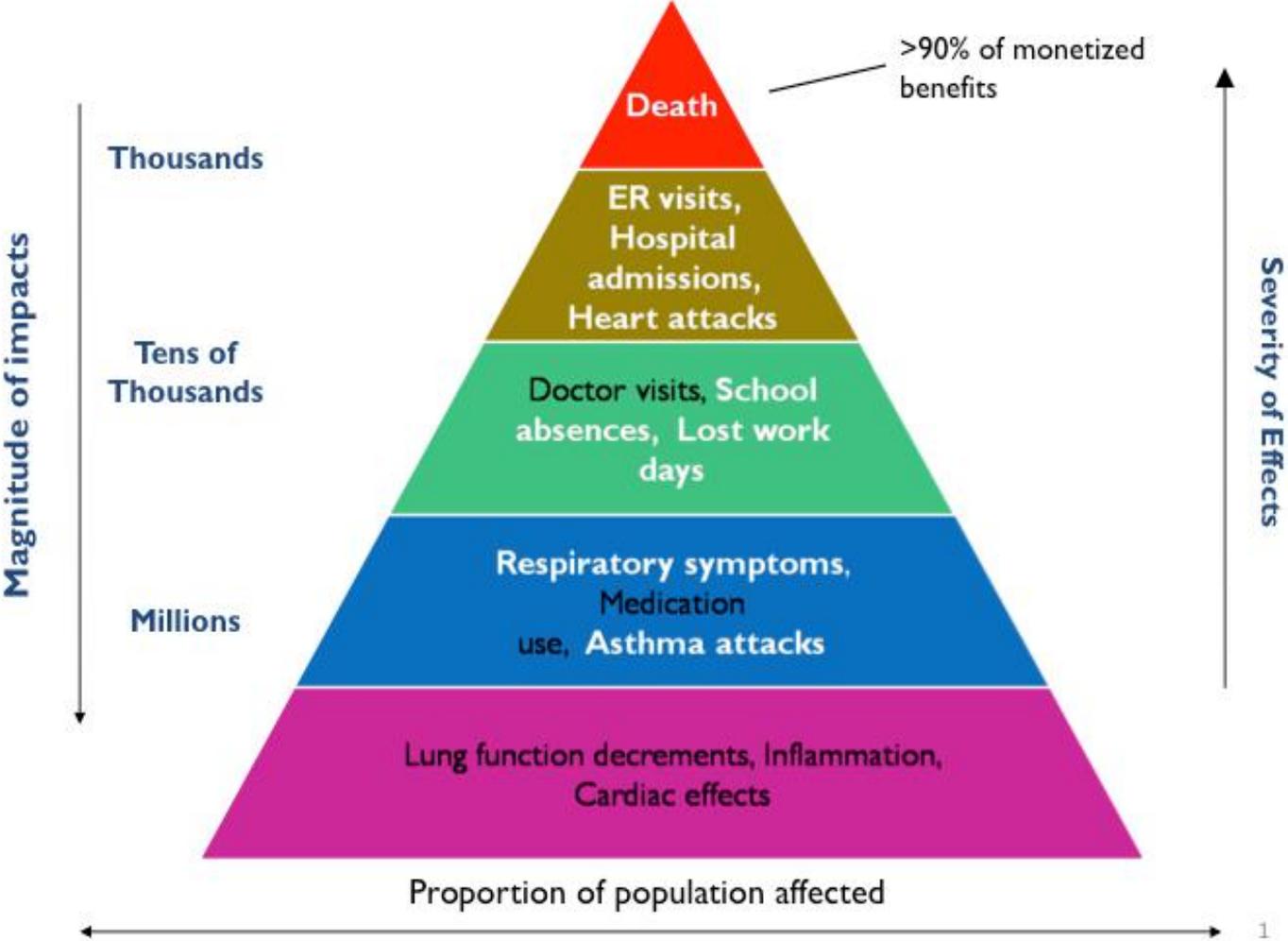
* Urban agglomeration
**PM2.5 value of 10 micrograms per cubic metre, annual average

Visual journalism: Steven Bernard © FT

The result is reduced standard of living, reduced productivity and deaths with long-term impacts



