CLIMATE CHANGE 2014
Synthesis Report

Integrated Assessment and Climate Policy

Leon Clarke
November 1, 2014

Synthesis Report of the

Fifth Assessment Report of the

Intergovernmental Panel on Climate Change

ipcc
INTERGOVERNMENTAL PANEL ON climate change

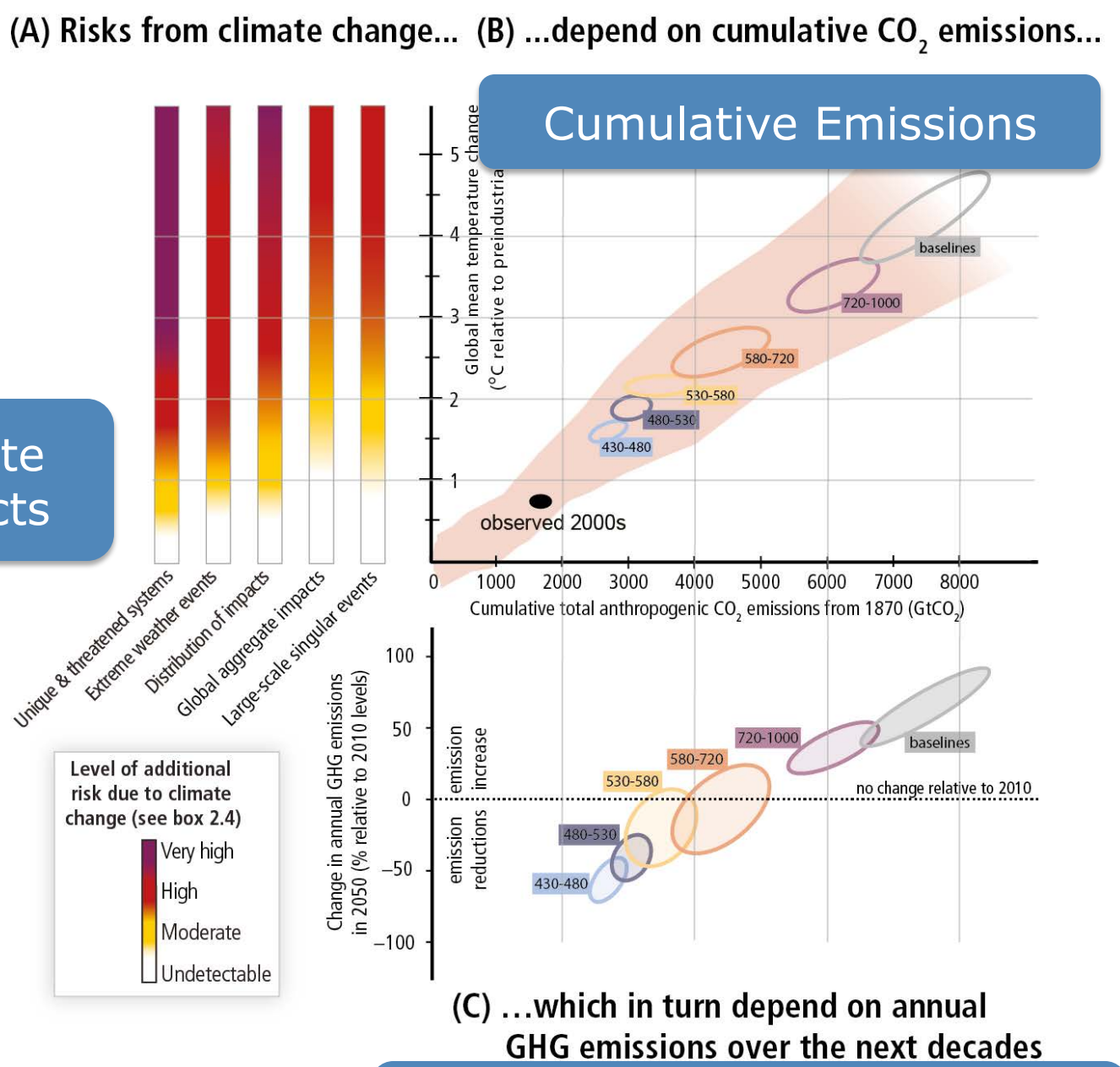
WMO UNEP

Figure SPM.10

Linking across Working Groups

Climate Impacts

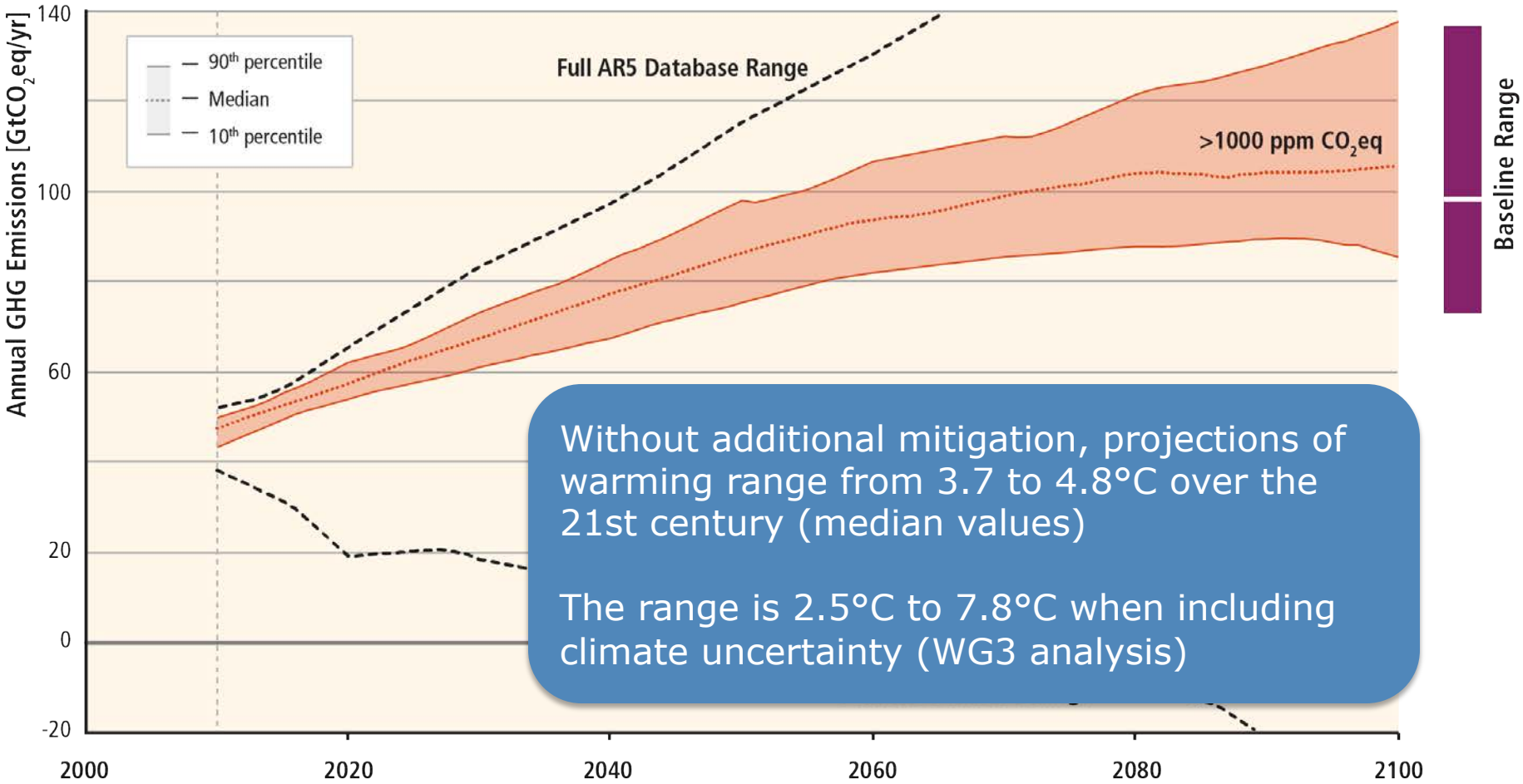
Cumulative Emissions



Emissions Reductions over the Coming Decades

Where are emissions, concentrations, and temperature currently headed?

