

OCTOBER 2022

# Working Group III Climate Change Mitigation

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# Climate Change 2022

## Mitigation of Climate Change



278 Authors + 354 contributing authors



65 Countries



41% Developing countries  
59% Developed countries



29 % Women /  
71 % Men



More than  
18,000 scientific papers



59,212 Review  
comments



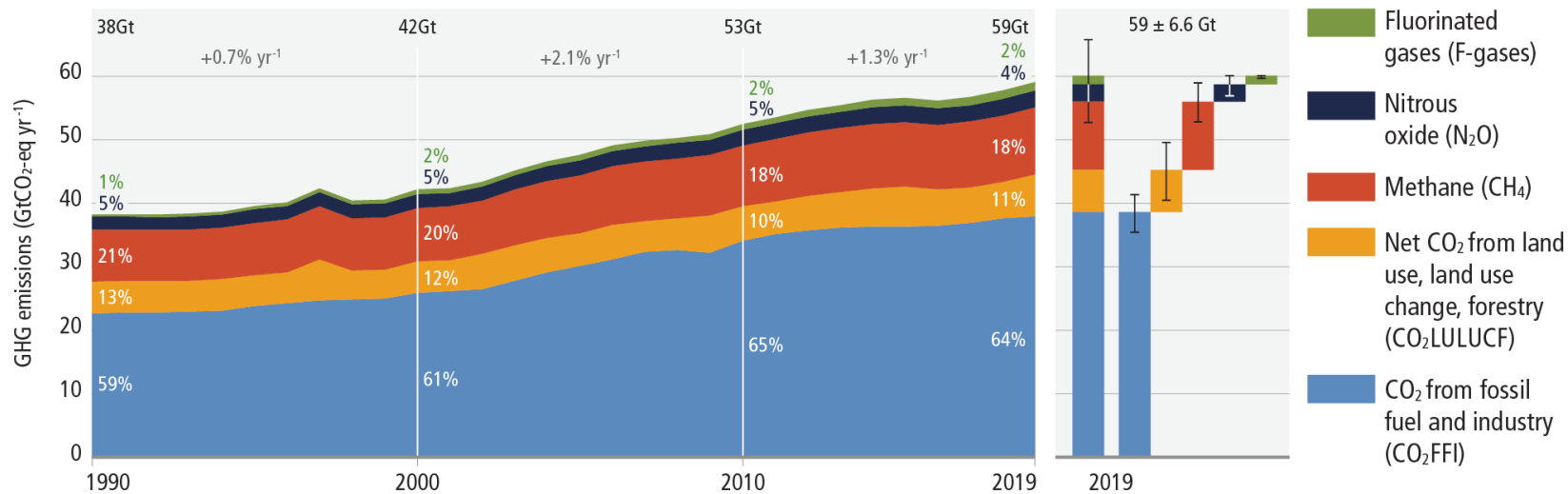
Working Group III contribution to the  
Sixth Assessment Report of the  
Intergovernmental Panel on Climate Change



# 2010-2019: Average annual greenhouse gas emissions at highest levels in human history ...

Global net anthropogenic emissions have continued to rise across all major groups of greenhouse gases.

a. Global net anthropogenic GHG emissions 1990–2019 <sup>(5)</sup>



- 2019 emissions 12% higher than in 2010 and 54% higher than in 1990.
- Emissions growth slowed from 2.1%/yr for 2000-2009 to 1.3%/yr for 2010-2019.
- Decarbonisation of energy is progressing far too slow at the global scale compared to what we see in 1.5°C and 2°C scenarios.
- Carbon emissions across the last decade are about the same size than the remaining carbon budget for keeping global warming to 1.5°C with a 50% probability.

## ... but there is increased evidence of climate action



Growing number of countries have achieved a **steady decrease** in emissions **consistent** with limiting warming to **2°C**.