A "Pyramid of Effects" from Air Pollution



Particulate matters (PM2.5, PM10) and Ozone (O3) impacts

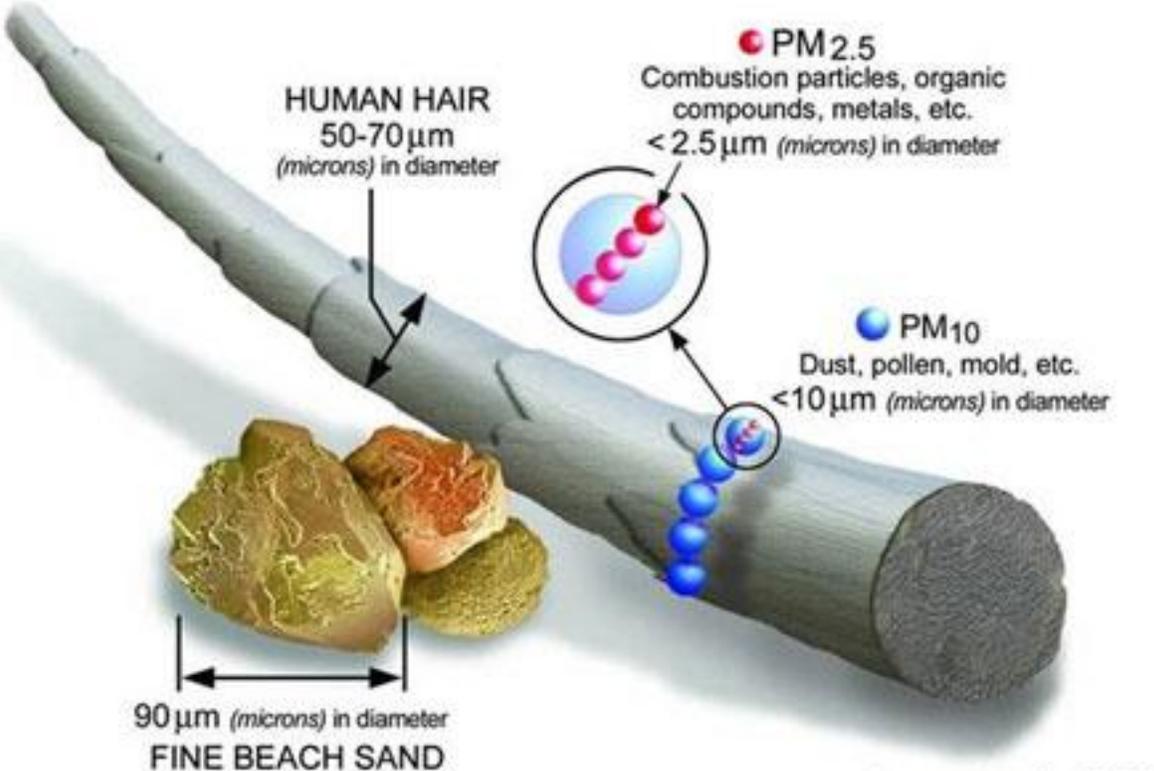
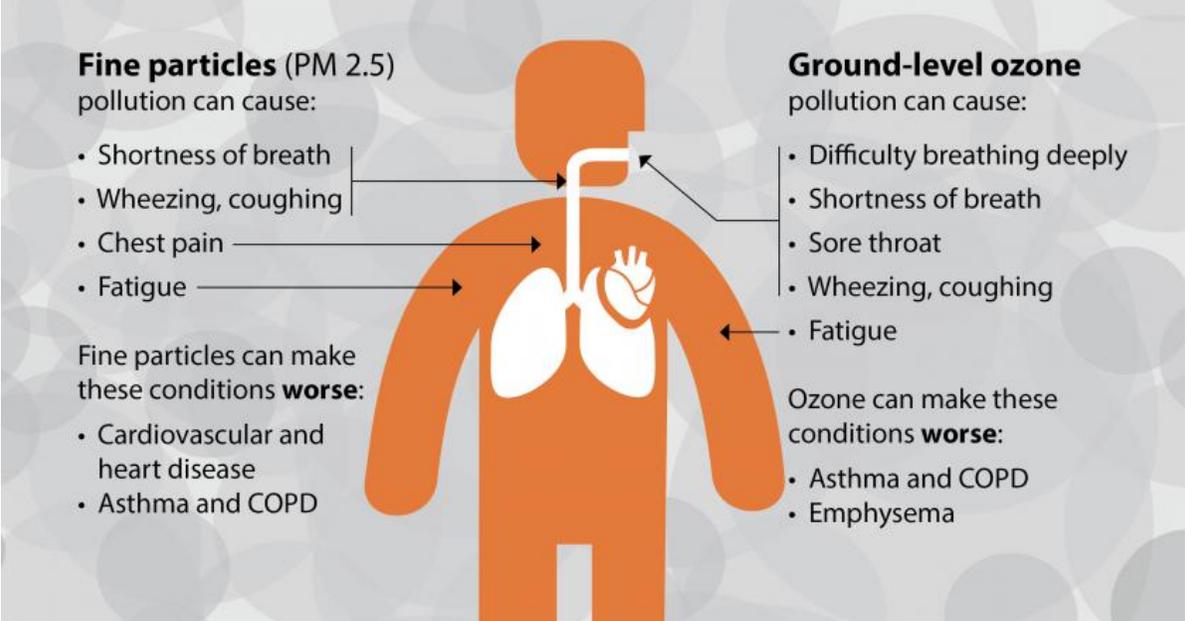
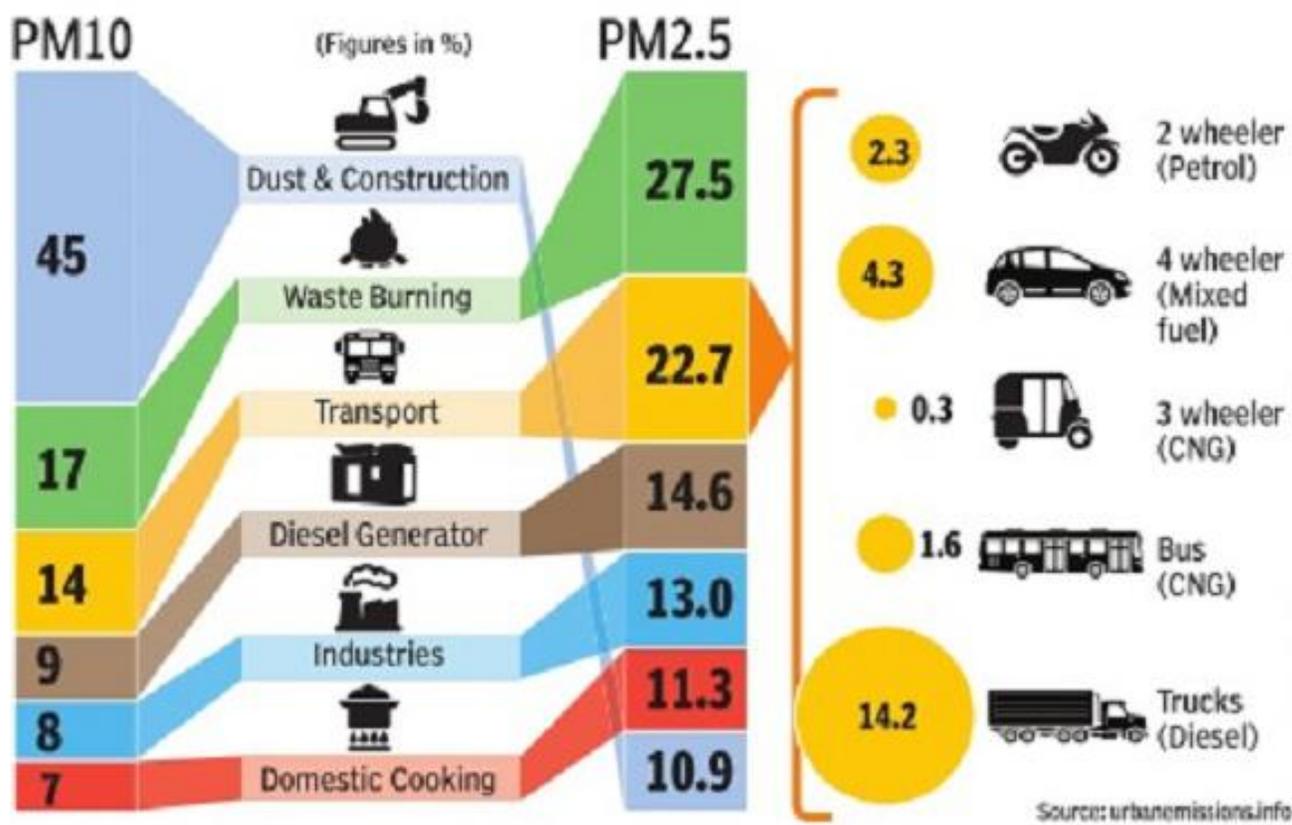