AR5 collected roughly 1200 baseline and mitigation scenarios.



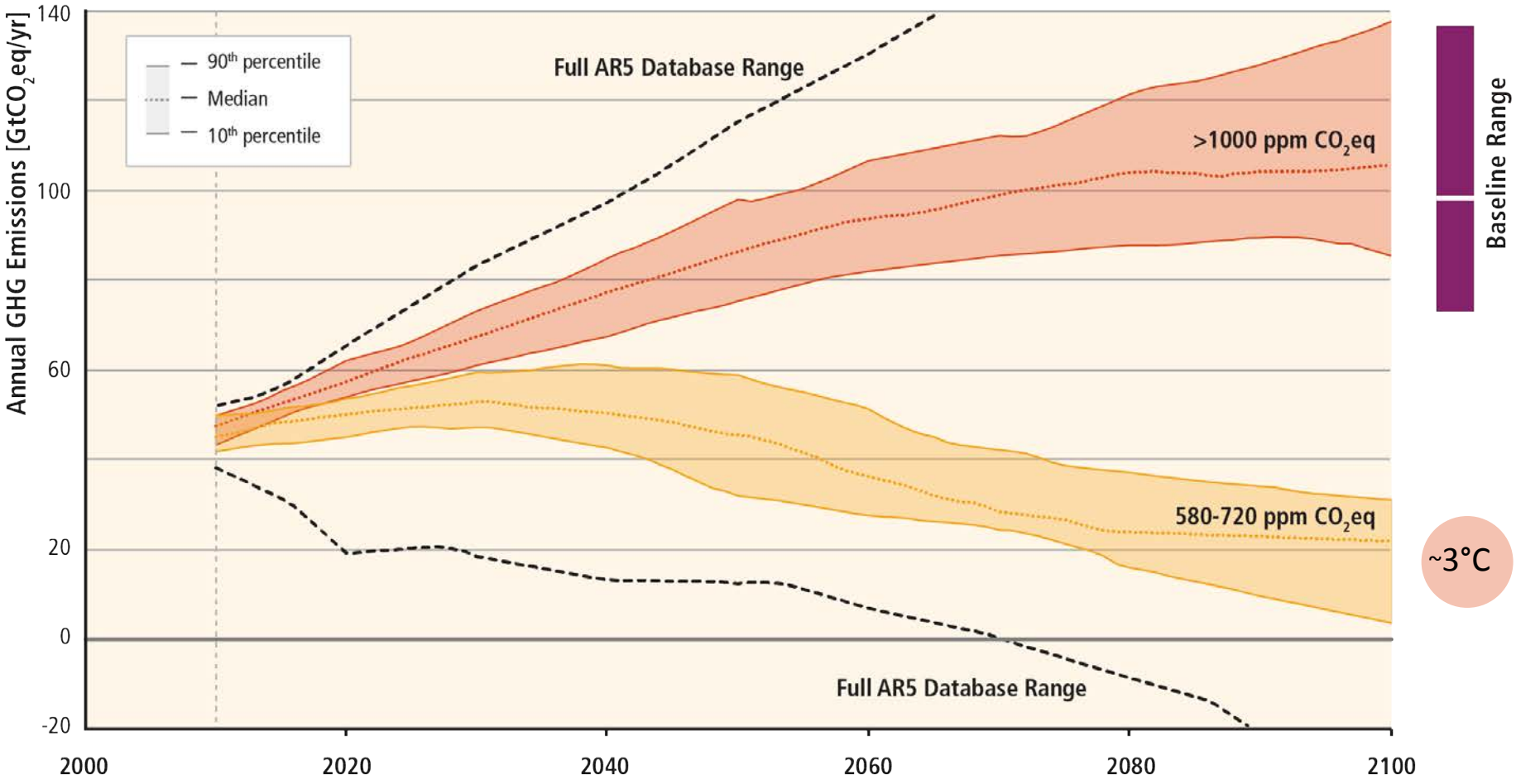
Without additional mitigation, projections of warming range from 3.7 to 4.8°C over the 21st century (median values)

The range is 2.5°C to 7.8°C when including climate uncertainty (WG3 analysis)

Based on Figure 6.7

How much must emissions be reduced to limit temperature change to 2°C or other levels?

Limiting temperature change will require substantial emissions reductions.



