

# **Carbon Taxes and Development: How Carbon Taxation Can Help Countries Achieve Their Sustainable Development Goals**

**Miria Pigato (World Bank), Simon Black (World Bank),  
James Daniel (IMF), & Ian Parry (IMF)**

*3 October 2019, Stockholm, Sweden*



# Outline

1. How can carbon taxes support development?  
- *Miria Pigato , World Bank*
2. What are the development benefits of carbon taxes?  
- *Simon Black, World Bank*
3. How much can carbon taxes support climate & development goals?  
- *James Daniel & Ian Parry, IMF*

# How can carbon taxes support development?

Miria Pigato – Lead Economist, World Bank  
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# Climate Change and Development

Three messages:

- Environmental sustainability is at the core of the 2030 development agenda.
- Slow progress in fighting climate change is undermining progress on the entire SDG agenda.
- Environmental tax reforms can reduce emissions in a cost efficient manner while advancing development goals.

# SDG 13: Climate Action



SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



**13 CLIMATE ACTION**  
Take urgent action to combat climate change and its impacts



SDGs show slow progress

The lack of progress is particularly apparent among SDGs such as climate action and biodiversity



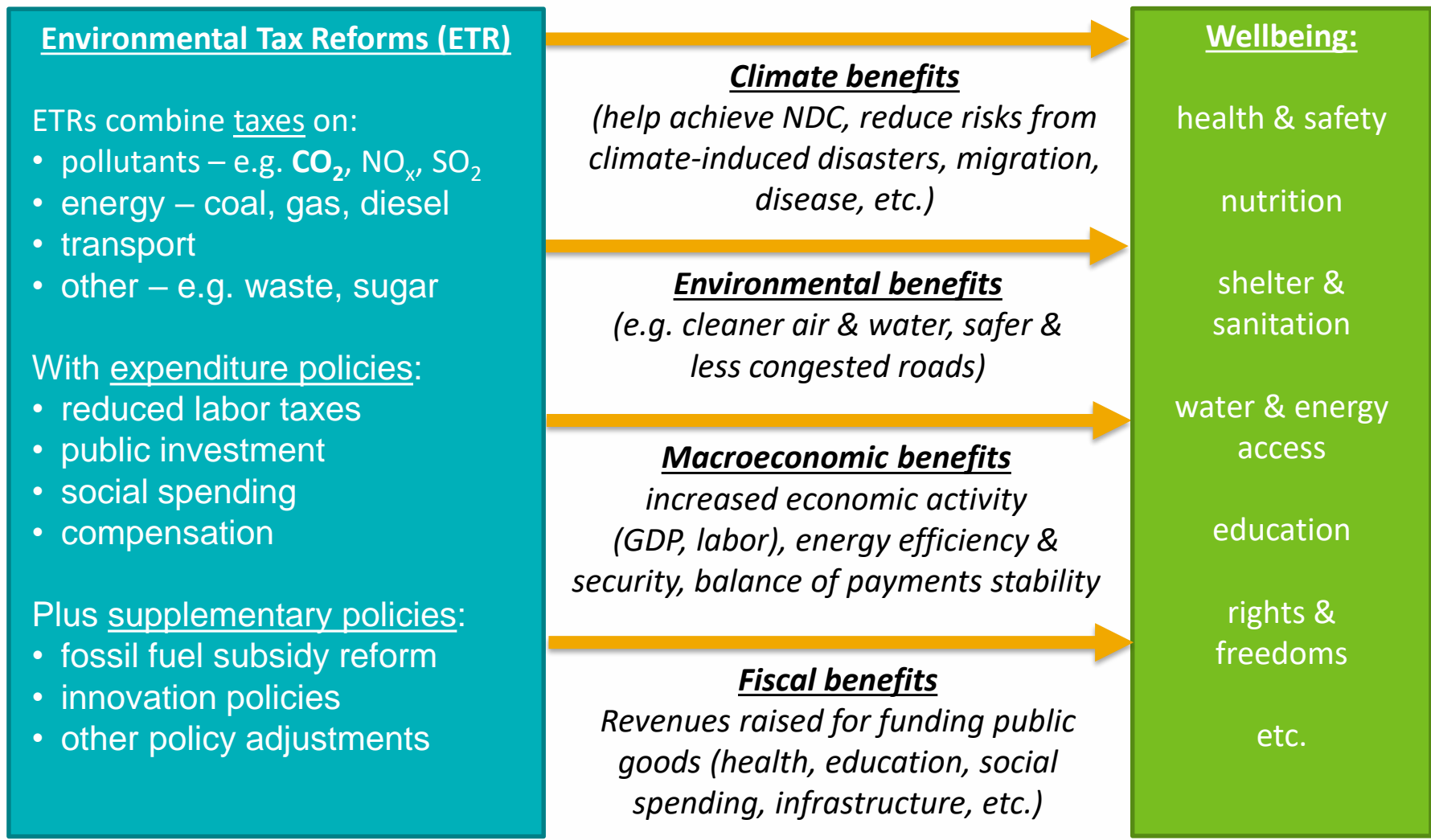
***“...investing in climate and the environment is a key step in reducing extreme poverty and boosting shared prosperity.”***

**David Malpass, President of the World Bank Group,  
September 20, 2019**





# Environmental tax reforms (such as those incorporating carbon taxes) have multiple benefits beyond climate

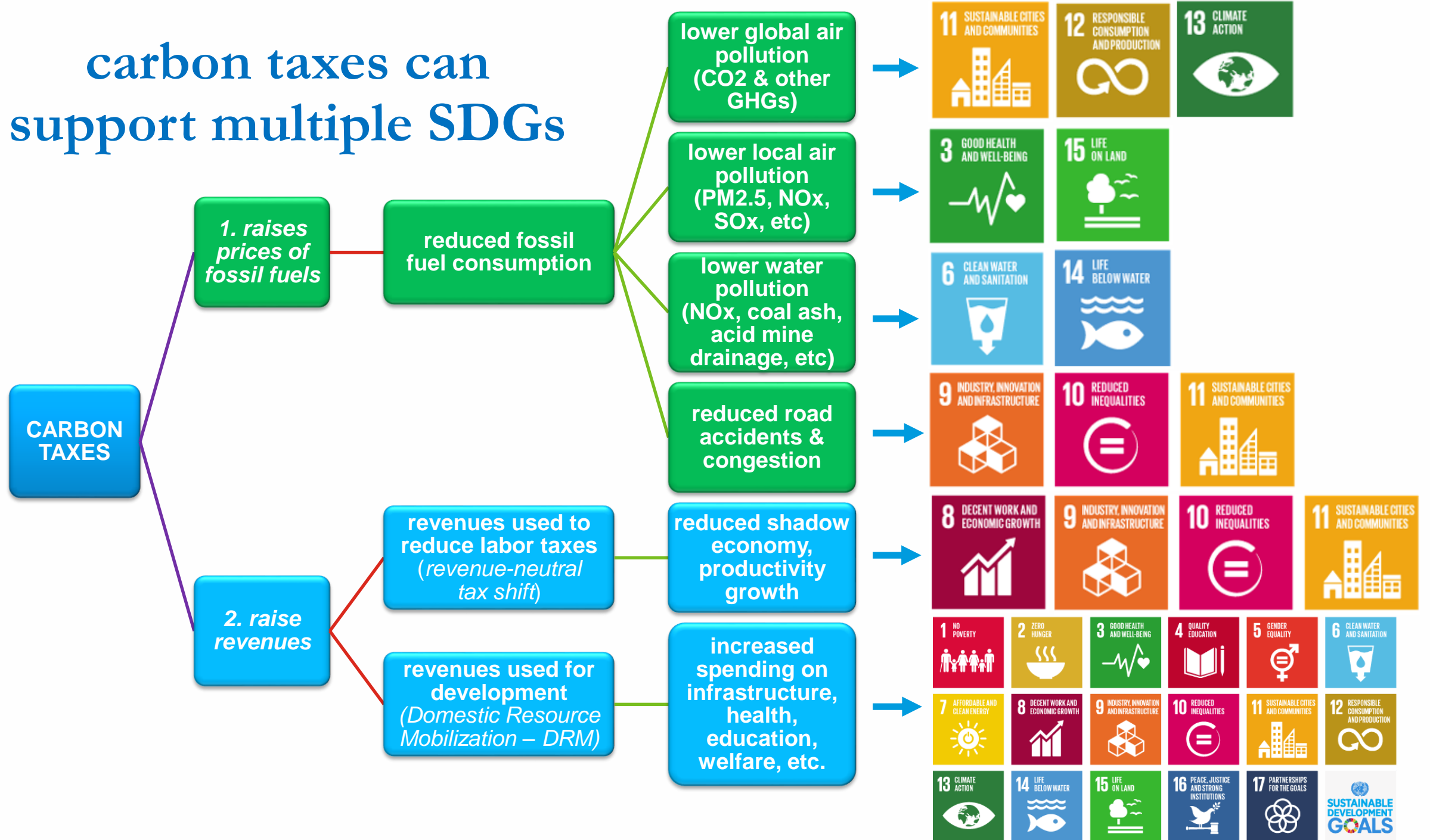


# What are the development benefits of carbon taxes?

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[simonblack@worldbank.org](mailto:simonblack@worldbank.org)



# carbon taxes can support multiple SDGs



# Three development benefits of carbon taxes

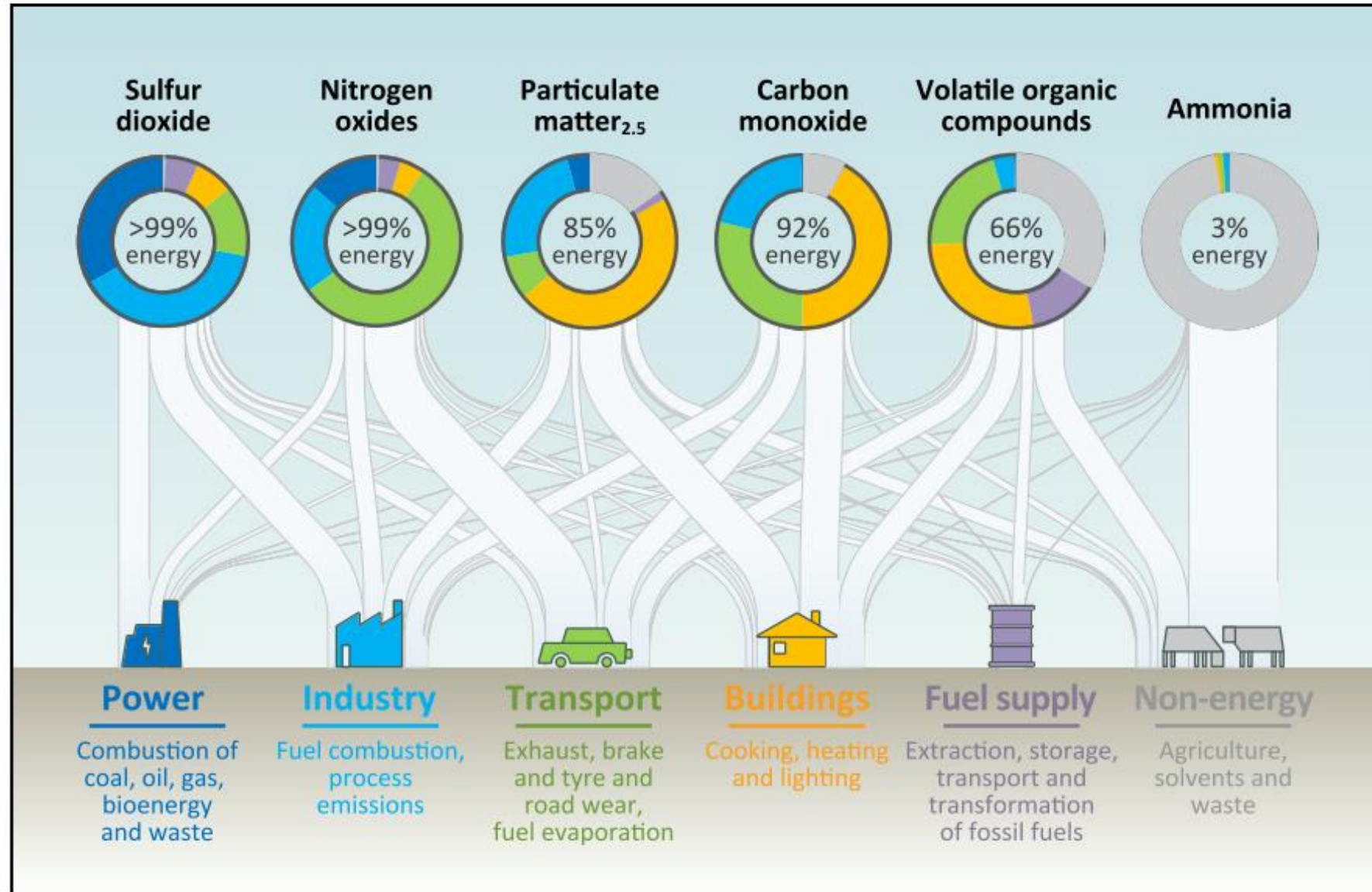
1. Reduced health costs from local air pollution
2. Safer and less congested roads
3. Raising revenues for achieving development objectives