Image courtesy of the U.S. EPA



Source of pollution differ by cities and countries

Pollution sources of Delhi



Source: State of the Air 2018

Figure 16. Source contributions to deaths attributable to PM_{2.5} in India in 2015.

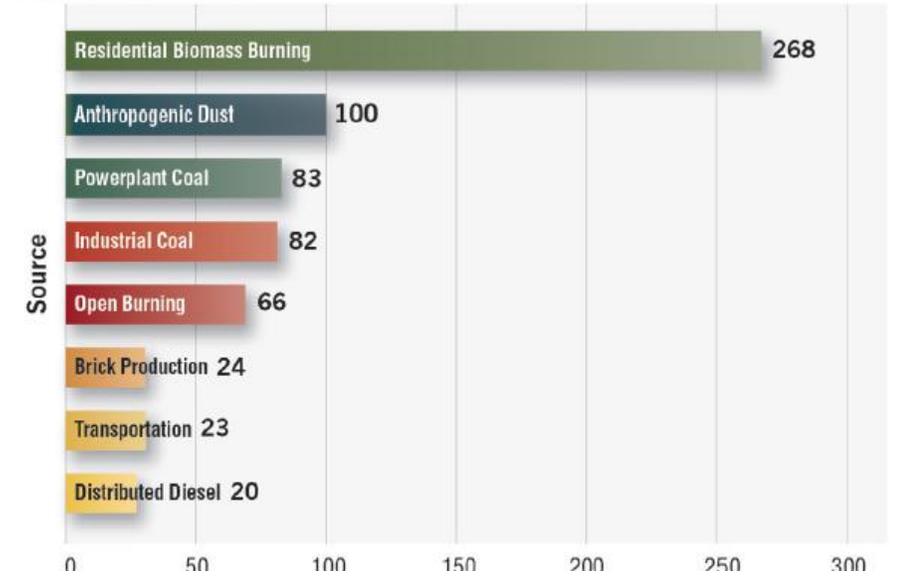
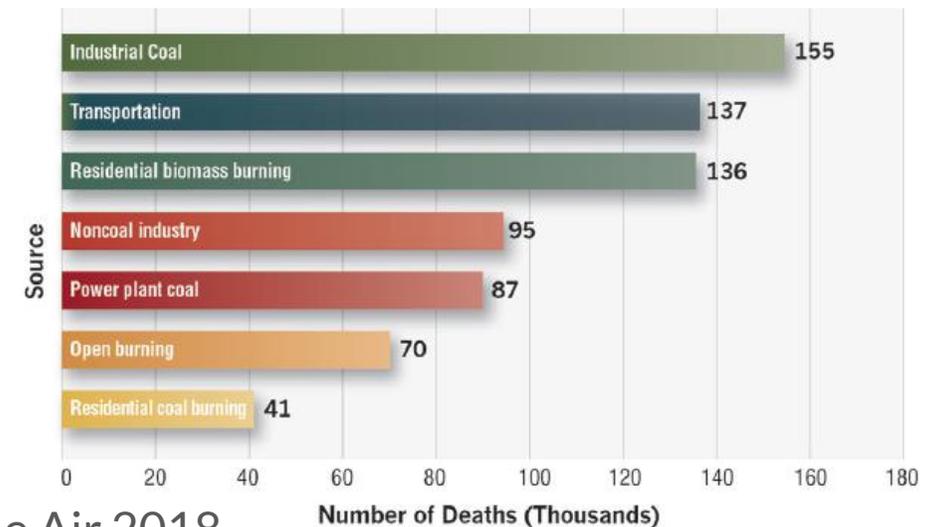


Figure 15. Source contributions to deaths attributable to PM_{2.5} in China in 2013.



Indoor Air Pollution: Impact

- Household air pollution alone kills approximately 3.8 million people a year.
- The use of polluting biomass stoves for indoor cooking and heating contribute to climate change and affect the health of the population.





Where is
the most
affected?

- Largely affects countries in Africa and Asia, where polluting fuels and technologies are used in households daily for energy needs, including heating, cooking, and lighting.
- Approximately half the world has no access to clean fuels or technologies (stoves, lamps, etc.)



Children, women, and urban poor are hardest hit, making it an issue of equity and intergenerational health



WHO IS MOST IMPACTED BY AIR POLLUTION?

Children

Pneumonia is the leading cause of death in children under five years of age. Air pollution is a major risk factor.