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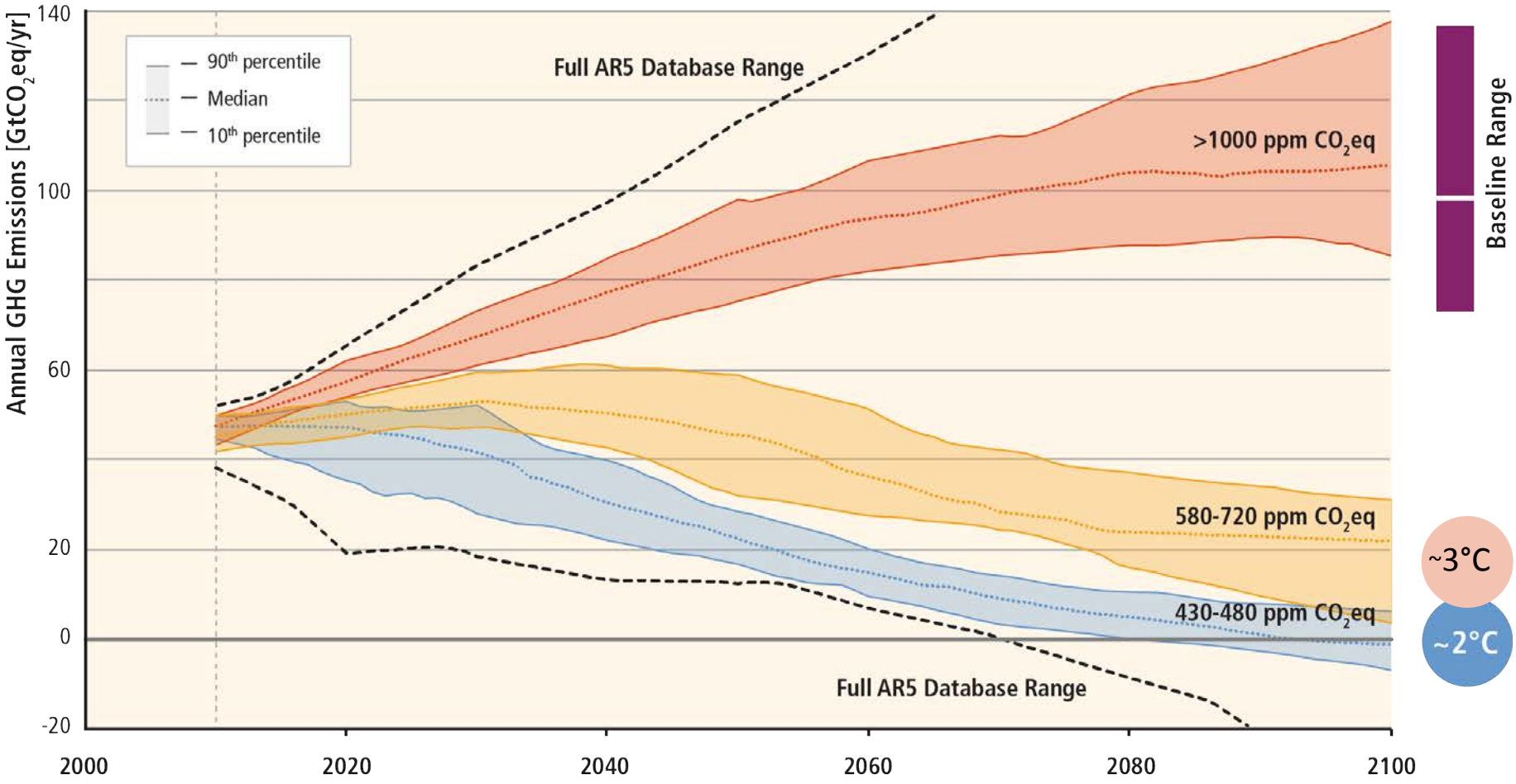
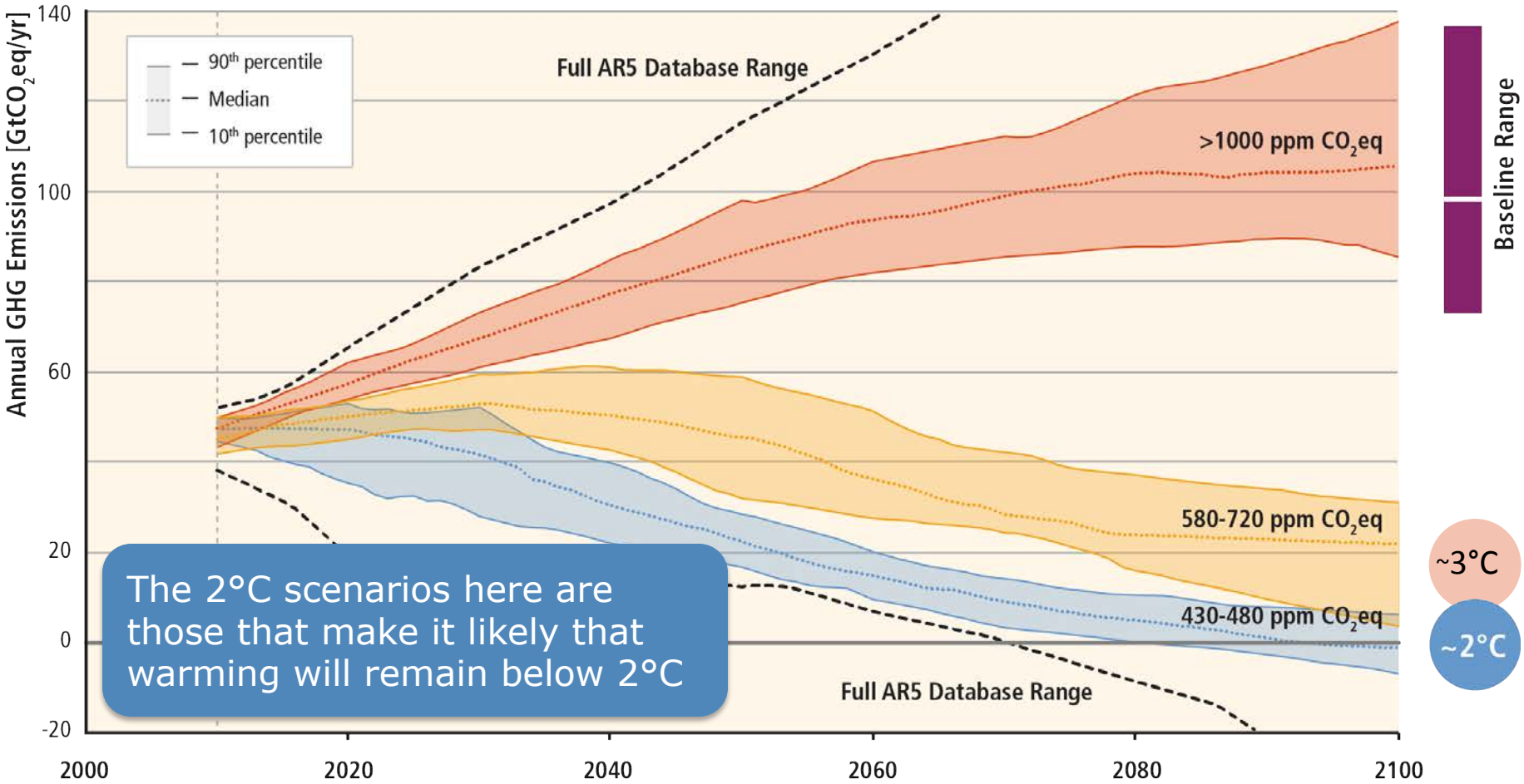


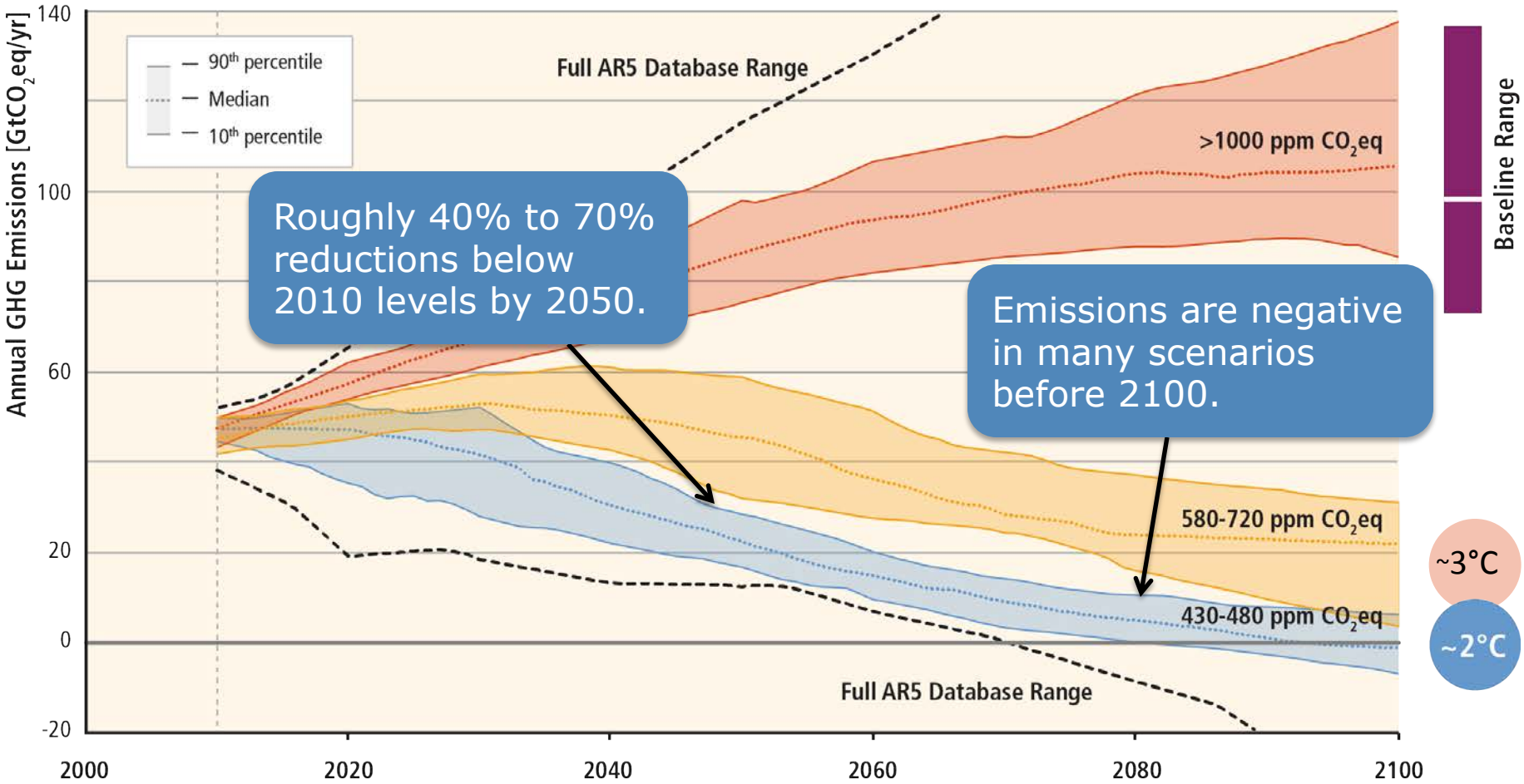
There are several ways to define a limit on warming.



