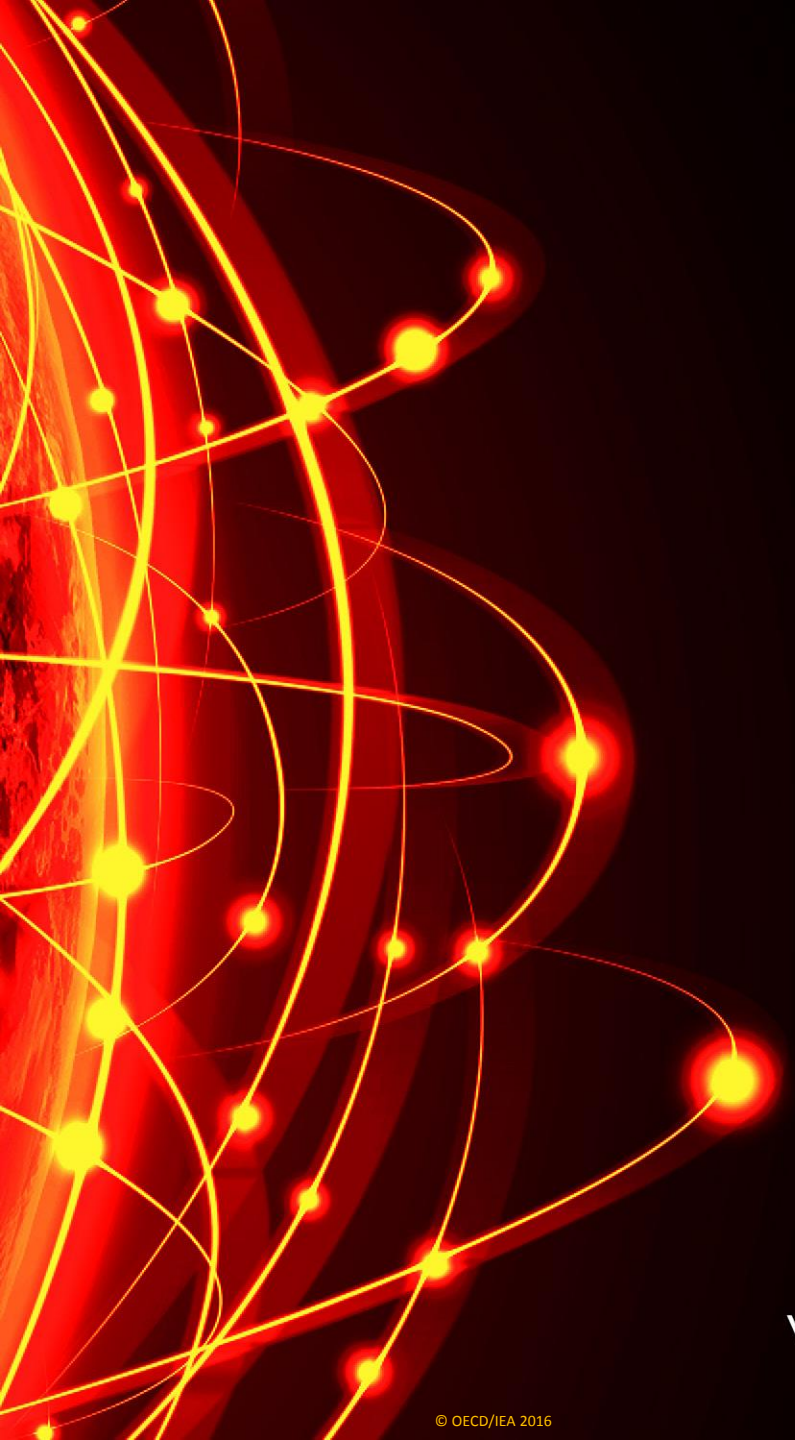


International Energy Agency
Secure Sustainable Together

Energy and Air Pollution

Dr. Timur Gül

Marrakech, 14 November 2016

World Energy Outlook Special Report

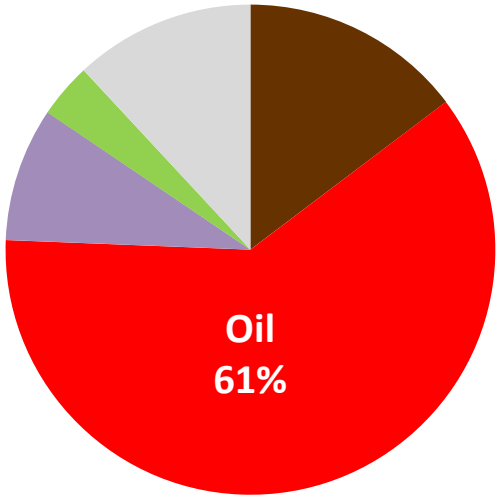
Context

- **Air pollution is the fourth largest human health risk**
  - *3.5 million premature deaths are linked to energy poverty due to the use of biomass for cooking and kerosene for lighting*
  - *3 million premature deaths are linked to outdoor air pollution, mostly in cities*
- **Many of its root causes – and cures – are in the energy sector**
  - *The majority of air pollutant emissions comes from the energy sector, mainly from fuel combustion*
  - *Currently only 8% of global energy production is combustion free: more than half of the rest has no effective technology in place to control emissions*
  - *No country in the world has solved the air pollution problem completely, but many are taking important policy steps*
- **Can the energy sector step up efforts to combat this global public health crisis?**