Women

Women working in smoky kitchens are exposed to high levels of household air pollution.



Outdoor workers

People who work outdoors, such as street vendors and traffic officers, are affected by air pollution.



CLEAN AIR FOR HEALTH

#AirPollution



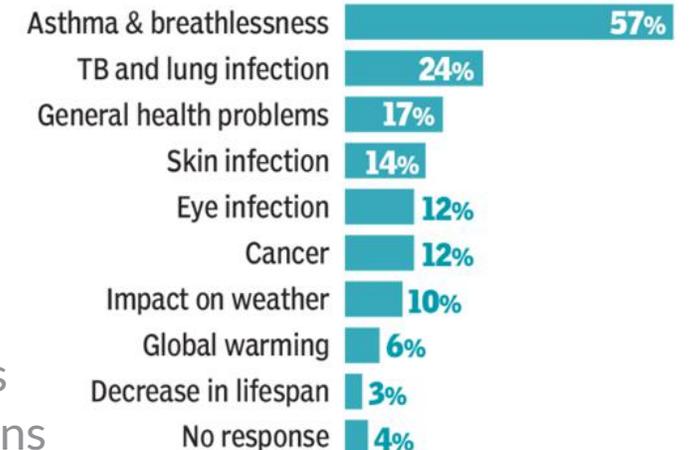
- Poor kids are more likely to be rushed to emergency wards than rich ones from asthma attacks
- Air pollution impacts kids' ability to learn and stay in task, and reduces their IQ.

(Edward Avol, Univ of Southern California)

ADDRESSING THE DANGERS OF BAD AIR



Reasons for concern



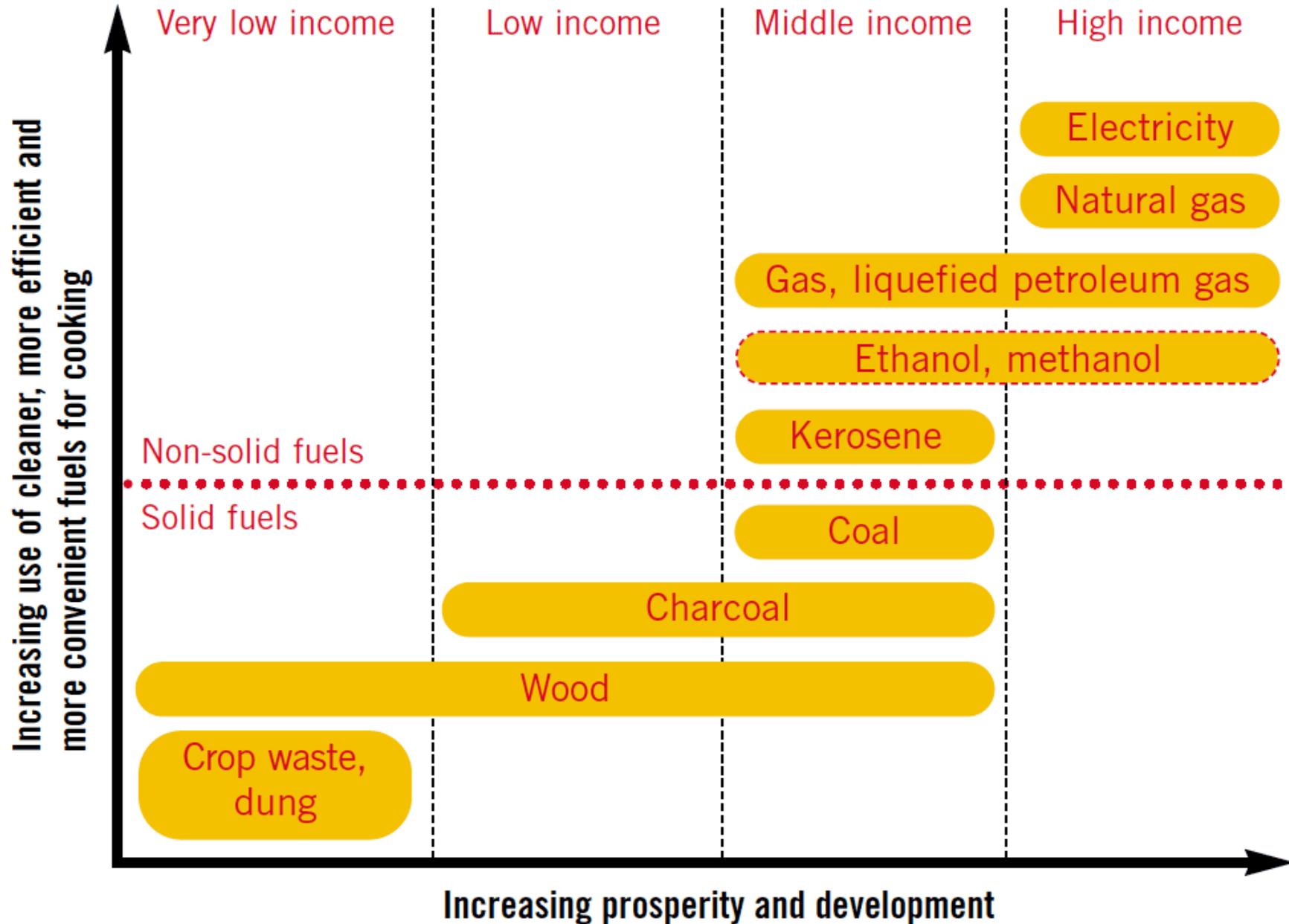
Recent Times of India survey among Delhites on air pollution concerns

Indoor Air Pollution - Causes

- Inefficient use of solid fuels for heating and cooking.
- Low-income households have a higher dependence on solid fuels for their basic needs.
- More than two billion people worldwide are dependent on polluting fuels for energy needs.