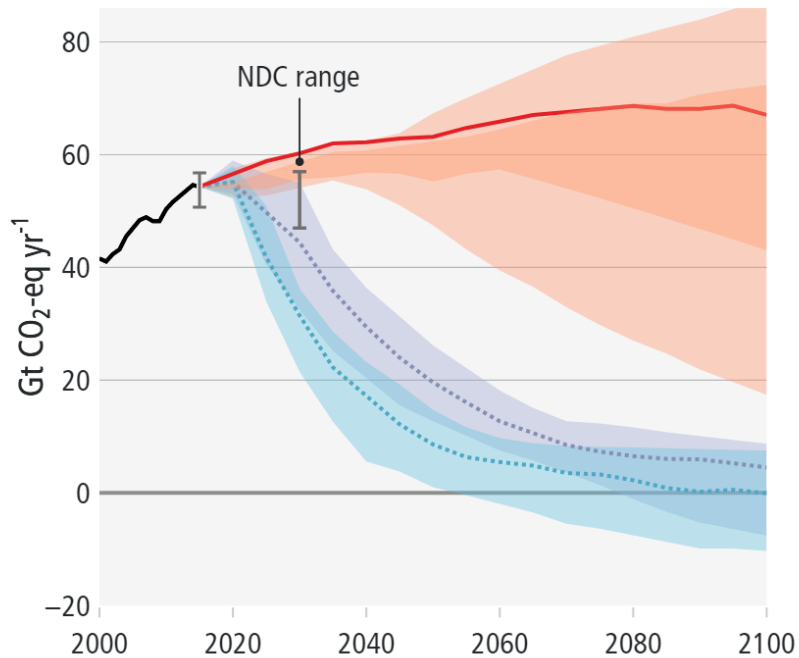
**Zero emissions targets** have been adopted by at least **826 cities** and **103 regions**

“

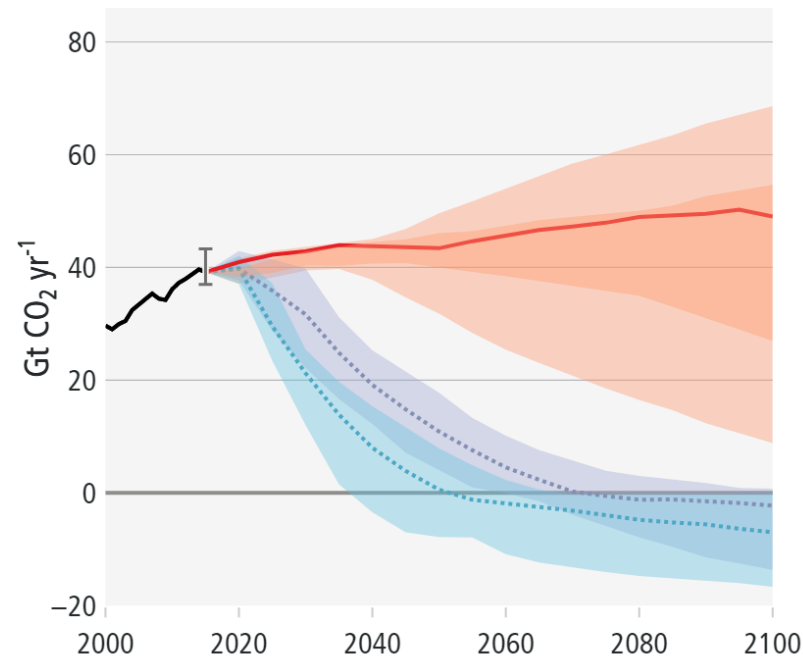
**Unless there are immediate and deep emissions reductions across all sectors, 1.5°C is beyond reach.**

# Rapid, deep and immediate GHG emissions reductions needed to limit warming to 2°C (>67%; C3) or 1.5°C (>50%) with no or limited overshoot (C1)

a. Net global GHG emissions

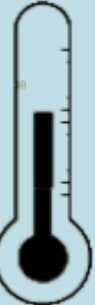


b. Net global CO<sub>2</sub> emissions



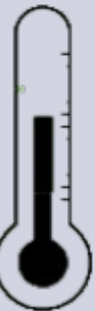
## 1.5°C (>50%):

