ipcc
INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2014

Mitigation of Climate Change

Prof. Dr. Ottmar Edenhofer
Co-Chair, IPCC Working Group III
Dublin, 6 October 2014

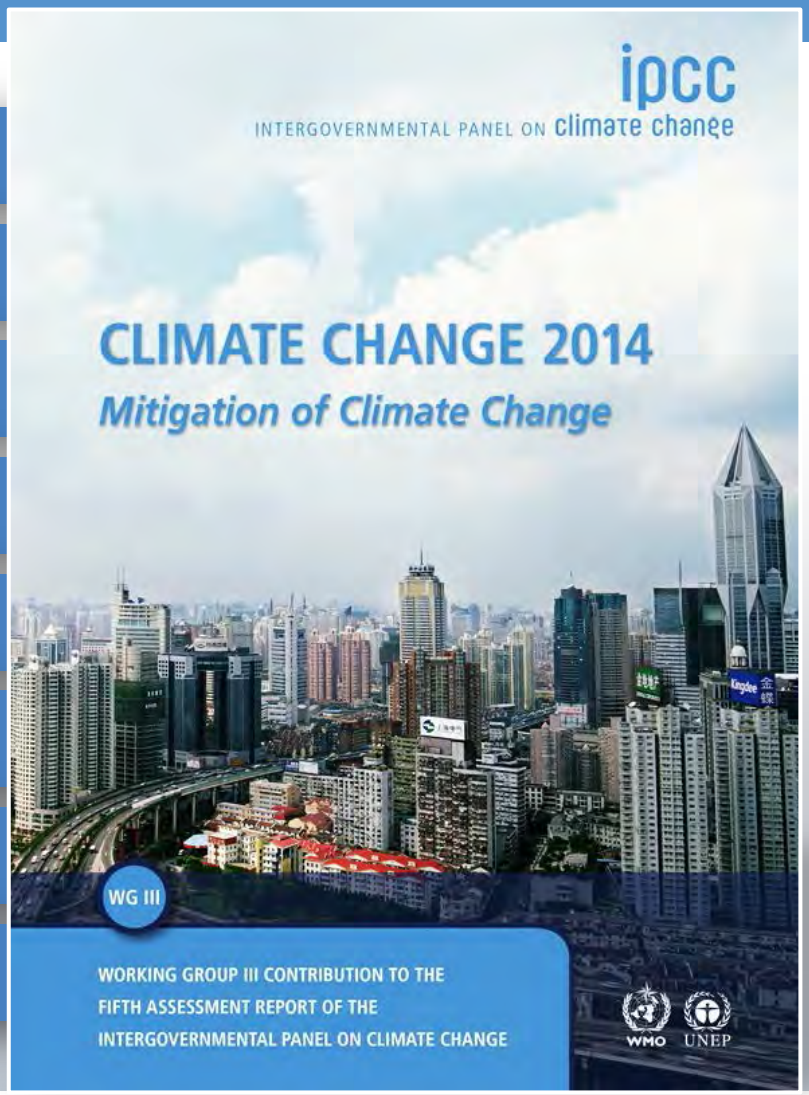
Working Group III contribution to the
IPCC Fifth Assessment Report

WMO UNEP

Exploring the solution space

IPCC reports are the result of extensive work of many scientists from around the world.

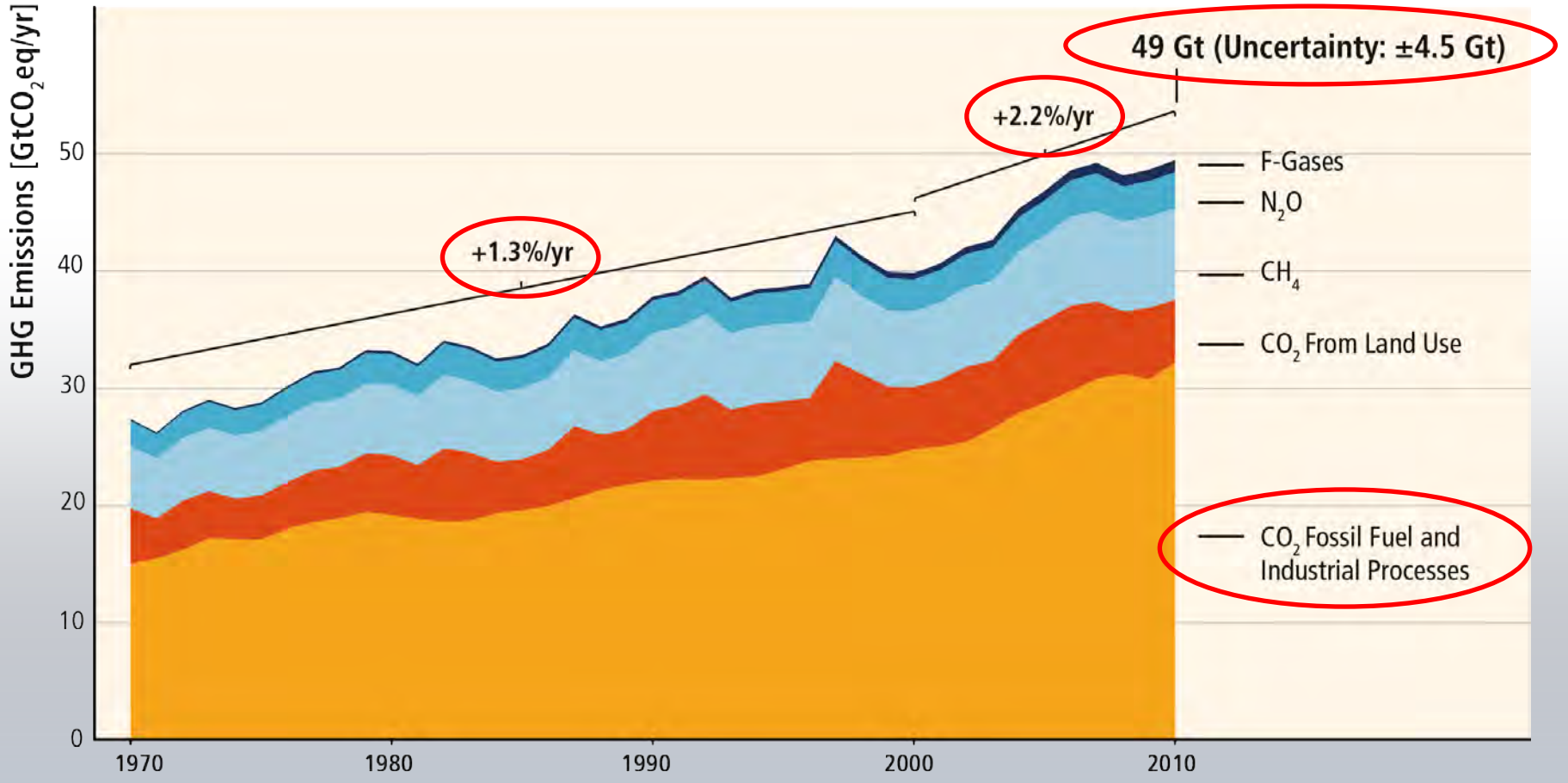
- 1 Summary for Policymakers
- 1 Technical Summary
- 16 Chapters
- 235 Authors
- 900 Reviewers
- More than 2000 pages
- Close to 10,000 references
- More than 38,000 comments




#1
What are the trends in stocks and flows of GHG emissions?

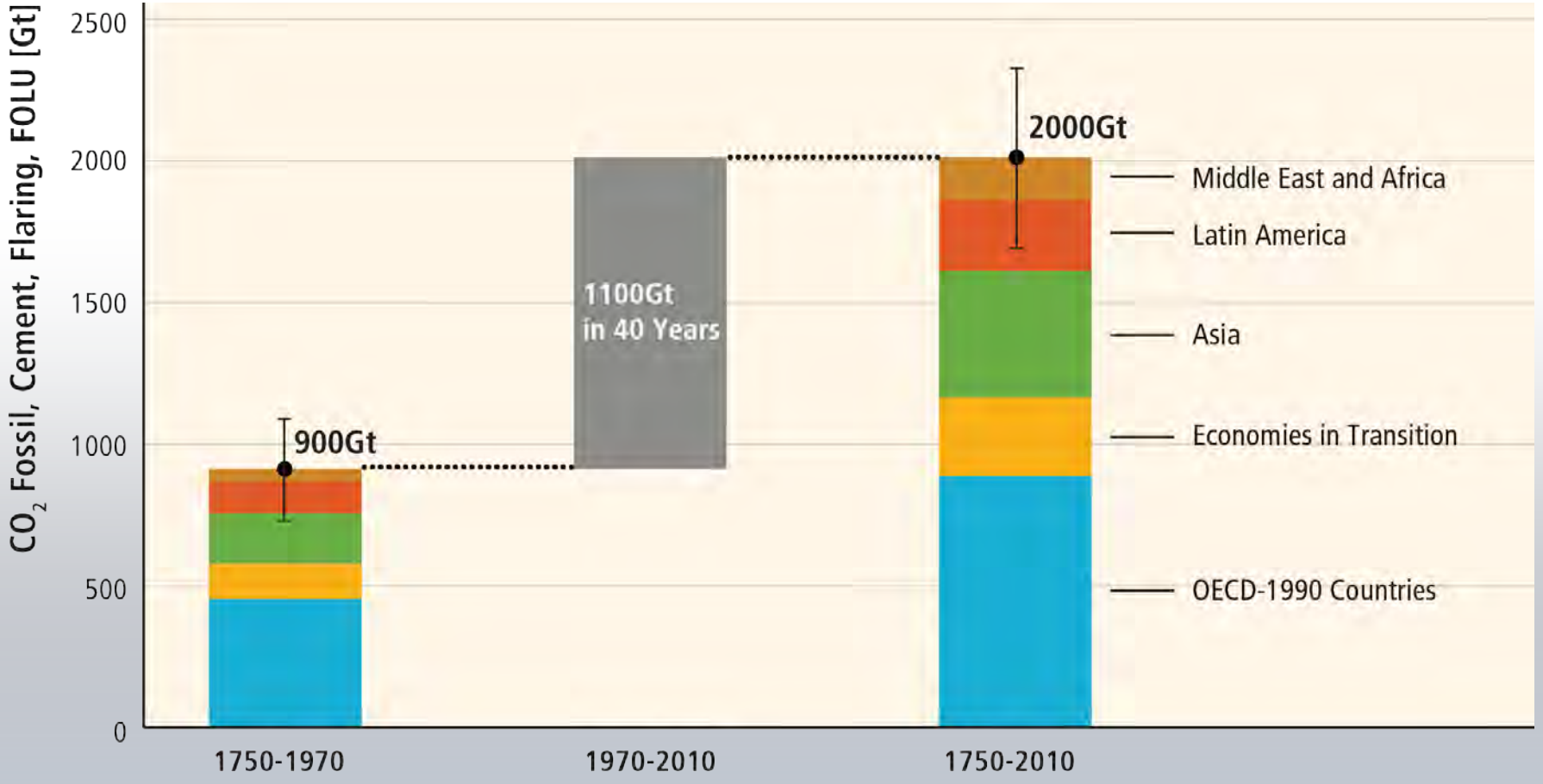

GHG emissions growth has accelerated
despite reduction efforts.

GHG emissions growth between 2000 and 2010 has been larger than in the previous three decades.



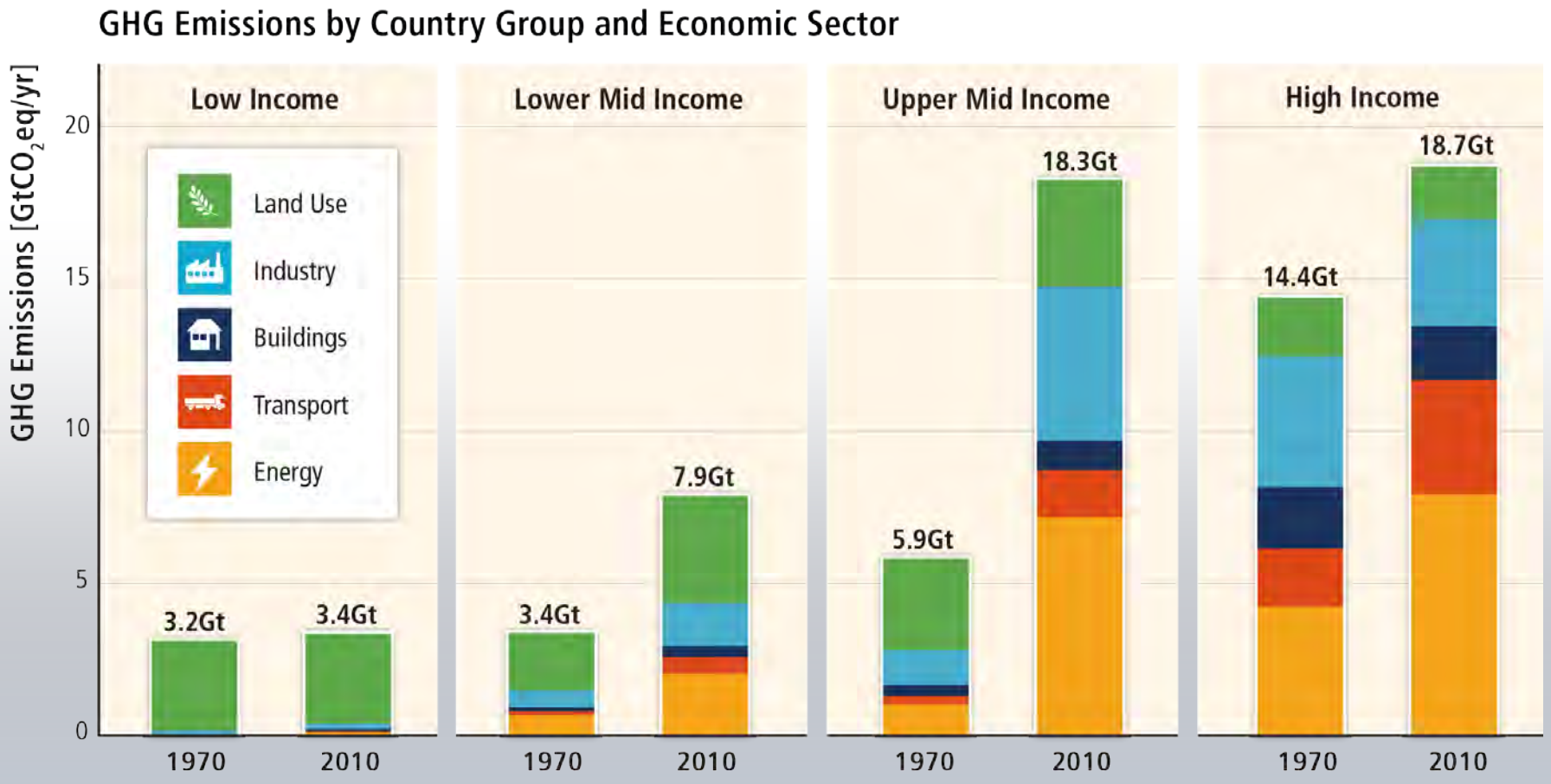
Based on Figure 1.3

About half of cumulative anthropogenic CO_2 emissions between 1750 and 2010 have occurred in the last 40 years.



