INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2014

Mitigation of Climate Change

Sectoral mitigation strategies and possible co-benefits of mitigation

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LA of IPCC WGIII AR5: SPM, TS, and Chapter 7

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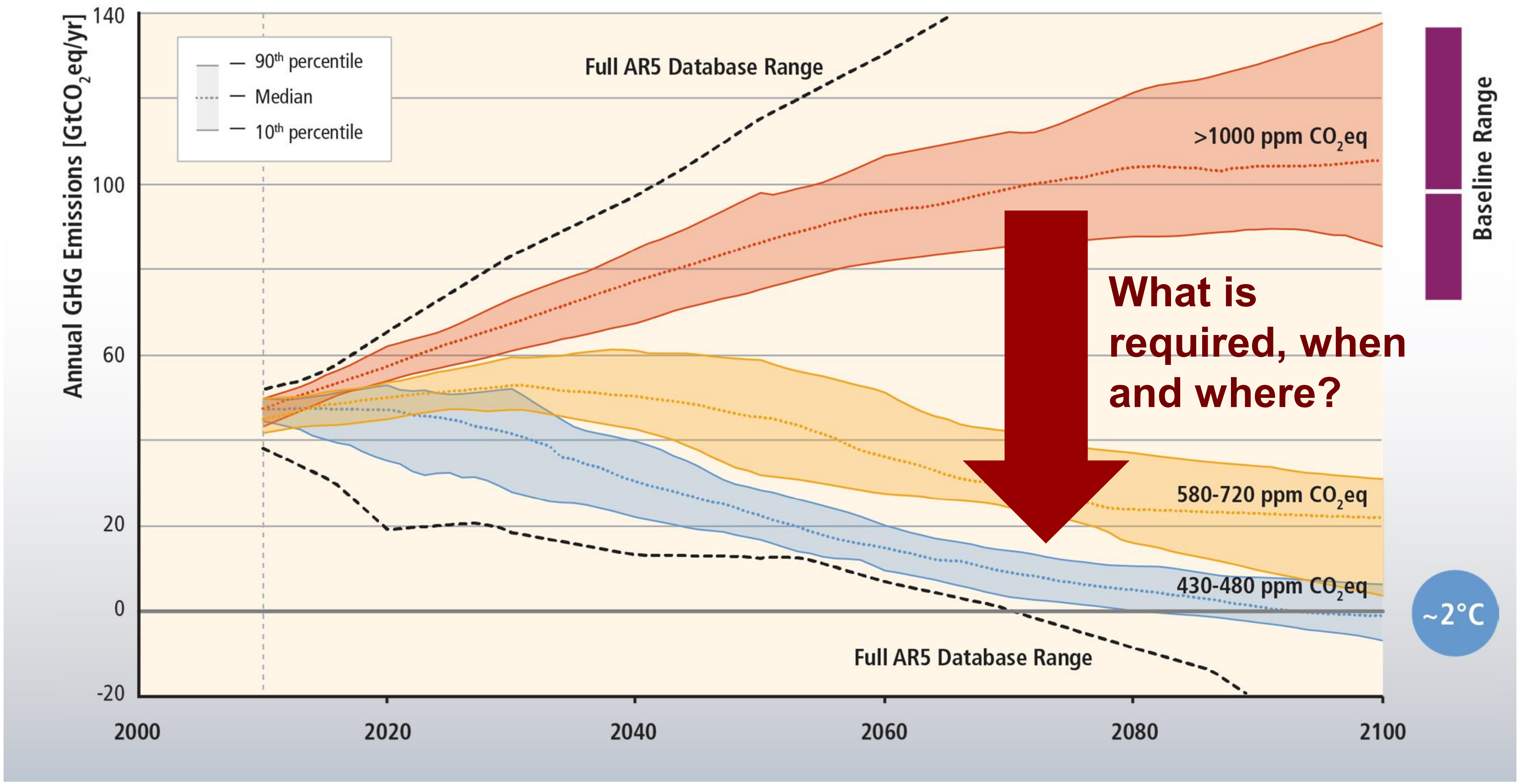
Working Group III contribution to the
IPCC Fifth Assessment Report

WMO UNEP

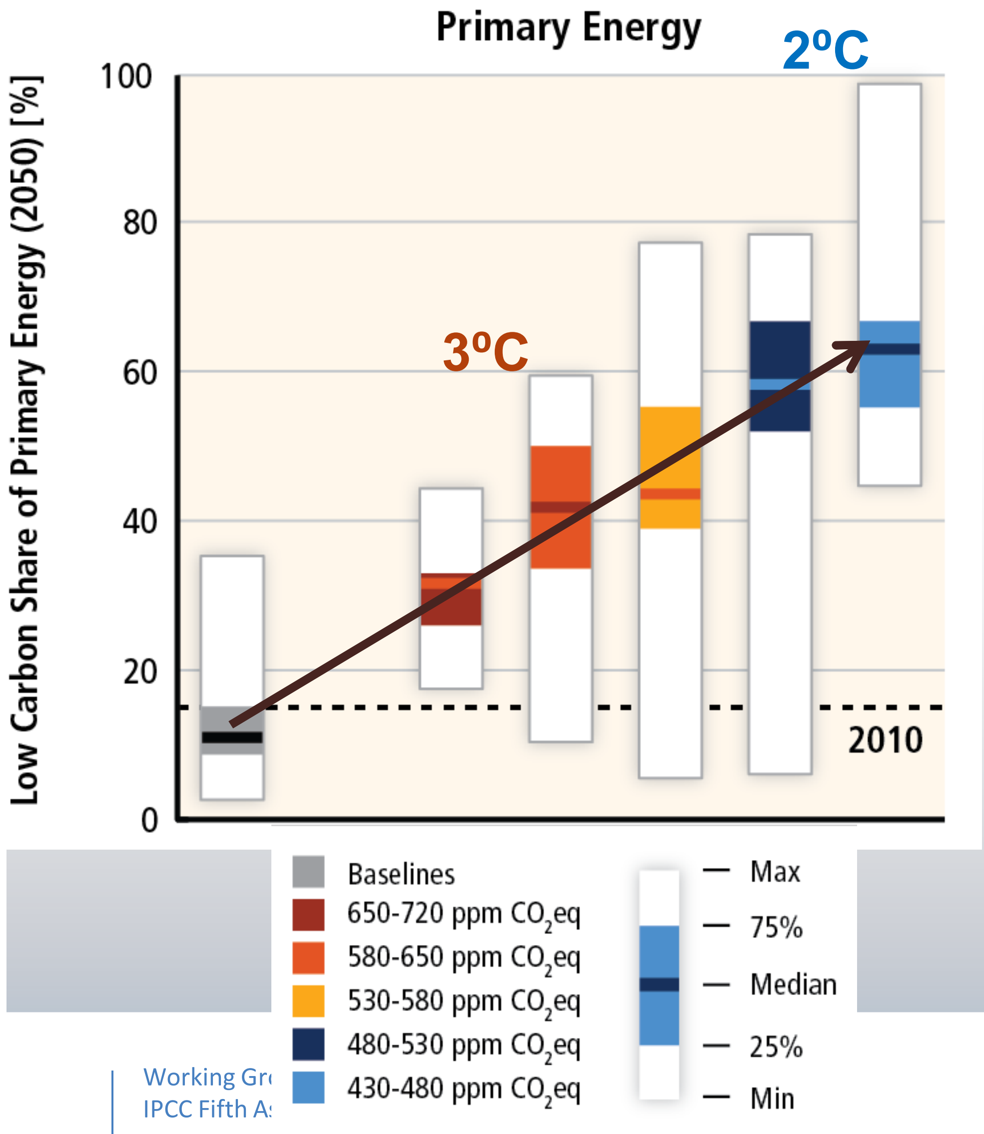
Stabilization of atmospheric concentrations requires moving away from the baseline – regardless of the mitigation goal.