- Emissions peak before 2025
- ~45% GHG reduction in 2030
- ~50% CO<sub>2</sub> reduction in 2030
- ~34% CH<sub>4</sub> reduction in 2030
- Net zero CO<sub>2</sub> in early 2050s



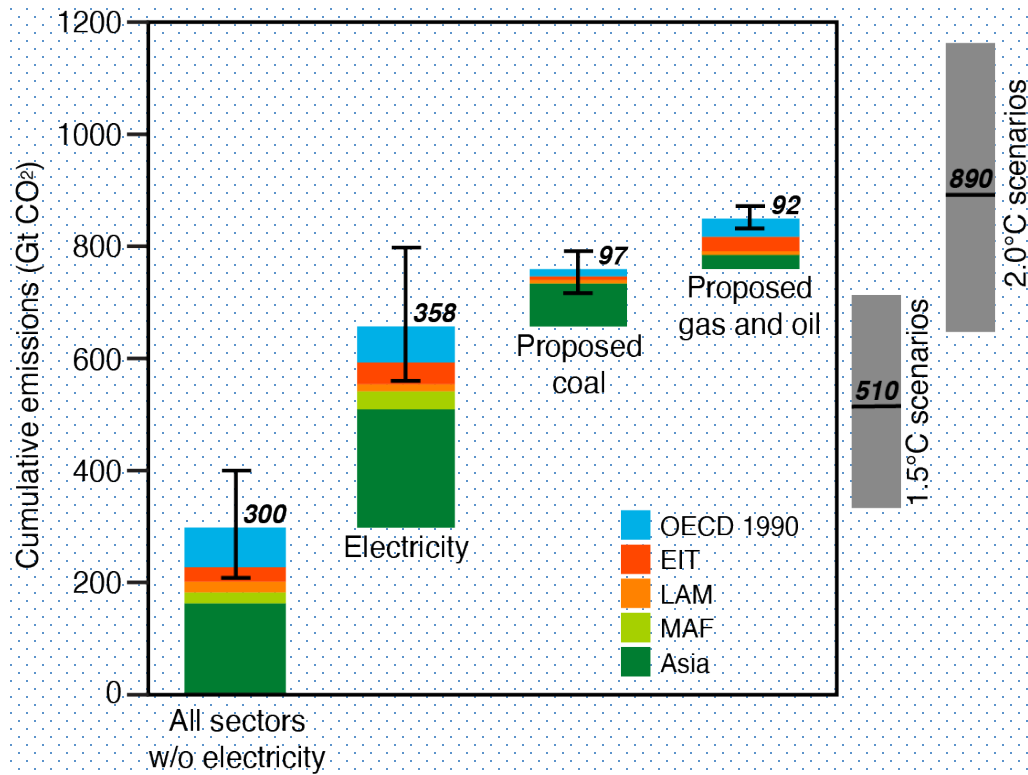
## 2°C (>67%) with immediate action:

- Emissions peak before 2025
- ~27% GHG reduction in 2030
- ~27% CO<sub>2</sub> reduction in 2030
- ~24% CH<sub>4</sub> reduction in 2030
- Net zero CO<sub>2</sub> in early 2070s



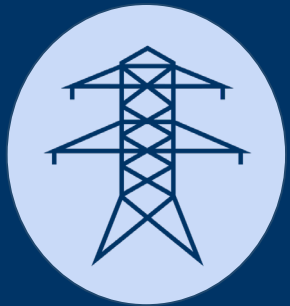
# Current fossil-fuel infrastructure vs. limiting warming to 2°C or lower

NEW COAL-POWER PLANTS (WITHOUT CCS) INCONSISTENT WITH „PARIS-CONSISTENT“ PATHWAYS



- Emissions from existing and planned fossil fuel infrastructure alone are higher than those consistent with limiting warming to 1.5°C.
- They are approximately equal to those with limiting warming to 2°C.
- Largest discrepancy in emissions from power sector infrastructure.
- Aligning emissions in the power sector involves decommissioning and reduced utilization of existing infrastructure, switching to low carbon fuels and cancellation of new coal power installations without CCS.