**Figure 1.3** ▶ Selected primary air pollutants and their sources, 2015



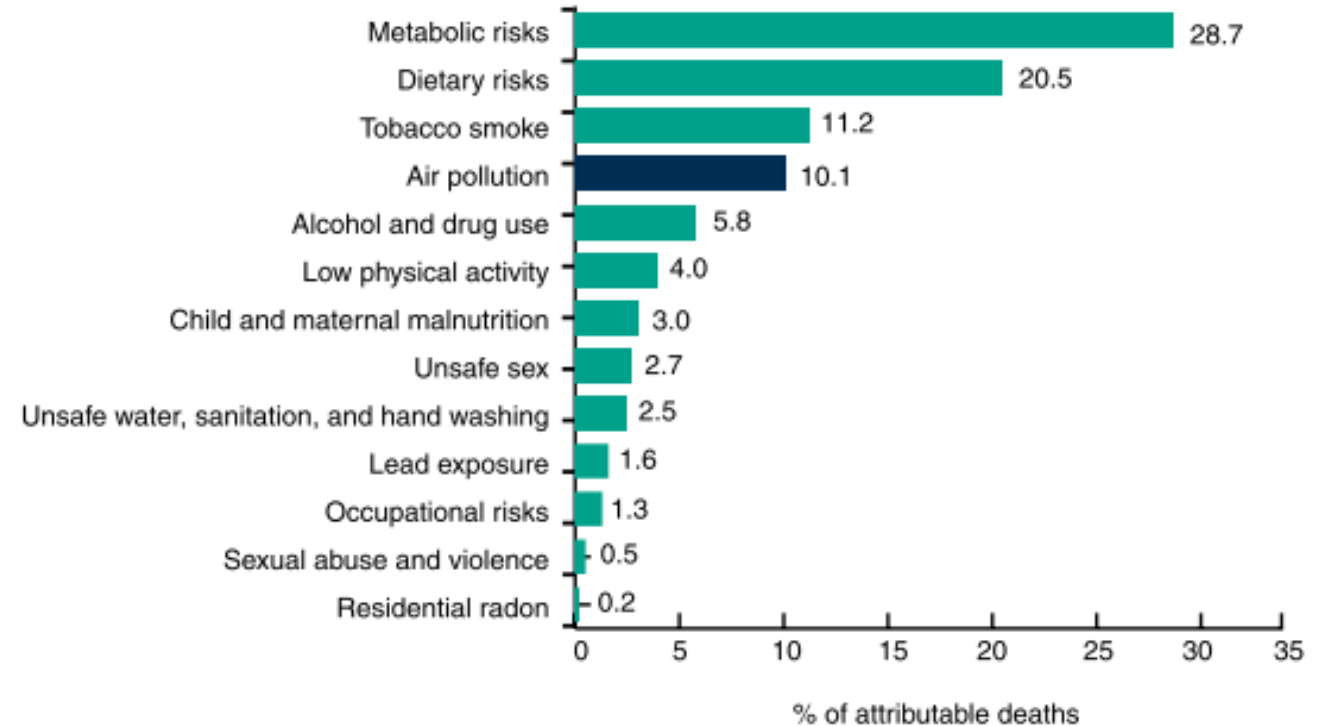
Source: IEA, “[Energy and Air Pollution, World Energy Outlook’s Special Report](#)”, 2016.

# 1. Air pollution is a huge development problem

**87% of the world's population** live in areas above the WHO Guidelines for PM2.5 (10 µg/m<sup>3</sup>)

air pollution is a **leading cause of illness and death globally**

- **1 in 10 premature deaths** caused by air pollution
- **9 million people** die because of ambient air pollution per year (Burnett et al 2018)
- **>20 times** as many people as **malaria**

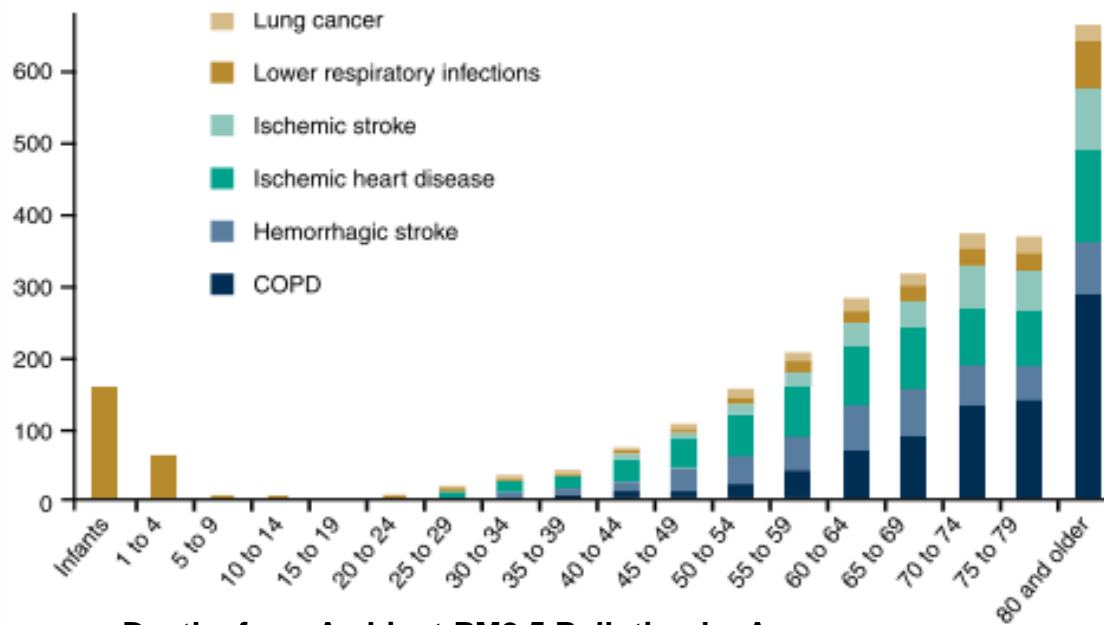


Sources: World Bank and IHME, using data from IHME, GBD 2013.

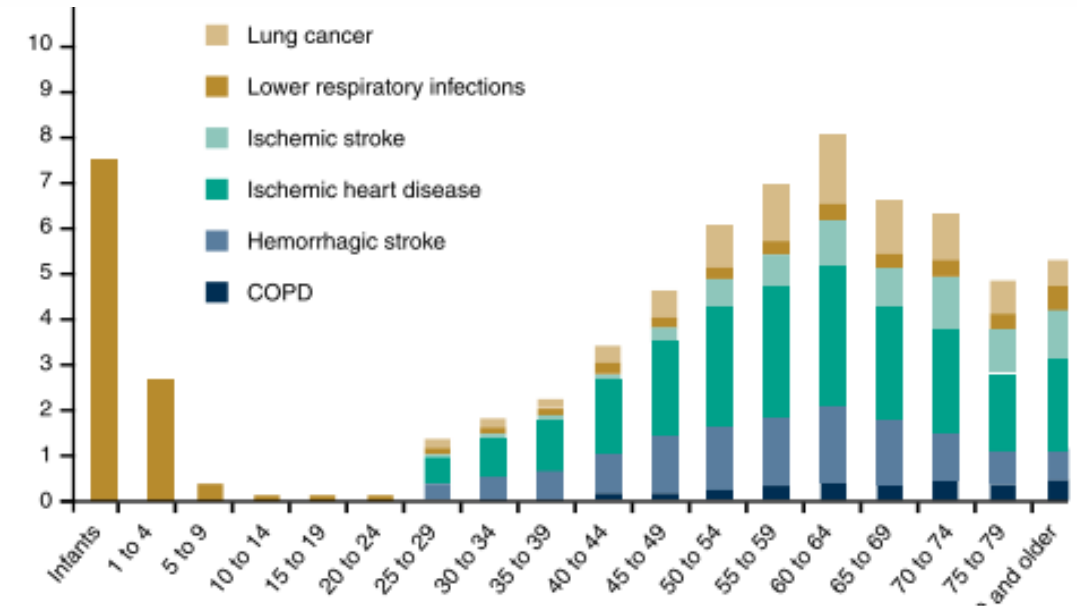
Source: Lancet Commission 2017; The World Bank and Institute for Health Metrics and Evaluation, [“The Cost of Air Pollution: Strengthening the Economic Case for Action”](#), 2016; Burnett, et al. [“Global Estimates of Mortality Associated with Long-Term Exposure to Outdoor Fine Particulate Matter”](#) 2018

# 1. Air pollution is a huge development problem

- affects **children and the elderly most**



Deaths from Ambient PM2.5 Pollution by Age group, per 100,000 population in the world in 2013