REQUIREMENTS (1)

Transformation of the energy supply sector

Reaching low stabilization levels requires the upscaling of low-carbon energy supply



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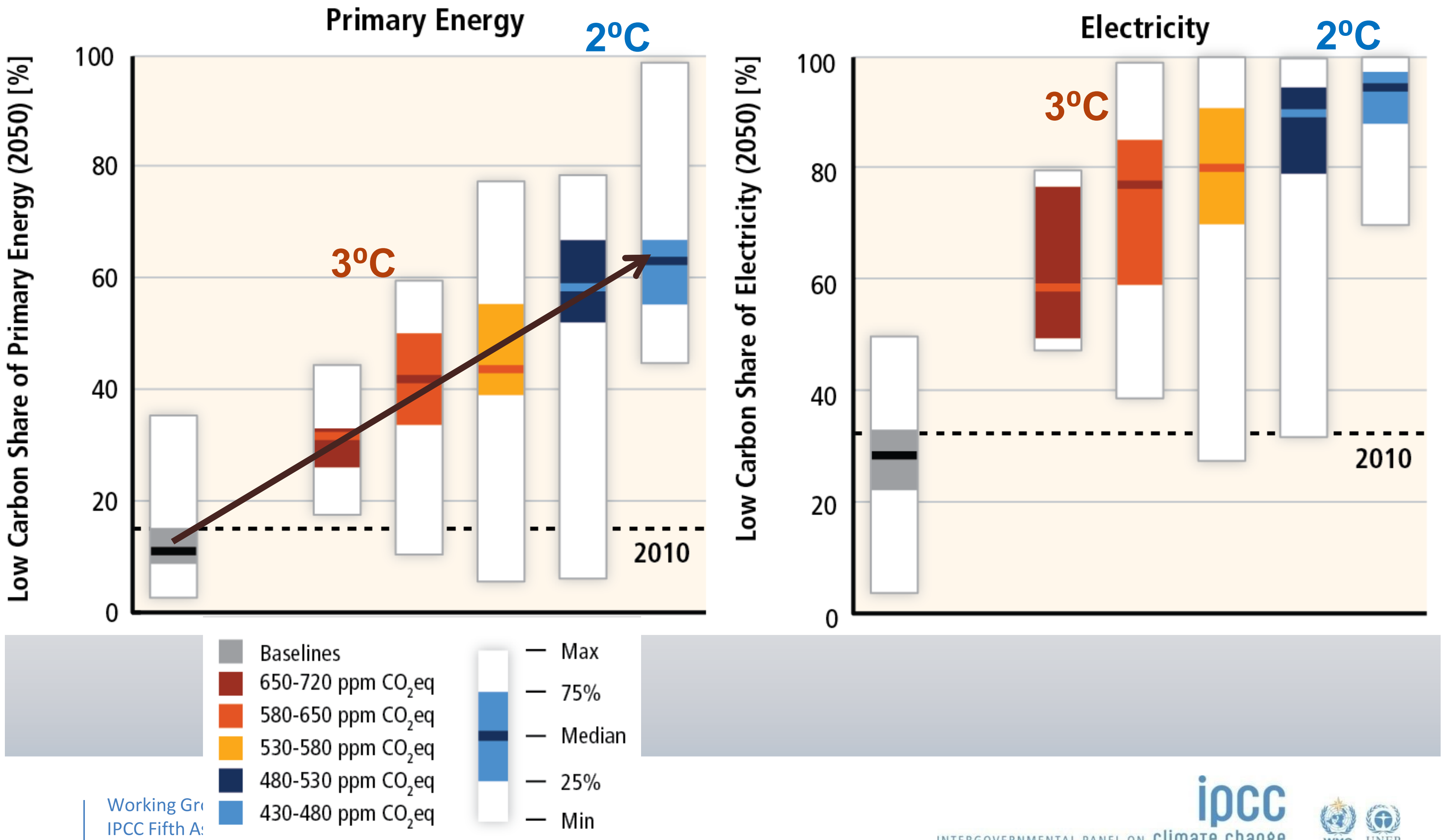

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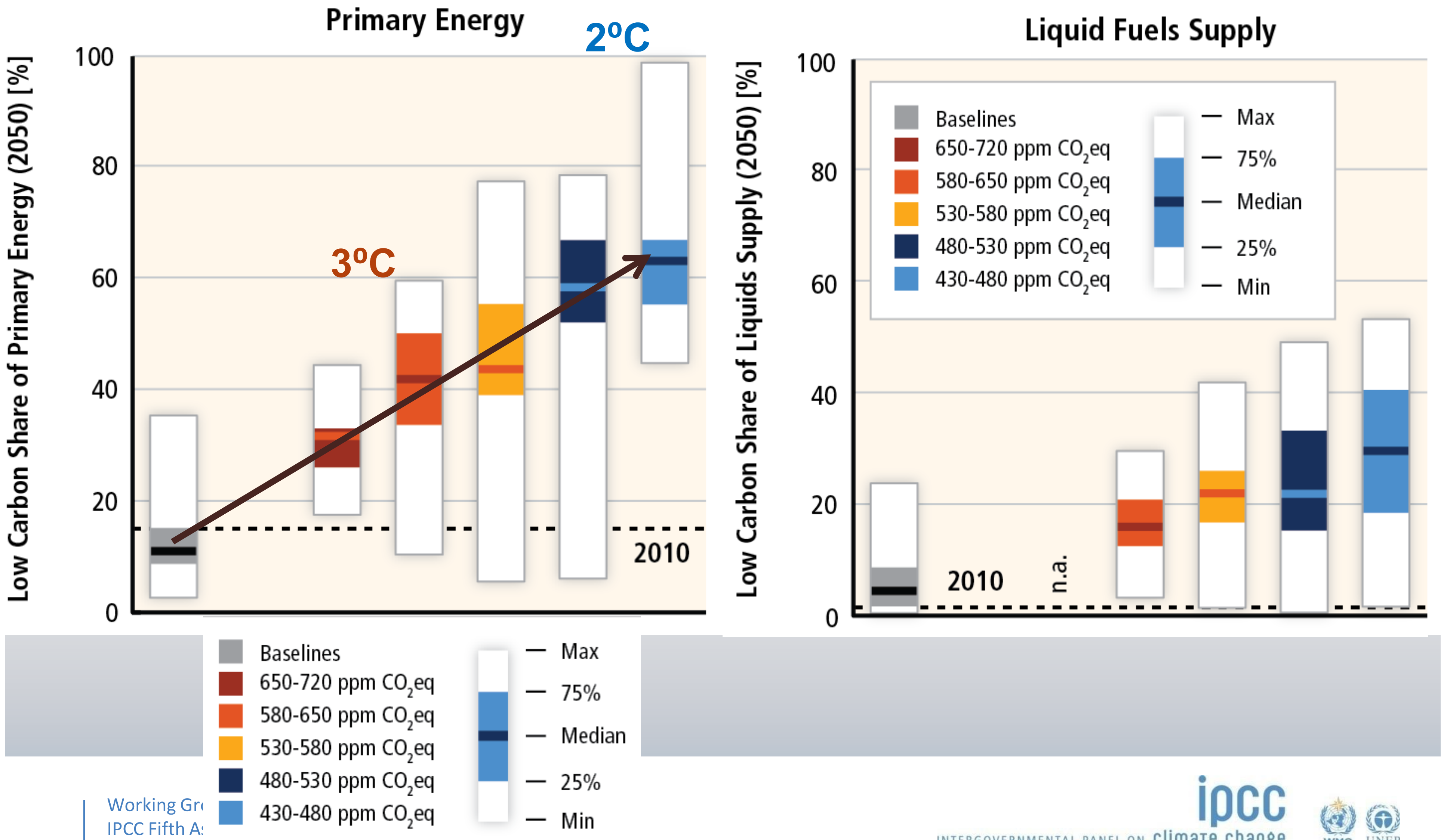
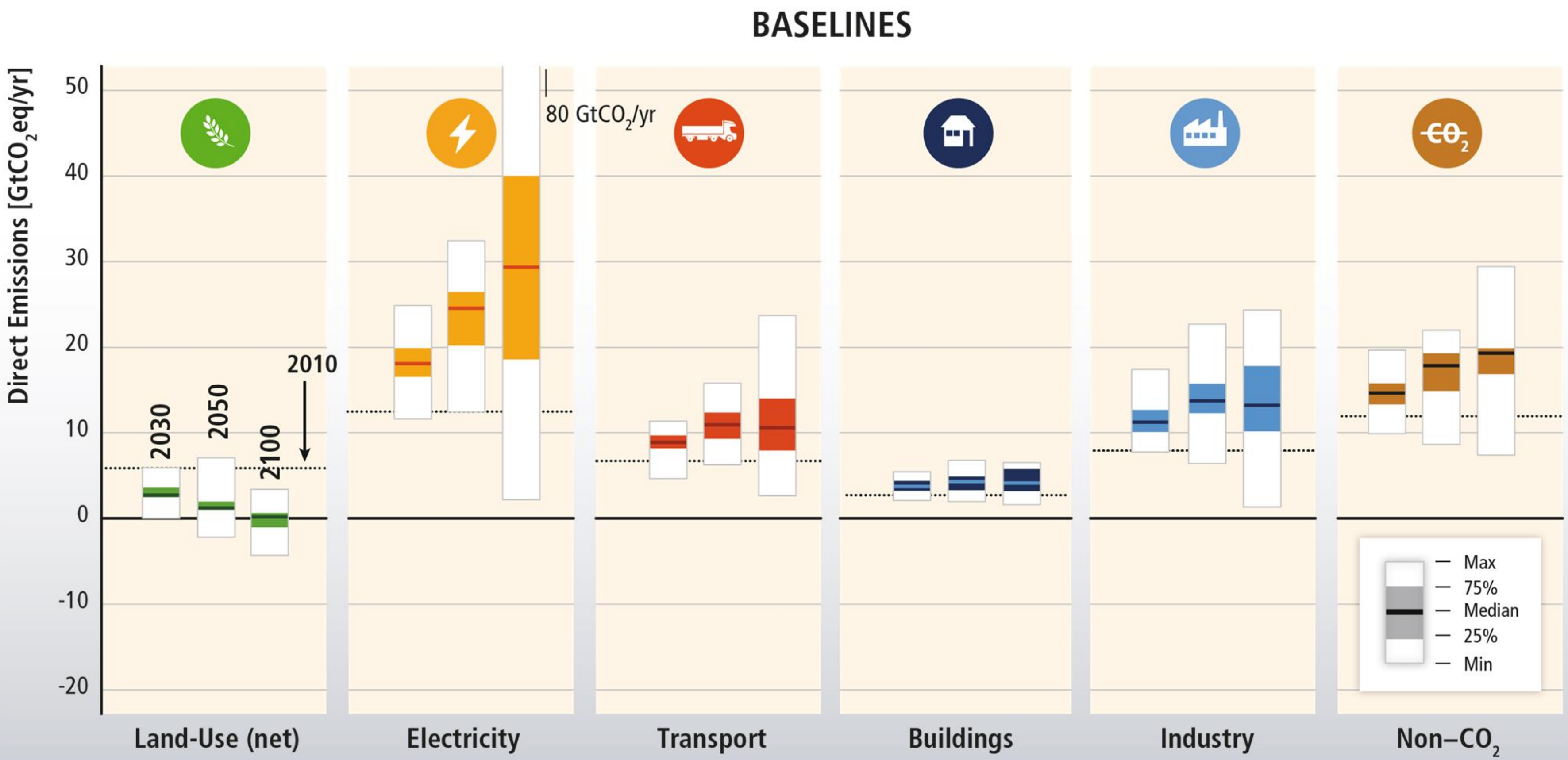