The 2°C scenarios here are those that make it likely that warming will remain below 2°C

Based on Figure 6.7

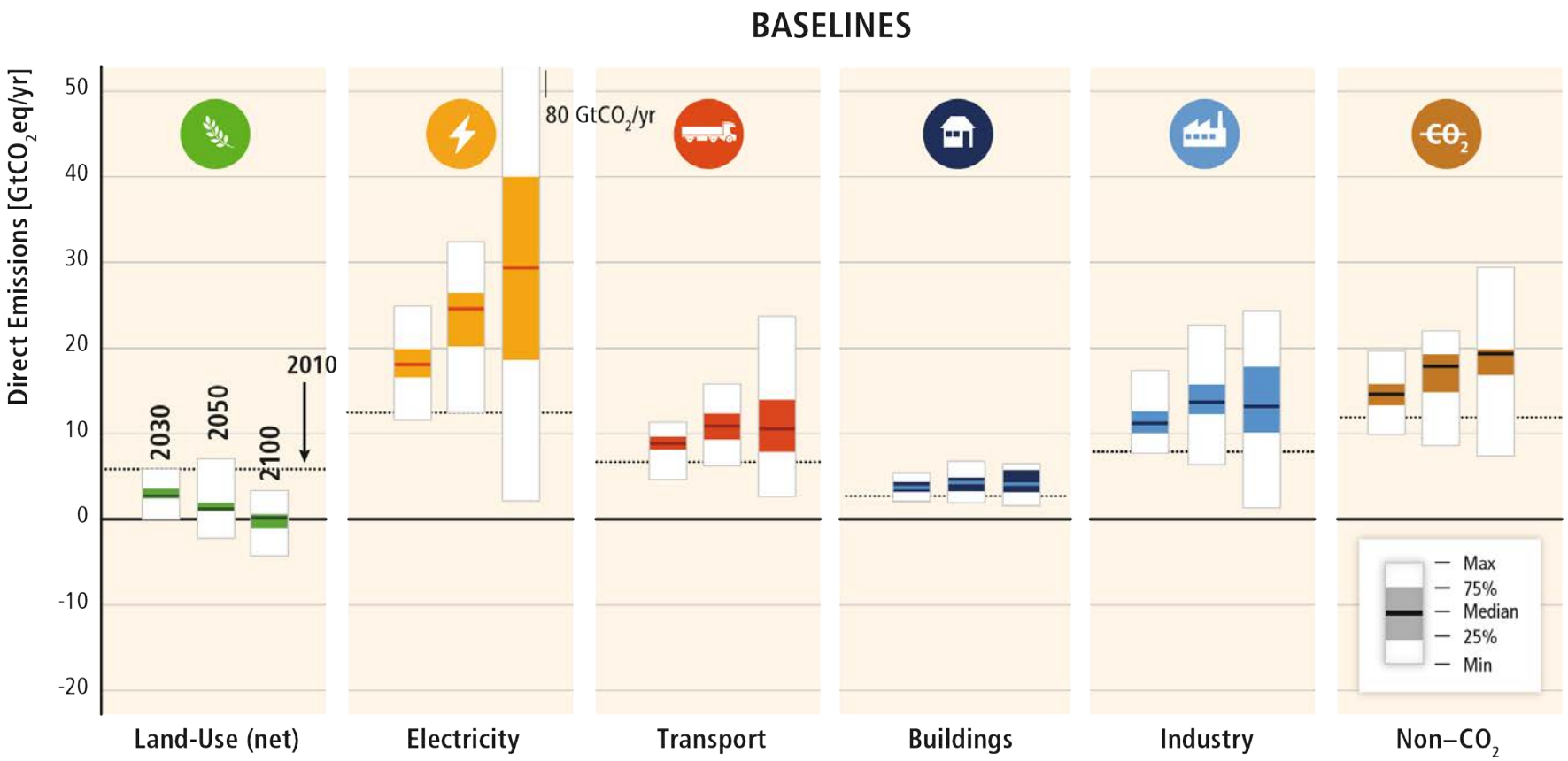
Limiting concentrations and temperature change requires substantial mitigation in the near- and long-term.