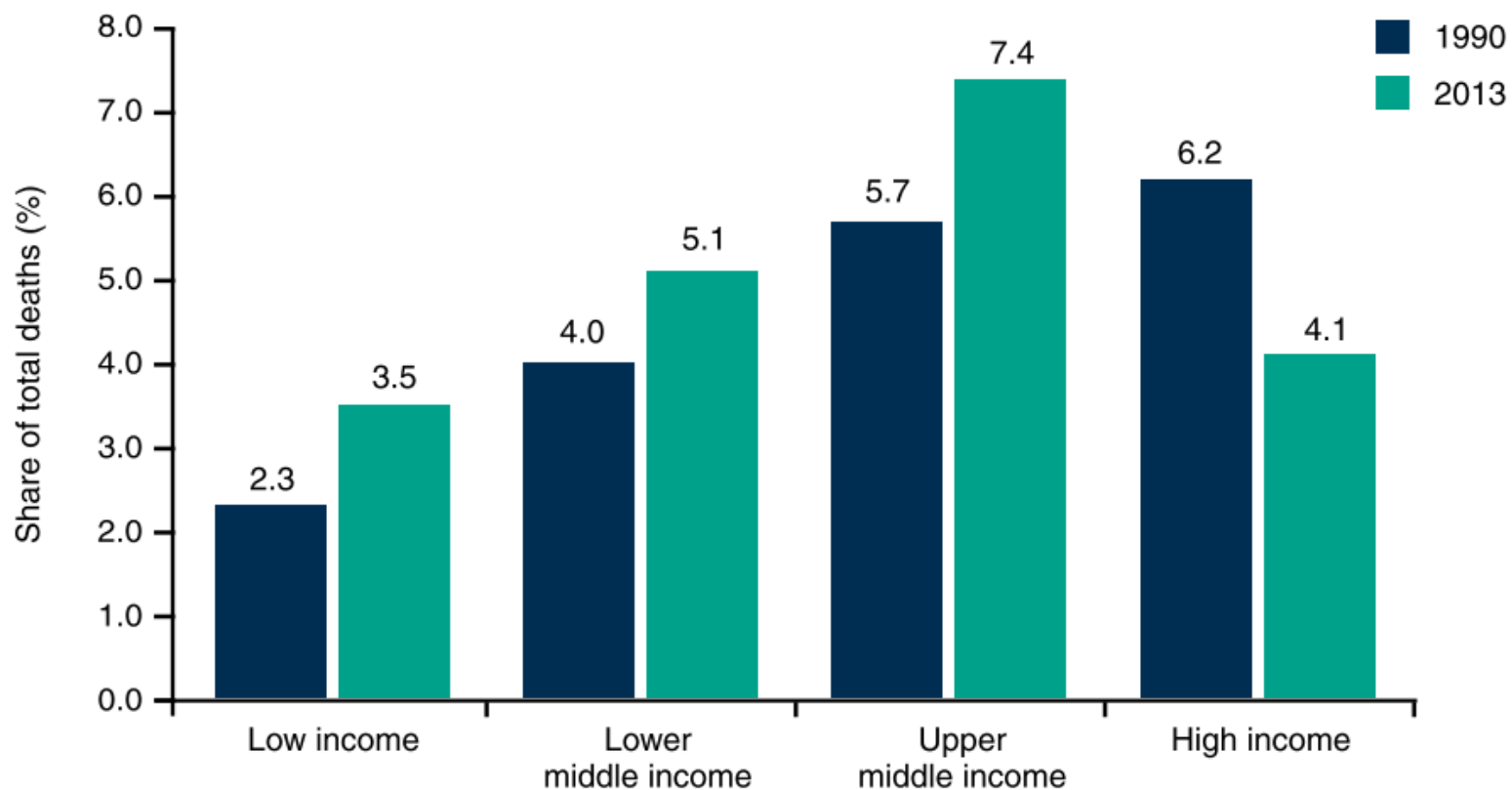
Disability-Adjusted Life Years (DALYs) from Ambient PM2.5, 2013

Source: The World Bank and Institute for Health Metrics and Evaluation, "[The Cost of Air Pollution: Strengthening the Economic Case for Action](#)", 2016.



# 1. Air pollution is a huge development problem

- **92% of deaths are in low- and middle-income countries...**
- **...where the problem is getting worse**

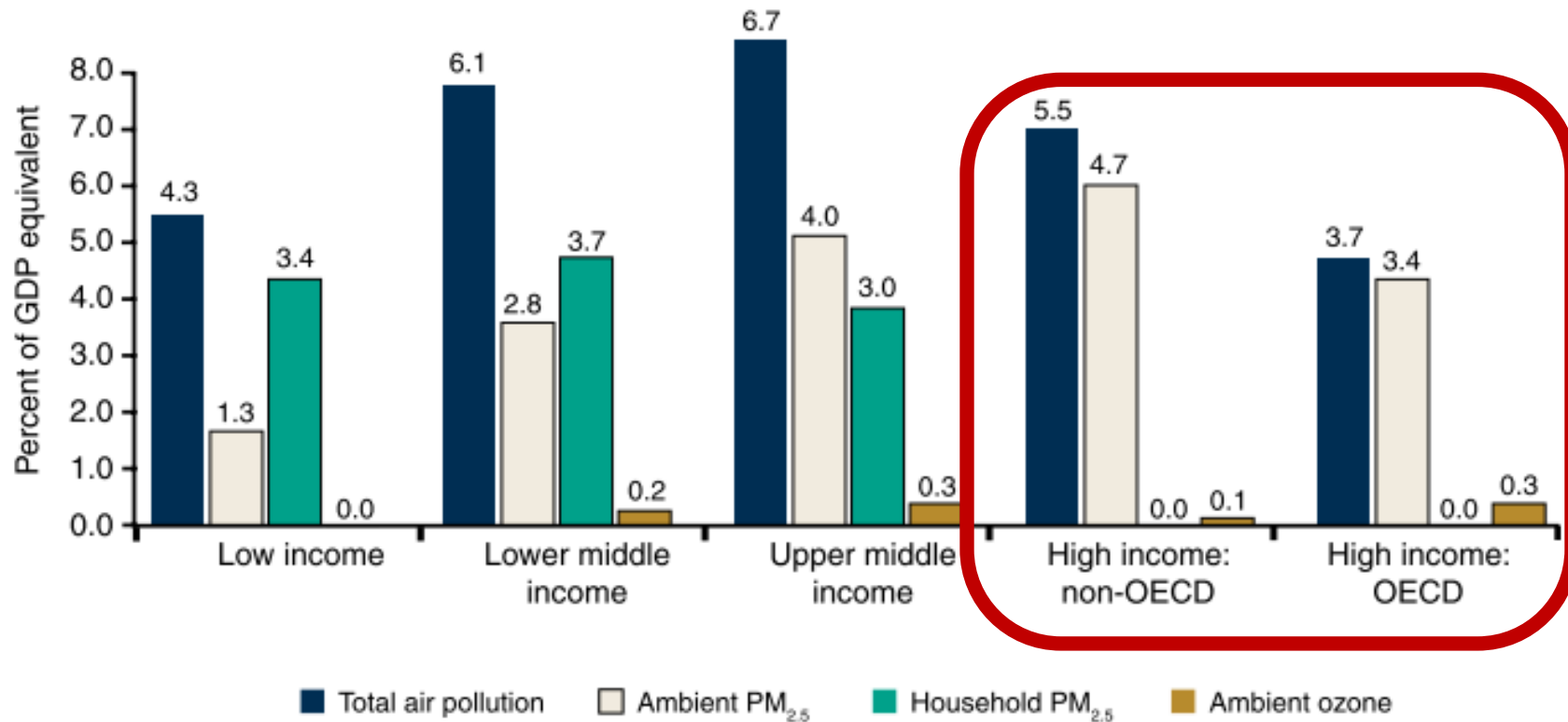


Sources: World Bank and IHME, using data from IHME, GBD 2013.

Source: The World Bank and Institute for Health Metrics and Evaluation, "[The Cost of Air Pollution: Strengthening the Economic Case for Action](#)", 2016.

# 1. Air pollution is a huge development problem

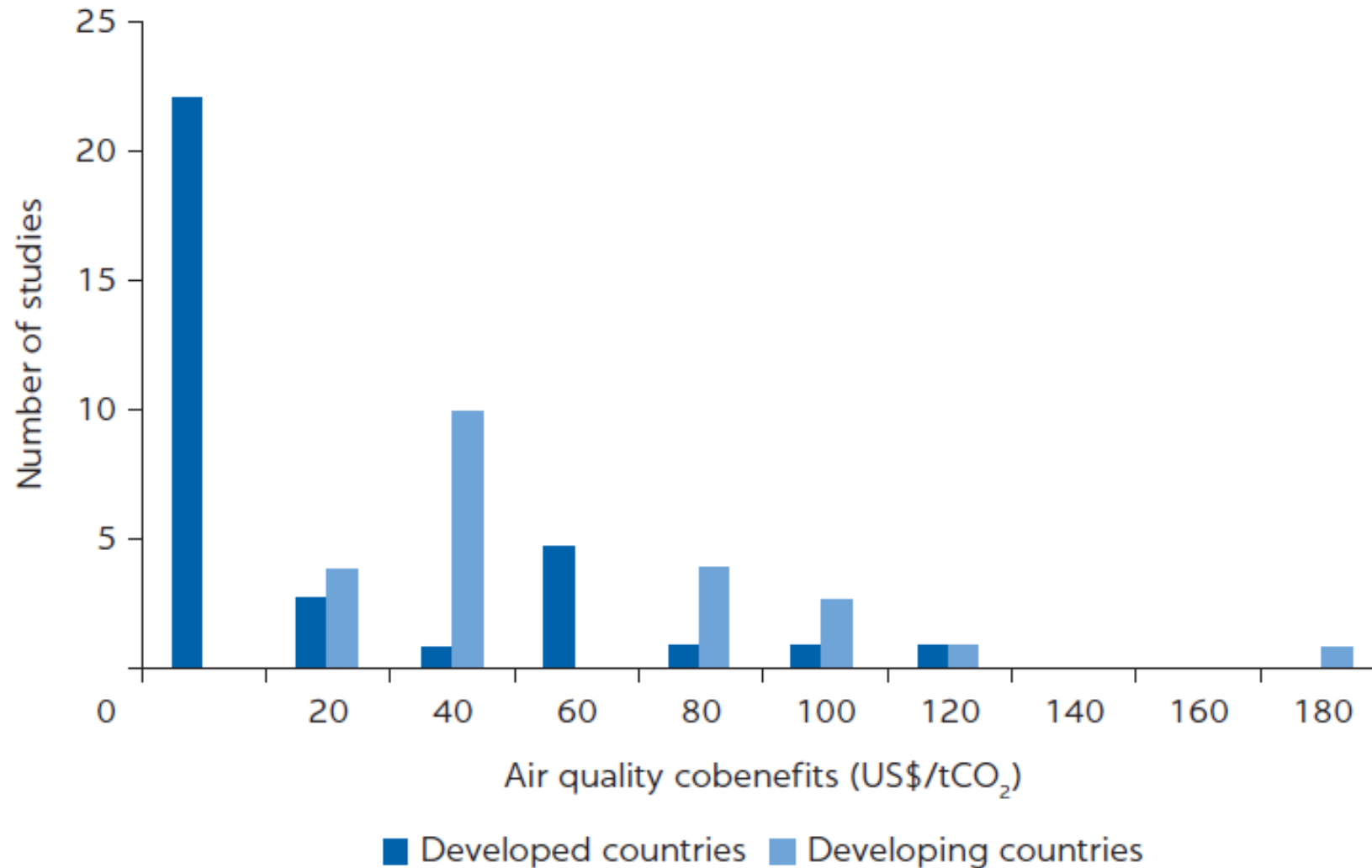
- ...but is **costly** for all countries, including in high-income countries



- **Total: \$5.11** trillion in welfare losses each year...or **6.7%** of global **GDP**

Source: The World Bank and Institute for Health Metrics and Evaluation, "[The Cost of Air Pollution: Strengthening the Economic Case for Action](#)", 2016.

# 1. Carbon taxation can reap large development benefits by improving local air quality



Source: Nemet, Holloway, and Meier 2010.