The energy ladder - the link between household energy and development; WHO 2006



Indoor Air Pollution: Energy Access

- Countries with low access to clean energy sources have the highest death rate from indoor air pollution
- Death rates from household air pollution decrease as access to clean energy sources and technologies increases.
- In 2016, 2.6 million people died prematurely from illnesses linked to household air pollution sources

Every \$1 spent to reduce emissions

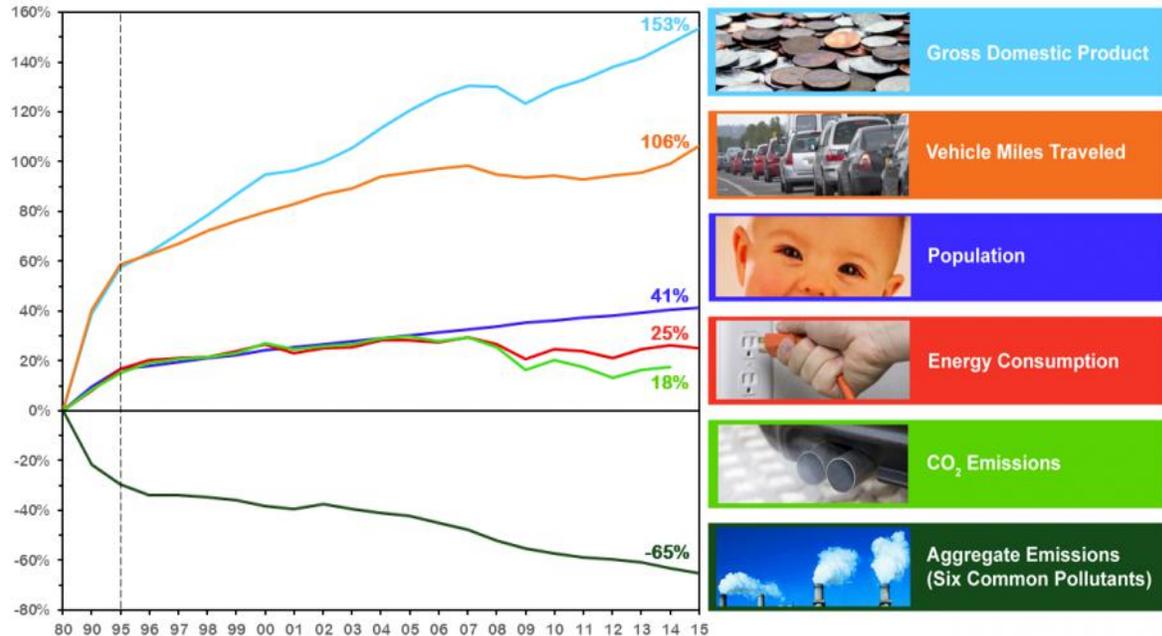
FROM MOBILE SOURCES
UNDER THE CLEAN AIR ACT

Results in \$9 of benefits

TO PUBLIC HEALTH, THE ENVIRONMENT,
PRODUCTIVITY, AND CONSUMER SAVINGS

US Clean Air Act passed in
1970

Comparison of Growth Areas and Emissions, 1980-2015



New York City: 1973 vs. 2013



Source: EPA Documerica "Then and Now Challenge"

Indoor Air Pollution: Solutions

Raise awareness on the dangers of indoor air pollution.

Increase access to clean fuels and technologies.

Research to develop efficient low cost, clean cooking and heating innovations.



Climate and the Private Sector



- Air pollution can cost companies trillions annually through reduced labor productivity and increased healthcare costs.
- Circular economy, climate action, cutting emissions and addressing climate risk are no longer CSR but core company strategy.

Pollution costs the global economy **\$4.6 trillion per year, equivalent to **6.2%** of global economic output.**

Pollution is neglected by funding agencies worldwide.



A background image showing a close-up of two hands shaking in a firm grip, symbolizing a business agreement or partnership. The hands are positioned in the center of the frame, with one hand from the left and one from the right. The background is slightly blurred, showing other people in business attire.

Private Sector Involvement: How?

- Innovation in green technologies and air quality solutions.
- Carbon pricing: Existing market schemes should be both strengthened and extended to include more economic sectors.
- Encourage asset managers, asset owners, banks, and insurers to decarbonize the economy and account for the true risks posed by climate change
- New business and investment opportunities with the transition to a low-carbon economy.
- UN Global Compact reports that 1,300 companies worldwide have already incorporated a carbon price into their operations.

Solutions: Renewable Energy

- Investment opportunity in renewable energy.
- Renewable energy is disrupting the energy market.
- Wind and solar energy, in many regions, are now cheaper than fossil fuels.
- Costs of renewable energy technologies, generally, continuing to fall.



Measures against air pollution in Mexico City



Tackle 20% of sources that produce 80% pollution

Number of days per year with Environmental Contingency in Mexico City

Days with more than 150 points in the air quality index (IMECAS) in Mexico City (1990- 2017)