Mitigation requires changes throughout the economy. Efforts in one sector determine mitigation efforts in others.



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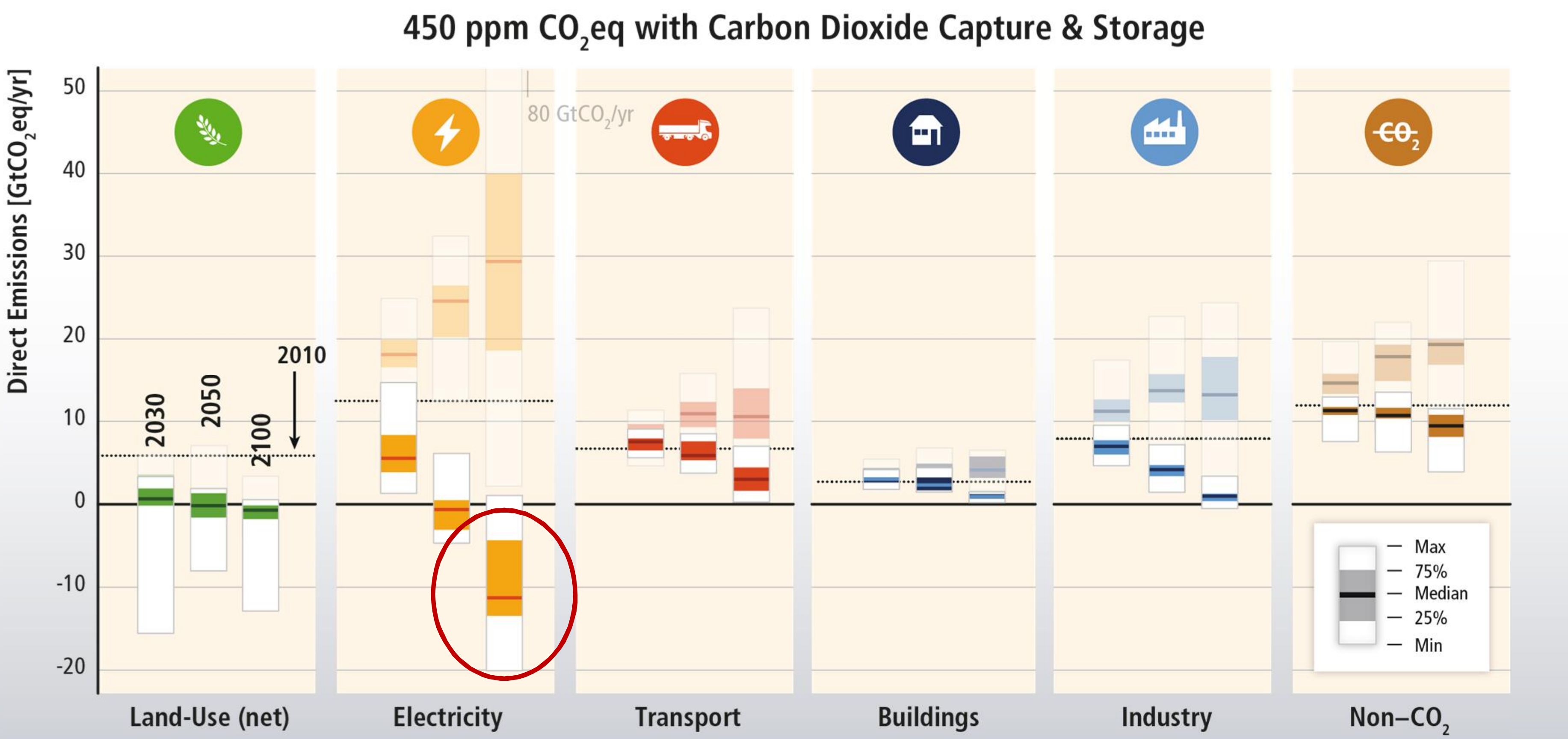