## 2. Road accidents are also a development problem

**Road accidents** inflict huge costs:

- **1.25 million killed** and **20-50 million seriously injured** on the roads pa
- developing countries account for a **90%** of deaths and injuries
- if the main breadwinner is lost to an accident a household can **fall into poverty for three generations** (World Bank 2016)

*Source:* World Bank, "[Sustainable Urban Transport Financing from the Sidewalk to the Subway](#)", 2016; World Bank, "[The High Toll of Traffic Injuries: Unacceptable and Preventable. The Macro-Economic And Welfare Benefits of Reducing Road Traffic Injuries in Low & Middle-Income Countries,](#)" 2017.

## 2. Road accidents are also a development problem...

**Cutting** road accidents would result in “**substantial increases in economic growth, national income, and welfare gains**”

Example: **halving road accidents would raise GDP by 7% to 22% over a 24-year period:**

- 7.1% in Tanzania
- 7.2% in the Philippines
- 14% in India
- 15% in China
- 22.2% in Thailand

*Source:* World Bank, “[Sustainable Urban Transport Financing from the Sidewalk to the Subway](#)”, 2016; World Bank, “[The High Toll of Traffic Injuries: Unacceptable and Preventable. The Macro-Economic And Welfare Benefits of Reducing Road Traffic Injuries in Low & Middle-Income Countries,](#)” 2017.

## ...and so is congestion

- Congestion **slows down** economic activity
- Congestion **skews** economic activity
- Congestion **hits the poor** the most:
  - Tend to live with lower-quality roads, farther from places of work, and use public transport which suffers disproportionately from congestion

“Congestion is a **tax on the poor that raises no revenue**”

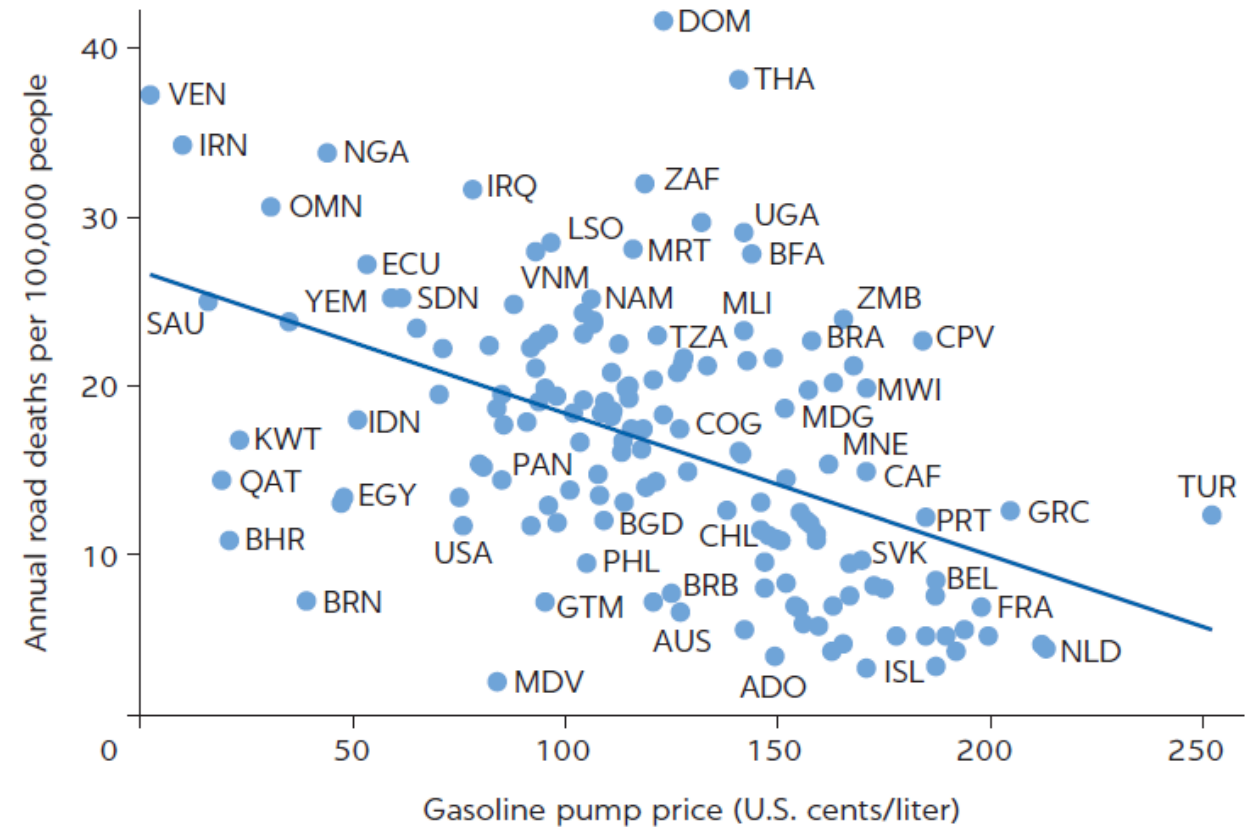
*Arturo Ardila-Gomez – Lead Economist, Transport GP, World Bank*

## 2. A carbon tax can help reduce costly road deaths and congestion

Reduces **vehicle miles travelled (VMT)**:

- **Reduces** road accidents fatalities and injuries
- **Reduces** congestion
- **Shifts** people to more sustainable and healthy substitutes e.g. public transport, cycling or walking

**Raises revenues** for investing e.g. in better public transport

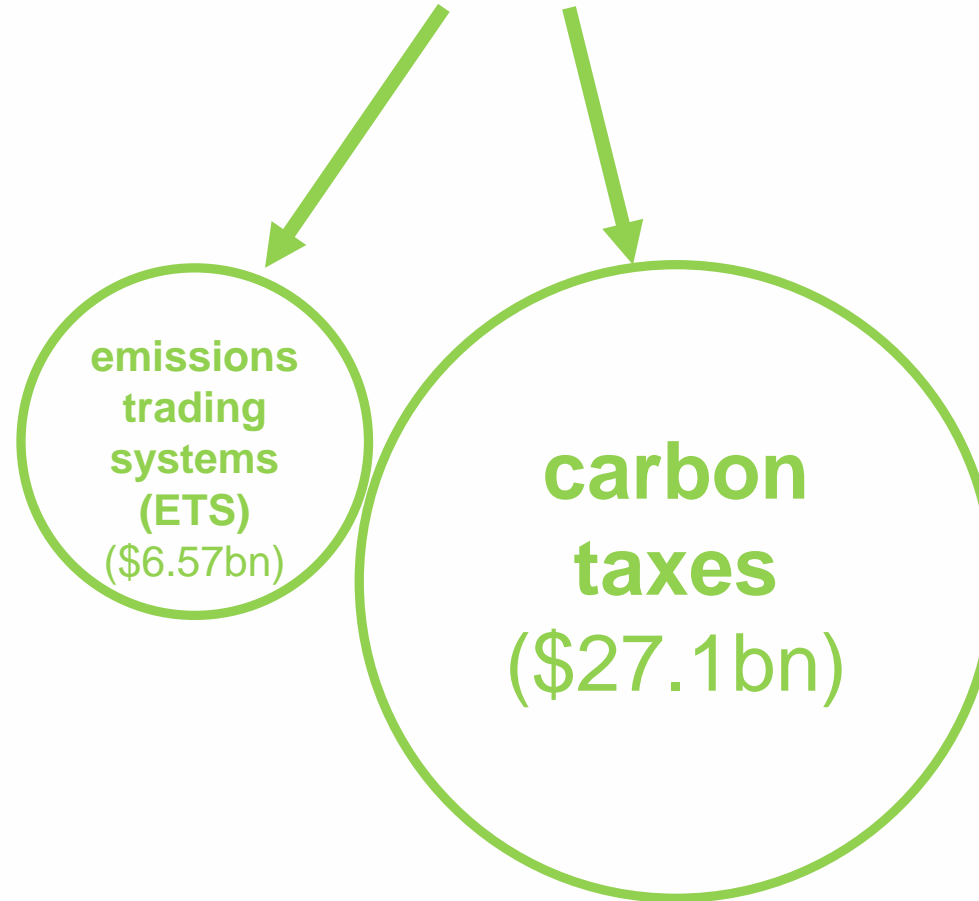




## carbon taxes in context

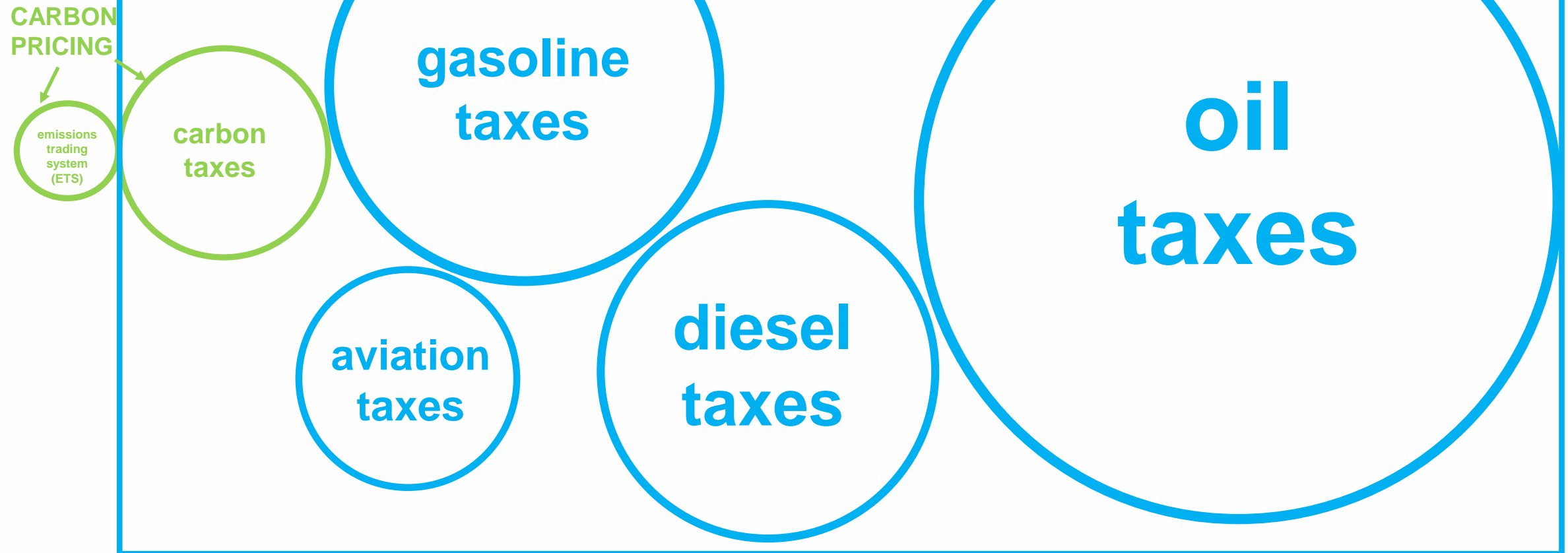
# CARBON PRICING

(\$33.7bn in 2016, global)



Notes: ETS raised \$6.57bn in public revenue and carbon tax systems raised \$21.7bn in 2016 (Source: [Carl, Jeremy, and David Fedor. 2016](#))