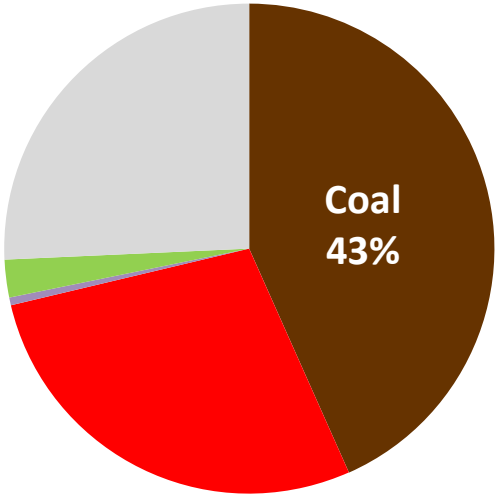
Air pollution is an energy problem

Pollutant emissions, 2015

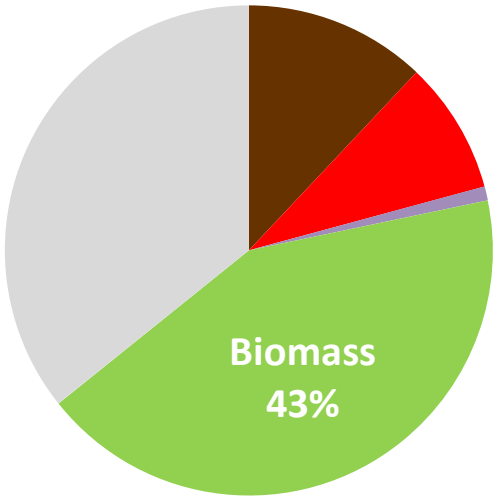
Nitrogen oxides (NO_X)
108 Mt



Sulfur dioxide (SO_2)
81 Mt



Fine particulate matter ($PM_{2.5}$)
41 Mt