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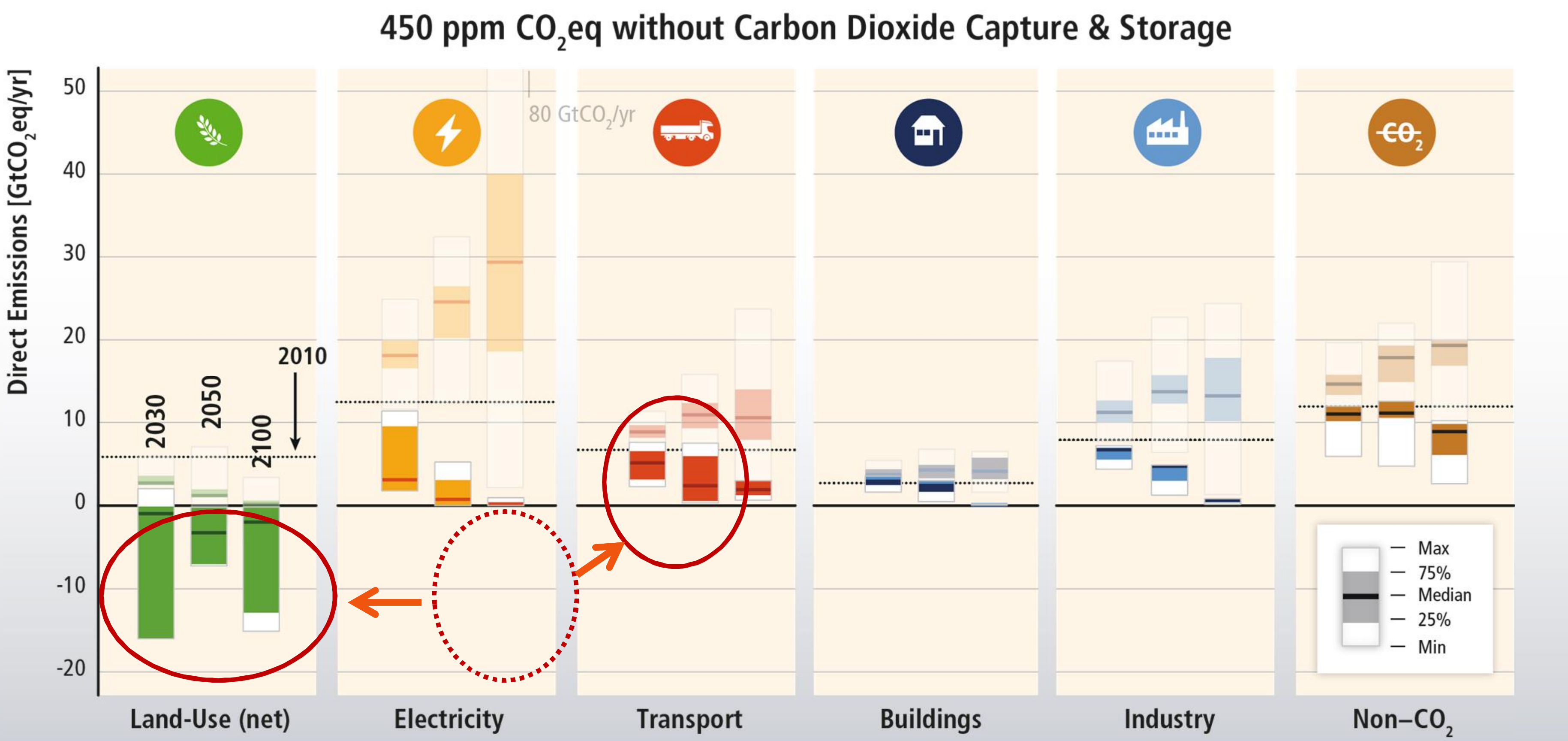
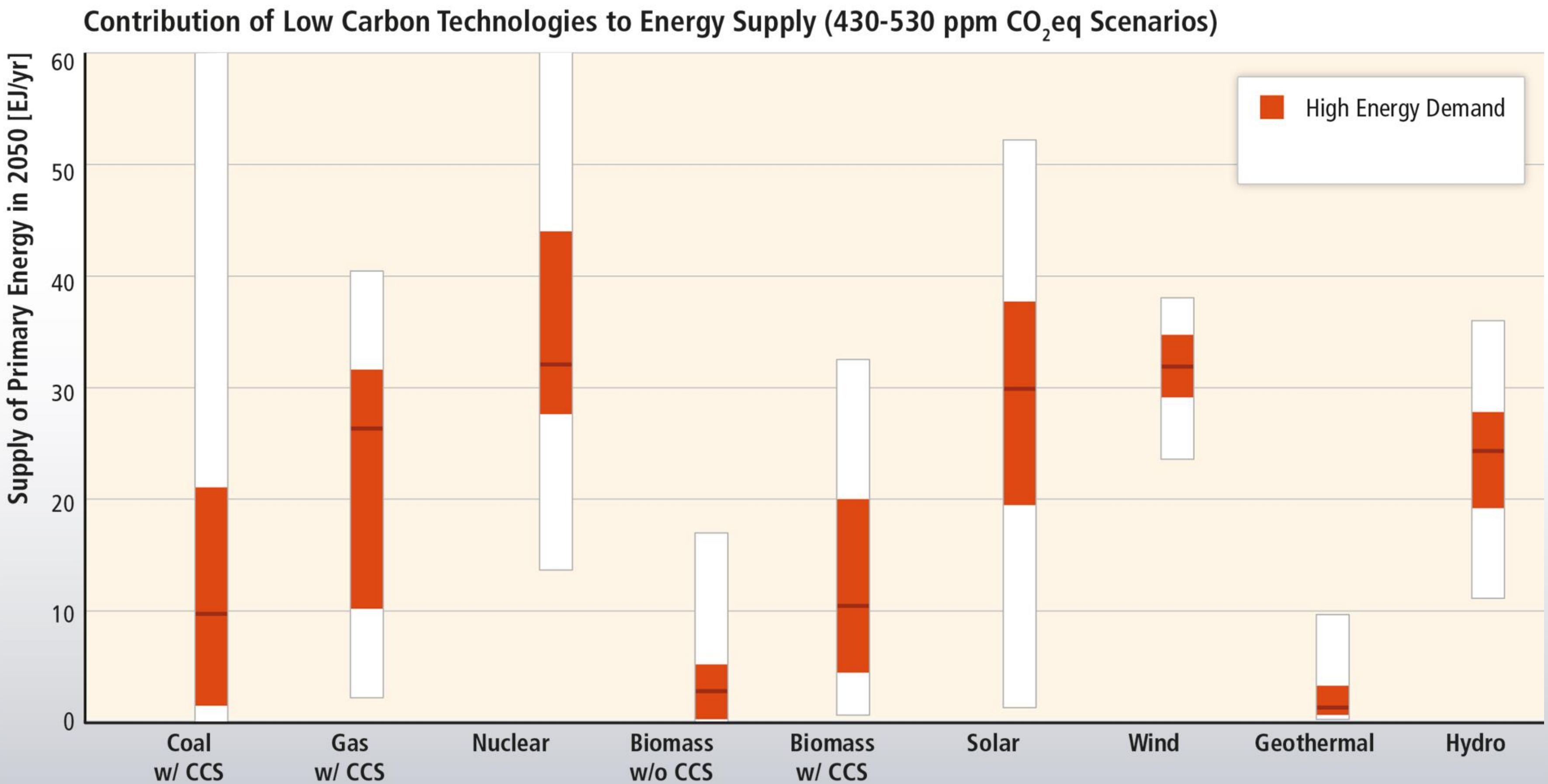


Decarbonization of energy supply is a key requirement for stabilizing atmospheric CO_2eq concentrations below 580 ppm.



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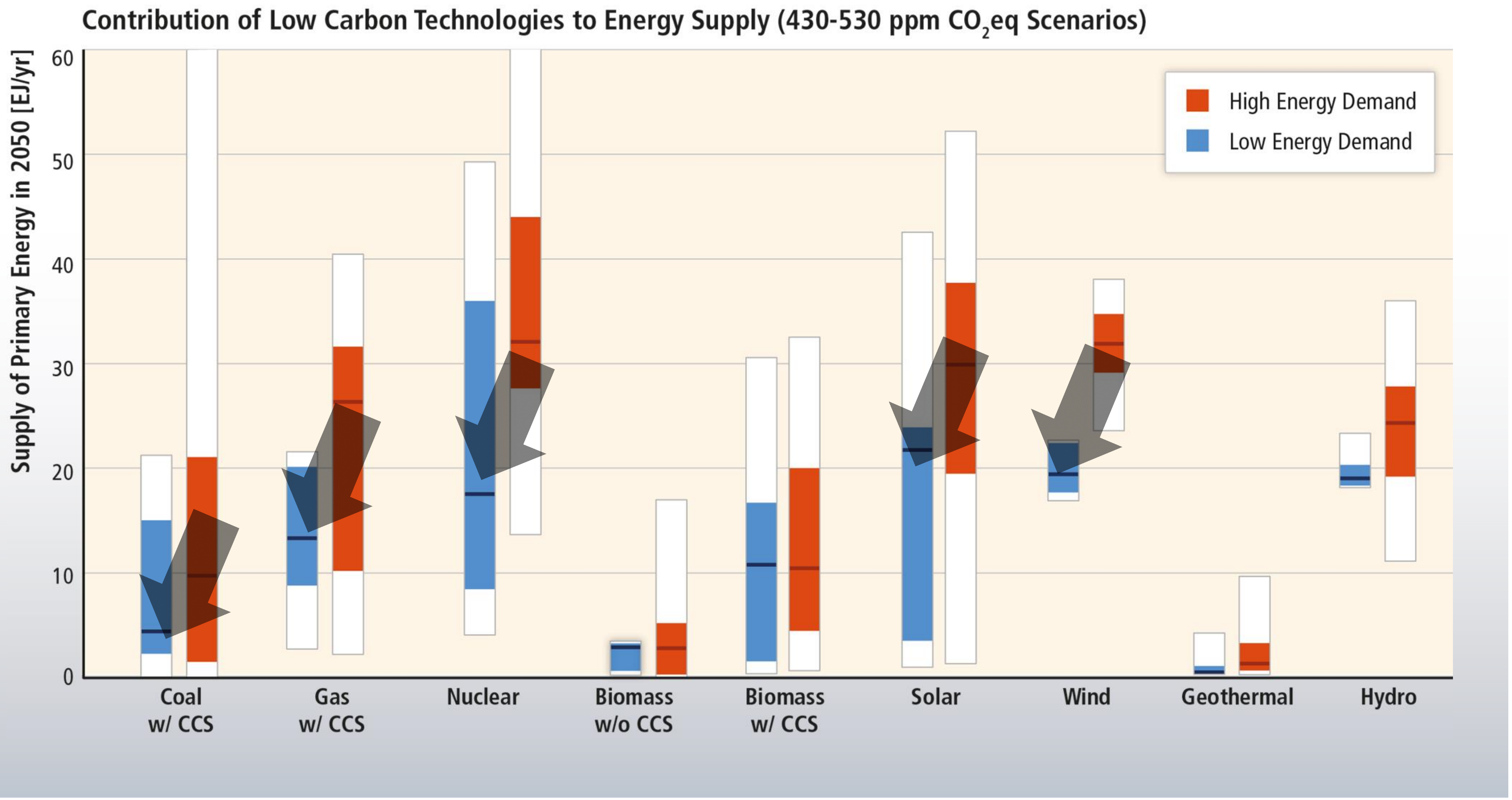
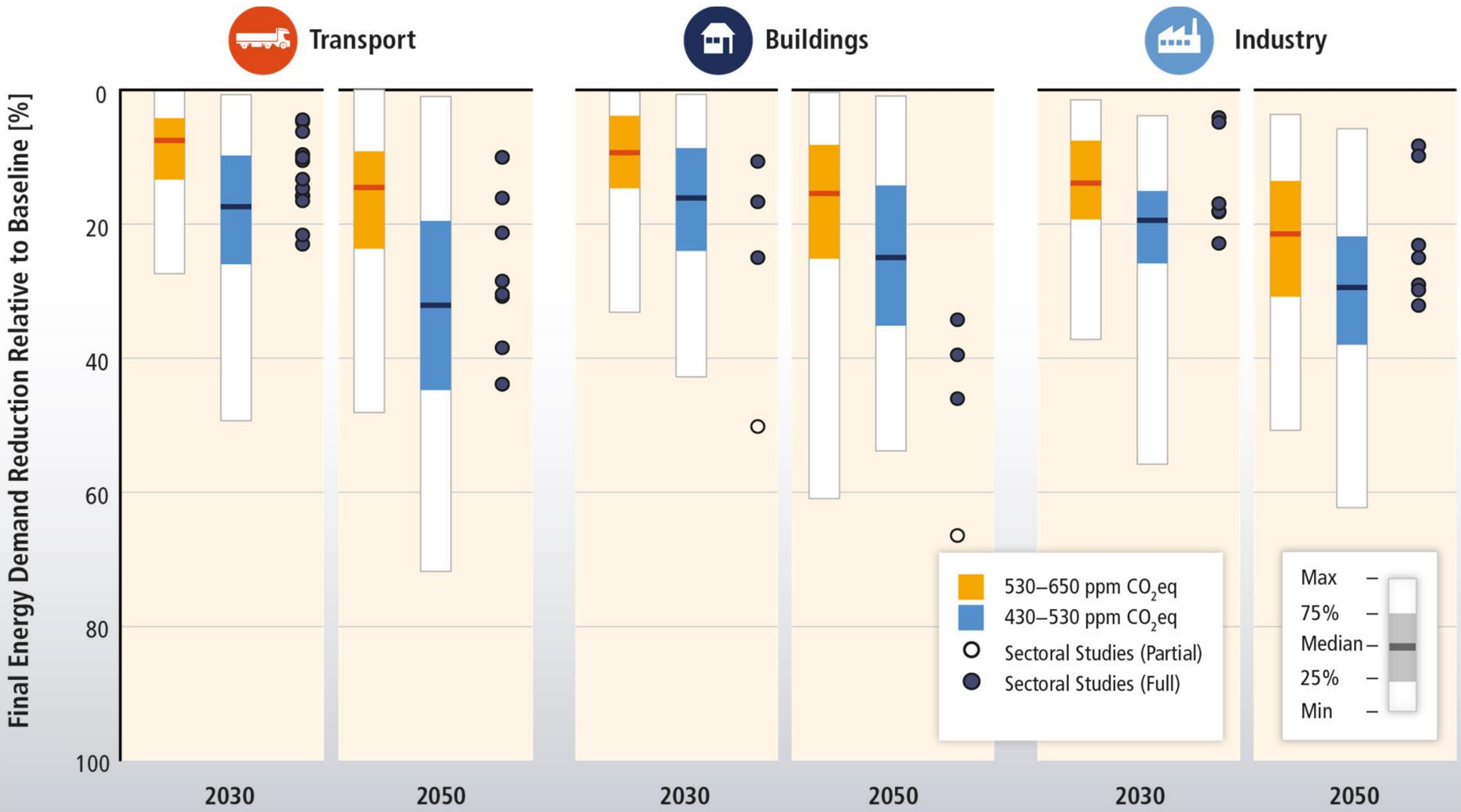