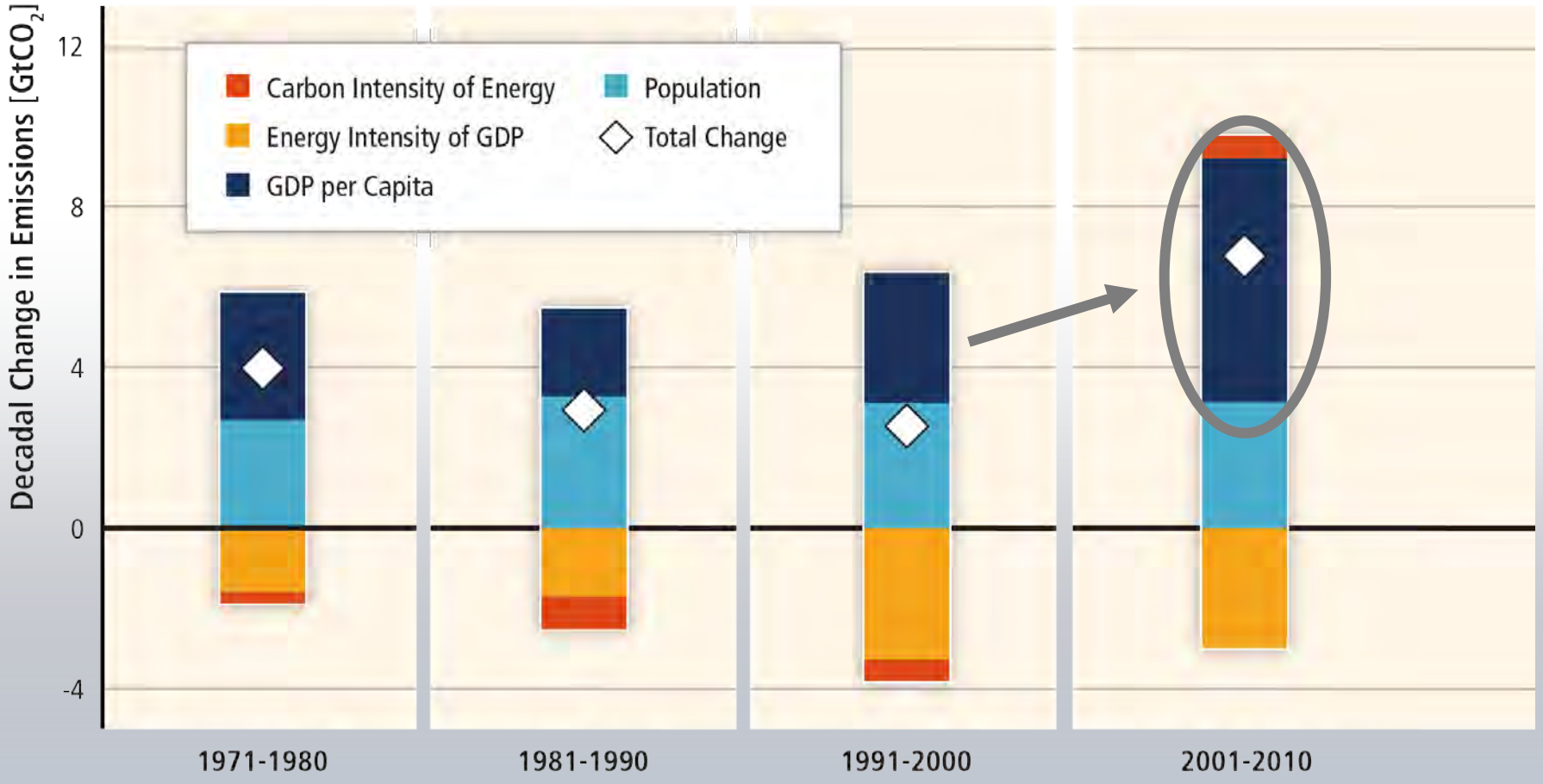
Based on Figure 5.3

Regional patterns of GHG emissions are shifting along with changes in the world economy.



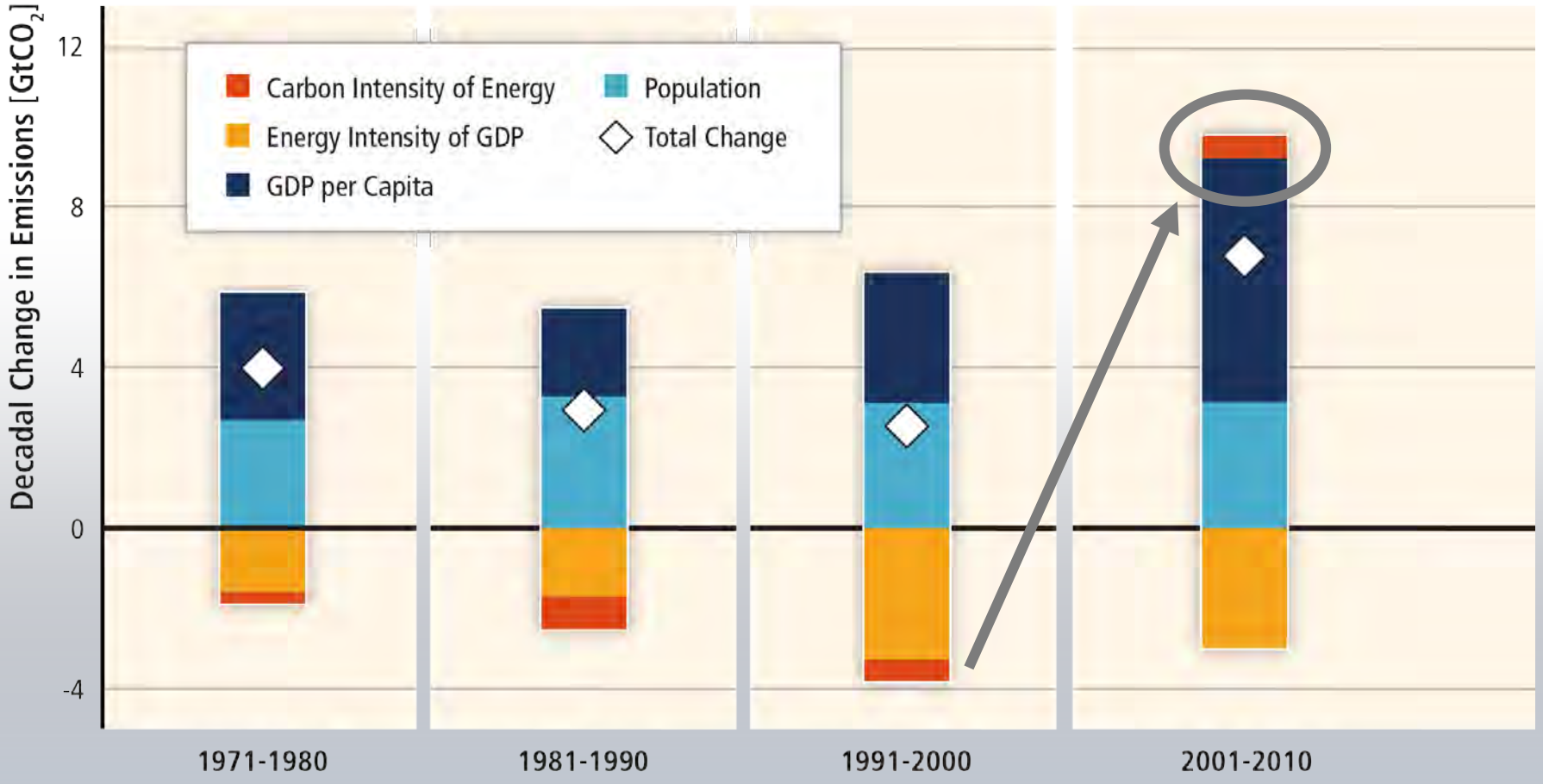
Based on Figure 1.6

GHG emissions rise with growth in GDP and population; long-standing trend of decarbonisation of energy reversed.

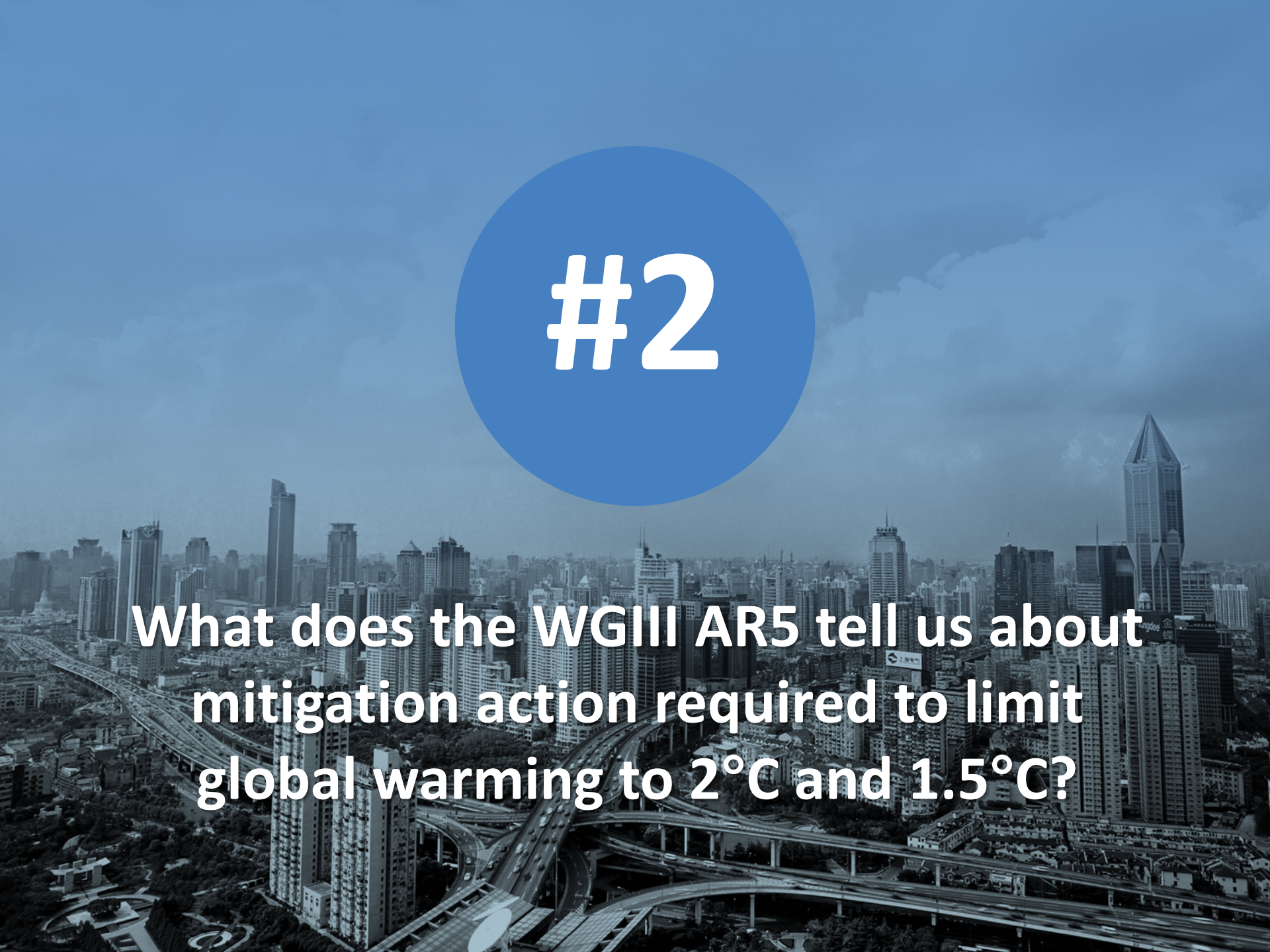


Based on Figure 1.7

GHG emissions rise with growth in GDP and population; long-standing trend of decarbonisation of energy reversed.