There are options available **now** in every sector that together can at least **halve** emissions by 2030



**Energy**



**Land use**



**Industry**



**Urban &  
buildings**



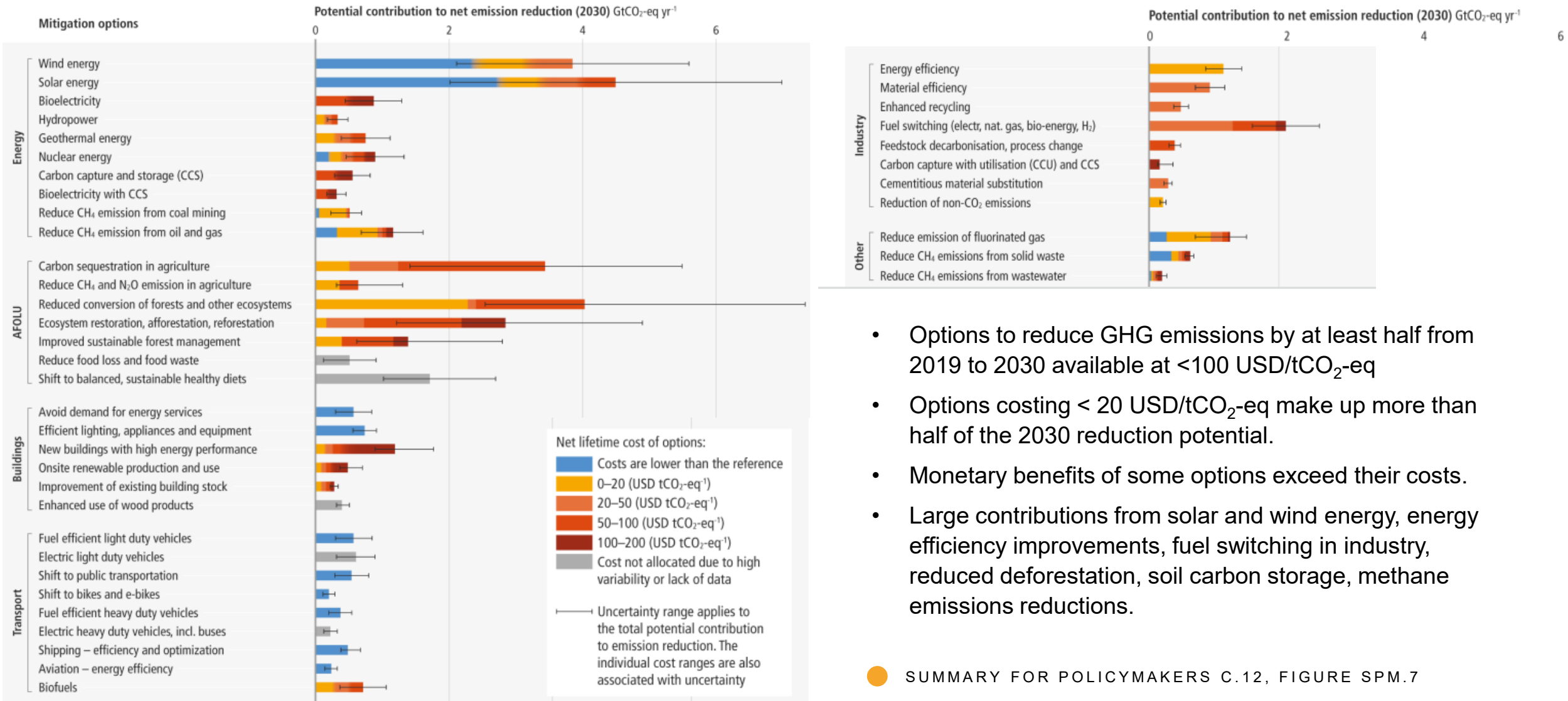
**Transport**



**Demand  
& services**



# Considerable mitigation potential <100USD/tCO<sub>2</sub>-eq in 2030



- Options to reduce GHG emissions by at least half from 2019 to 2030 available at <100 USD/tCO<sub>2</sub>-eq
- Options costing < 20 USD/tCO<sub>2</sub>-eq make up more than half of the 2030 reduction potential.
- Monetary benefits of some options exceed their costs.
- Large contributions from solar and wind energy, energy efficiency improvements, fuel switching in industry, reduced deforestation, soil carbon storage, methane emissions reductions.