Coal Oil Gas Bioenergy Other

Energy is the single most important cause of emissions of all main pollutants

High risk air pollution areas

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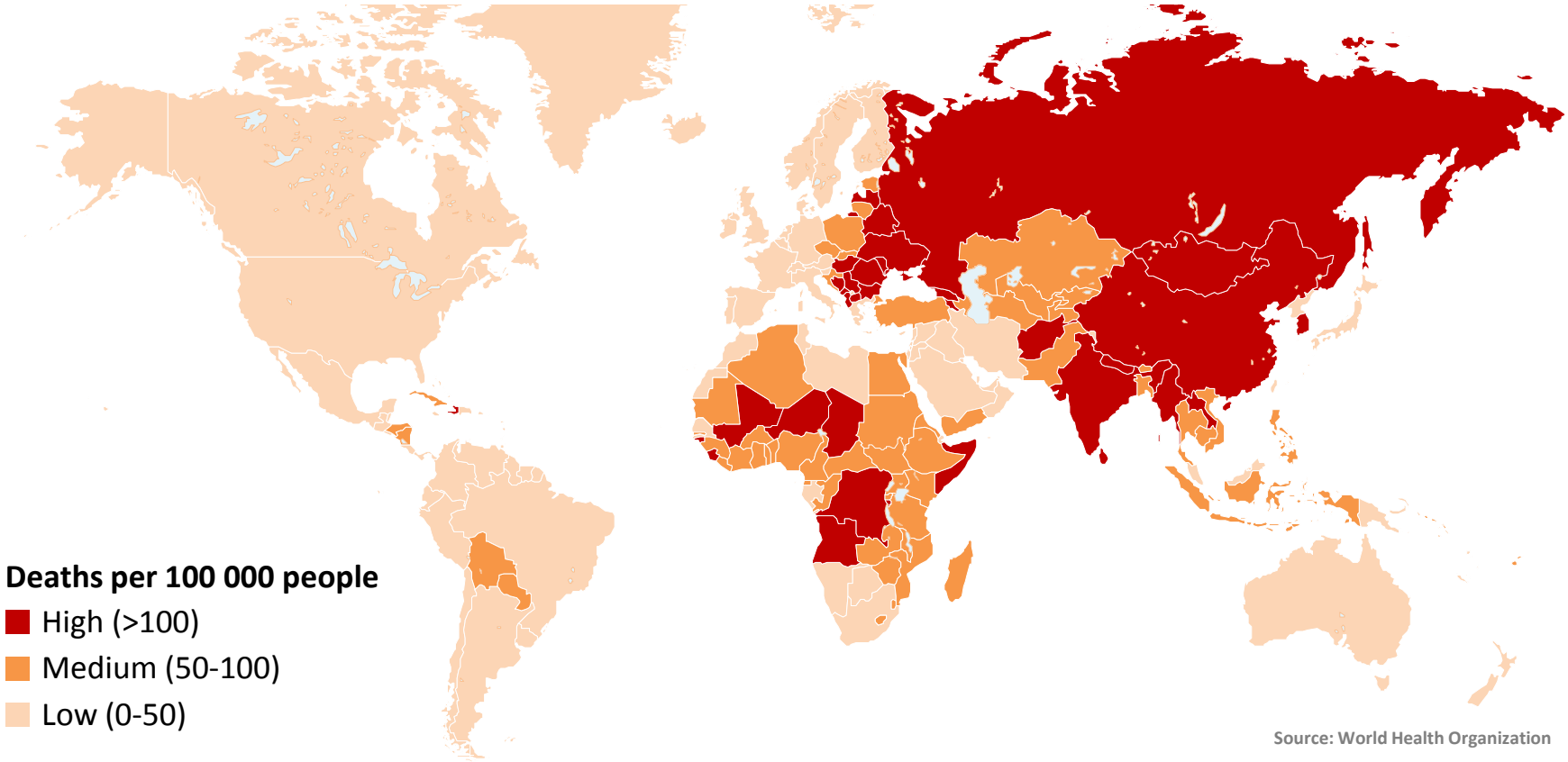
Mortality rate due to air pollution, 2012