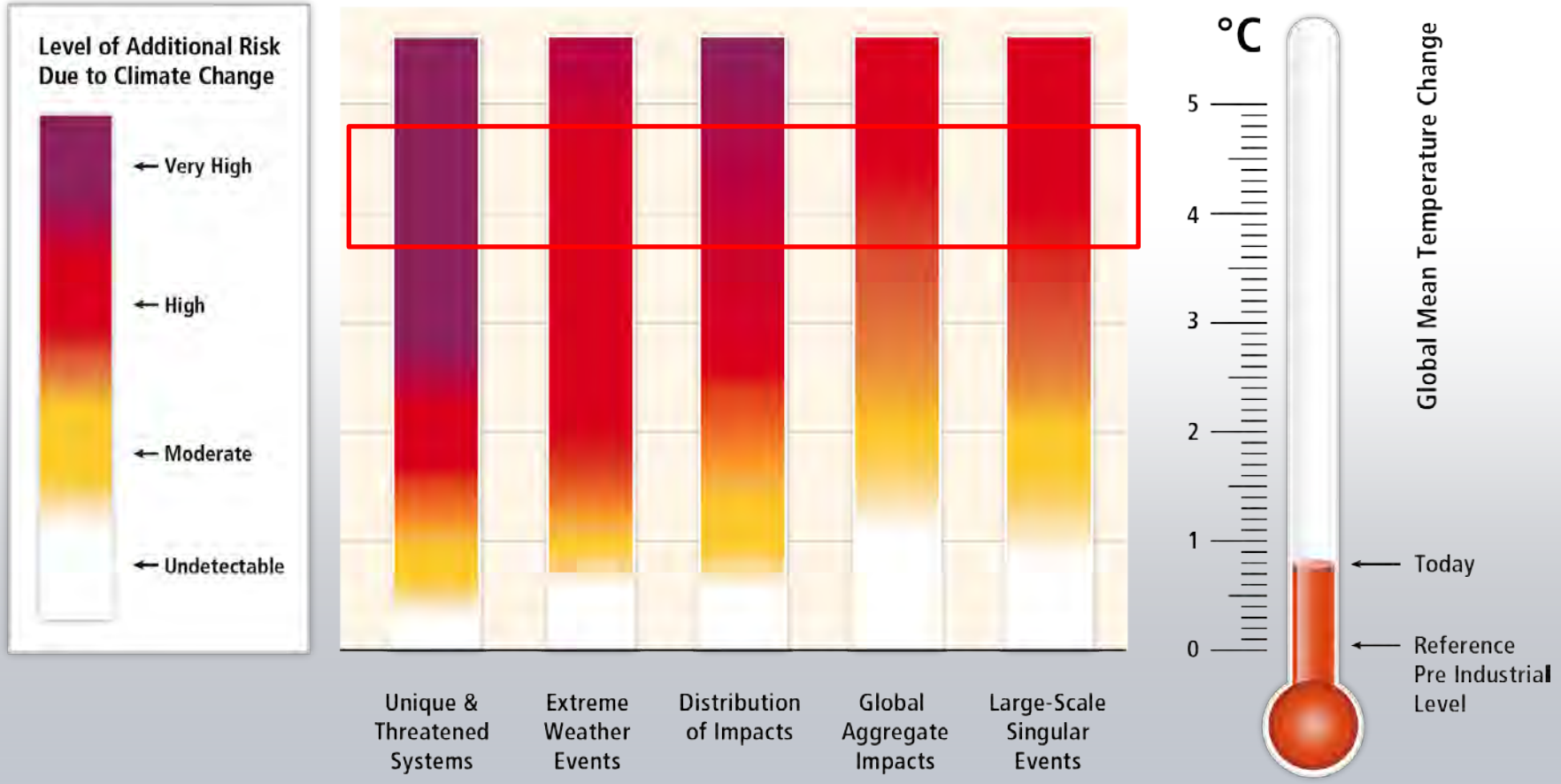


Based on Figure 1.7


#2
What does the WGIII AR5 tell us about mitigation action required to limit global warming to 2°C and 1.5°C?

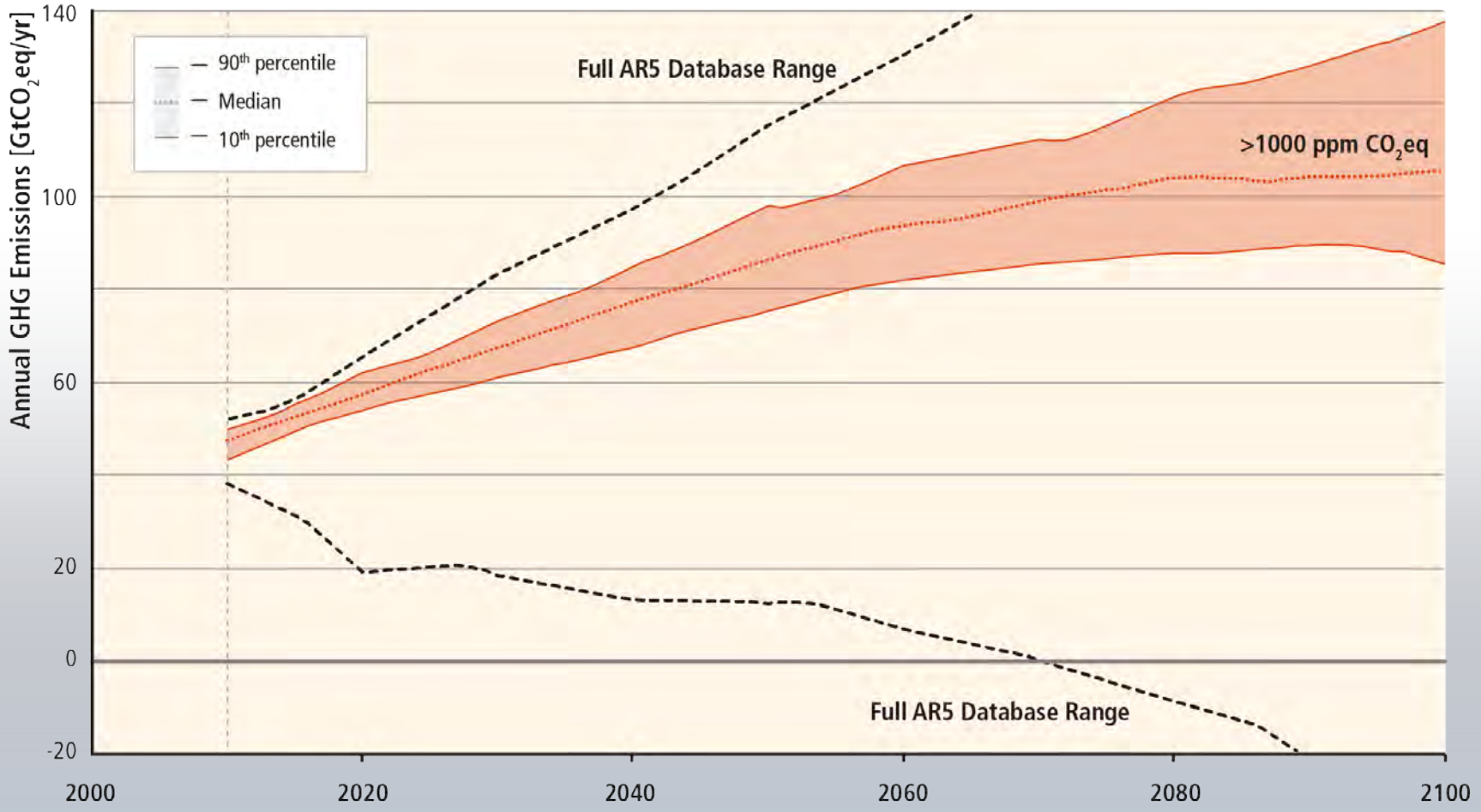

Limiting warming to 2°C involves substantial technological, economic and institutional challenges.

Without additional mitigation, global mean surface temperature is projected to increase by 3.7 to 4.8°C (2.5 to 7.8°C) over the 21st century.



Based on WGII AR5 Figure 19.4

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



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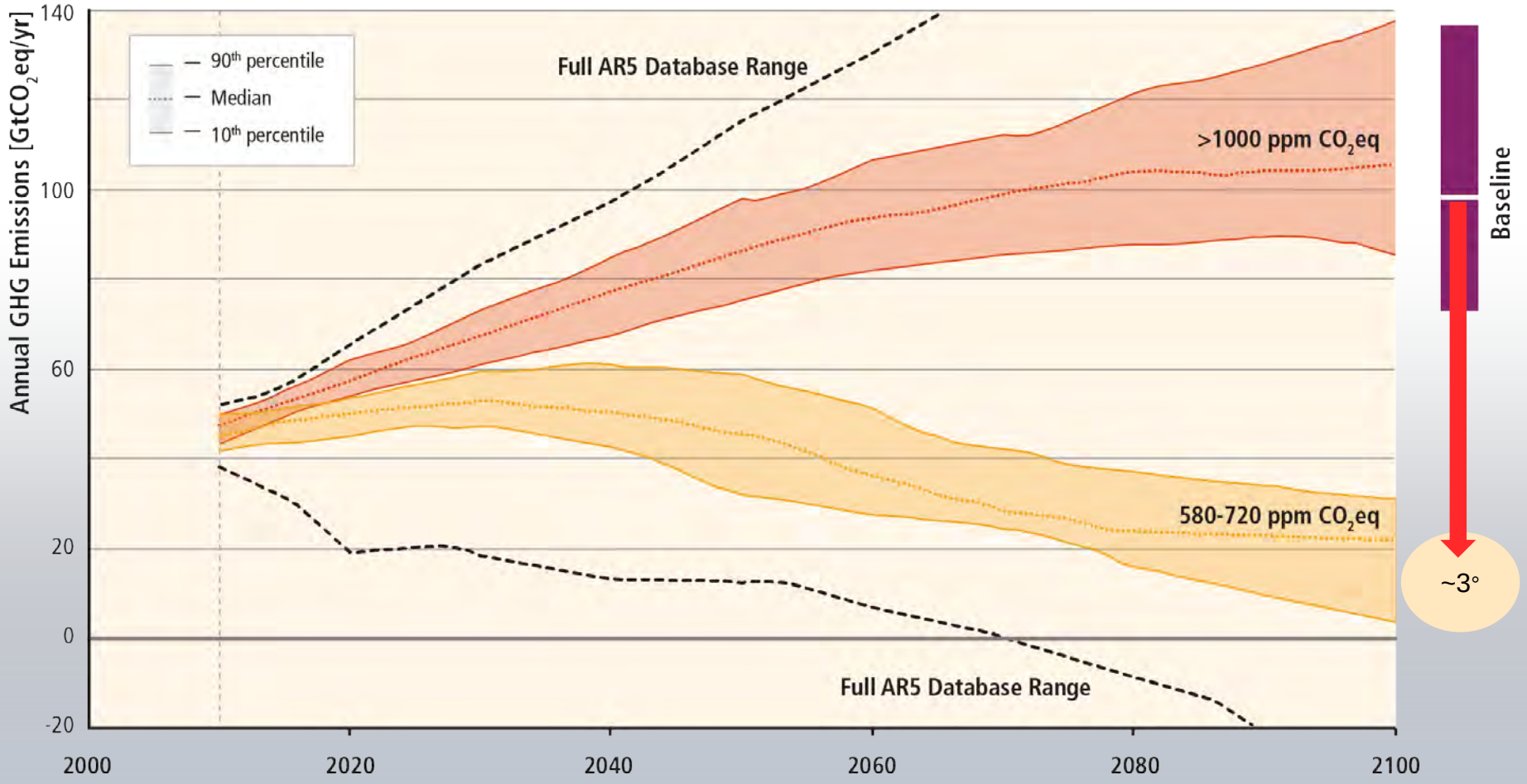