# ENVIRONMENTAL TAXES AND CHARGES (\$539.1bn, 89 countries)

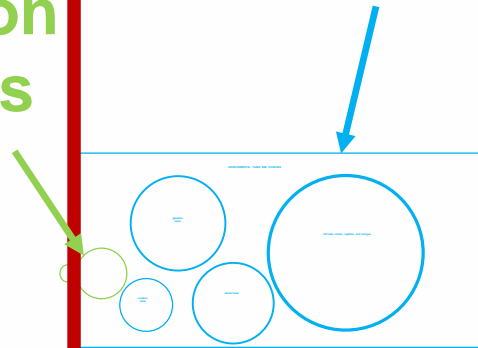


Notes: ETS raised \$6.57bn in public revenue and carbon tax systems raised \$21.7bn in 2016 (Source: [Carl, Jeremy, and David Fedor. 2016](#)); total environmental taxes + charges for OECD and non-OECD countries raised \$539.1bn that year, other taxes included on: gasoline (\$55.6bn), diesel (\$40.7bn), oil (\$149.5bn - OECD [PINE database](#))

# TOTAL TAX REVENUES (\$15,164bn, OECD)

ENVIRONMENTAL TAXES AND  
CHARGES

carbon  
taxes



**social  
security  
contributions**

Notes: ETS raised \$6.57bn in public revenue and carbon tax systems raised \$21.7bn in 2016 (Source: [Carl, Jeremy, and David Fedor. 2016](#)); total environmental taxes + charges for OECD and non-OECD countries raised \$539.1bn that year, other taxes included on: gasoline (\$55.6bn), diesel (\$40.7bn), oil (\$149.5bn – OECD [PINE database](#) & [data](#))

### 3. Carbon taxes can raise substantial revenues to support multiple development objectives

#### 1. Rebalancing tax structures (mostly high-income countries)

- ◆ Environmental taxes are **less distortionary** than labor/income taxes
- ◆ So **shifting tax bases** from work to pollution could yield a ‘**double dividend**’:
  - *Raise economic activity (GDP/employment) – through improving the economic efficiency of the tax system (reducing distortions) and incentivizing productive activities (labor, investment)*
  - *Reduce environmental externalities – climate and non-climate (cleaner air & water, safer & less congested roads)*

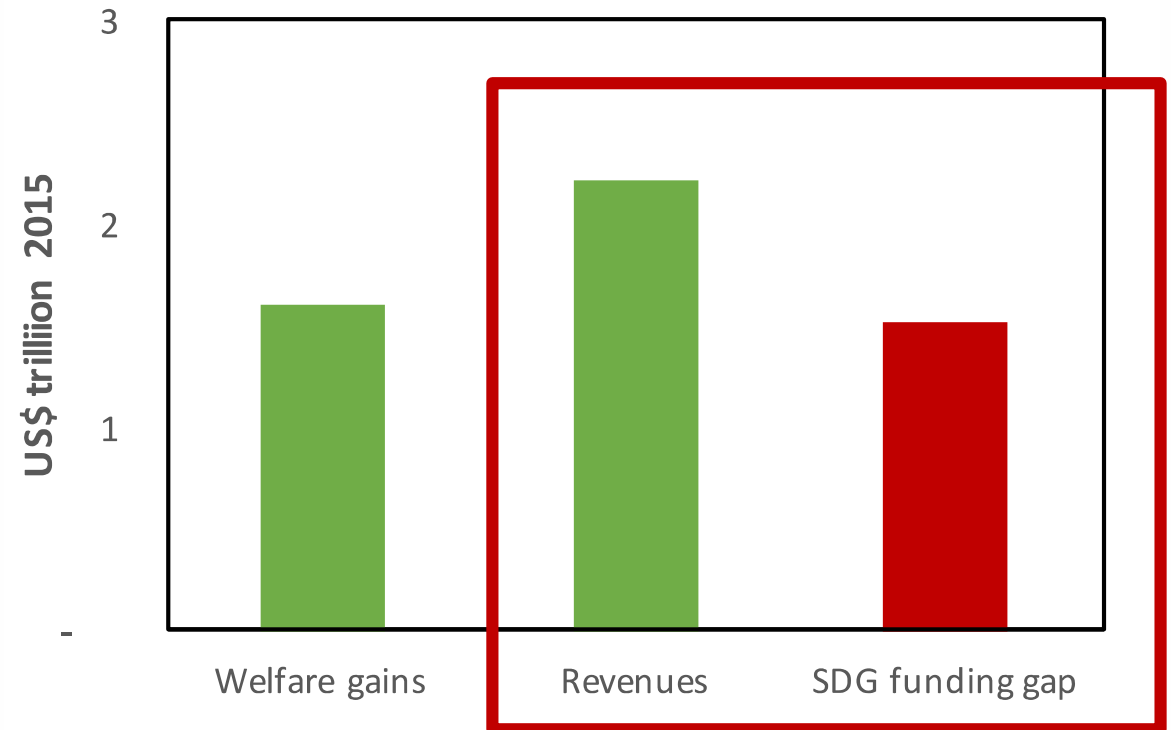
#### 2. Raising tax revenues (mostly low- and middle-income countries)

- ◆ Domestic Resource Mobilization (DRM) is a **top priority** for achieving the SDGs

# Domestic resource mobilization (DRM)

Plugging the **~\$4.0 trillion environmental tax gap** (13% GDP) – including through carbon taxes – in lower- and middle-income countries would:

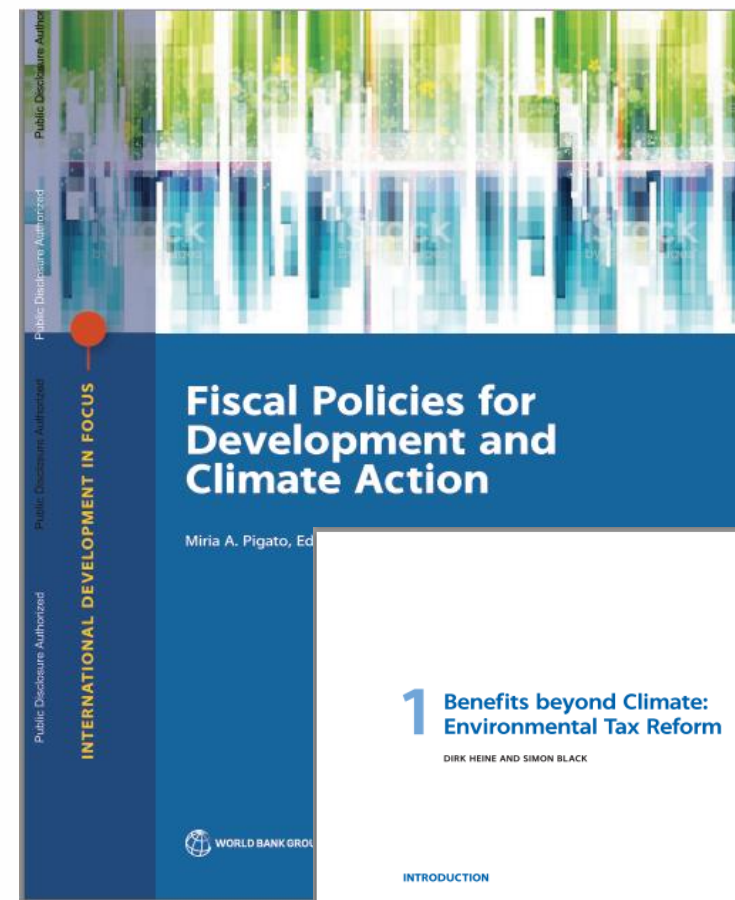
- yield **\$1.6trn welfare gain** (health, congestion, global warming; 5.2% global GDP)
- raise **\$2.2trn in fiscal revenues** (7.0% GDP)



Sources: Matthew Martin, Development Finance International and Jo Walker, Development Finance International, “Financing the Sustainable Development Goals” (Oxfam, 2015); Coady, David, Ian Parry, Louis Sears, and Baoping Shang. “How Large Are Global Fossil Fuel Subsidies?”, IMF 2017

# Other development co-benefits from carbon taxation

1. **Reducing the size of the shadow economy** (revenue-recycling via labor taxes)
2. **Reduced tax evasion** (revenue-recycling via labor taxes)
3. **Induced technological innovation** (Porter Hypothesis)
4. **Reduced dependence on oil & gas imports** = reduced vulnerability to oil price shocks, increased energy security
5. **Better job quality** (e.g. renewable energy sector more labor-intensive, service-oriented, and healthier than coal mining/combustion)
6. **And others!** (refer to: [\*Fiscal Policies for Development and Climate Action\*](#) and future IMF-WB work including tools)



## 1 Benefits beyond Climate: Environmental Tax Reform

DIRK HEINE AND SIMON BLACK

### INTRODUCTION

Ending poverty while managing climate change are the defining challenges of this century. In recent years, these twin objectives have become embedded normatively and enshrined institutionally. In the last three years, 193 countries committed to achieving 17 Sustainable Development Goals (SDGs)—from tackling poverty, hunger, and gender disparities to improving health, energy access, and education. In addition, 195 countries committed in the Paris Agreement to limit global warming to “well below” 2 degrees Celsius by the end of this century. Notably, over 130 developing countries committed to national emissions abatement (Nationally Determined Contributions, NDCs), for the first time. As a result, these countries need policy instruments to help them achieve their SDGs and NDCs.

Environmental tax reform (ETR) has been proposed as a potential solution. This chapter argues that ETR can help developing countries reap substantial benefits, far beyond those of climate action. Building on more than two decades of research in development and environmental economics, it argues that the welfare of ETR effects are likely to be more positive in developing countries than is commonly understood. In developing contexts, ETR is more likely to yield a “double dividend”: cutting pollution while raising economic activity. Further, development co-benefits, such as direct improvements in human health, are often larger than in developed countries. ETR can also help finance ministries raise much-needed domestic funds for expanding public expenditure. Last, low administrative capacity and political support need not hinder reform efforts: ETR can be simple to design and implement. In short, ETR can be the fiscal foundation upon which developing countries achieve both the SDGs and their NDCs.

The argument in this chapter proceeds as follows. There is a strong need for mitigating climate change while raising development, especially in developing countries (“Why ‘climate action?’” and “Why ‘beyond climate?’”). ETR can help foster market efficiency, cost-effectively mitigate climate change, and raise domestic resources (“Why ETR?”). However, large gaps in environmental tax