REQUIREMENTS (2)

Supply-side mitigation needs to be complemented by efficiency and decarbonization of end-use sectors

Reducing energy demand through efficiency enhancements and behavioural changes are a key mitigation strategy.



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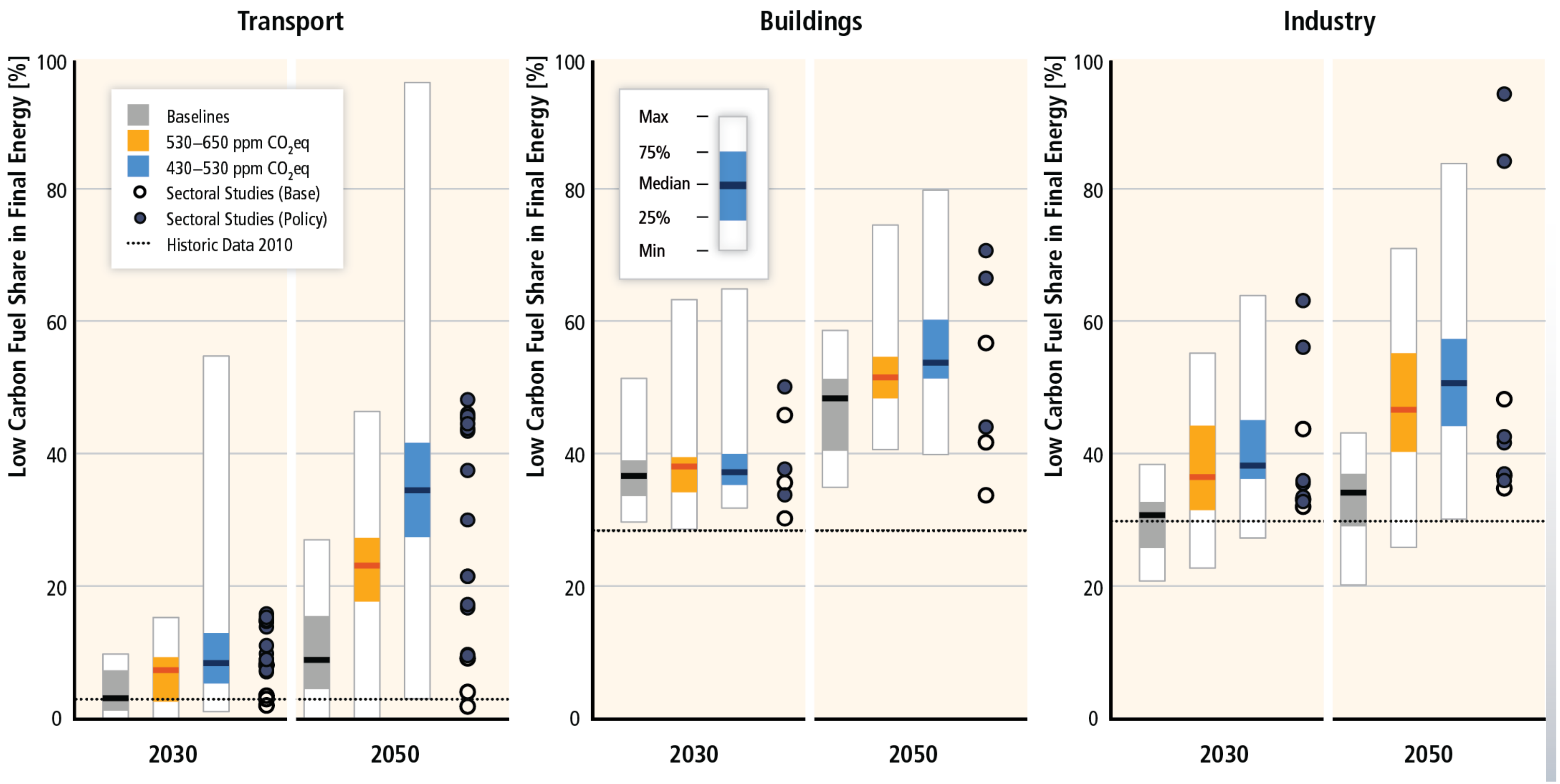
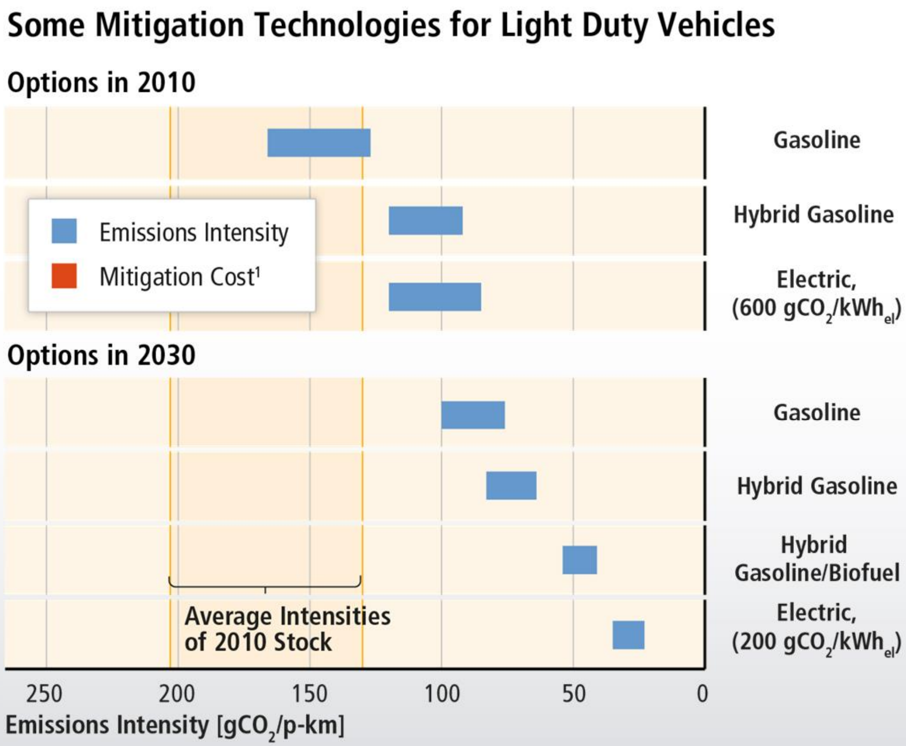
Low-carbon energy share in end-use sectors



Example transport: many technologies can achieve substantial emission reductions.