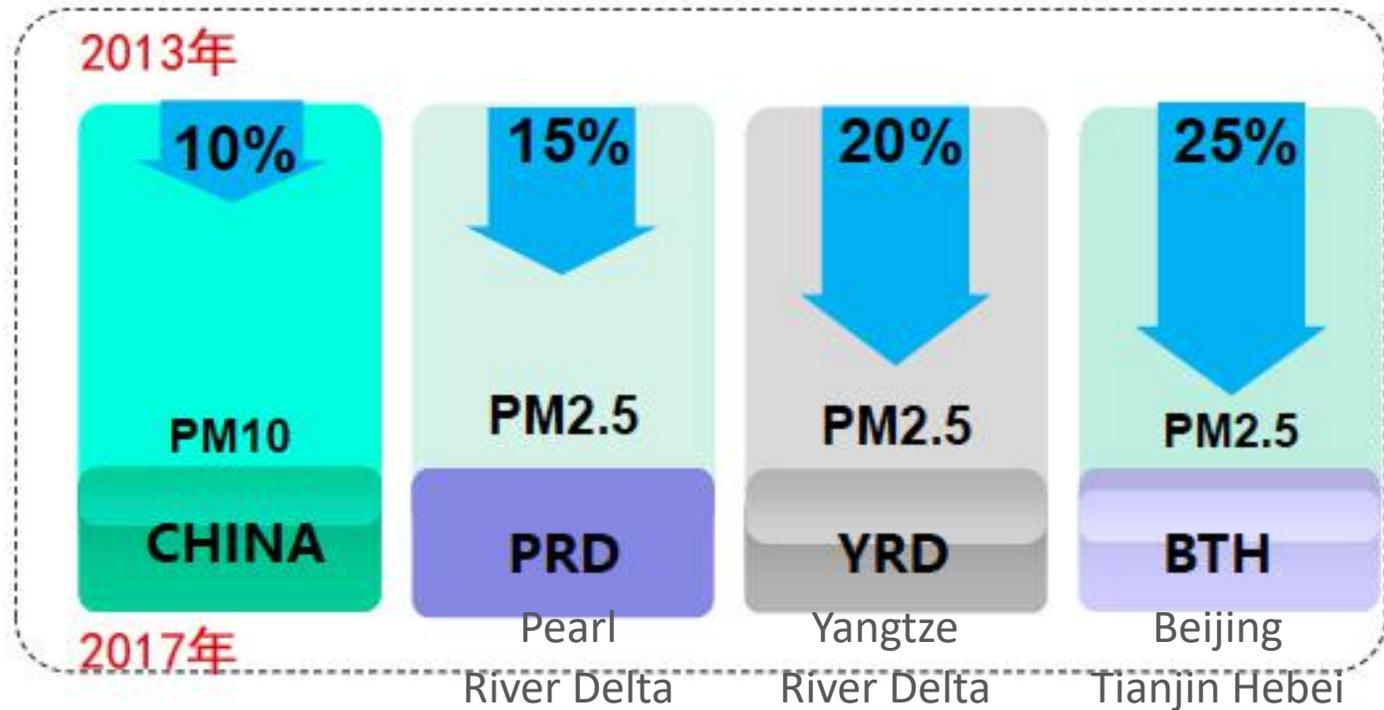
- 1985- Development of Metropolitan Quality Air Index (IMECA)
- 1988 – general law on eco balance and environ protection, application of 21 measures identified
- 1990 – “Cars don't circulate”
- 2014- Strengthening of PM10, PM2.5, CO, O₃, NO₂ and SO₂ and limits
- 2015 – New vehicle emissions verification system. Enhancement of “Programa Hoy no Circula”
- 2015 – Fines to polluting companies
- 2017 – APP “AIRE” and analytical tool to forecast quality air (up to 24hr.) and monitor air quality in real-time (AQI)
- 2018 – Join the program “Respira la vida” – To promote low carbon mobility

Government plans to improve air quality

(Clean Air Action Plan or "the National 10 Measures")

- Goals: PM_{2.5} concentration in Beijing-Tianjin-Hebei region should be reduced by 25% in 2017 and annual concentration in Beijing can't exceed 60 µg/m³

China's Climate Action Plan initiated in 2013



Source: Presentation by Prof. Kebin He, Tsinghua University

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GGGI's Success Stories



GGGI at a Glance

Headquartered in Seoul, Republic of Korea, GGGI has **33 Members** with **operations in 33 countries**



Member Countries

Australia, Burkina Faso, Cambodia, Costa Rica, Denmark, Ethiopia, Fiji, Guyana, Hungary, Indonesia, Jordan, Kiribati, Republic of Korea, Lao PDR, Mexico, Mongolia, Norway, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Rwanda, Senegal, Sri Lanka, Thailand, Tonga, United Arab Emirates, United Kingdom, Uganda, Uzbekistan, Vanuatu, Viet Nam