# **How much can carbon taxes support climate & development goals?**

**James Daniel & Ian Parry**  
FAD, IMF

**COALITION OF FINANCE MINISTERS  
FOR CLIMATE ACTION  
WORKSHOP ON CARBON TAXATION,  
STOCKHOLM, OCTOBER 3, 2019**



# Introduction

## Outline

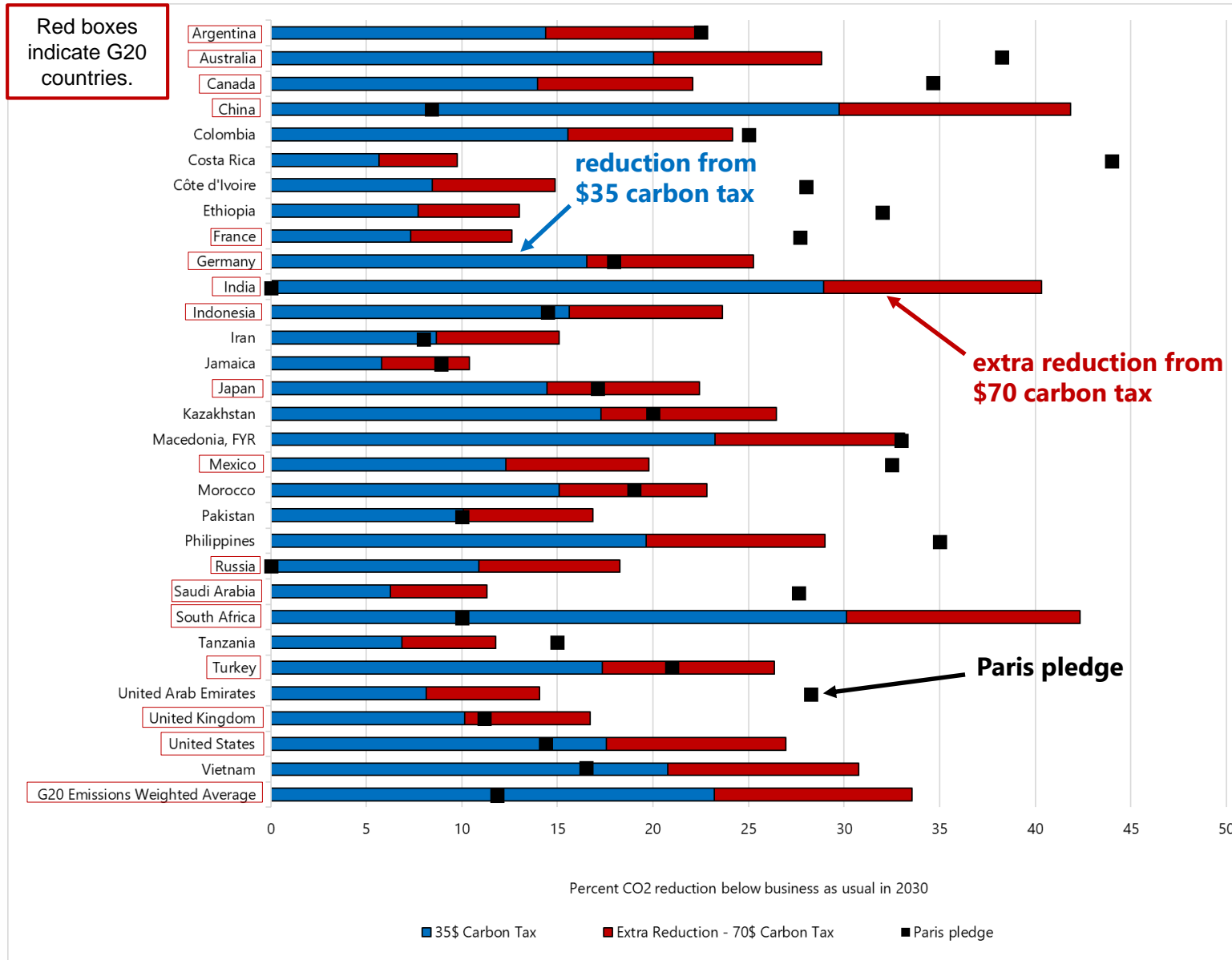
- ◆ Carbon pricing needed for environmental objectives
- ◆ Co-benefit example: impact on air pollution deaths
- ◆ What are investment needs: (a) for climate (b) other SDGs
- ◆ How can revenues from carbon pricing help

# Analysis from Spreadsheet Model (135 Countries)

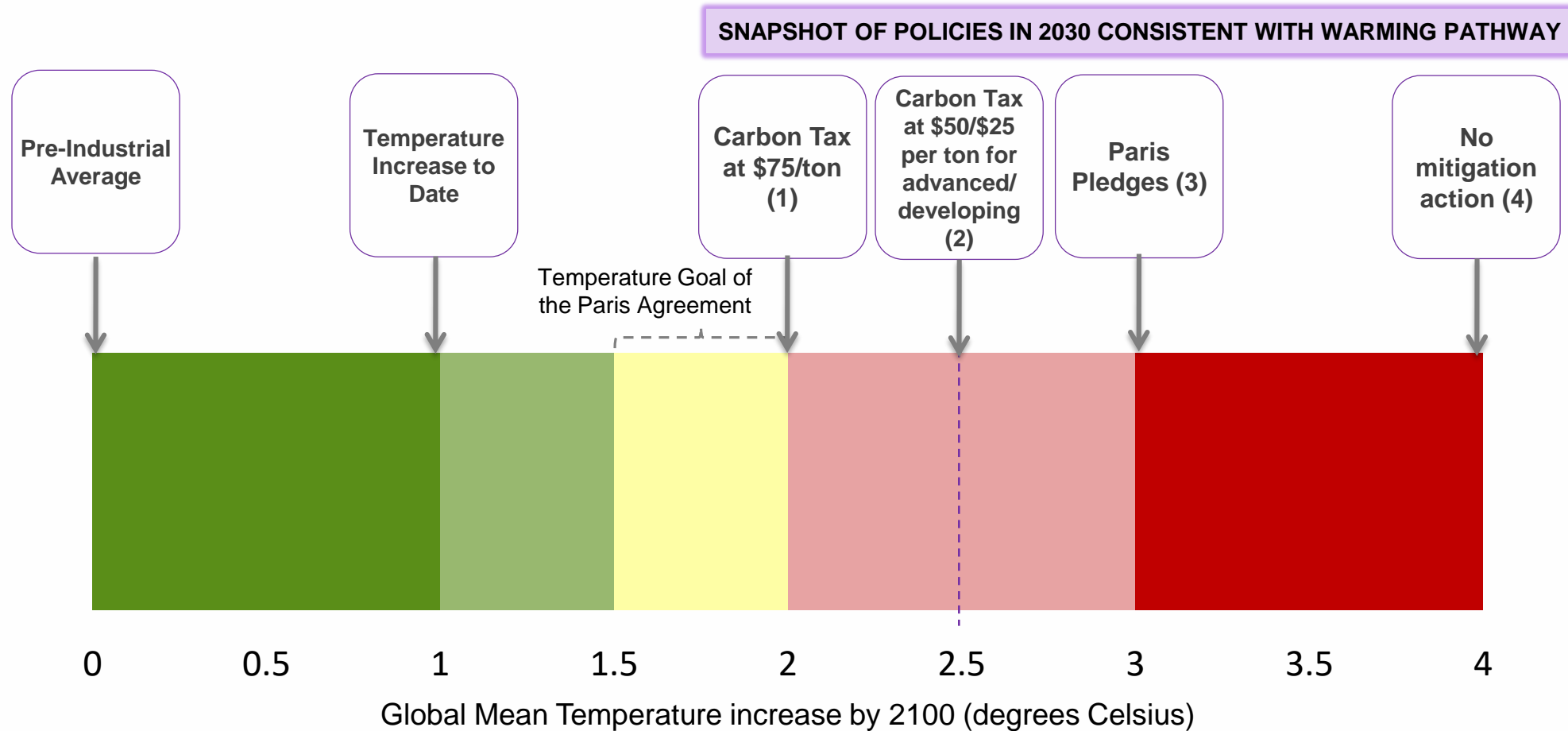
- Developed by IMF, being refined by Bank/IMF
- Projects fuel use by power, transport, households, industry
- Policy impacts depend on
  - ◆ Price elasticities for fuels, electricity (-0.5 to -0.8 from empirical/modelling studies)
  - ◆ Local air pollution death rates by fuel type/country
    - E.g., for coal, combines data on location of power plants, population living in proximity, baseline mortality and how it responds to pollution exposure, country emission rates