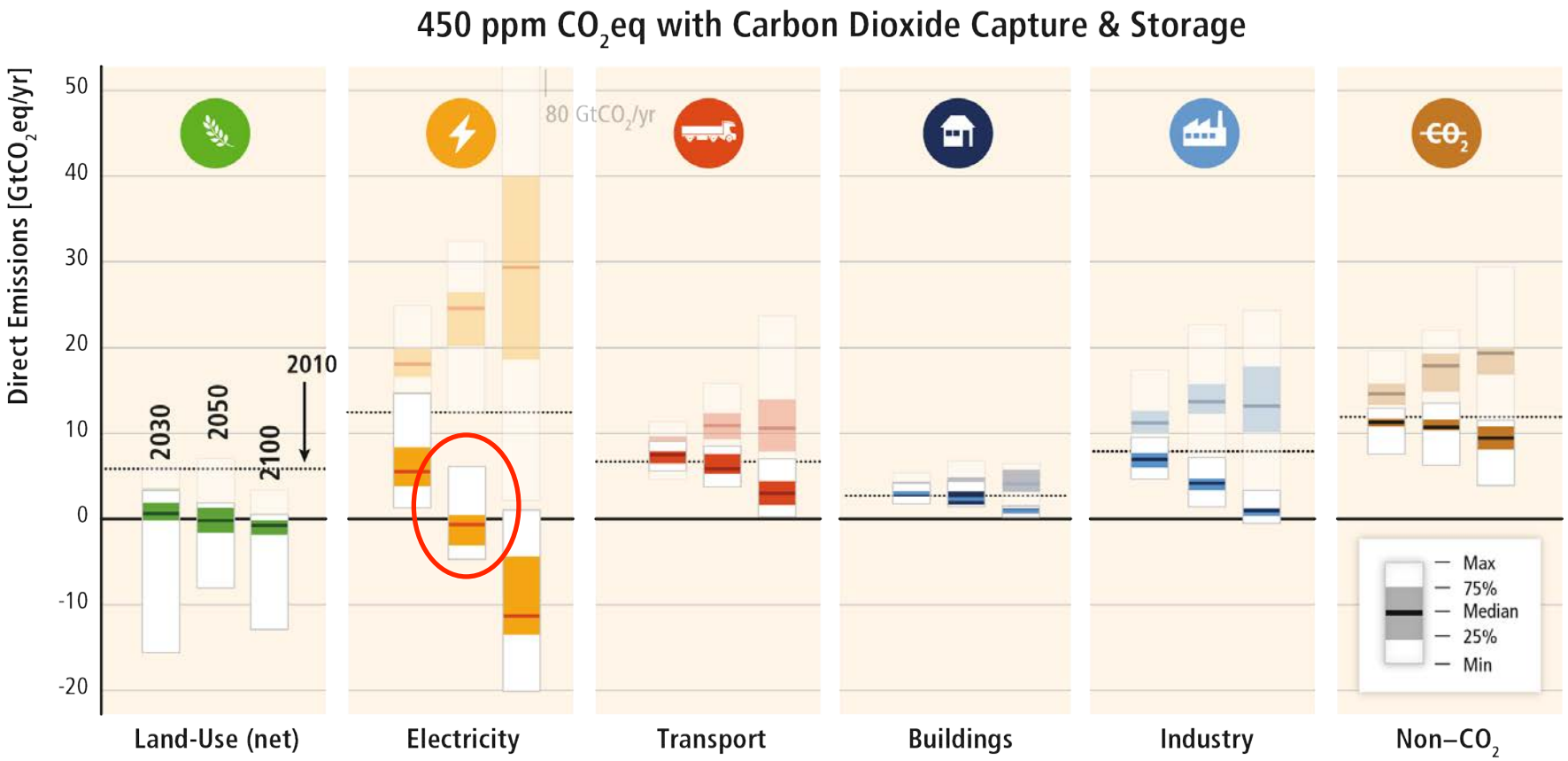
Based on Figure 6.7

How much does the energy system need to change to limit temperature change?

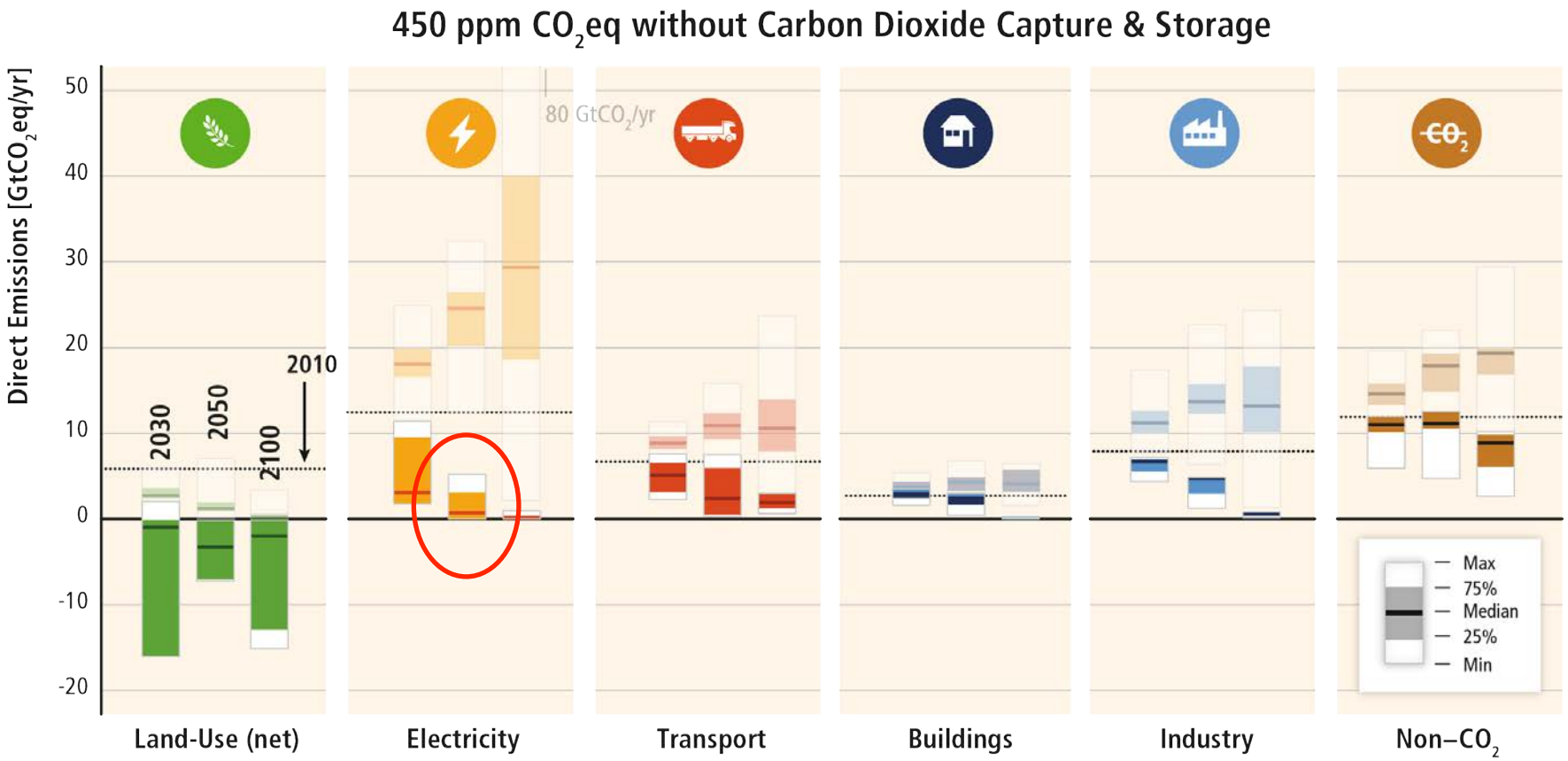
Baseline scenarios suggest rising GHG emissions in all sectors, except for CO_2 emissions in the land-use sector.



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

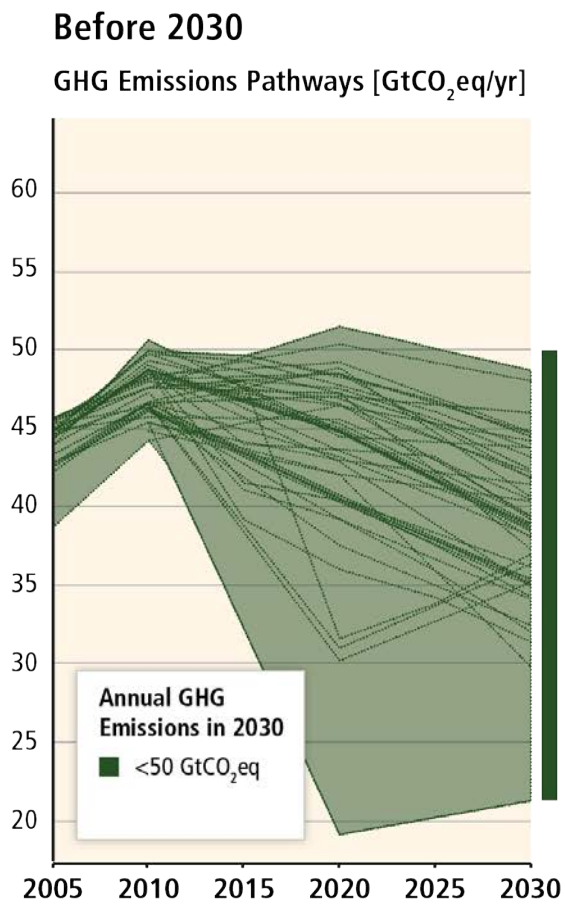


Mitigation efforts in one sector determine efforts in others.



How will mitigation over the next 15 years influence the challenge of meeting 2°C?