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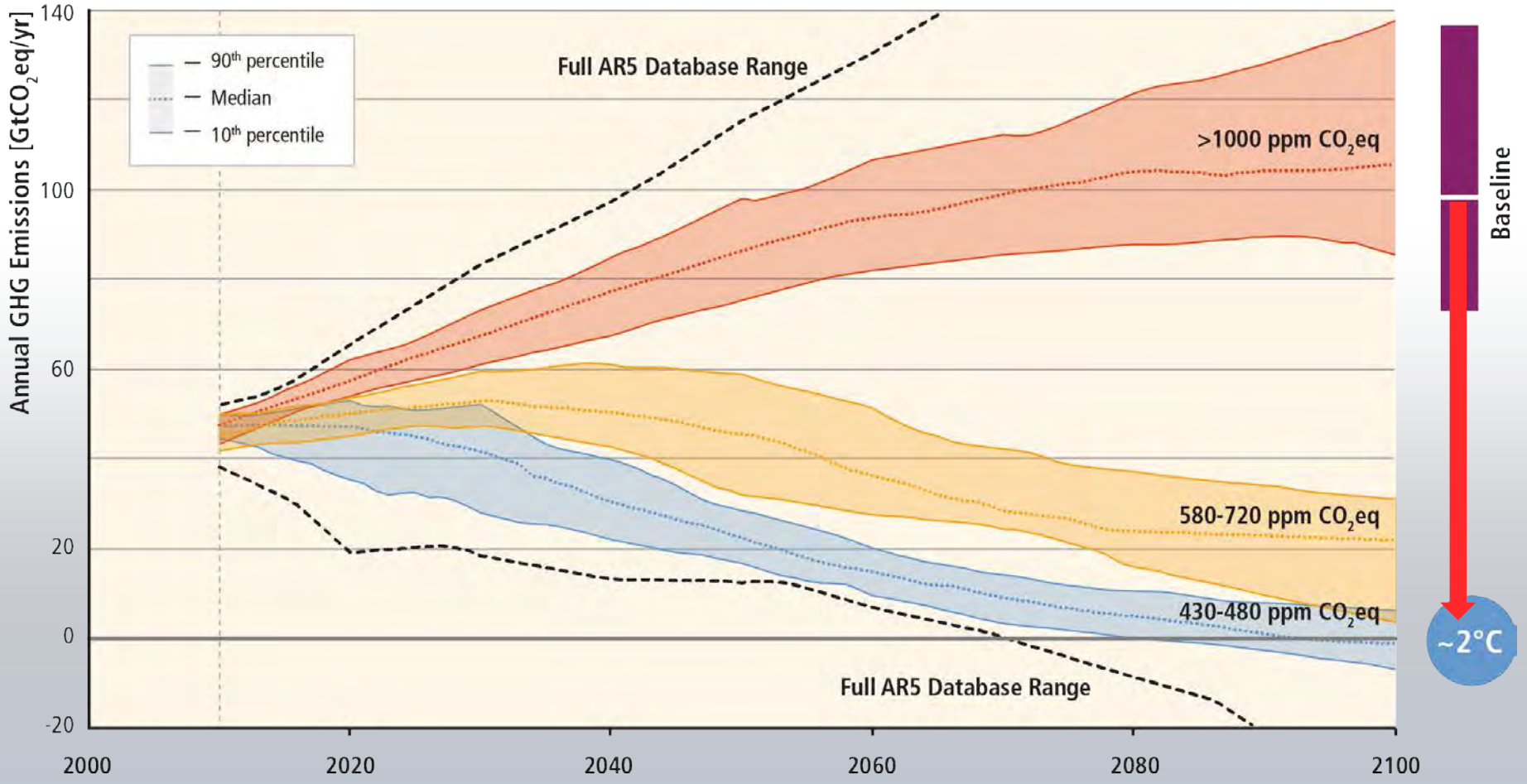
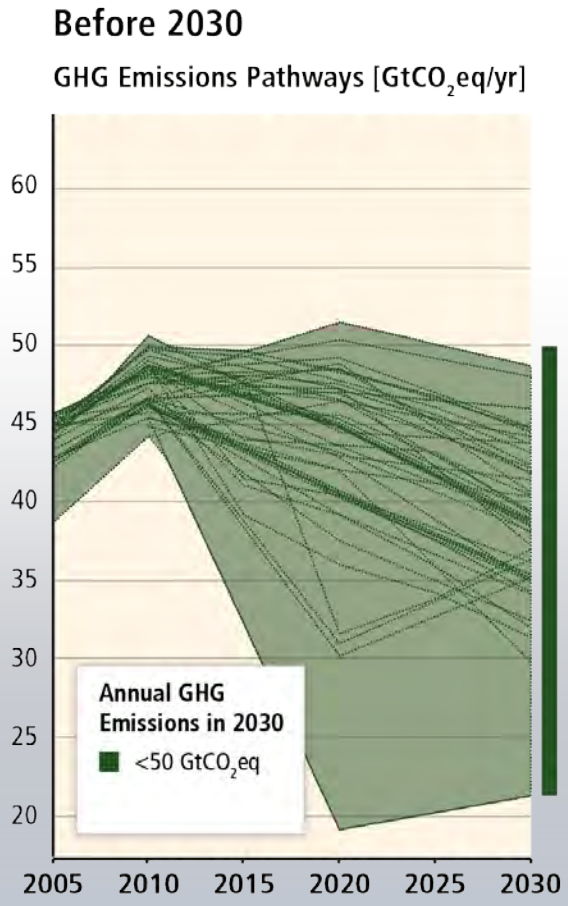


Delaying mitigation increases the difficulty and narrows the options for limiting warming to 2°C.

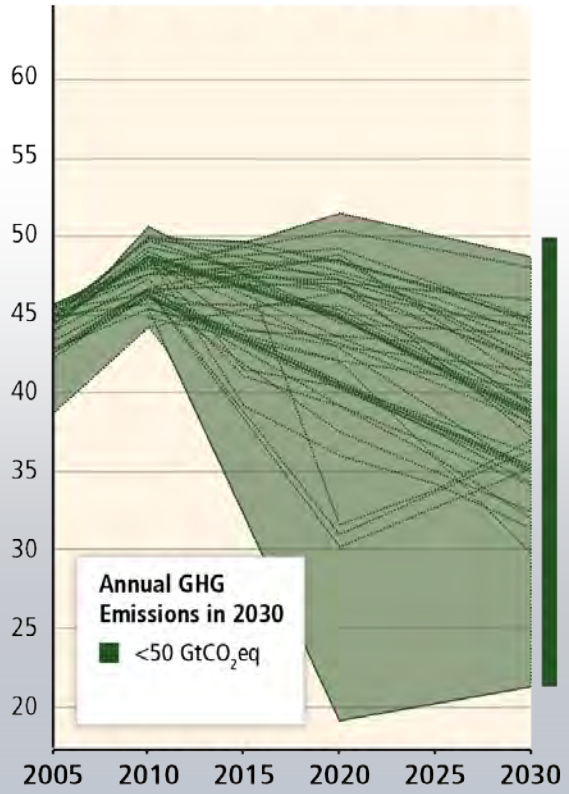


„immediate action“

Delaying mitigation increases the difficulty and narrows the options for limiting warming to 2°C.

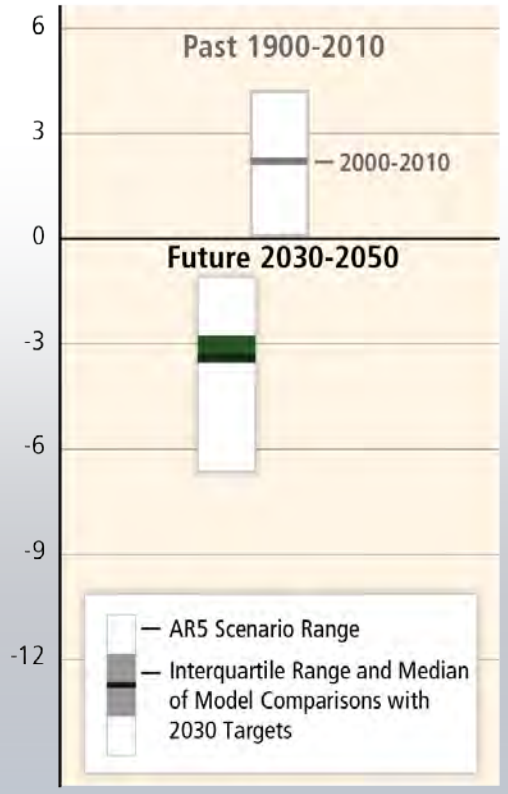
Before 2030

GHG Emissions Pathways [$GtCO_2eq/yr$]



After 2030

Rate of CO_2 Emission Change [%/yr]



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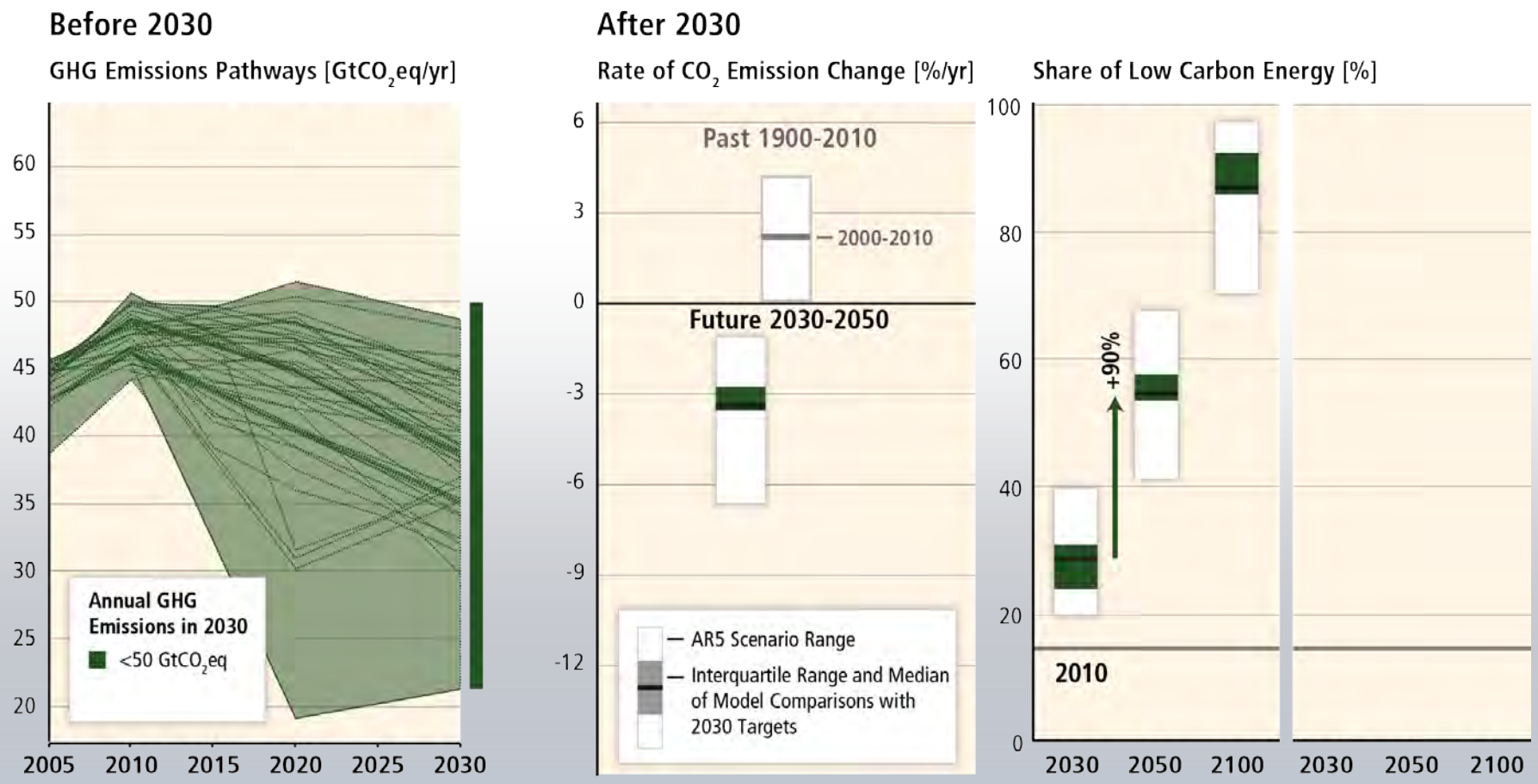
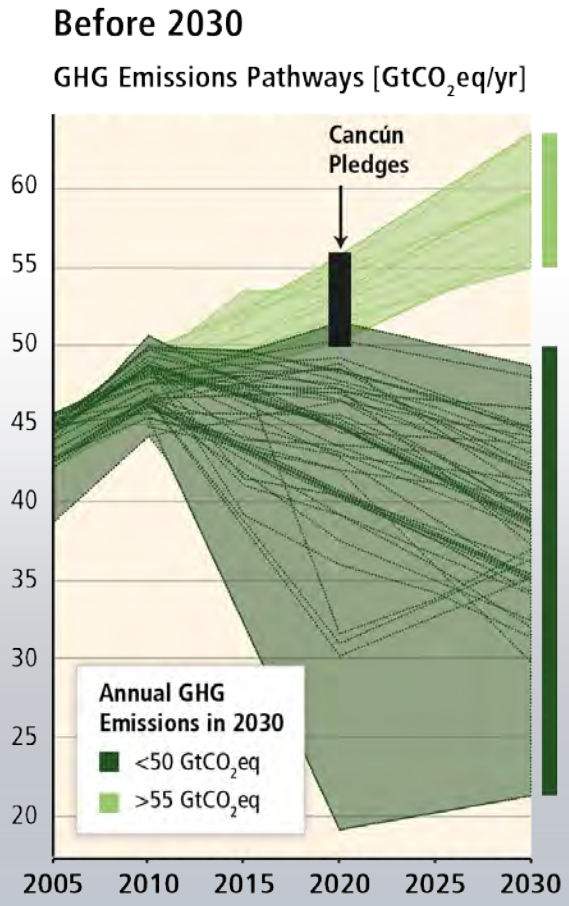


Delaying mitigation is estimated to increase the difficulty and narrow the options for limiting warming to 2°C.