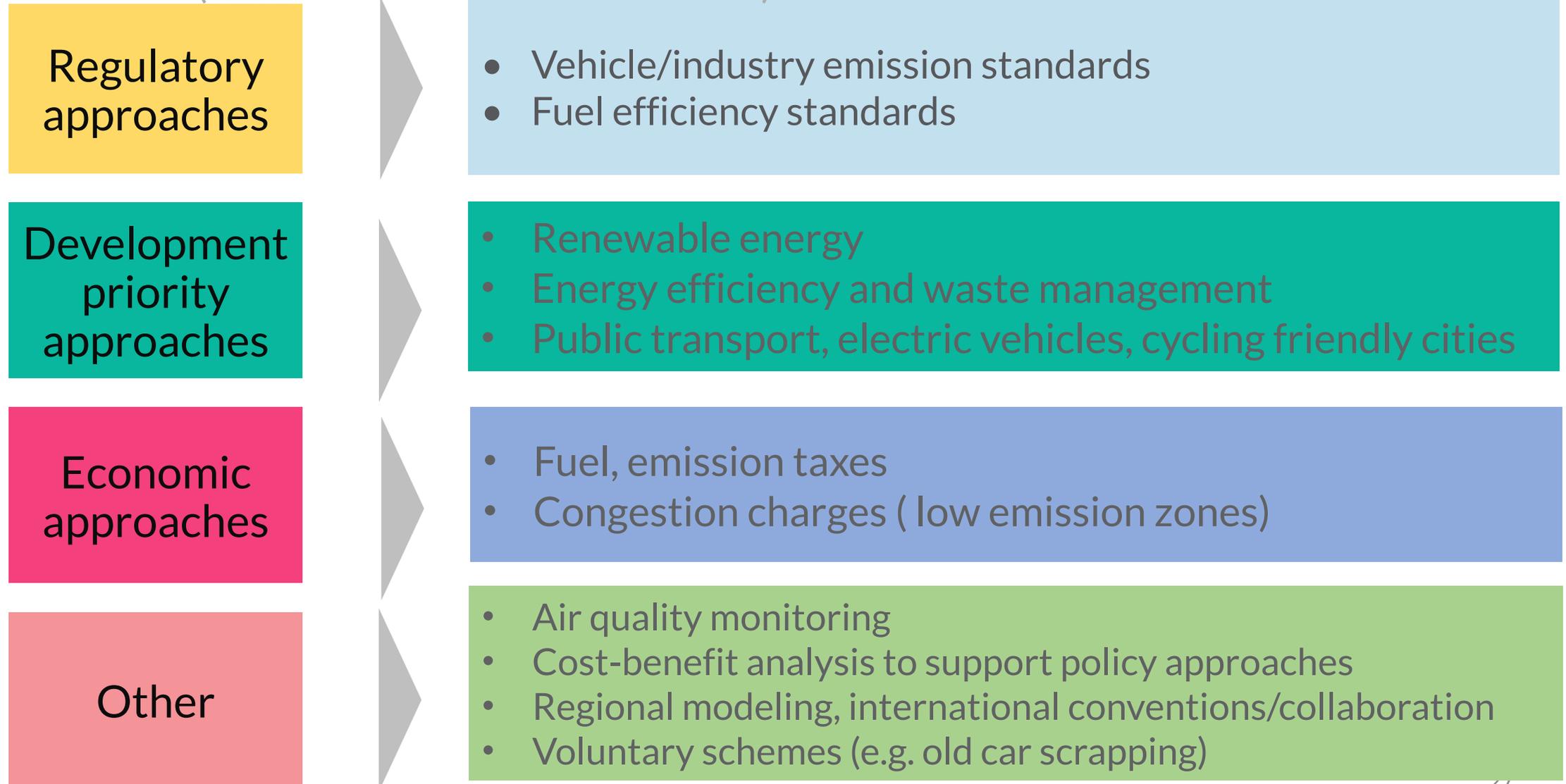
Operations

Burkina Faso, Cambodia, China, Colombia, Costa Rica, Ethiopia, Fiji, Guyana, Hungary, India, Indonesia, Jordan, Kiribati, Lao PDR, Mexico, Mongolia, Morocco, Mozambique, Myanmar, Nepal, Caribbean, Papua New Guinea, Peru, Philippines, Qatar, Rwanda, Senegal, Thailand, Tonga, Uganda, United Arab Emirates, Vanuatu, Viet Nam

Policy approaches and measures for attaining healthy level of air quality are the *same* as for climate-smart and green economic growth

Policy approaches for air quality management

(source: GGGI TL based on various sources)



Nepal's Success Story

Nepal: Advancing Green Growth in Nepal through Electric Mobility

Nepal's new electric buses will help the government fulfill its commitment under the country's Nationally Determined Contribution, which sets targets for air quality and electric vehicle adoption.

A collaborative effort by the Ministry of Forests and Environment, Ministry of Physical Infrastructure and Transport, and GGGI led to the launching of Nepal's first National Action Plan for Electric Mobility—a road map for achieving the NDC targets.



Green and Climate Finance

- US\$482 million in 2018, plus US\$ 525 million in 2017
- ***GGGI mobilized green and climate finance commitments of over US\$1 billion in 2017-18***
- Still a very short track record – to mature and scale up!
- Strong GCF strategic partnership: ***focus on direct access for members***
 - 24 countries elected GGGI as delivery partner,
 - 12 readiness projects awarded
 - 12 more in pipeline plus 5 NAPs
 - 6 full proposals submitted to GCF for about \$250M in climate finance
- Growing private sector engagement (15 project examples in 2018)