# Carbon Pricing to Meet Countries' Paris Mitigation Pledges

## % Reduction in CO<sub>2</sub> from Carbon Pricing, 2030

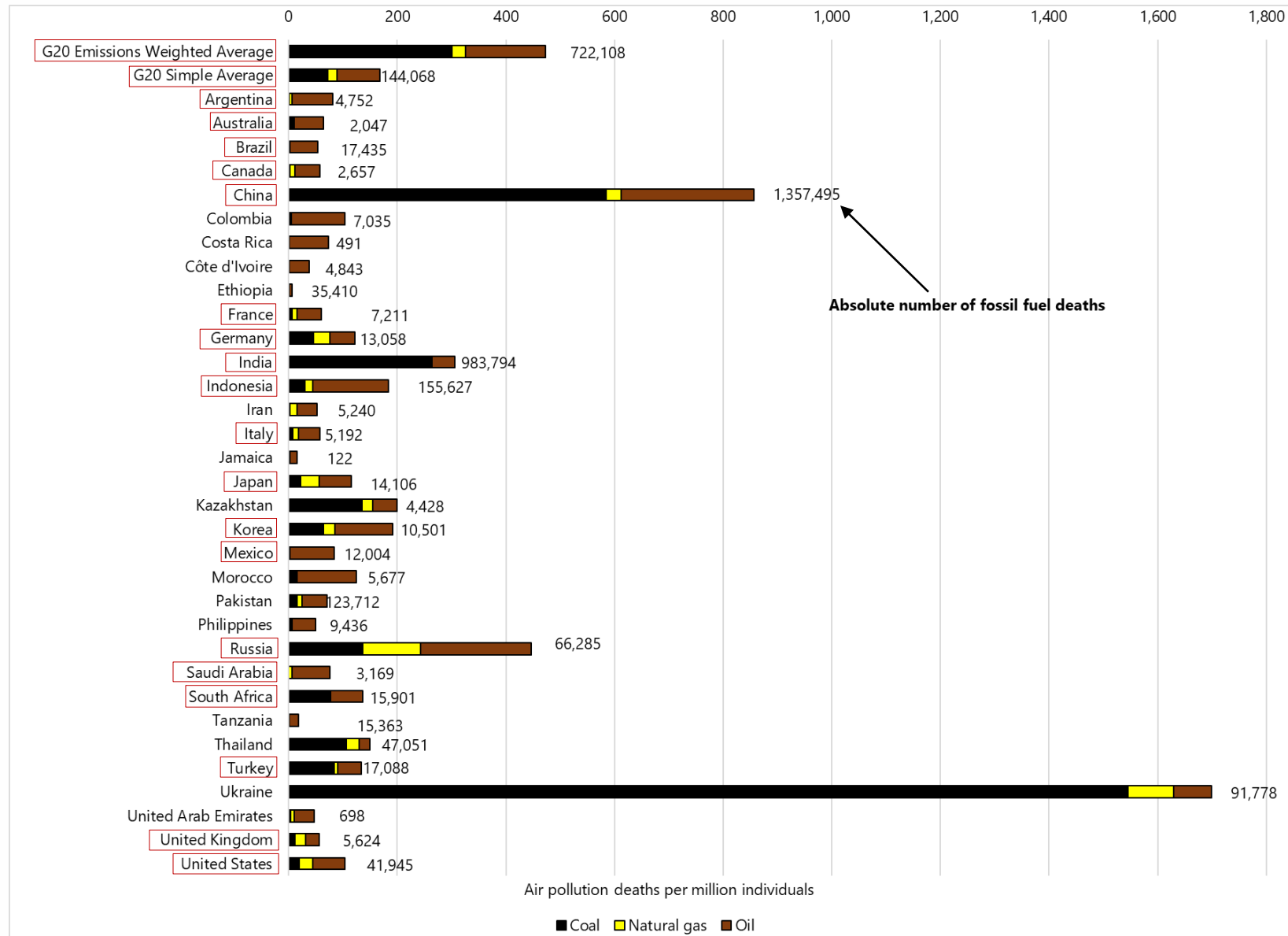


# Climate Action and Global Temperatures

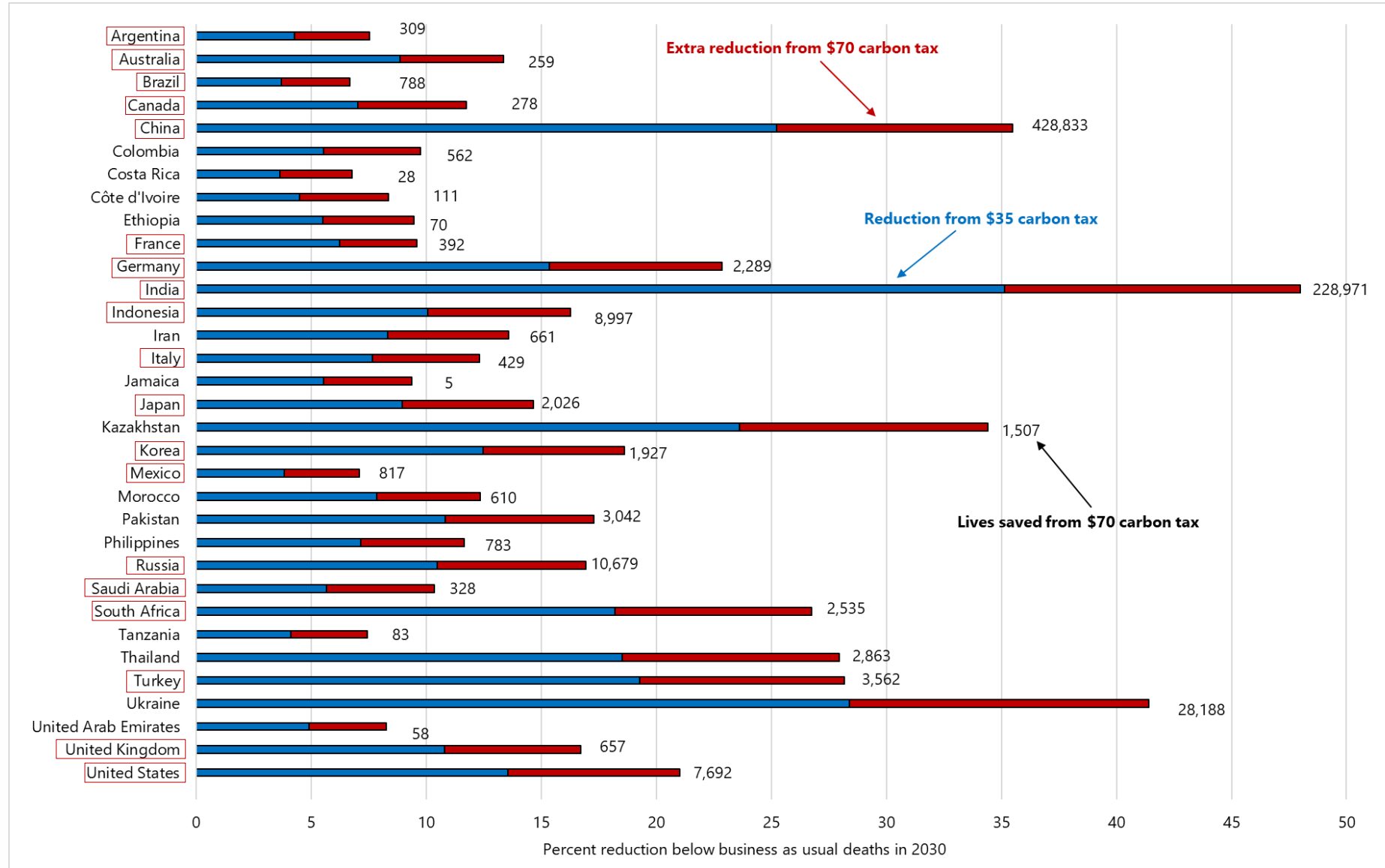


- (1) Assumes the explicit carbon-price level of US\$40–80/tCO<sub>2</sub> by 2020 and US\$50–100/tCO<sub>2</sub> by 2030 (Stiglitz and Stern, 2017).
- (2) Fiscal Monitor (October, 2019).
- (3) UNEP (2018).
- (4) Nordhaus (2018); and Intergovernmental Panel on Climate Change (2014).

# Annual Air Pollution Deaths from Fossil Fuels Baseline, 2030



# Reductions in Air Pollution Death Rates from Carbon Pricing 2030

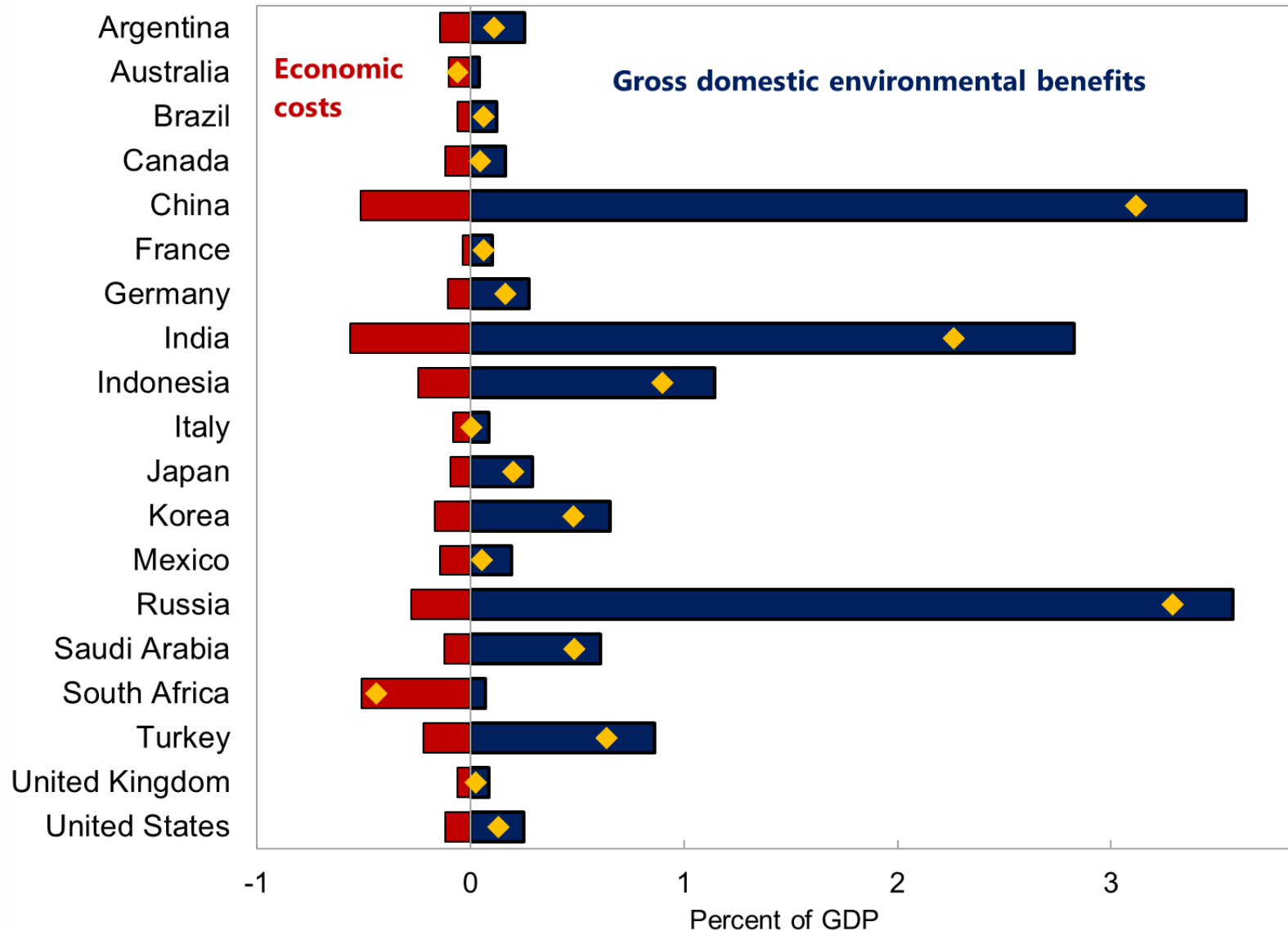


For G20:

- \$50 price saves 600,000 lives
- \$75 price saves 725,000 lives

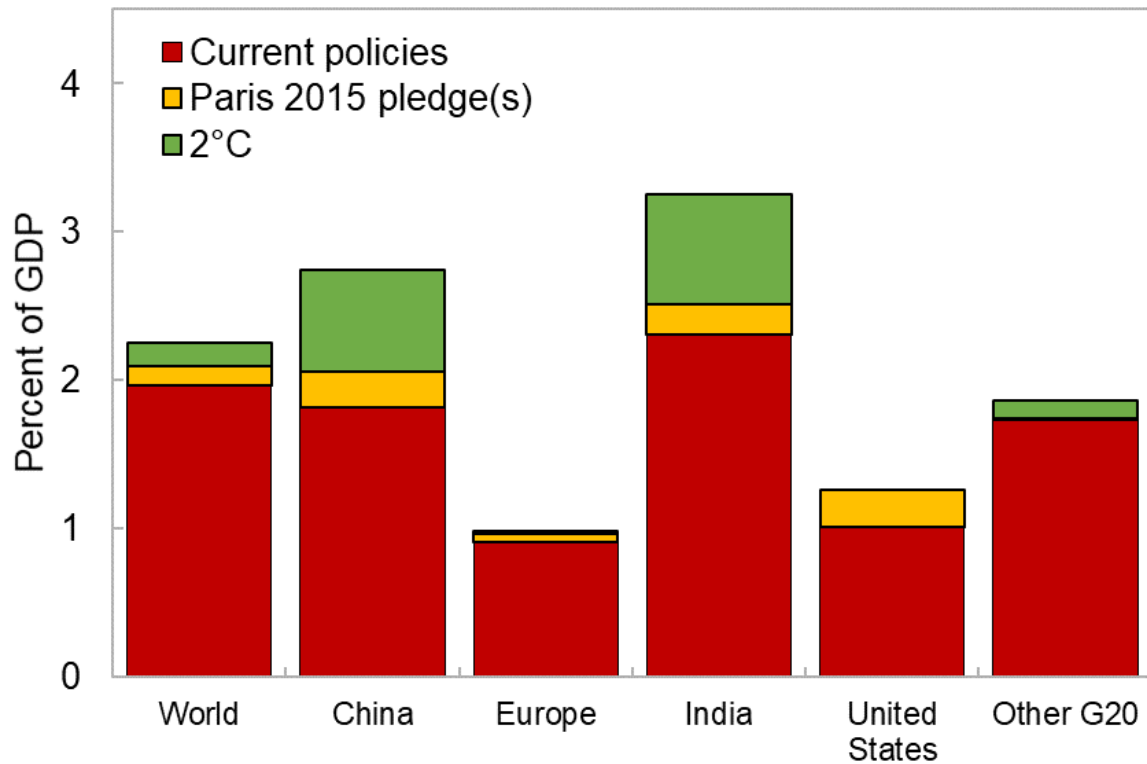
# Carbon Pricing Can Be in Countries' Own Interests