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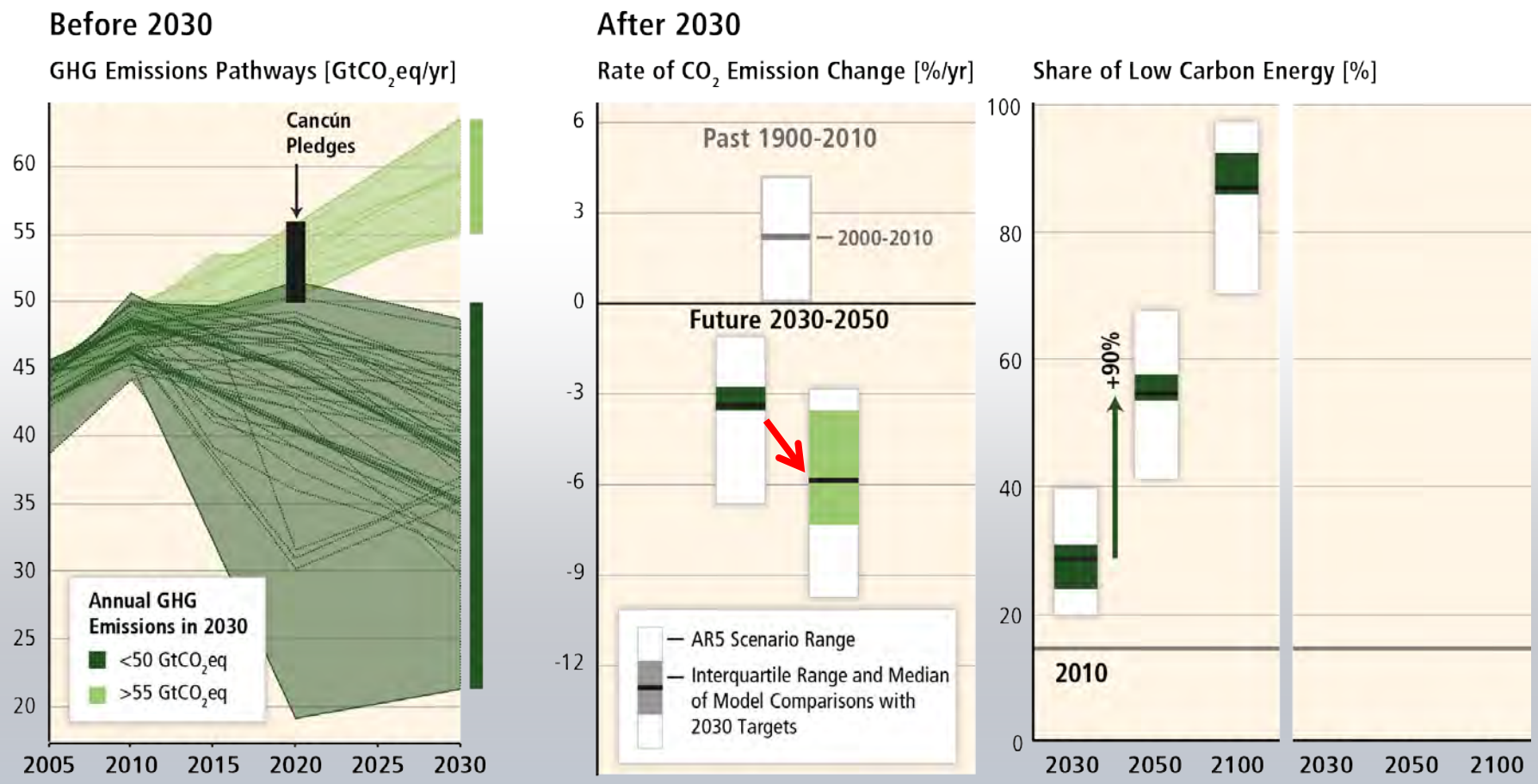

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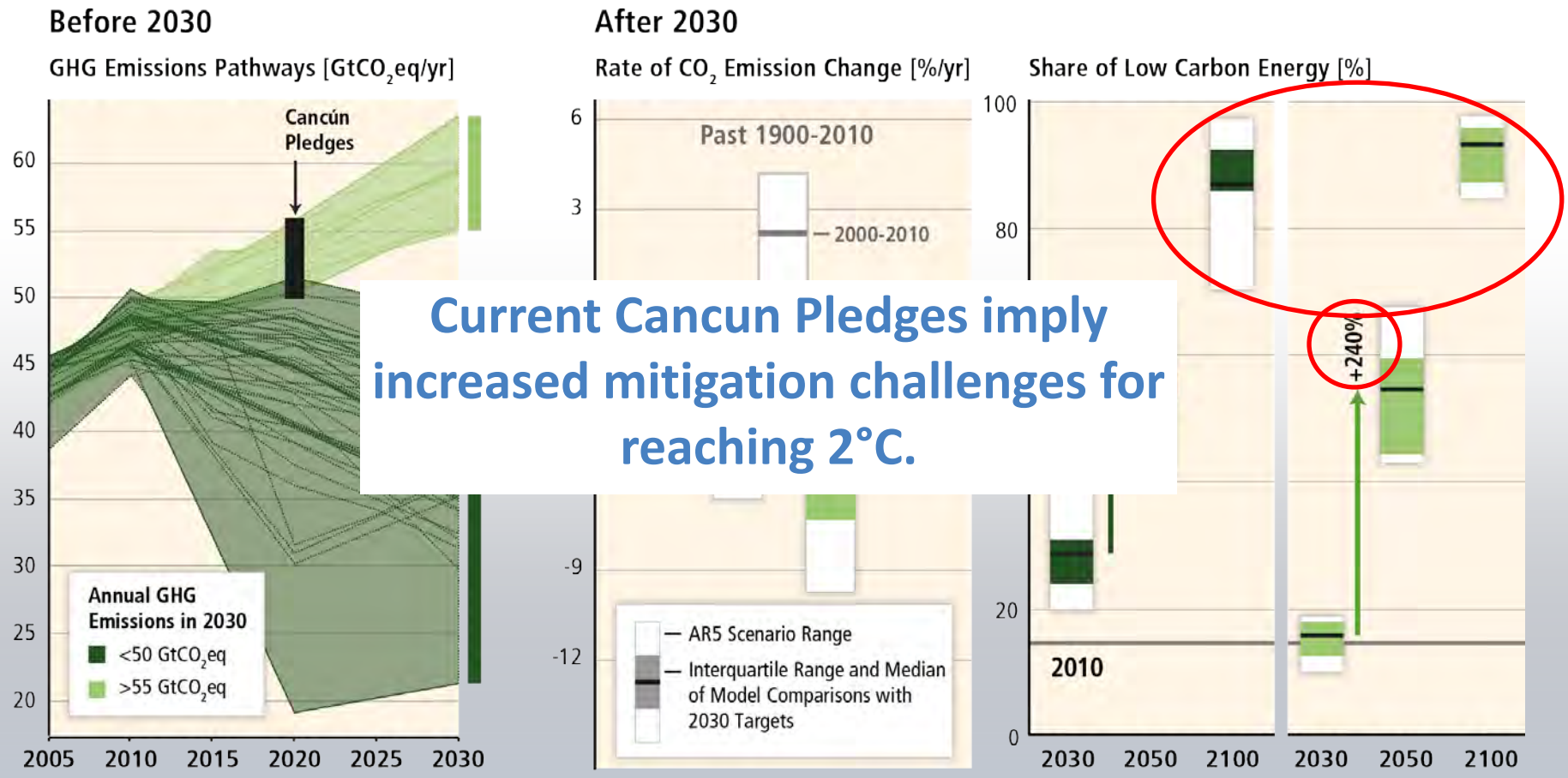


Current Cancun Pledges imply increased mitigation challenges for reaching 2°C.

Based on Figures 6.32 and 7.16

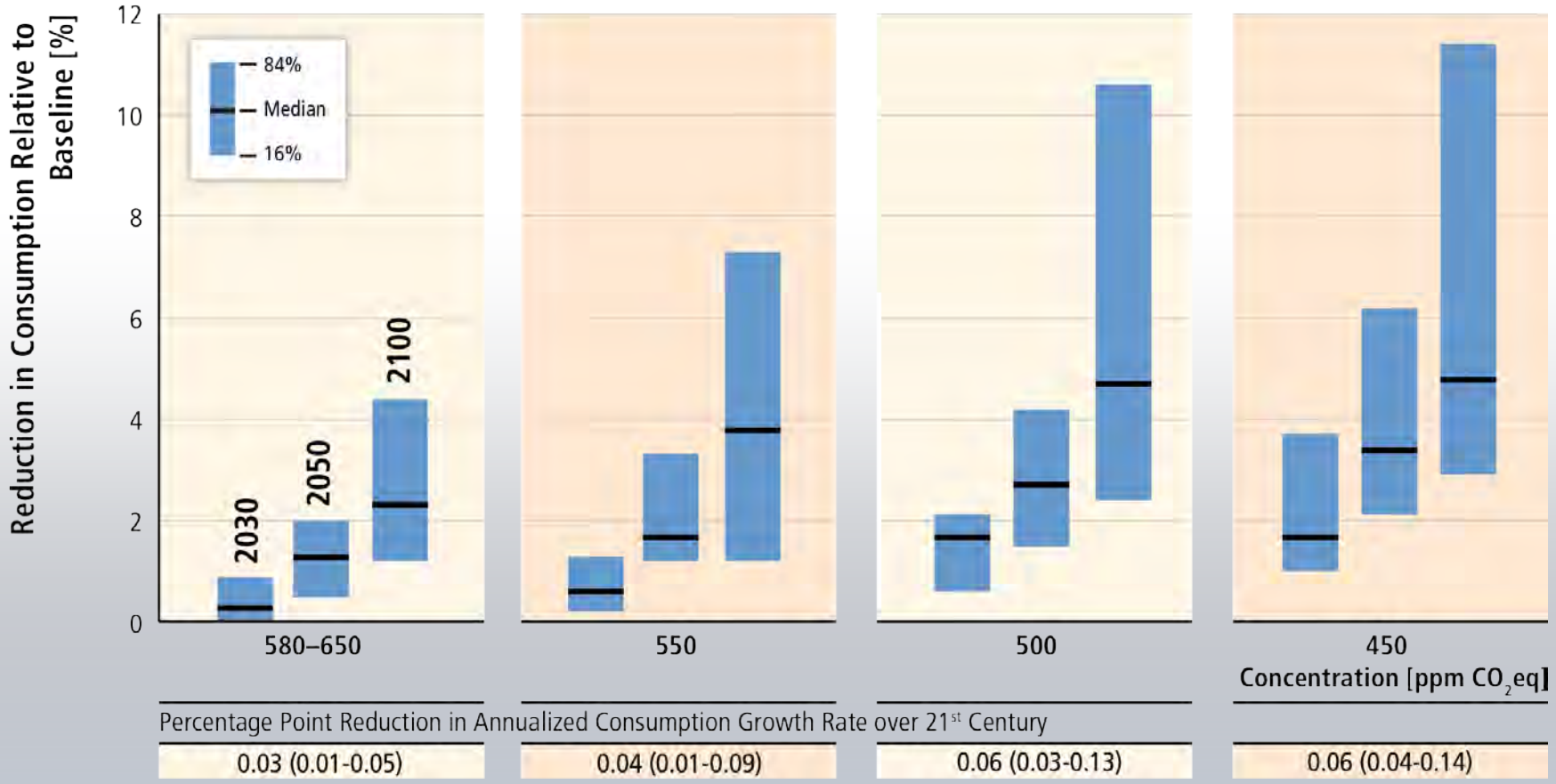
Scientific evidence on the 1.5°C goal remains limited.

A comprehensive assessment is difficult in the absence of multi-model comparison studies and the limited number of studies focusing on the 1.5°C goal. Existing studies indicate:

- Temperature overshoot and large scale application of carbon dioxide removal technologies
- Immediate mitigation action
- Rapid upscaling of the *full* set of technologies
- Development along a low energy demand pathway

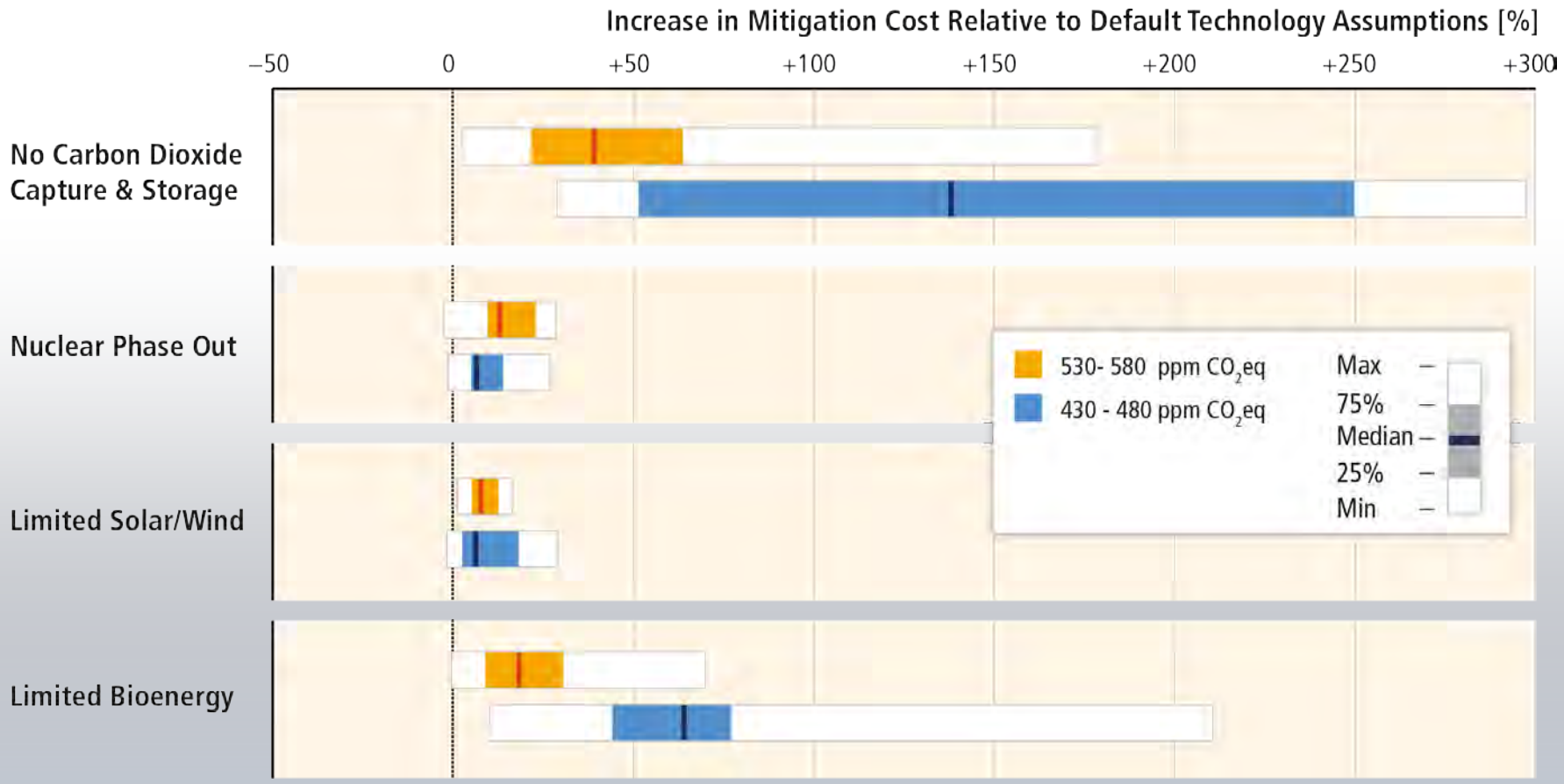

Mitigation cost estimates vary, but do not strongly affect global GDP growth.