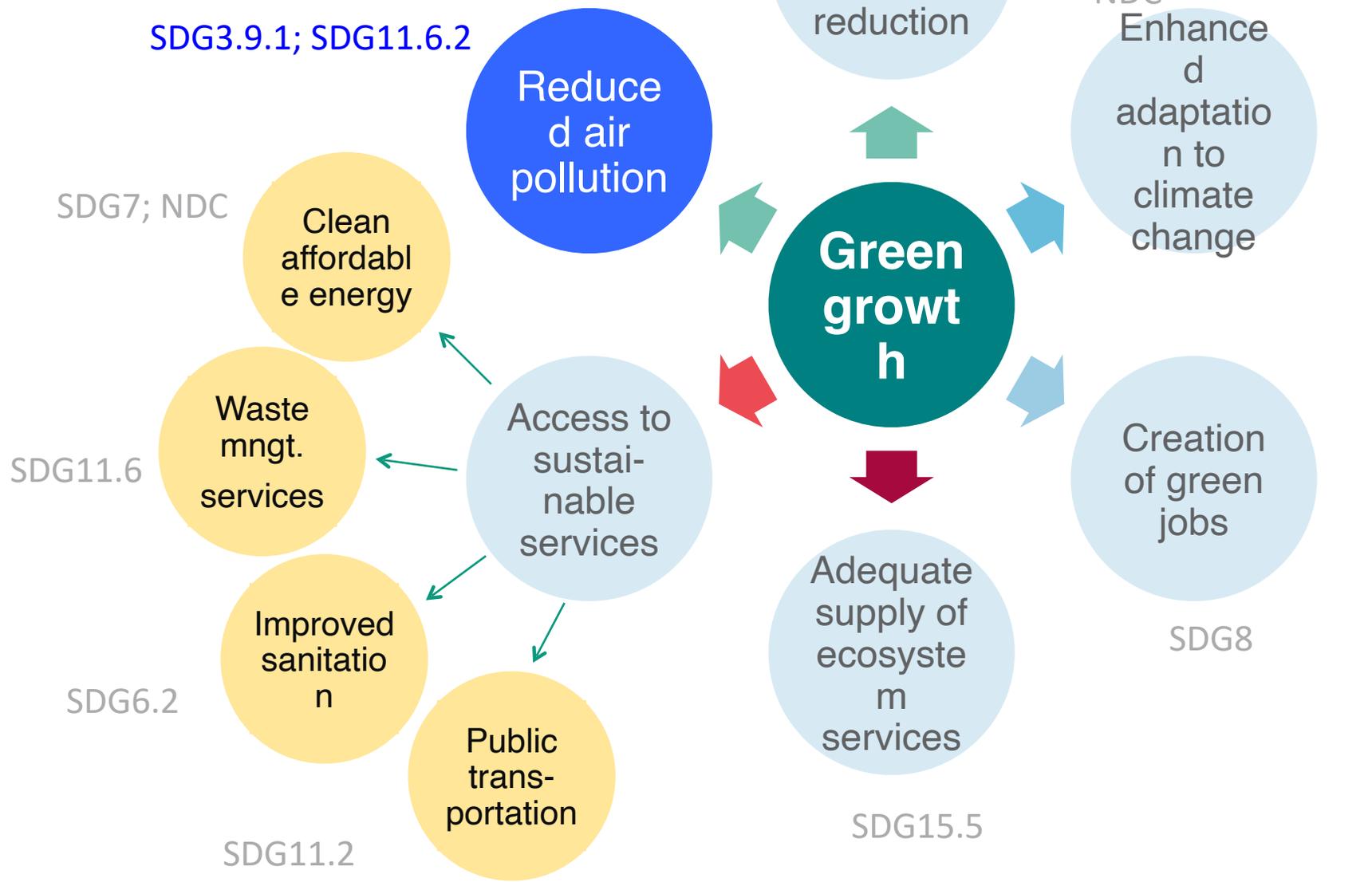
2018 RESULTS

GREEN INVESTMENTS 2018

TOTAL VALUE OF GREEN INVESTMENTS
CATALYZED WITH GGGI'S SUPPORT



Improved air quality through green growth is one of GGGI's six strategic objectives



(Luo et al, 2014)

GGGI air quality Assessment and Improvement Solutions Program - 2018 activities



- Air quality baseline assessment in number of GGGI countries for target-setting aimed at improvement
- Stock-taking of air quality management measures for policy and capacity development support



Target countries

Vietnam



Mongolia



Thailand



Nepal



Mexico



UAE



Myanmar's Success Story

Using Blockchain Technology to Distribute Fuel Efficient Cookstoves in Myanmar

GGGI has been working with representatives from national and regional government, NGOs, and households from rural communities on how to increase the distribution and usage of fuel efficient cookstoves.

GGGI presented initial ideas for providing novel investment solutions to increase distribution and usage of fuel efficient cookstoves across the Delta, including linking the proven carbon savings of the fuel efficient cookstove to distributed ledger or 'blockchain' technology to access carbon credits from the international carbon market.





Vanuatu's Success Story

Vanuatu: Financing 100% Renewable Energy

As Vanuatu's government looks to improve their electricity supply while following a path of sustainable, environmentally-friendly growth, GGGI is playing a key role in securing investment for the Pacific Island country to achieve its development goals.

GGGI, which developed parts of the National Energy Road Map, covering energy efficiency and green growth — has helped create the National Green Energy Fund to mobilize finance for investment.



Vanuatu's Success Story

Enhancing Vanuatu's Rural Tourism Sector
through Green Energy



In rural areas, where many of the tourist bungalows are located, less than 10% of households are connected to the electrical grid. Therefore, many of these bungalows rely on solar lanterns for lighting and petrol generators for other electricity needs. Generators, however, only provide a few hours of electricity a day, limiting tourism potential.

This pilot project—devised by the Vanuatu government, in collaboration with the Global Green Growth Institute (GGGI)—has seen the installation of solar-powered freezers in ten tourist bungalows in rural areas on the islands of Santo, Tanna, Pele, Maskelynes, and Nguna.

Mongolia's Success Story

Mongolian Green Credit Fund (MGCF) to reduce air pollution by financing more efficient heating equipment

The Mongolian Green Credit Fund (MGCF) will help the Government of Mongolia to achieve the targets set in the National Green Development Policy and its declared Nationally Determined Contributions.

The Readiness and Preparatory Program was created to work on market demand assessment and pipeline project development of (i) energy efficiency heating and small-scale renewable energy in Ger district, (ii) green and affordable housing and (iii) urban sanitation and waste management.



Rwanda's Success Story

Rwanda: Green Certification of the New Bugesera International Airport



The Government of Rwanda (GoR) through the Ministry of Infrastructure (MINIFRA) and GGGI have a standing Memorandum of Understanding (MoU) to advocate sustainability and provide support to the enable a sustainable built environment in Rwanda. GGGI has been supporting GoR in green cities development focusing in Kigali and the six secondary cities.

Along these lines, GGGI in collaboration with MINIFRA embarked on Green Certification of the New Bugesera International Airport. This project is looking into several measures to demonstrate resource efficiency and the overall sustainability of the airport infrastructure when completed.

Rwanda's Success Story

Rwanda: Green Building Minimum Compliance System

The building sector is a key economic driver. Green buildings offer an opportunity for GHG emission reduction, job creation, resource efficiency, improved productivity to building occupants, and decreased impact on the environment.

GGGI worked closely with the Buildings Regulations Standards Inspection & Audits (BRSIA) Division of the Rwanda Housing Authority (RHA) and other stakeholders to develop the Green Building Minimum Compliance System, a point-based system to help building owners and developers choose indicators based on the applicability to the building type, usage, and the benefits associated.



Partnering to beat air pollution!



- **RE100**: global corporate leadership initiative bringing together 191 influential businesses committed to 100% renewable electricity.
- **EV100**: 52 forward looking companies committed to accelerating the transition to electric vehicles
- **P4G**: brings together business, government, and civil society organizations in innovative public-private partnerships to advance solutions for green growth.



Thank You

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