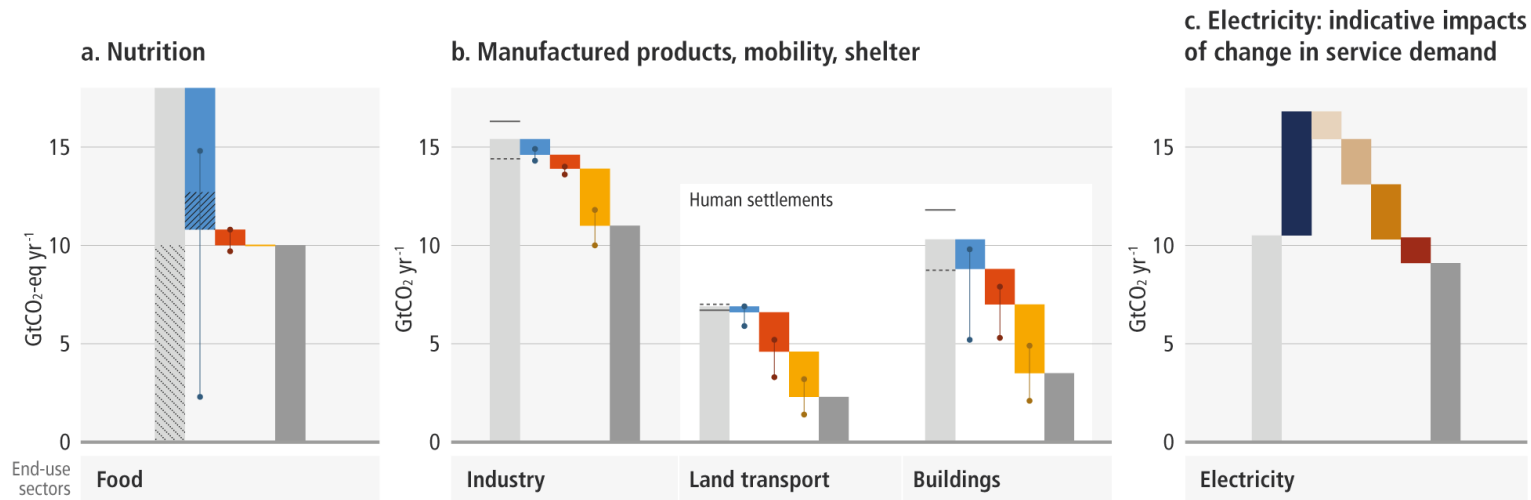


## Demand & services

# Demand-side measures can reduce end-use sector GHG emissions by 40-70% in 2050 and improve human well-being

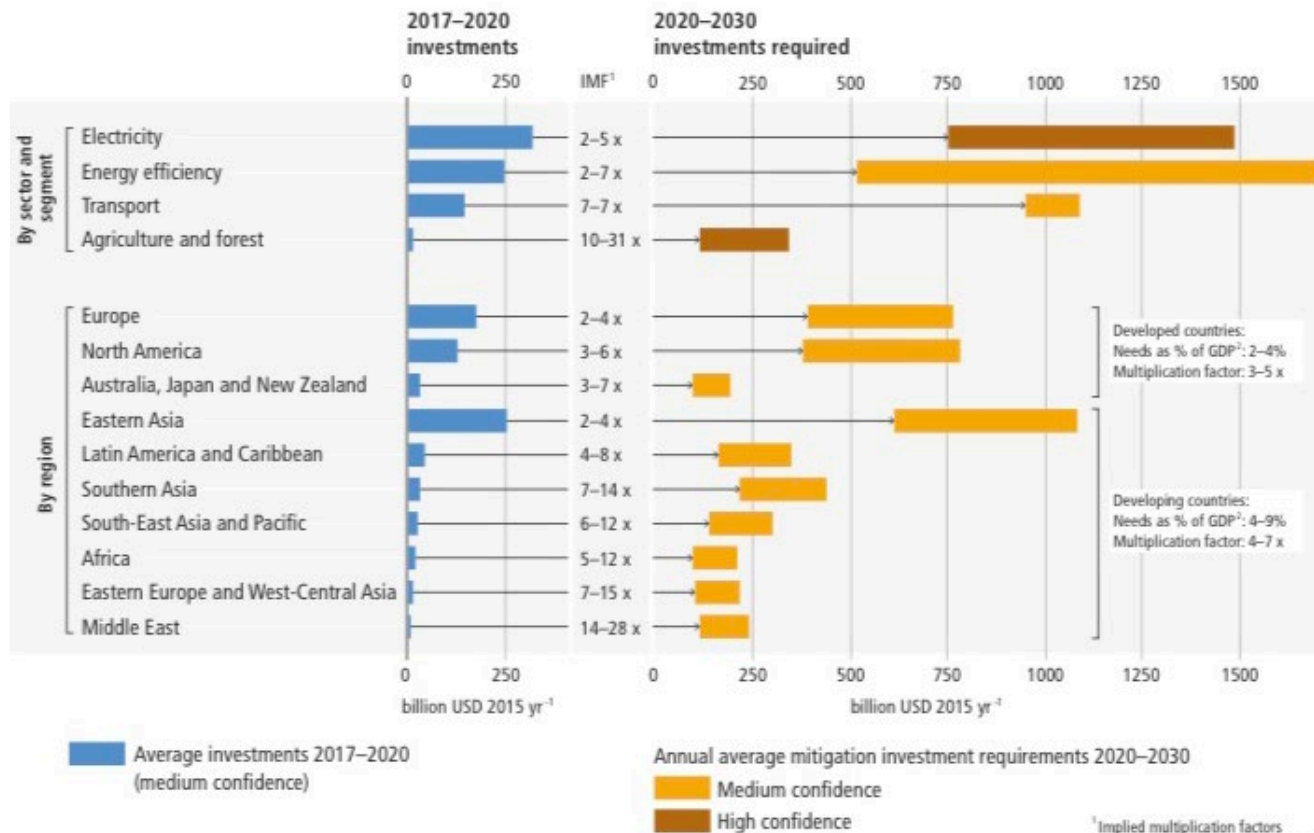
Demand-side mitigation can be achieved through changes in socio-cultural factors, infrastructure design and use, and end-use technology adoption by 2050.

- Enabled by a combination of effective policies, improved infrastructure and technologies leading to behavioural change
- Technologies and infrastructure can help individuals to lead low-carbon lifestyles (e.g. energy-efficient buildings; make walking & cycling, car-sharing & access to public transport easier).
- The way choices are presented can influence decision-making (e.g. plant-based diets; food waste).



# Closing the investment gap

Mitigation investments need to increase significantly across all sectors and segments, particularly in developing countries.



- financial flows for deployment of mitigation technologies: 3-6x lower than average levels needed between 2020- 2030 to limit warming to below 1.5°C or 2°C
- there is sufficient global capital and liquidity to close investment gaps
- challenge of closing gaps is widest for developing countries



We are still stuck in the age of fossil fuels



There are still pathways to 1.5°C and 2°C, but we are running out of time

This decade is crucial, for immediate and deep emission reduction



Need to enter an age of climate solutions.

The options to get us on track are available and affordable, but need to be supported by adequate climate policies.



# Thank you

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