Global costs rise with the ambition of the mitigation goal.



Based on Table SPM.2

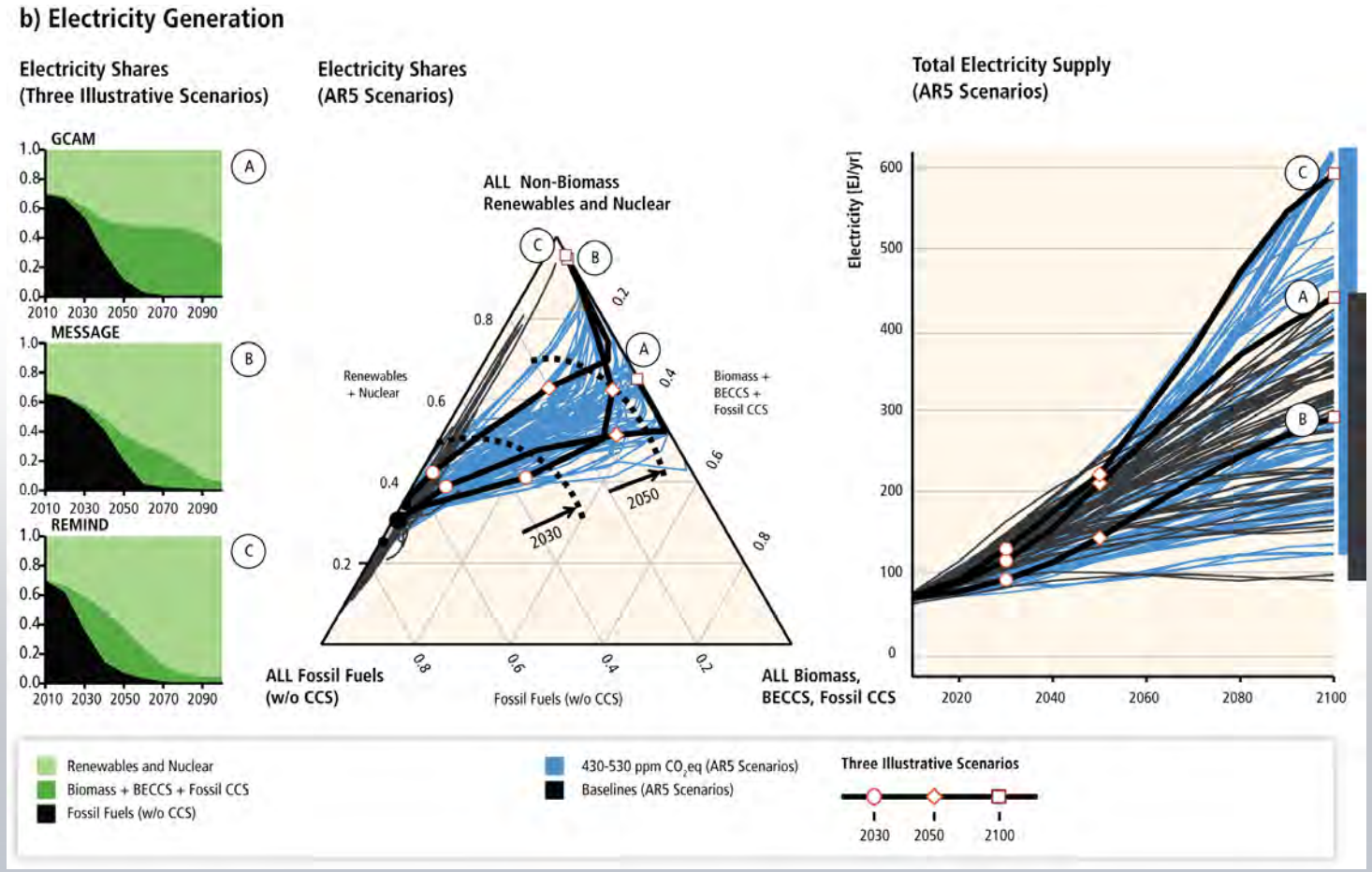
Availability of technology can greatly influence mitigation costs.



Based on Figure 6.24

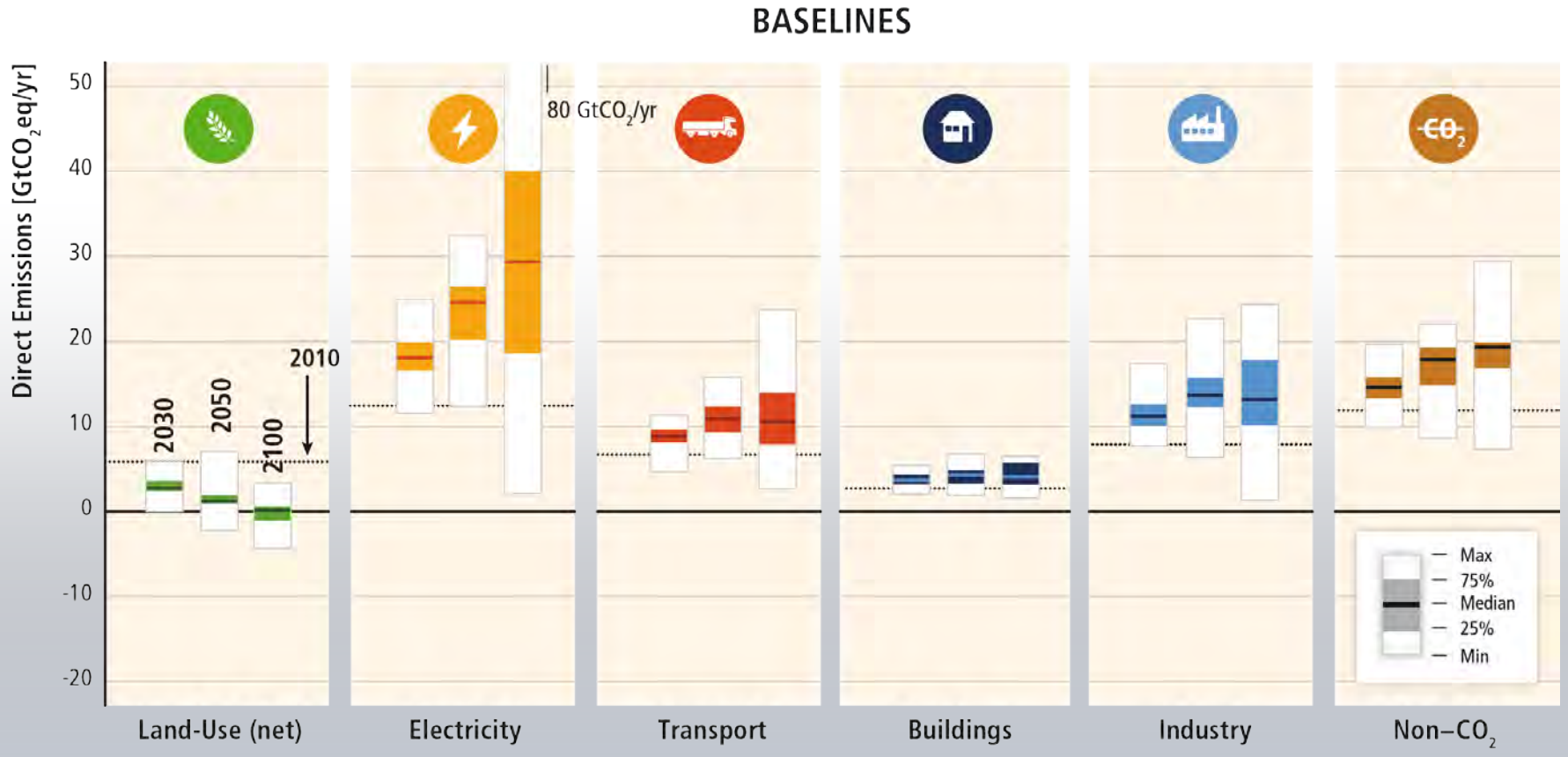

#3
What are the sectoral and technological options for reducing GHG emissions?

In low CO_2 concentration stabilization scenarios, fossil fuel use without CCS is phased out in the long-term.



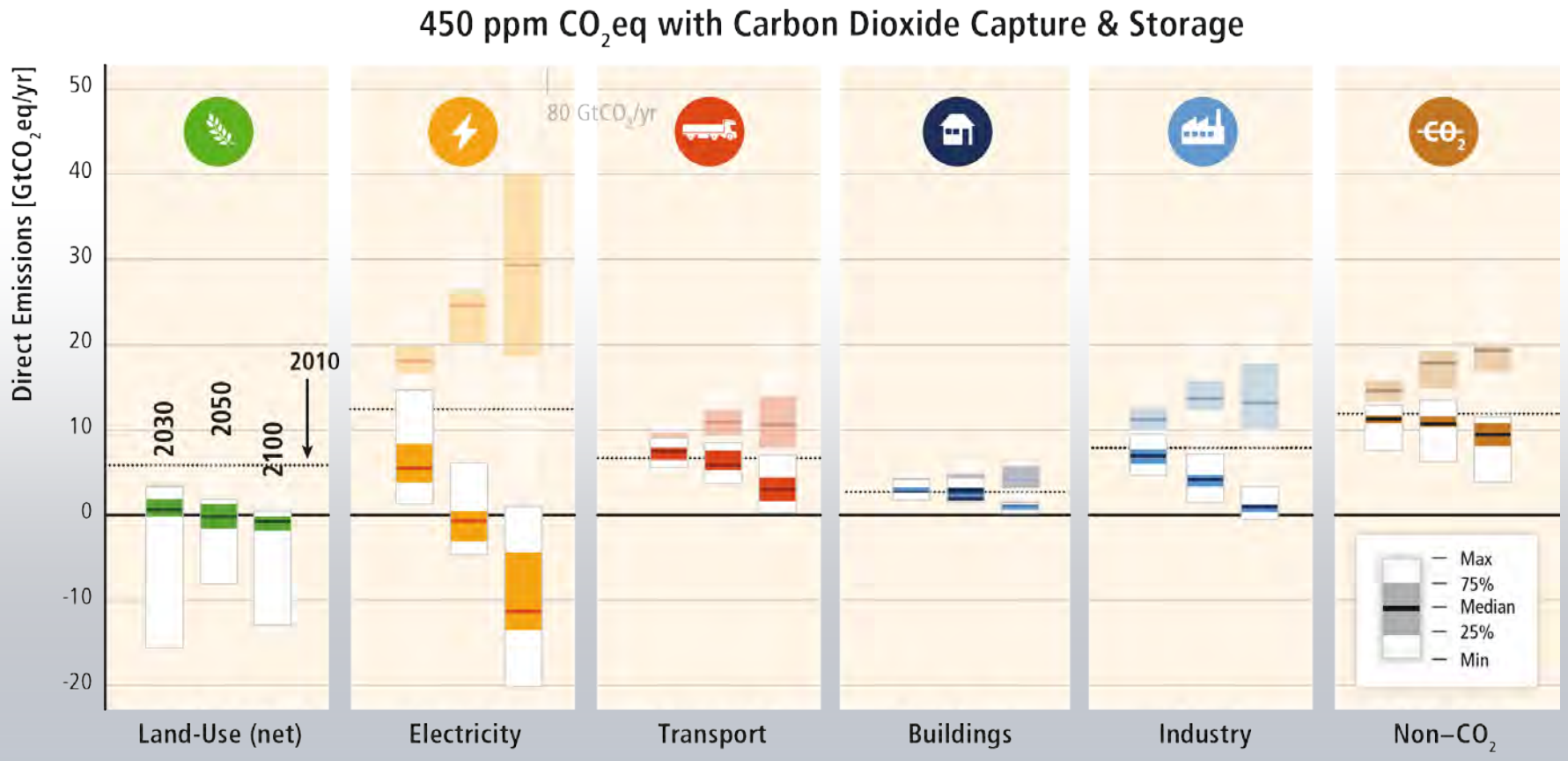
Based on Figure 7.15b

Baseline scenarios suggest rising GHG emissions in all sectors, except for CO_2 emissions in the land-use sector.