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

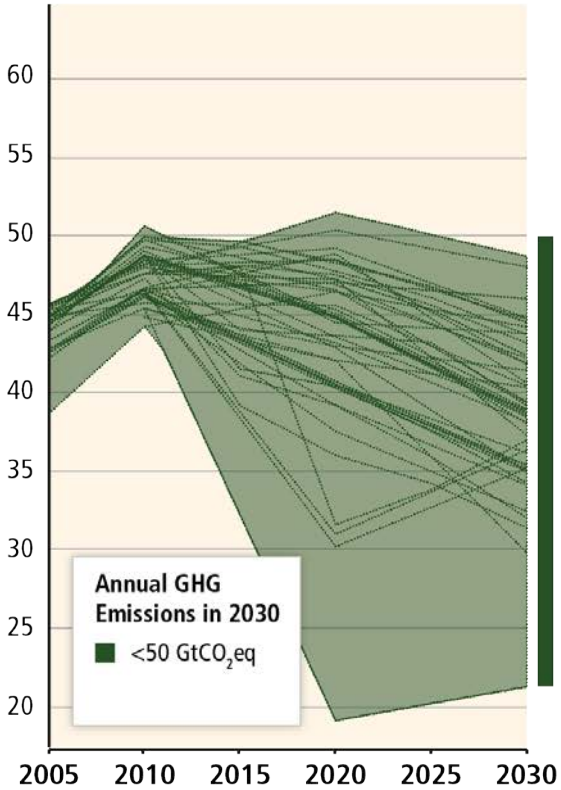


„immediate action“

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

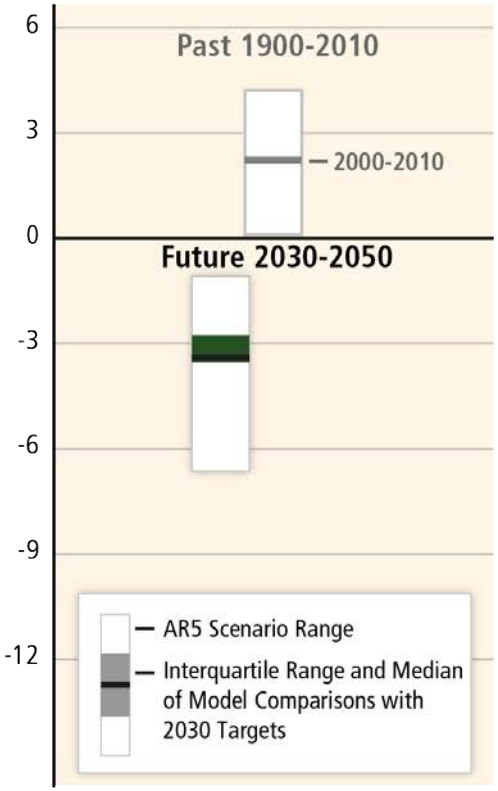
Before 2030

GHG Emissions Pathways [$GtCO_2eq/yr$]



After 2030

Rate of CO_2 Emission Change [%/yr]



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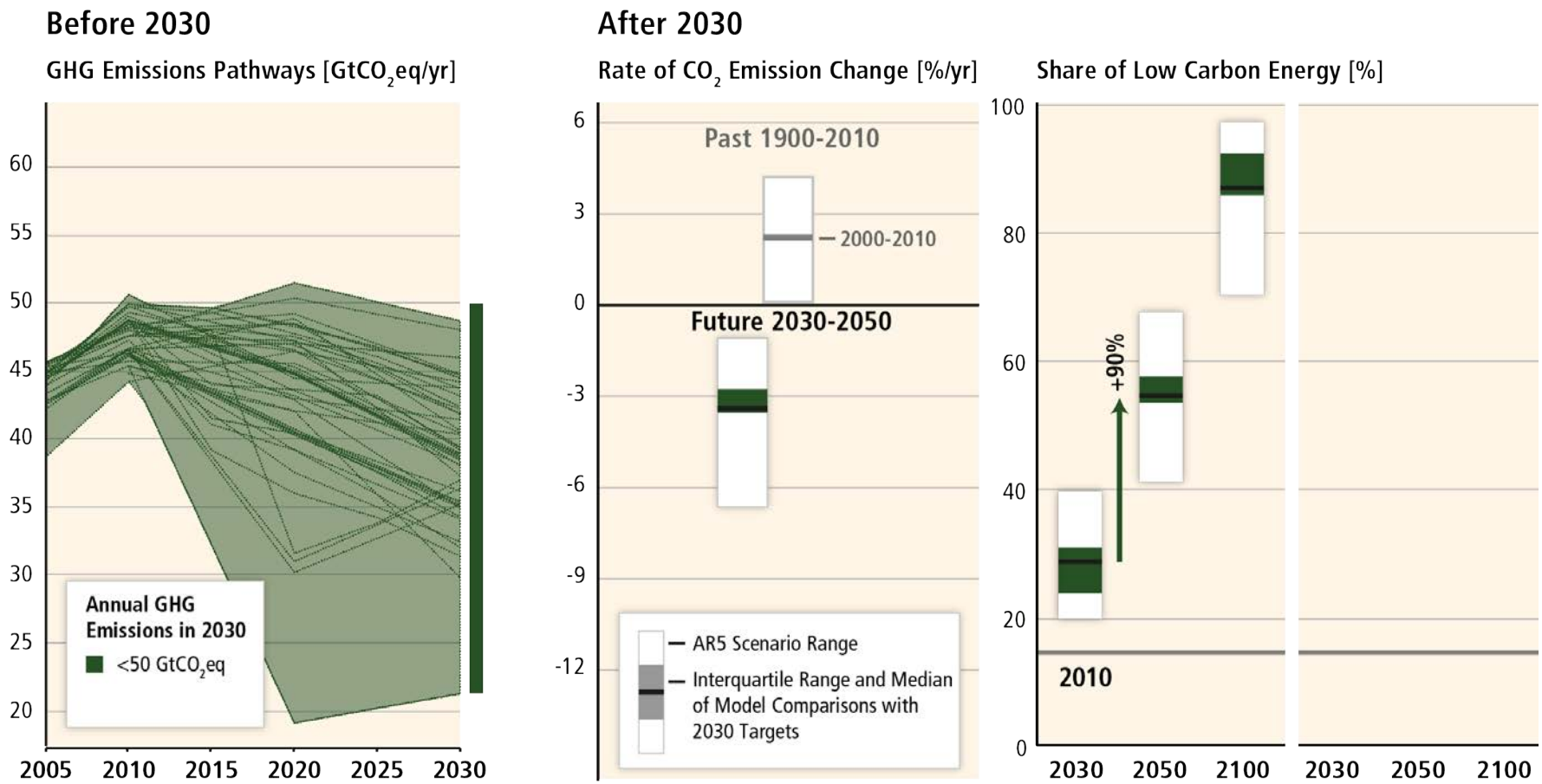
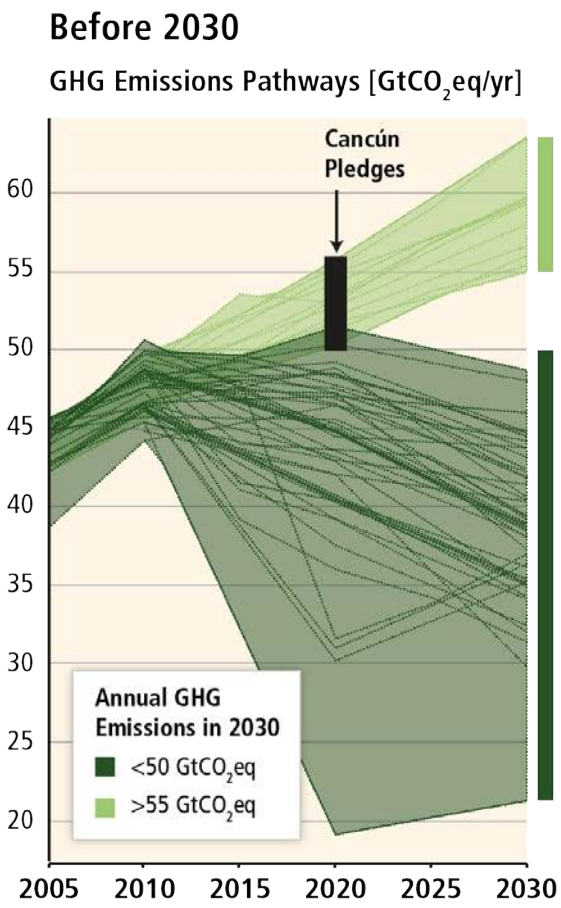


Delaying mitigation is estimated to increase the difficulty and narrow the options for limiting warming to 2°C.