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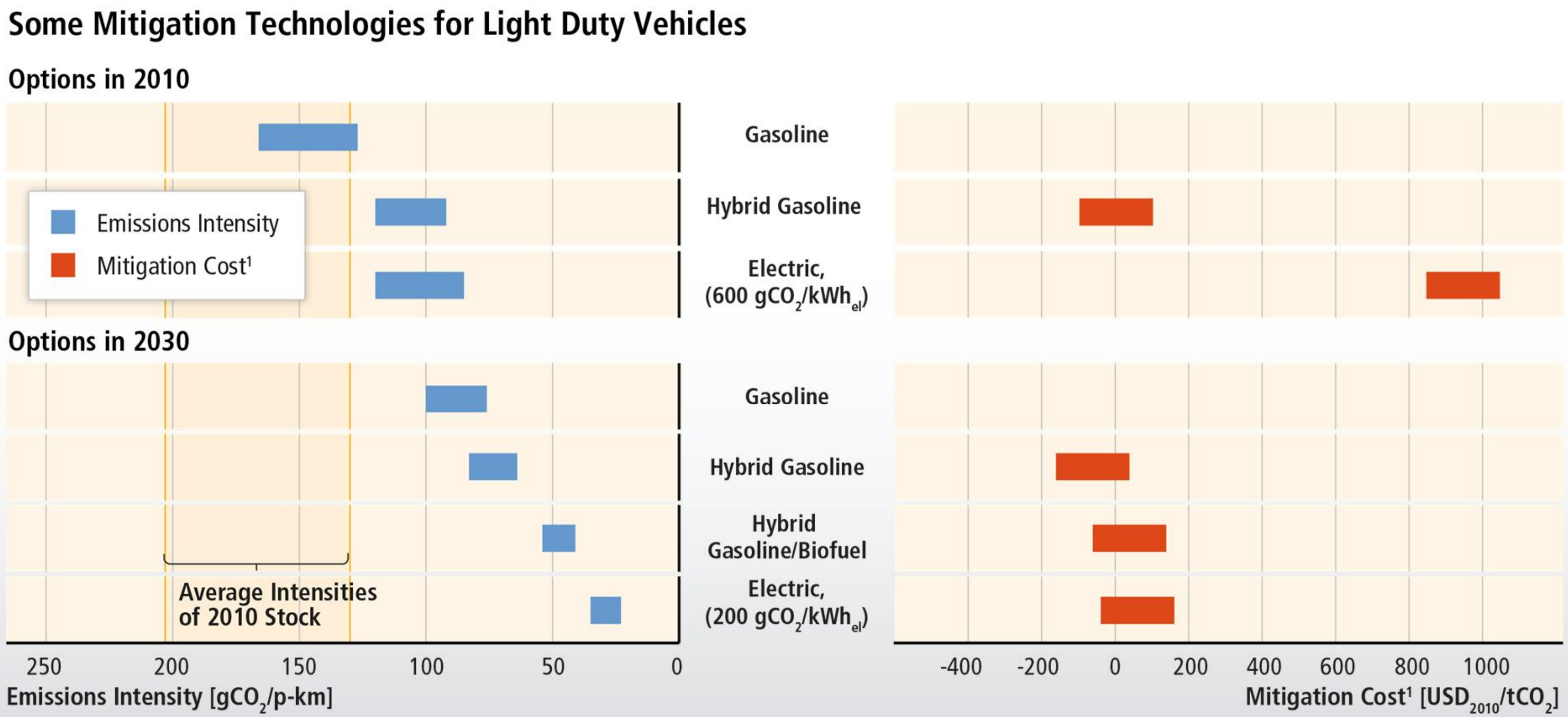


[1] Levelized cost of conserved carbon; calculated against 2010 new gasoline (2030 optimized gasoline) for 2010 (2030) options. Mitigation cost are based on point estimates ±100 USD_{2010}/tCO2 and are highly sensitive to assumptions.

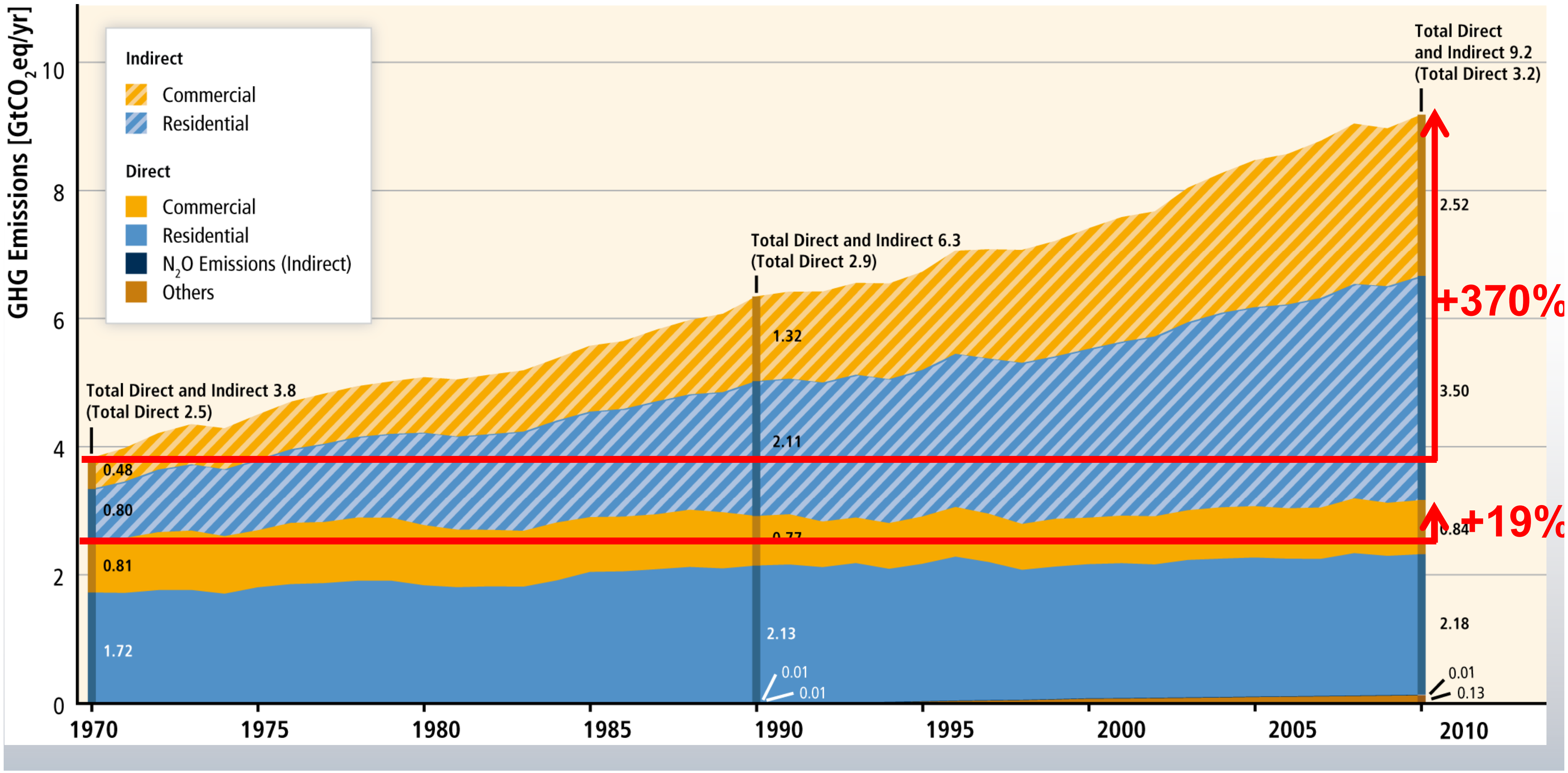
Transport Sector

- **Technical and behavioral mitigation measures** for all transport modes, plus **new infrastructure and urban redevelopment investments**, could reduce final energy demand in 2050 by around 40 % below the baseline
- Projected **energy efficiency and vehicle performance improvements** range from 30–50 % in 2030 relative to 2010 depending on transport mode and vehicle type
- Integrated **urban planning**, including more compact urban form and together with **investments in new infrastructure** (eg, high-speed rail) can lead to modal shifts that could reduce transport GHG emissions by 20–50 % in 2050 compared to baseline
- Strategies to reduce the carbon intensities of transport fuels are constrained by **challenges associated with energy storage and the relatively low energy density** of low-carbon transport fuels

Building Sector

- Recent advances in technologies, know-how and policies provide opportunities to **stabilize or reduce global buildings sector energy use** below current levels by 2050.
- Particularly for new buildings, the adoption of **very low energy building codes** is important. Building codes and appliance standards have been **among the most environmentally and cost-effective instruments** for emission reductions.
- **Retrofits** form a key part of the mitigation strategy with the possibility to achieve reductions of heating / cooling energy use by 50–90 % in individual buildings, sometimes even at negative costs.
- Most mitigation options for buildings have considerable and diverse **co-benefits in addition to energy cost savings**.
- **Strong barriers**, such as split incentives (e. g., tenants and builders), fragmented markets and inadequate access to information and financing, hinder the market-based uptake of cost-effective opportunities.