## Unilateral Costs/Benefits of \$50/ton CO<sub>2</sub> Carbon Tax, 2030

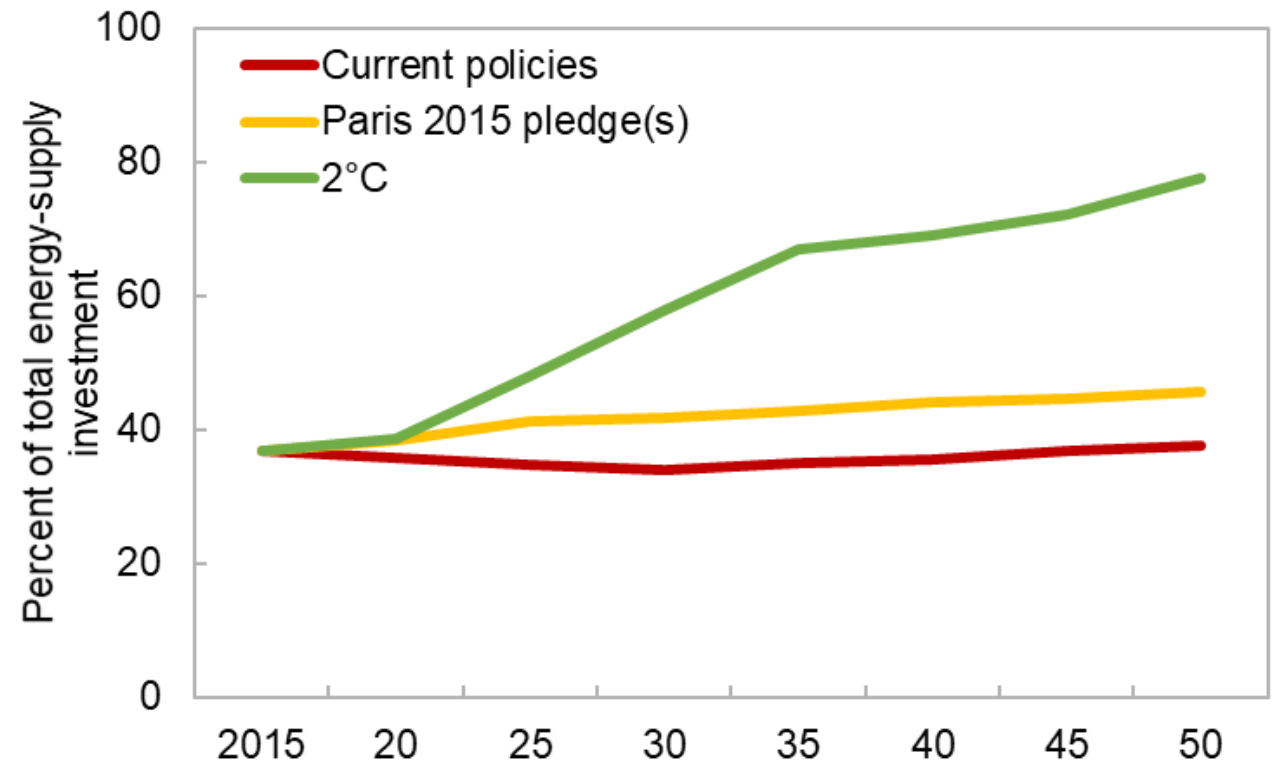


# Investment Needs for Mitigation

## Energy Investment Needs, 2030



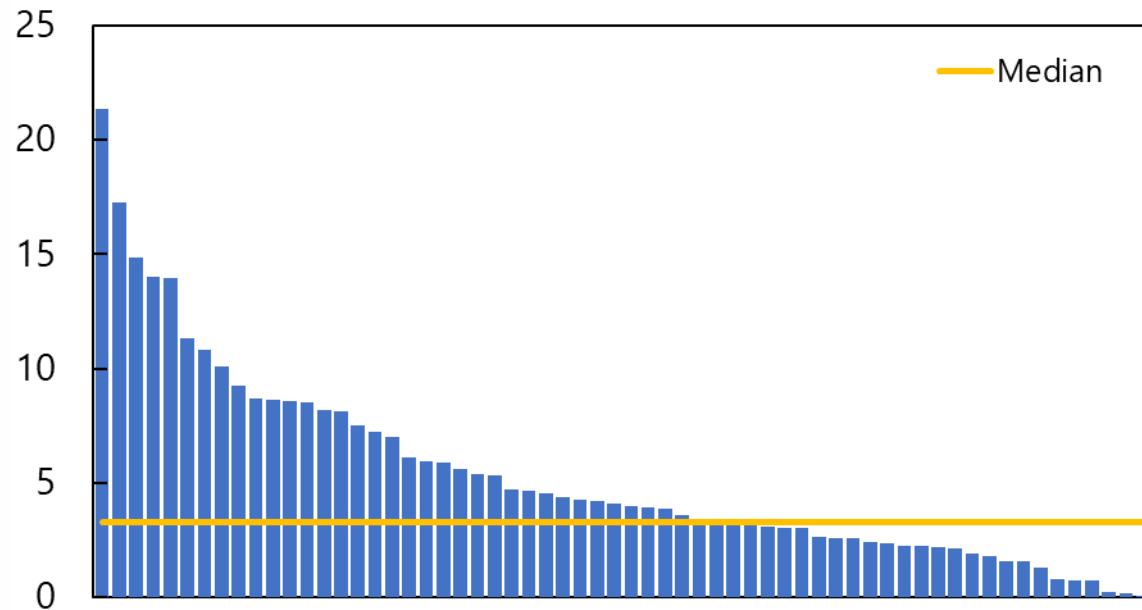
## Global Low-Carbon-to-Total-Energy-Supply Investment



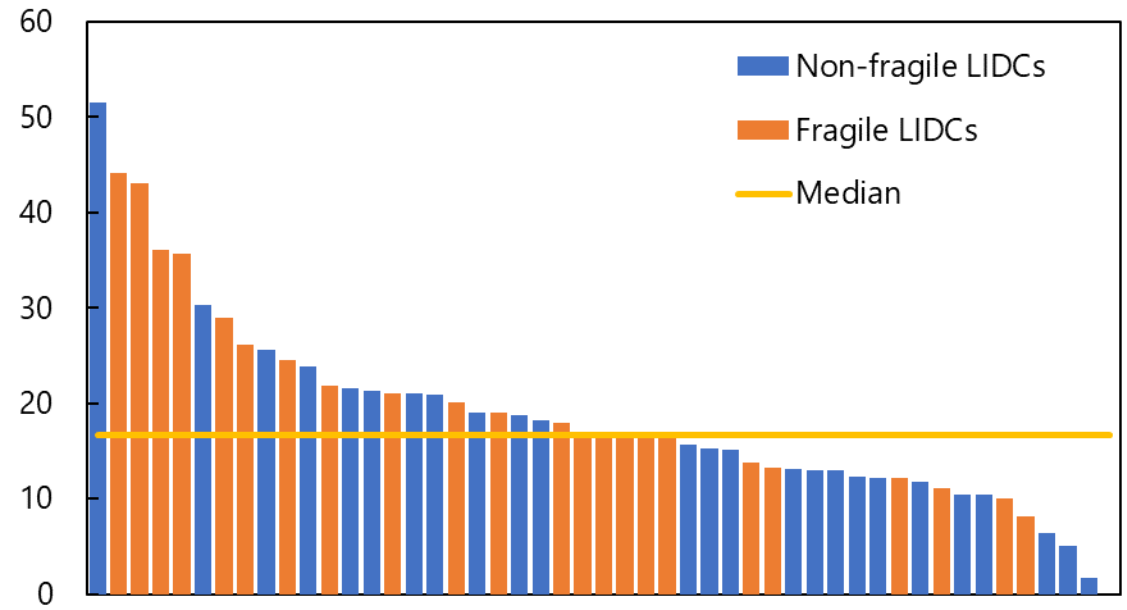


# Non-Climate Investment Needs for SDGs

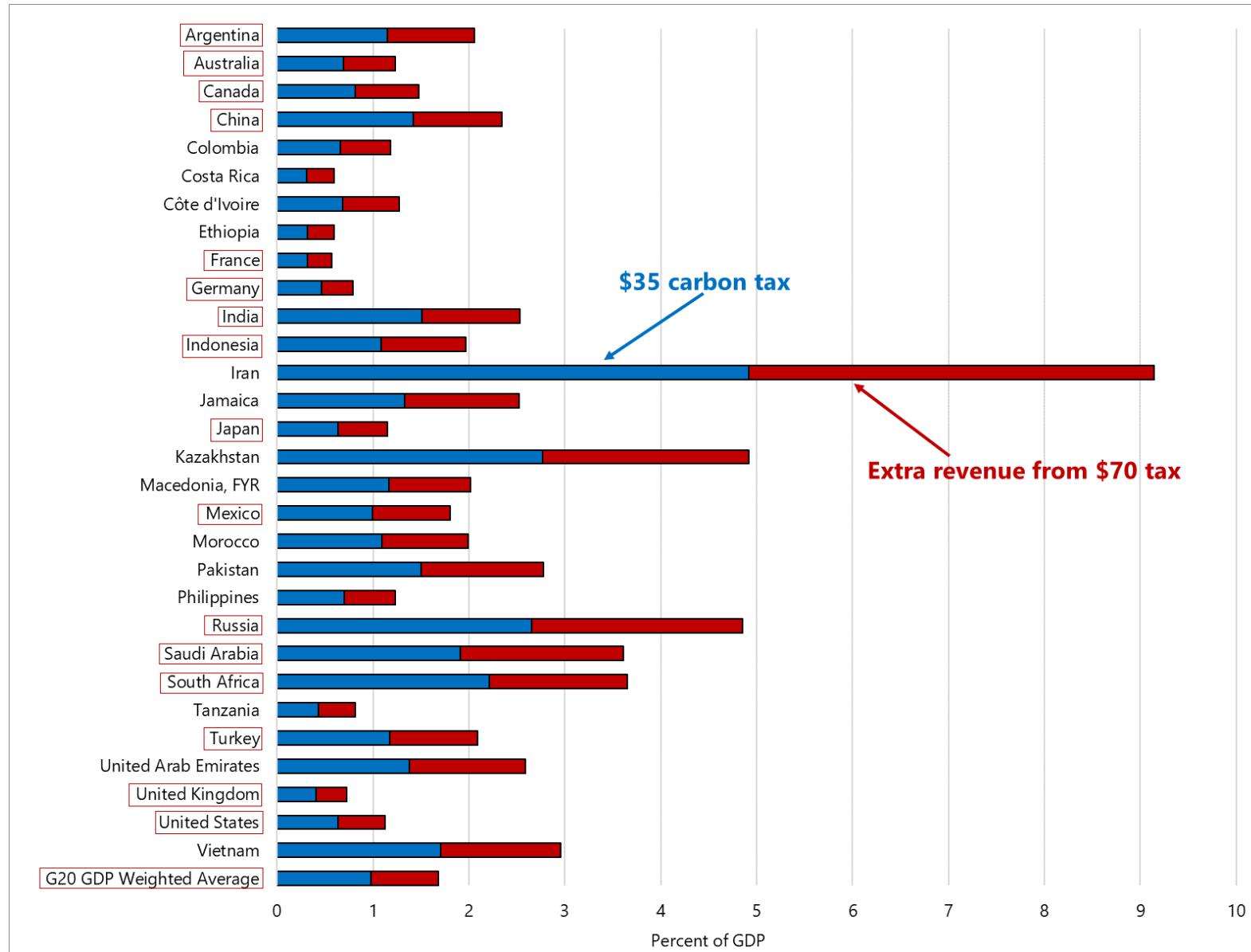
Additional Spending in 2030 for 72 Emerging Market Economies (Percentage points of GDP)



Additional Spending in 2030 for 49 Low-Income Developing Countries (Percentage points of GDP)



# Revenue from Carbon Pricing % GDP, 2030



**Thank You**