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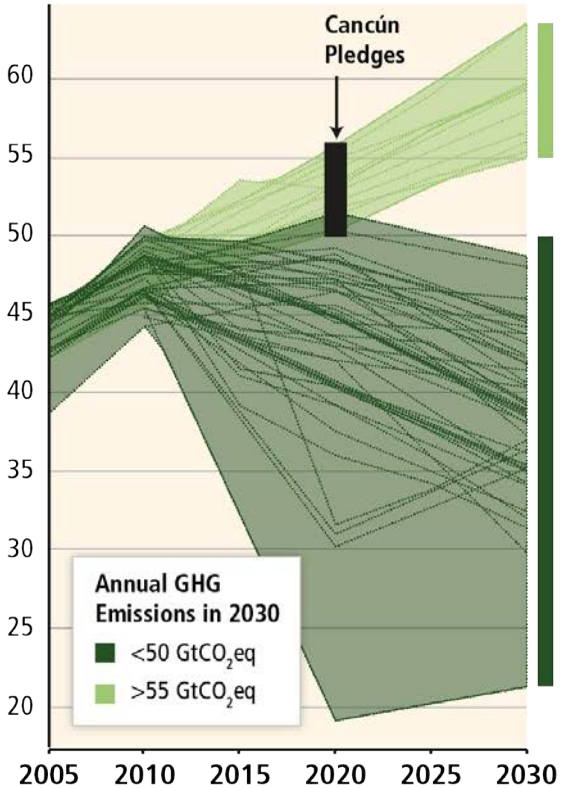

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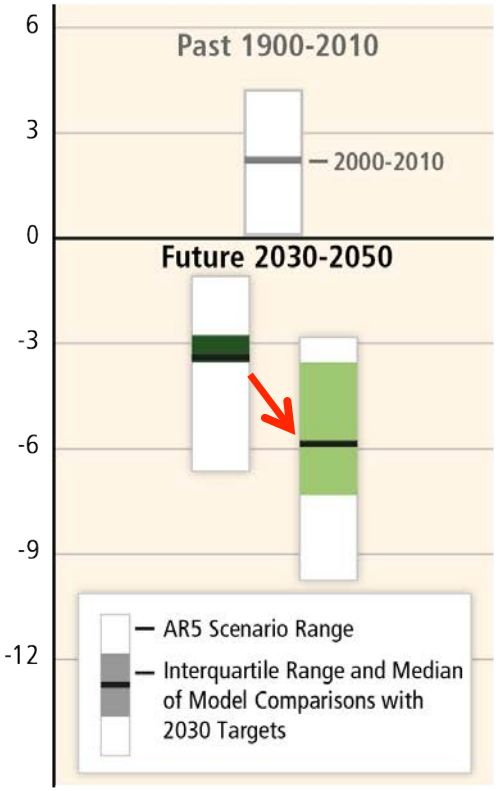
Rate of CO_2 Emission Change [%/yr]



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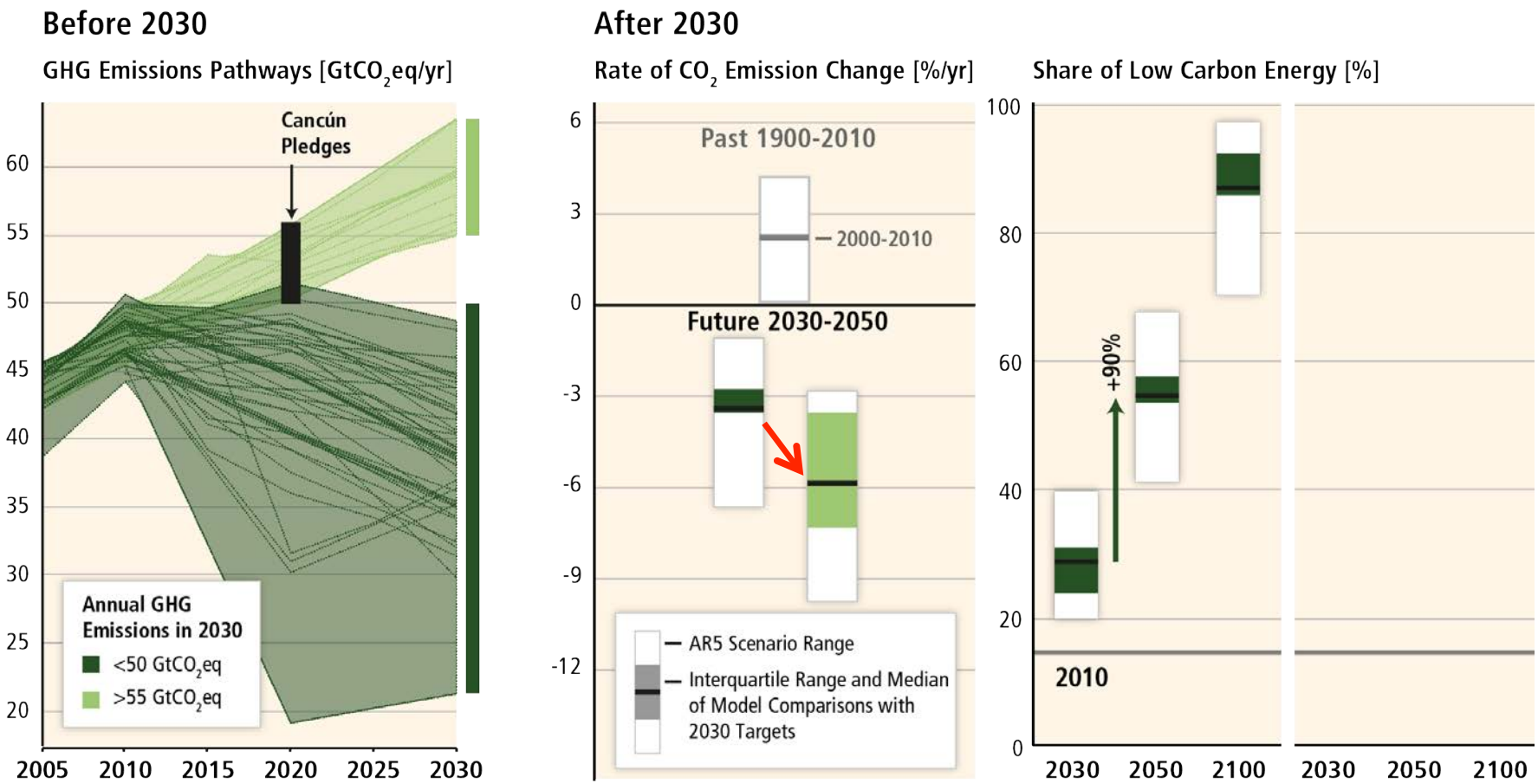