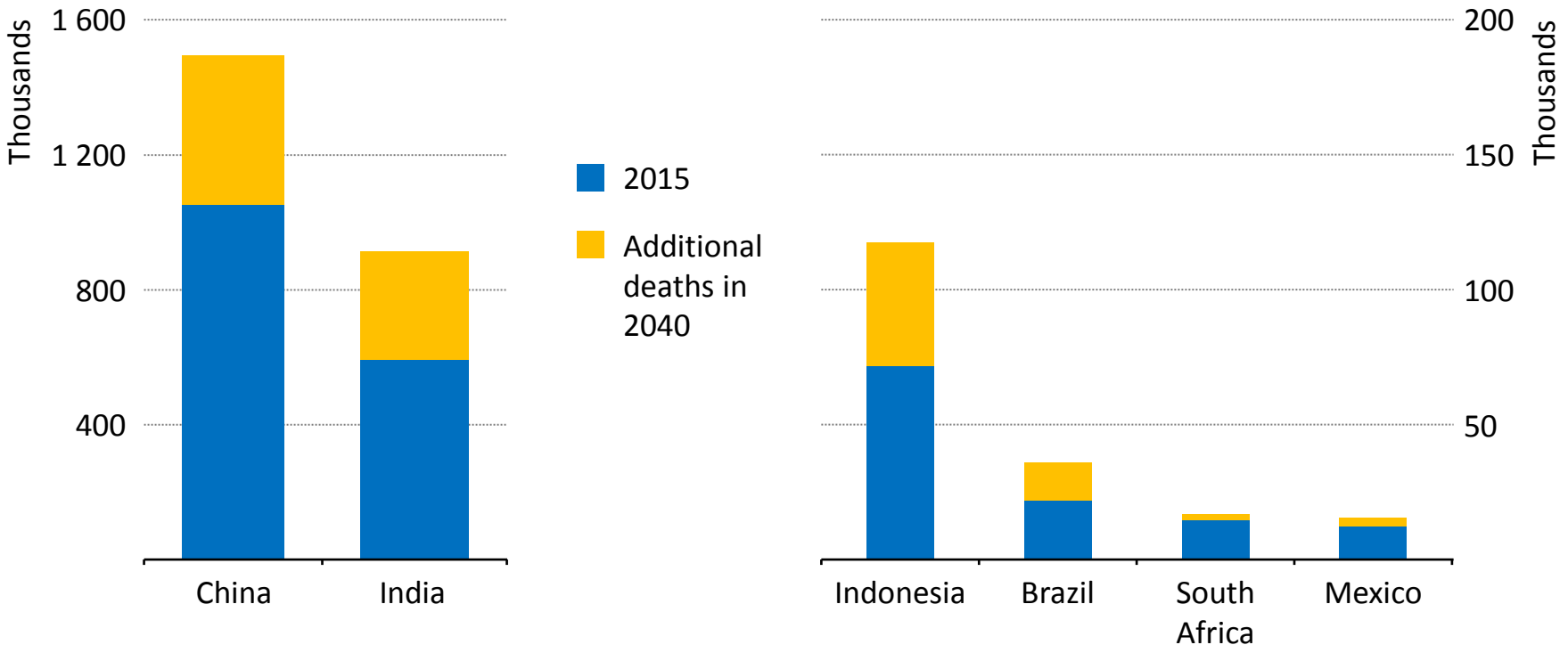


Source: World Health Organization

Countries with the largest death toll are China and India, but on a per capita basis many countries across Africa, Asia and Eastern Europe are affected