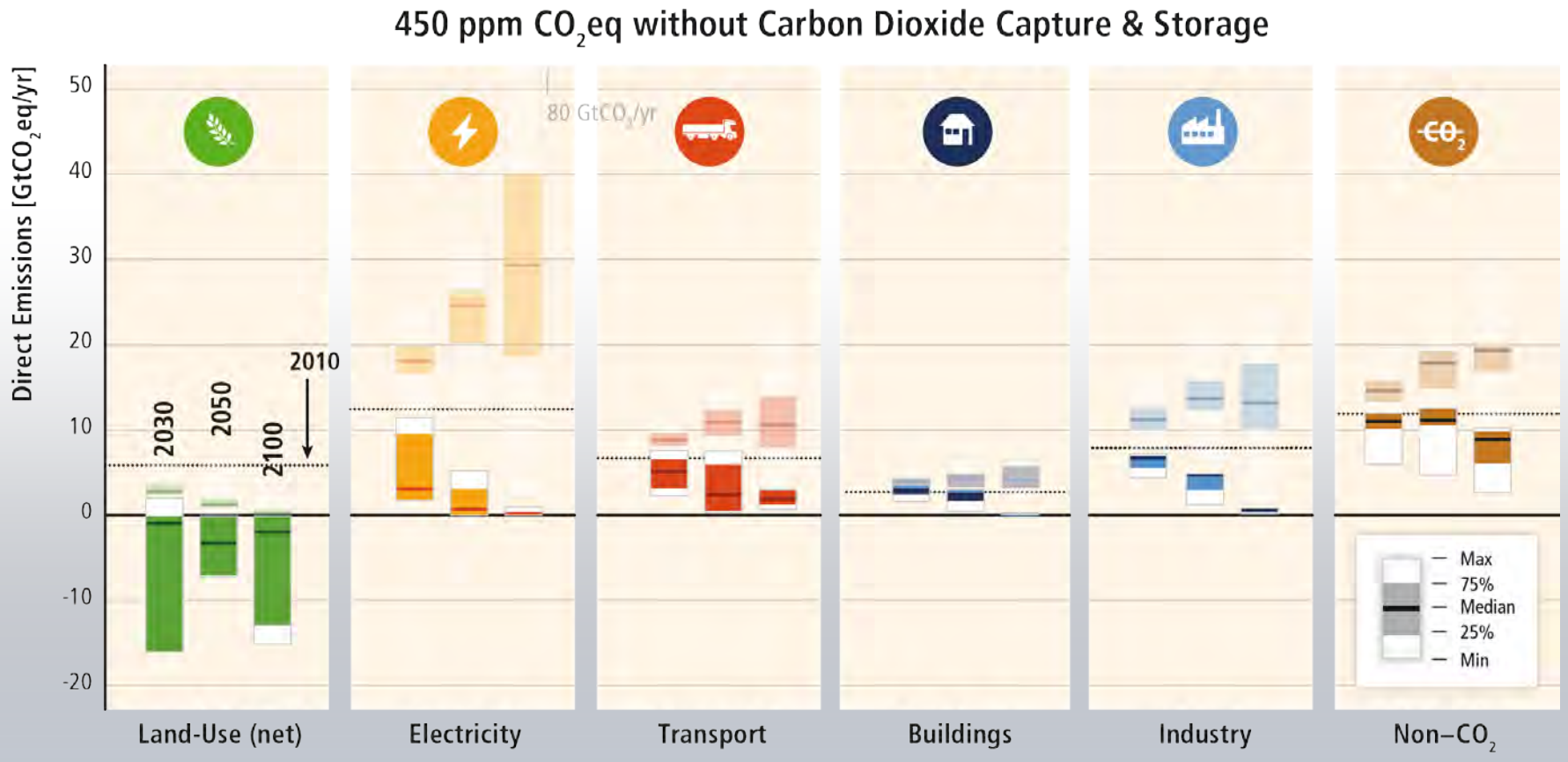
Based on Figure TS.17

Mitigation requires changes throughout the economy. Systemic approaches are expected to be most effective.



Based on Figure TS.17

Mitigation efforts in one sector determine efforts in others.

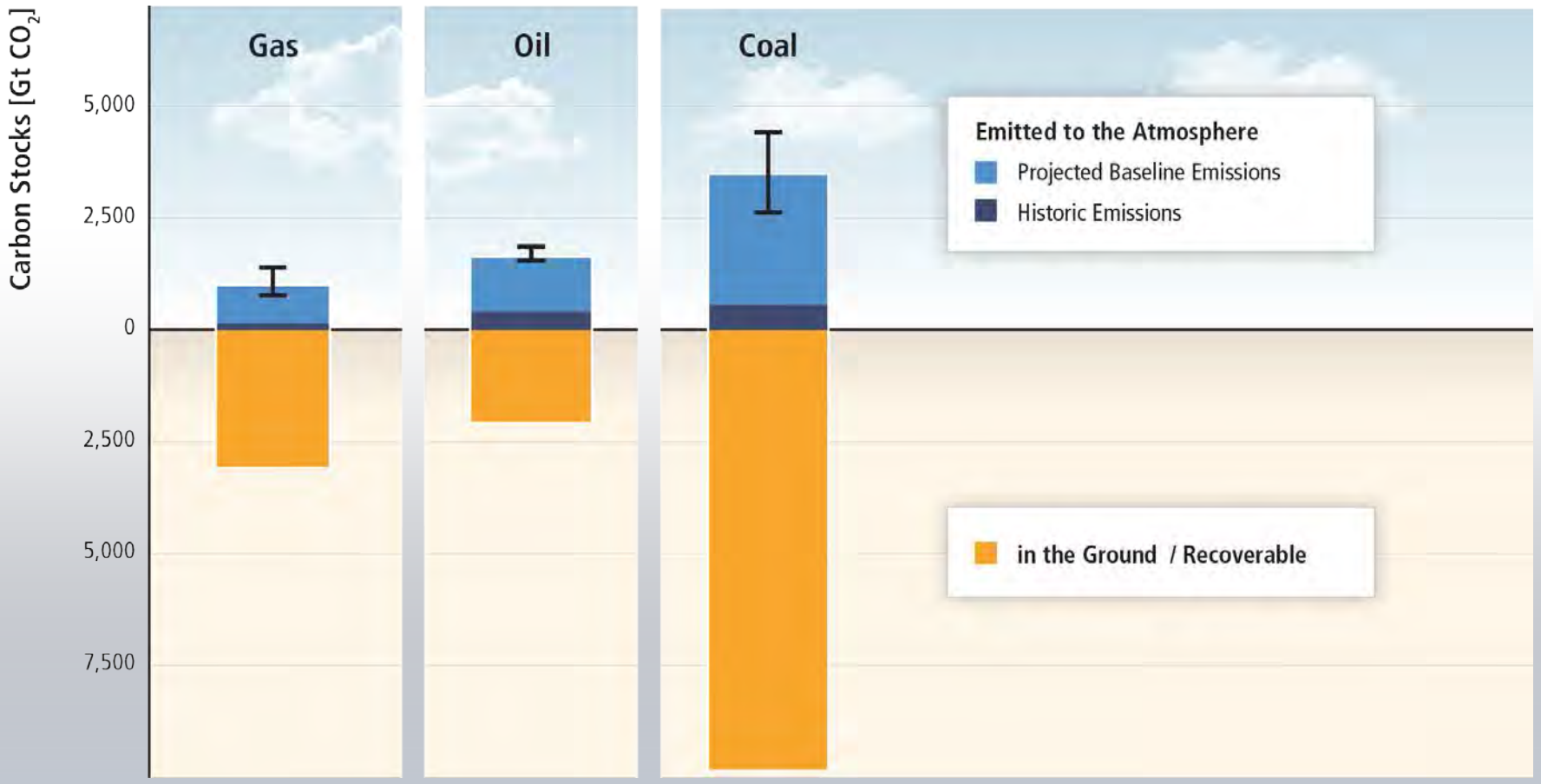


Based on Figure TS.17


#4
What is the role of international cooperation and national policies in reaching mitigation goals?

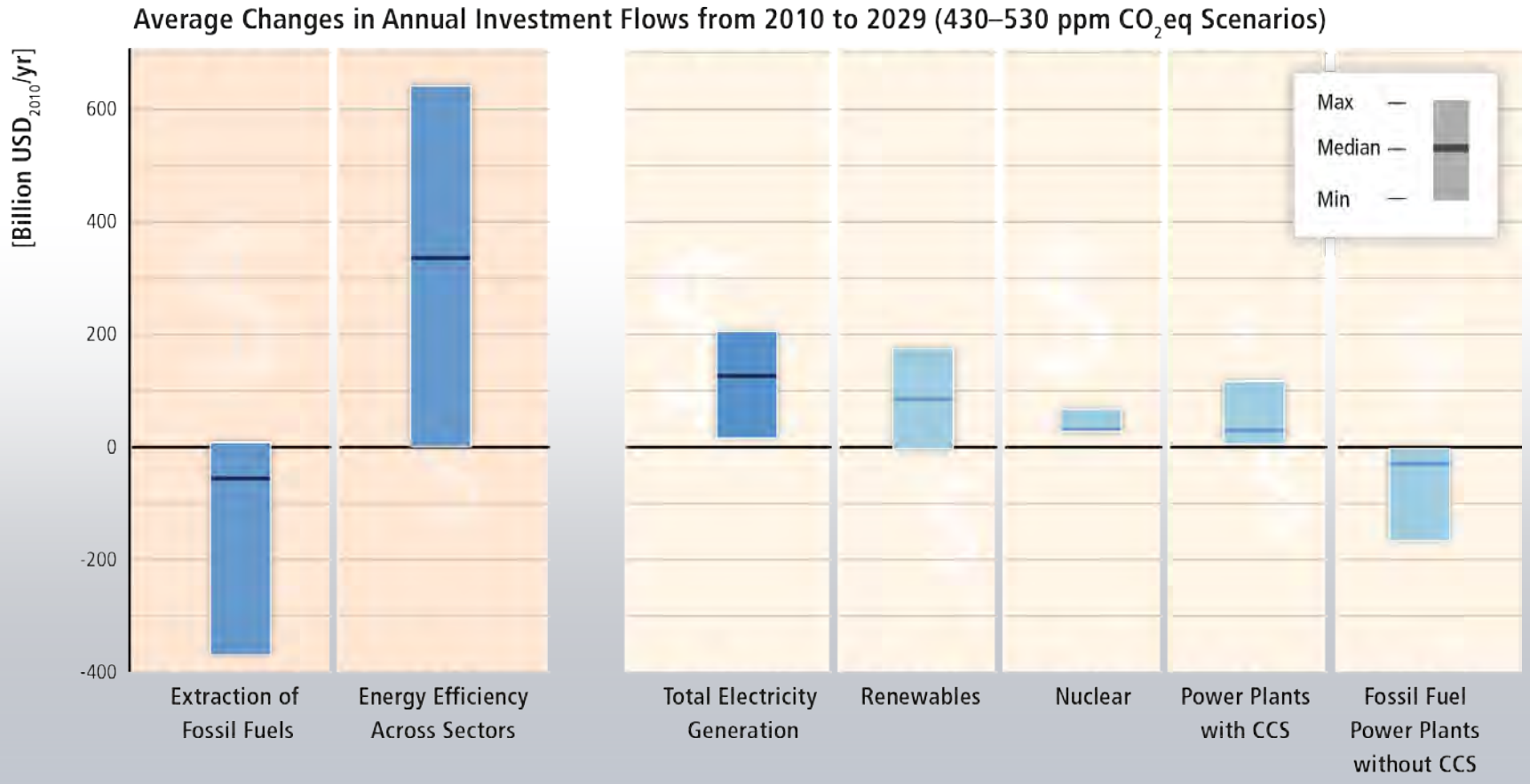

Climate change is a global commons problem that requires international cooperation and coordination across scales.

There is far more carbon in the ground than emitted in any baseline scenario.