Direct and Indirect Emissions from the building sector

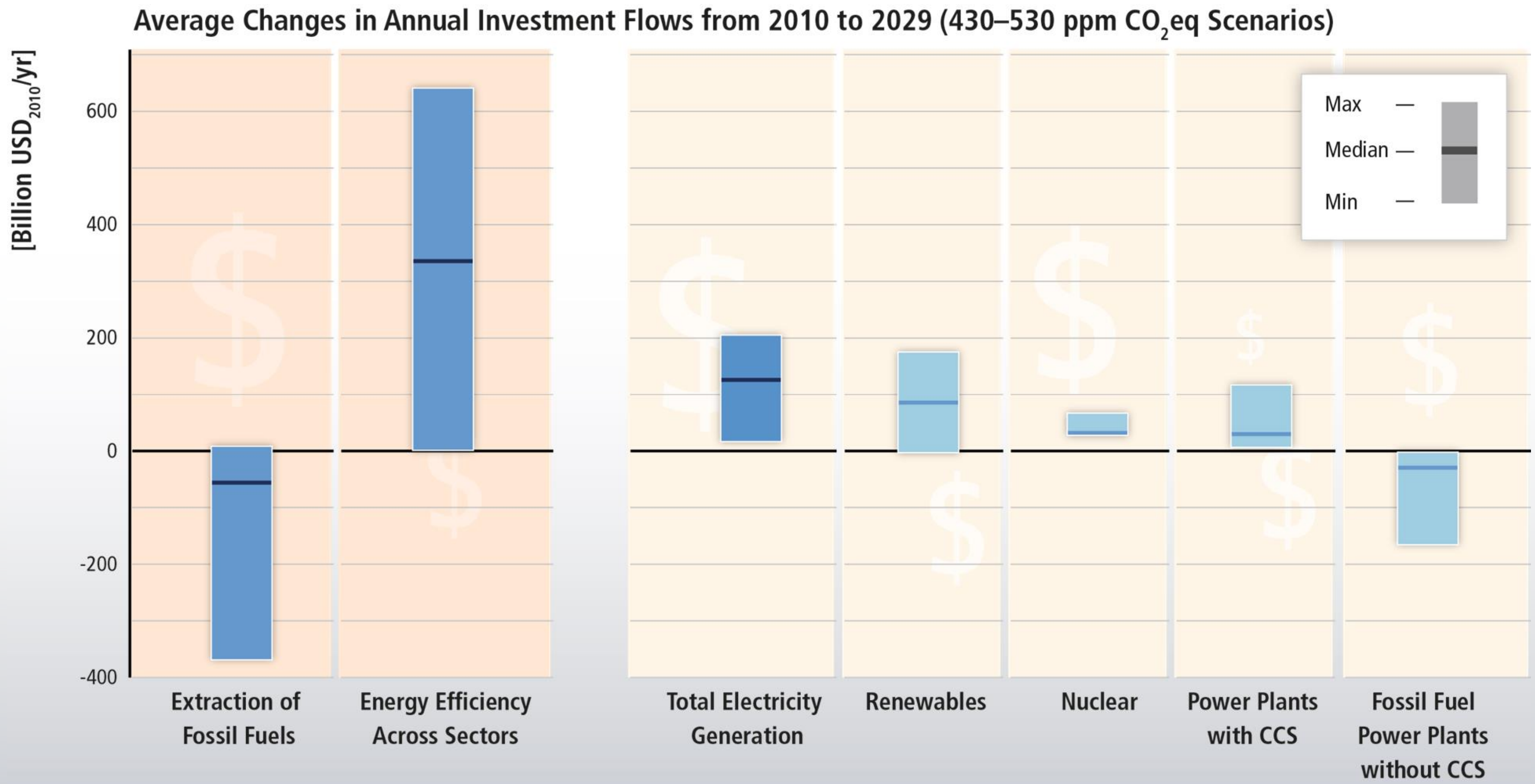


Industry Sector

- Energy **efficiency and behavioural changes** can result in significant emissions reductions in the short and medium term:
    - The energy intensity of the industry sector could be directly reduced by about 25 % compared to the current level through the wide-scale upgrading, replacement and deployment of best available technologies
    - Additional energy intensity reductions of about 20 % may potentially be realized through innovation significant GHG emission reductions.
- In the long term, a shift to **low-carbon electricity**, **new industrial processes**, radical **product innovations** (e. g., alternatives to cement), or **CCS** could contribute to significant GHG emission reductions.
- Important options for mitigation in waste management are **waste reduction, followed by re-use, recycling and energy recovery**
- Many industry options are **cost effective, profitable and associated with multiple co-benefits**
- **Barriers to implementing** energy efficiency relate largely to initial investment costs and lack of information.


REQUIREMENTS (3)
Achieving low stabilization levels requires substantial investments, which can lead to significant co-benefits for other local or national policy objectives

Substantial reductions in emissions would require large changes in investment patterns and appropriate policies.



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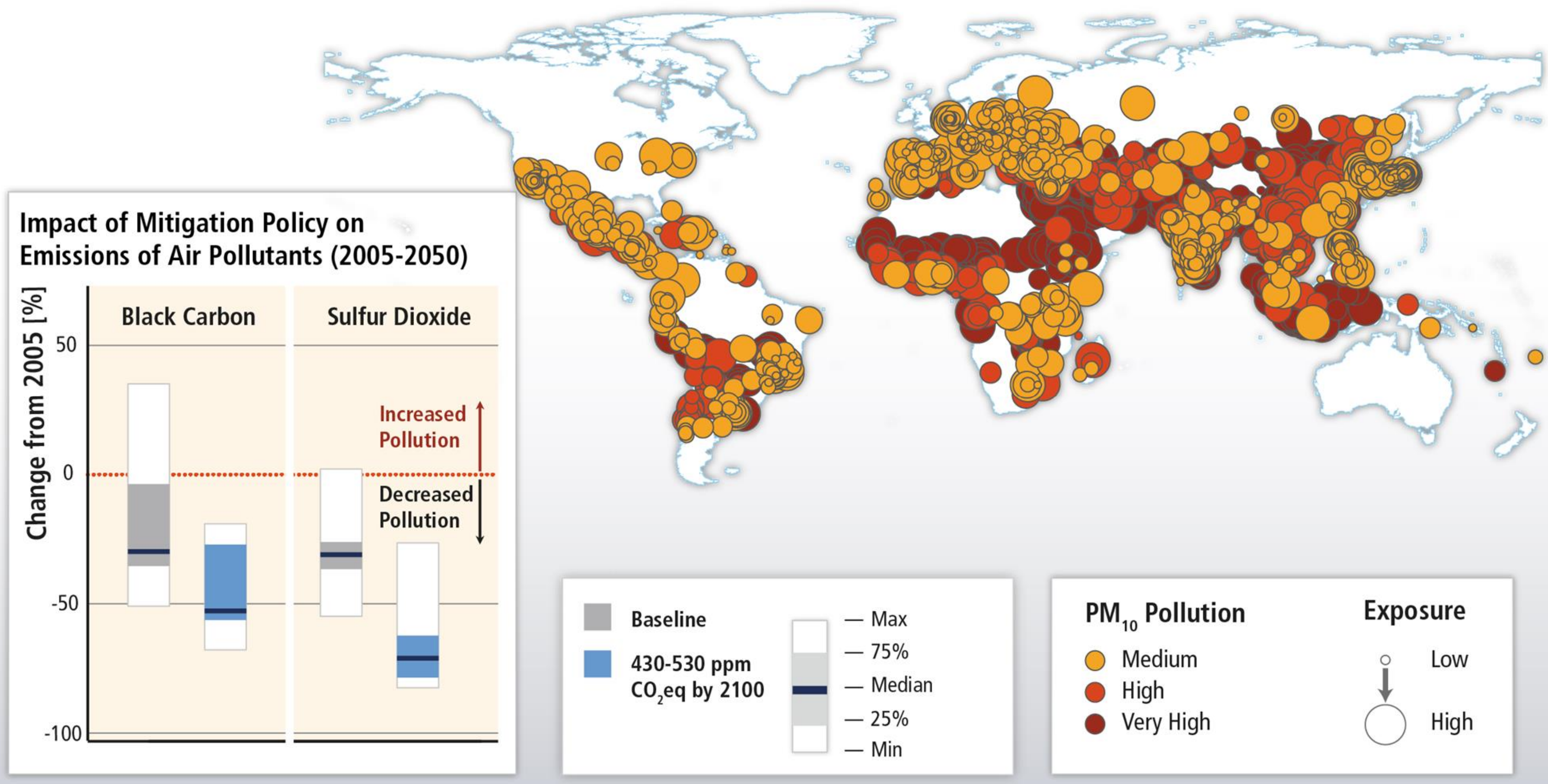
Mitigation can result in large co-benefits for human health and other societal goals.