The death toll keeps rising…

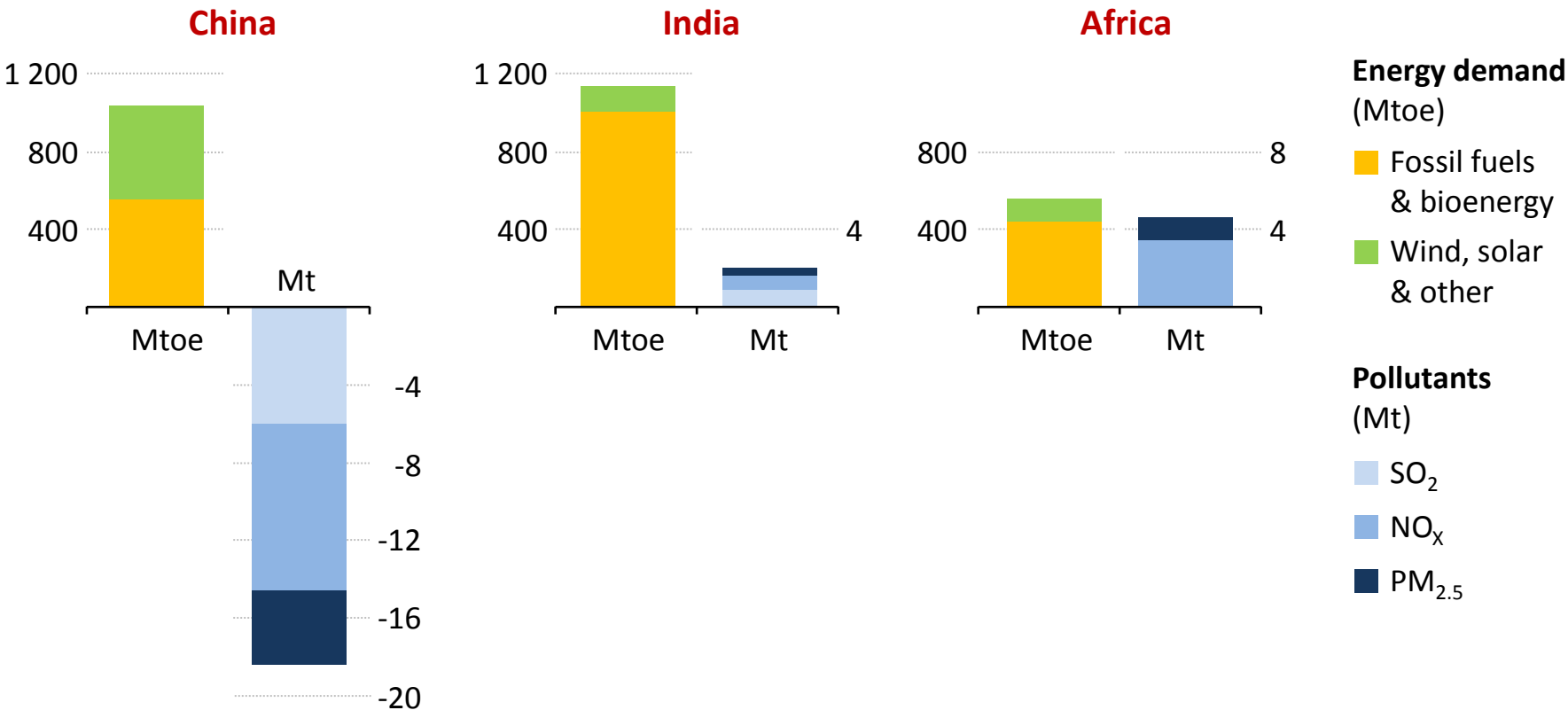
Premature deaths due to outdoor pollution in selected regions



Despite planned policies premature deaths increase from 3 to 4.5 million in 2040

…although action is being taken in many parts of the world

Change in energy demand and pollutants to 2040



Policies are successful to decouple pollutant emissions from energy demand growth to 2040; but the air pollution problem remains far from being solved

What should the energy sector do?

- **The IEA proposes a pragmatic strategy to cut pollutant emissions & deaths by around 50%, compared with our main scenario**
- **A Clean Air Scenario, based on existing technologies & tailored to local conditions, relies on actions in three areas:**
  1. *A long-term **air quality goal***
  2. *A **package of clean air measures for the energy sector**:*
     - *An **accelerated energy transition:** more efficiency & more renewables*
     - *More widespread use of **advanced pollution controls***
  3. *Strict **monitoring & enforcement** and effective **communication***

Selected mitigation technologies for pollutants: industry and power

Pollutant	Mitigation technology	Type of technology	Abatement efficiency
SO_2	Wet flue-gas desulfurisation	End-of-pipe	70-98%*
	Spray-drier absorption	End-of-pipe	50-70%
NO_X	Low and ultralow-NO_X burners	Integral to combustion process	20-30%
	Selective catalytic reduction	End-of-pipe	90%
	Selective non-catalytic reduction	End-of-pipe	<50%
$PM_{2.5}$	Fabric filtration	End-of-pipe	>99%
	Electrostatic precipitators	End-of-pipe	>99%

*Abatement efficiency based on coals with 0.3-4.8% sulfur content.