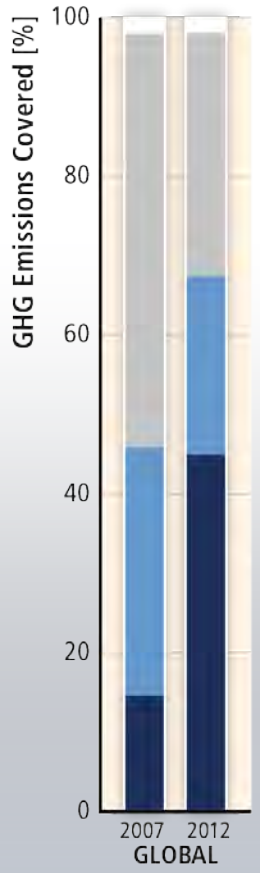
Based on SRREN Figure 1.7

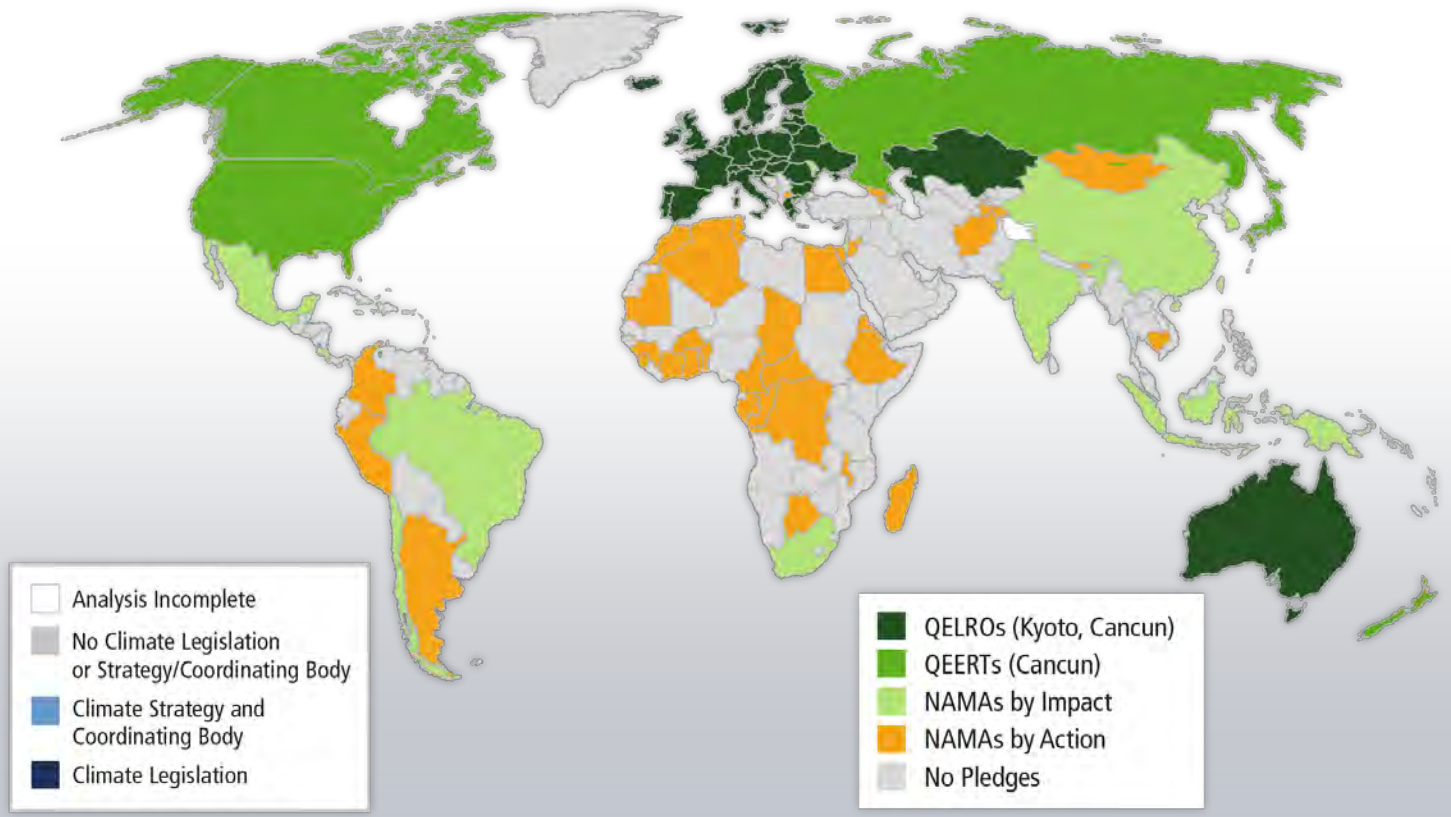
Substantial reductions in emissions would require large changes in investment patterns and appropriate policies.



Based on Figure 16.3

There has been a considerable increase in national and sub-national mitigation policies since AR4.



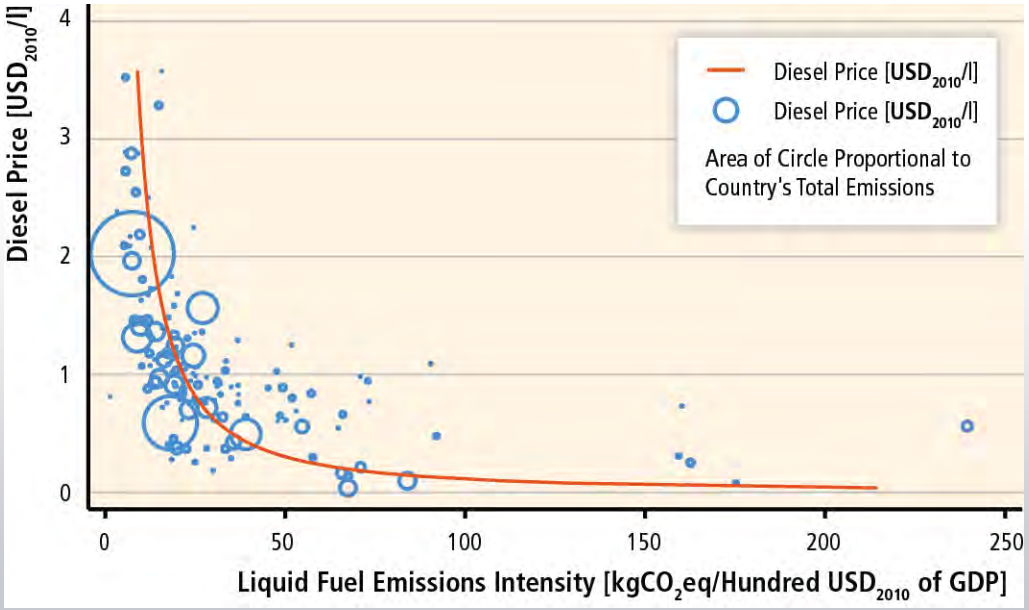


Based on Figures 15.1 and 13.3

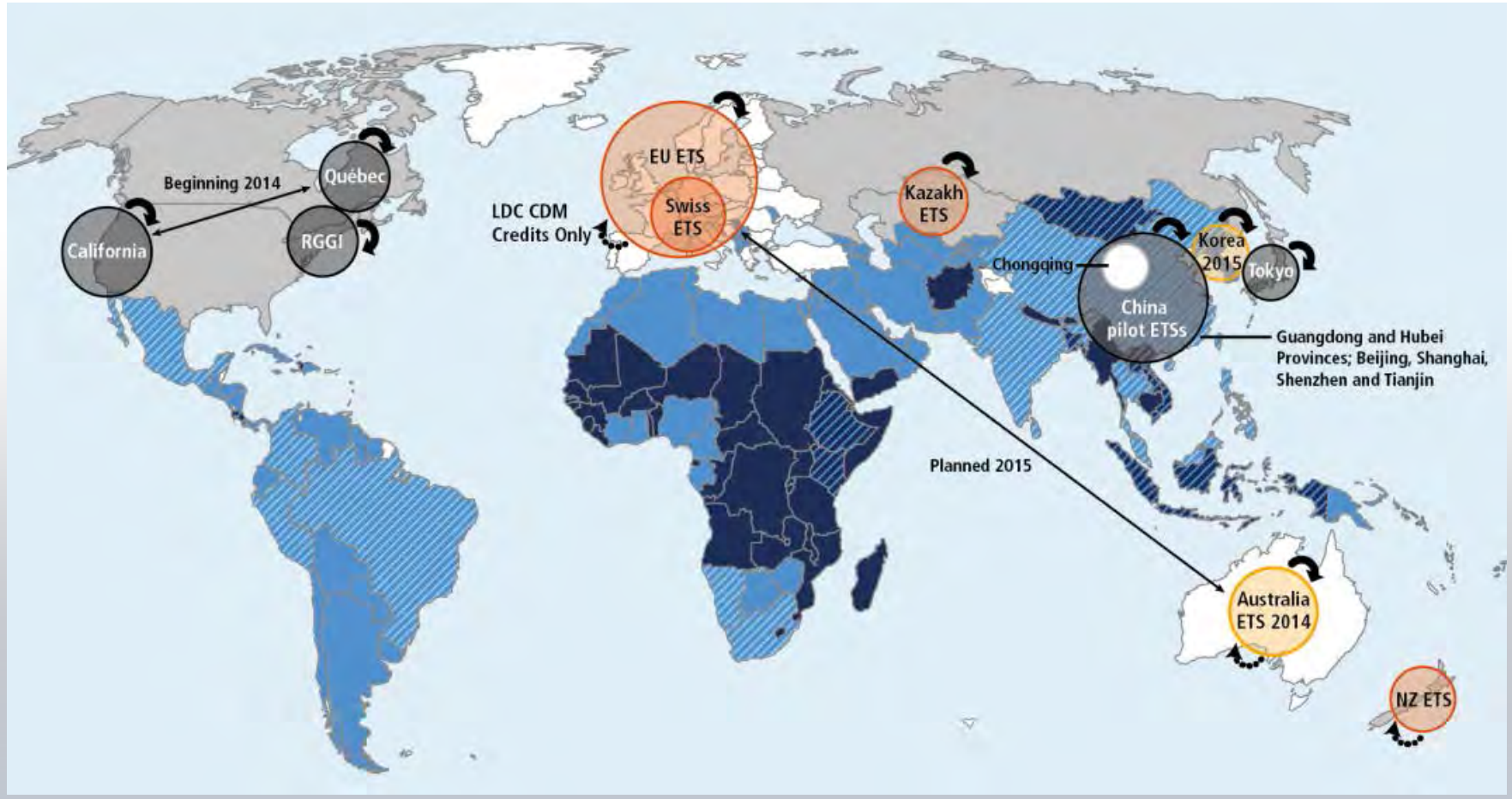
Examples of the performance of emission taxes

Fuel taxes

- In the long run 10% higher fuel prices will lead to a roughly 7% reduction in fuel use and emissions
- OECD could have decreased fuel use by more than 35% if all member countries had chosen taxes as high as in the UK



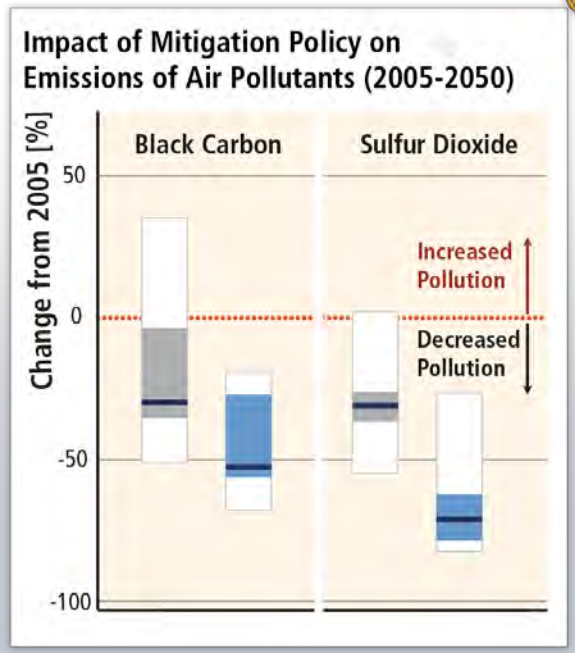
Regions are starting to cooperate.

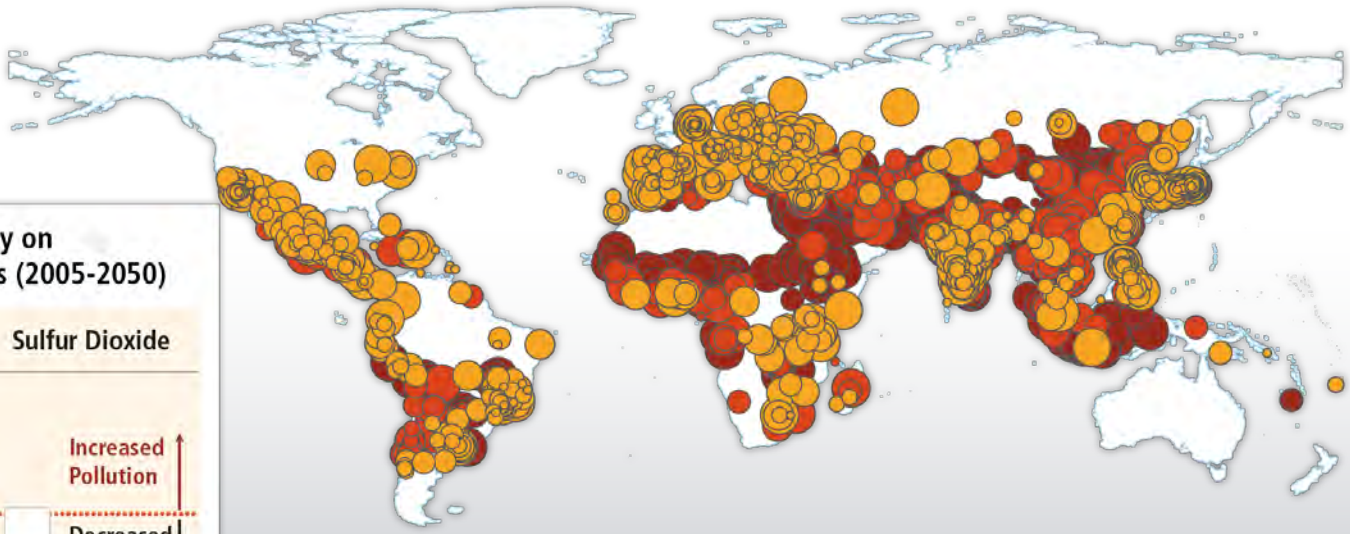


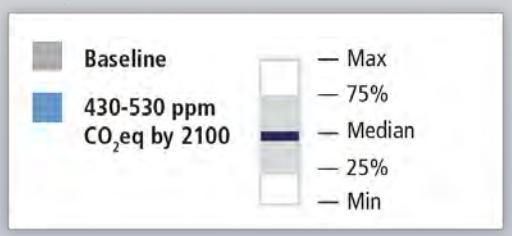
International climate policy is only slowly taking shape.

- The UNFCCC regime is the only platform with broad legitimacy.
- Cooperation outside the UNFCCC has increased but except for the Montreal Protocol did not lead to significant emissions reduction.
- The Kyoto Protocol was less successful than envisaged.
  - The emissions commitments were reached, benefitting from economic changes in countries in transition.
  - The market mechanisms have mobilized low-cost mitigation, whose additionality is however debated.

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







Based on Figures 6.33 and 12.23

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Working Group III contribution to the
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