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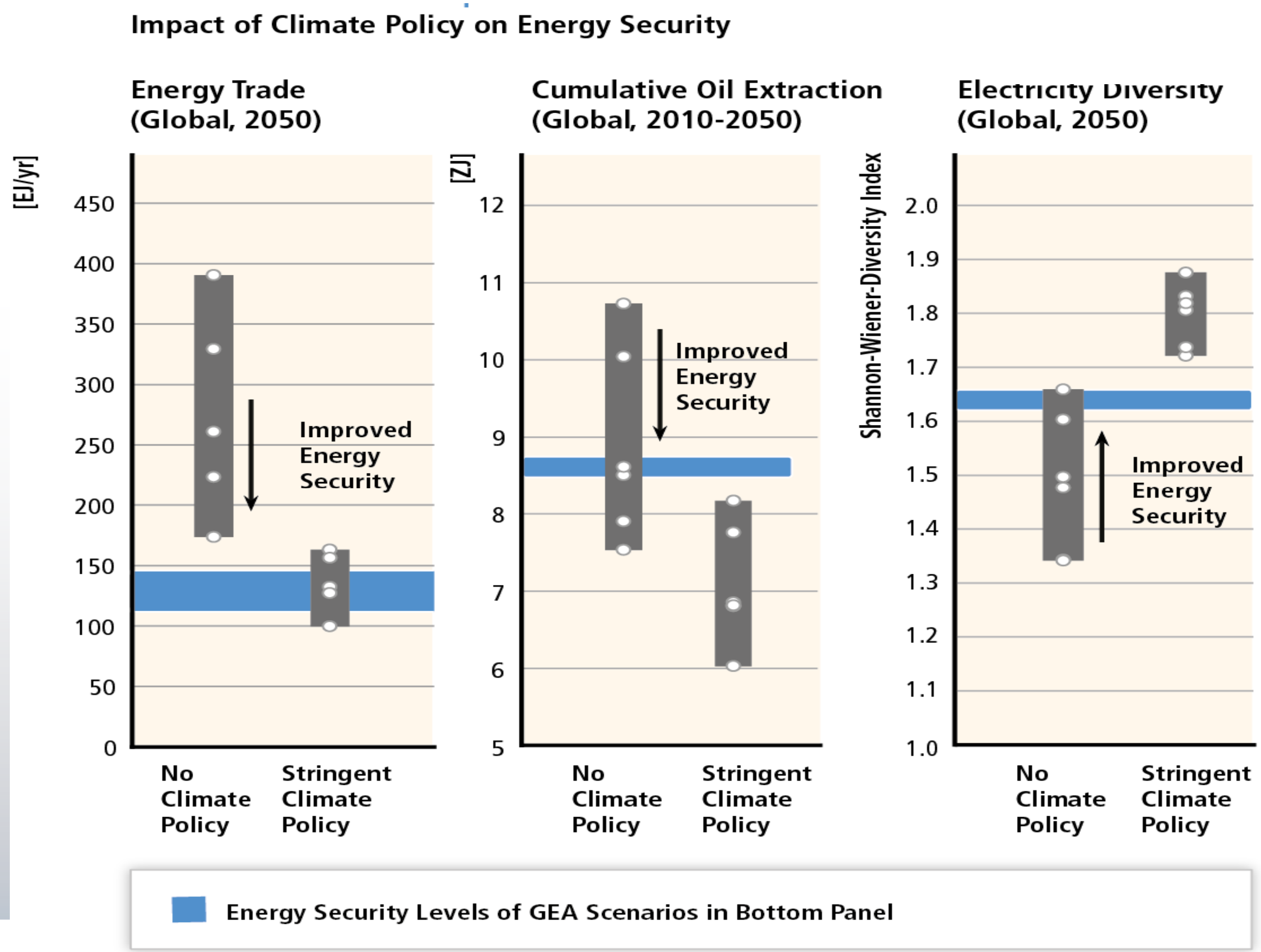
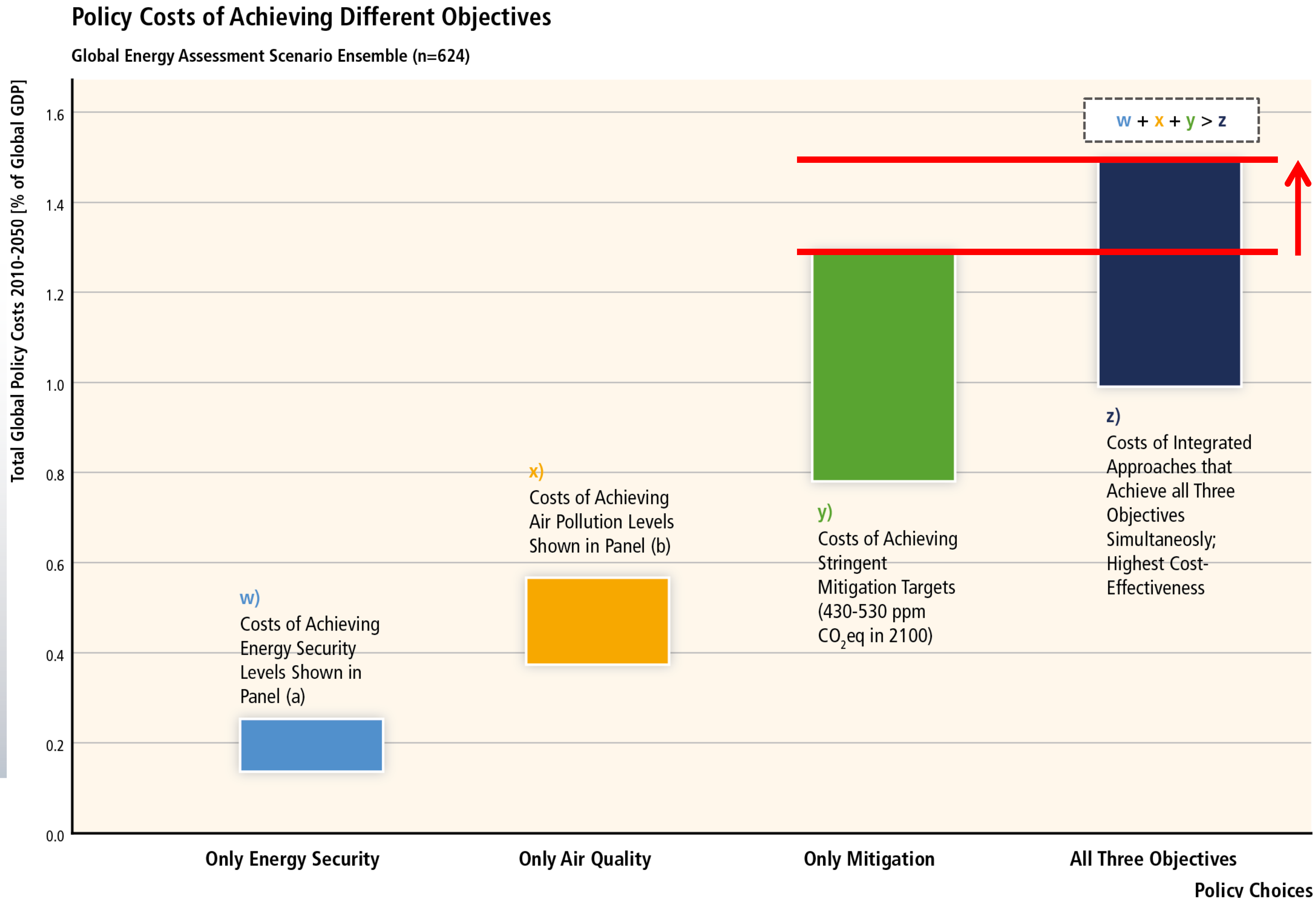
Mitigation can help to reduce energy security concerns



Integration across climate and other objectives is key for cost-efectivly addressing environmental challenges




Thank you!