State-of-the-art control technologies can reduce air pollution significantly; lack of alignment of policy goals can create undesired negative consequences for climate

The IEA Clean Air Strategy

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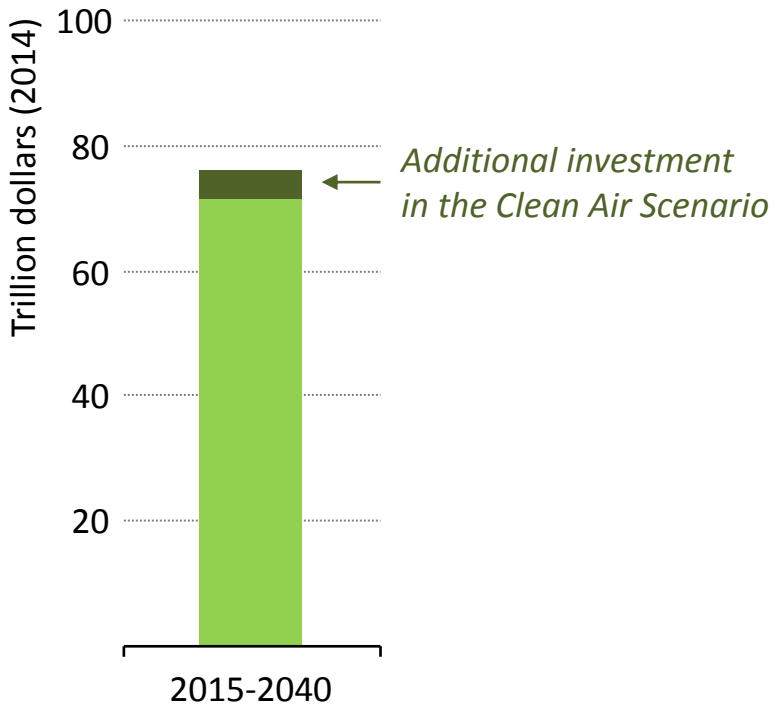
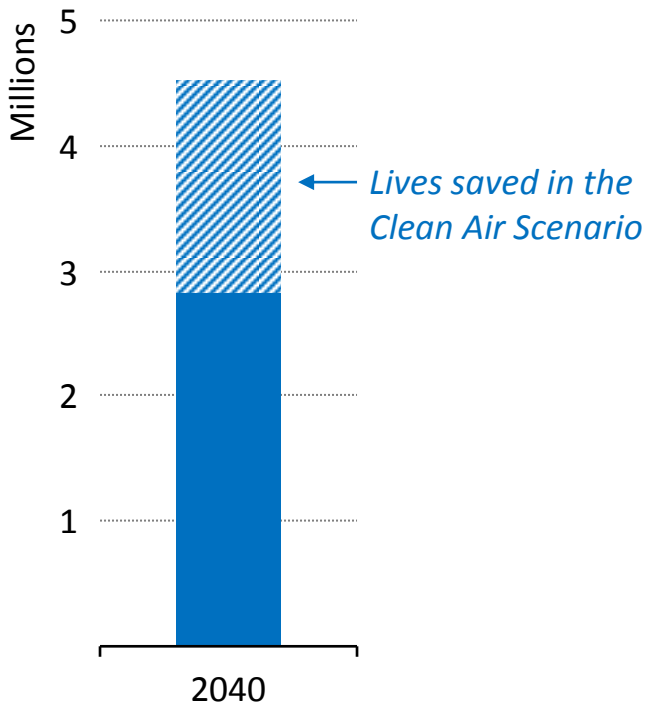
Cumulative investment



Premature deaths from outdoor air pollution



A 7% increase in investment can save over 3 million lives in 2040, while providing energy access for all, lower energy import bills and leading to a peak in CO_2 by 2020

The IEA Clean Air Strategy

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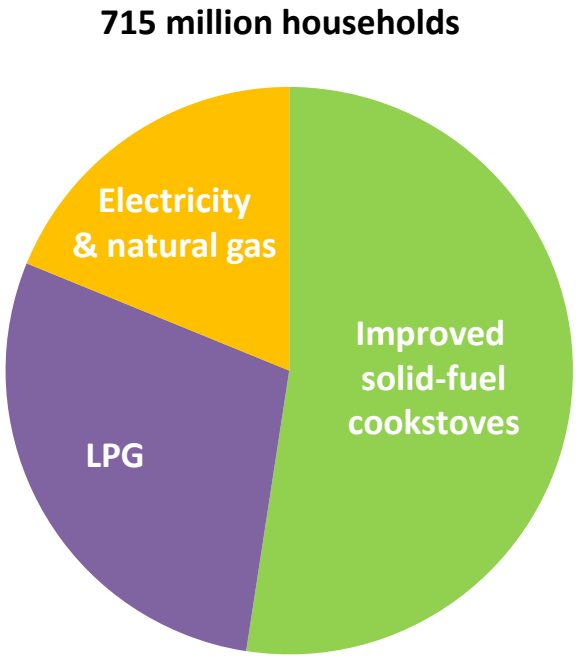
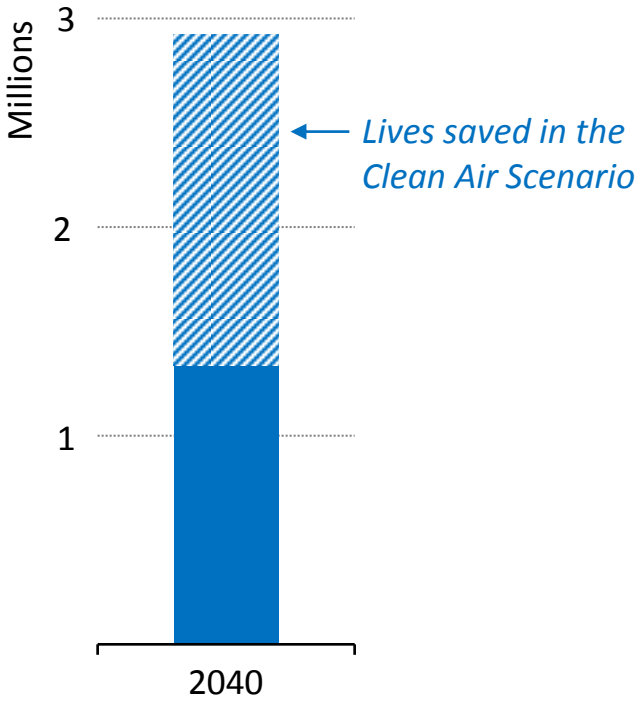
Improvement in cooking methods, 2040



Premature deaths from indoor air pollution



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Conclusions

- The impacts of air pollution are concentrated in fast-growing Asia & in Africa, but no country has solved the problem entirely
- The overall death toll still rises, despite post-COP decarbonisation policies & targeted pollution measures that mitigate pollution trends
- IEA's Clean Air Strategy cuts 2040 pollutant emissions & premature deaths by around half, with only a 7% increase in investment
- A well-designed air quality strategy will have major co-benefits for other policy goals, including energy access & climate change
- IEA will continue to promote integrated policy approaches as it strengthens its role as a global hub for clean & efficient energy

The IEA works around the world to support an accelerated clean energy transition that is

enabled by real-world SOLUTIONS

supported by ANALYSIS

and built on DATA