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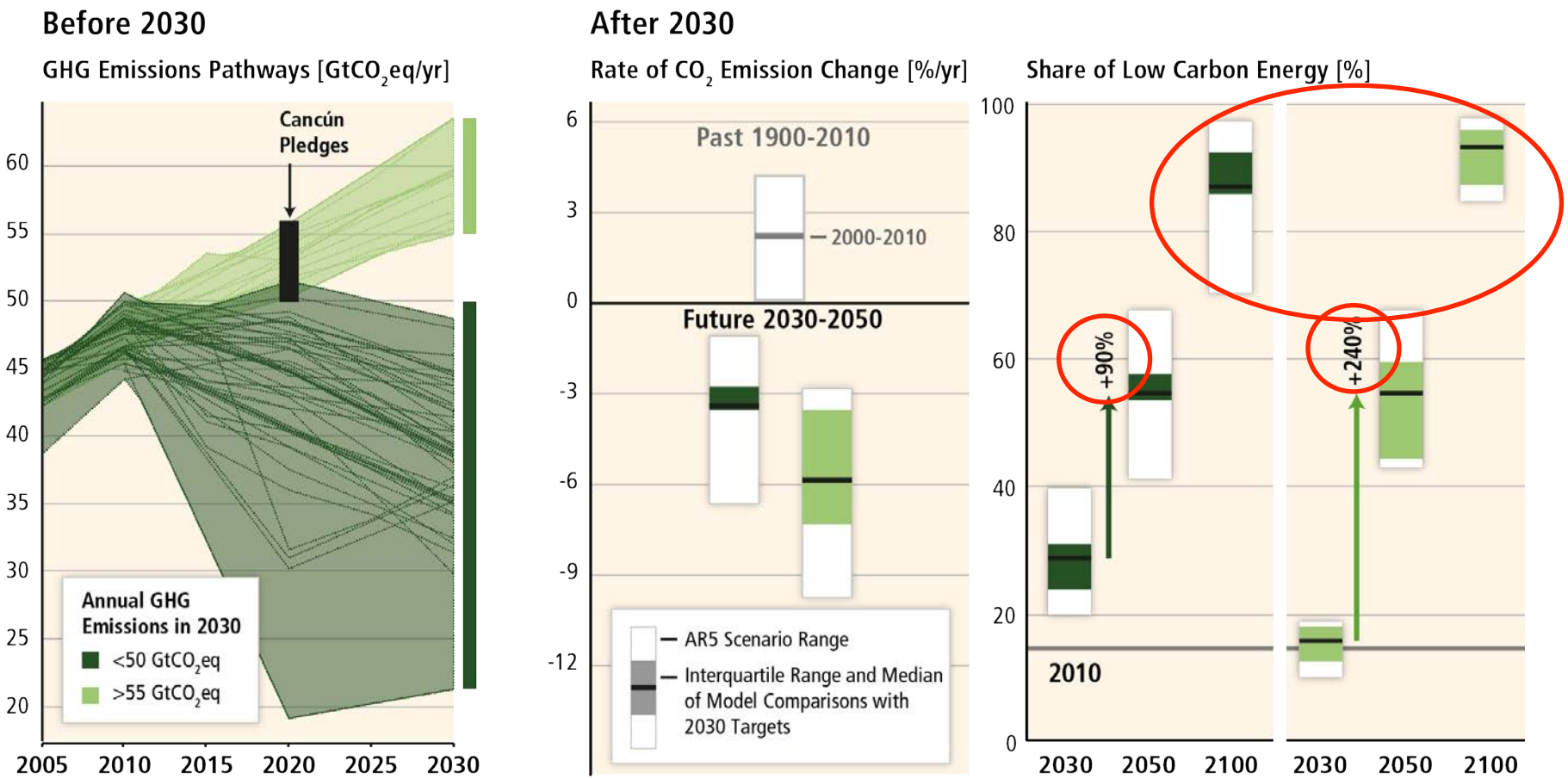


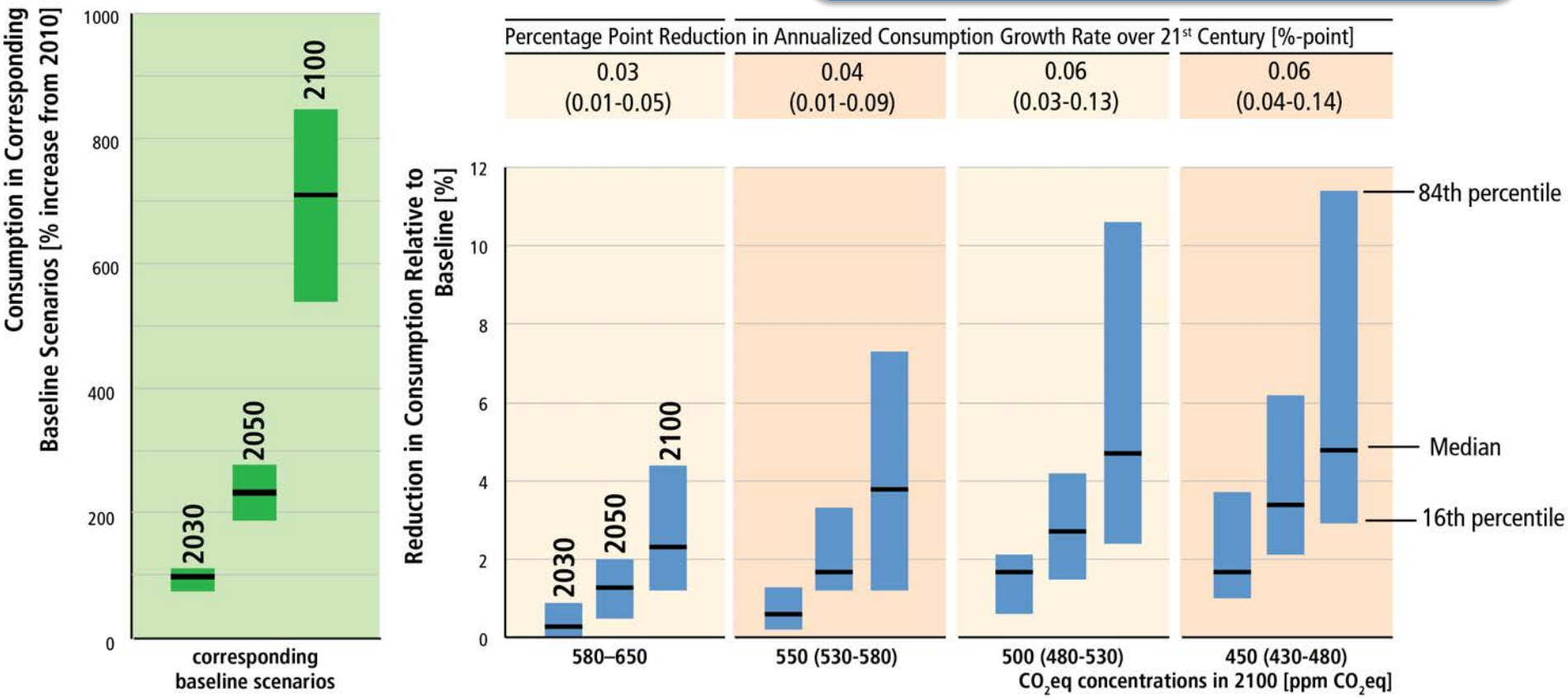
Based on Figures 6.32 and 7.16

How much will it cost to reduce emissions?

Estimates of aggregate global mitigation costs vary widely, even under idealized assumptions; they increase with mitigation.

These cost estimates do not account for the benefits from reduced climate change.

Global Mitigation Costs and Consumption Growth in Baseline Scenarios



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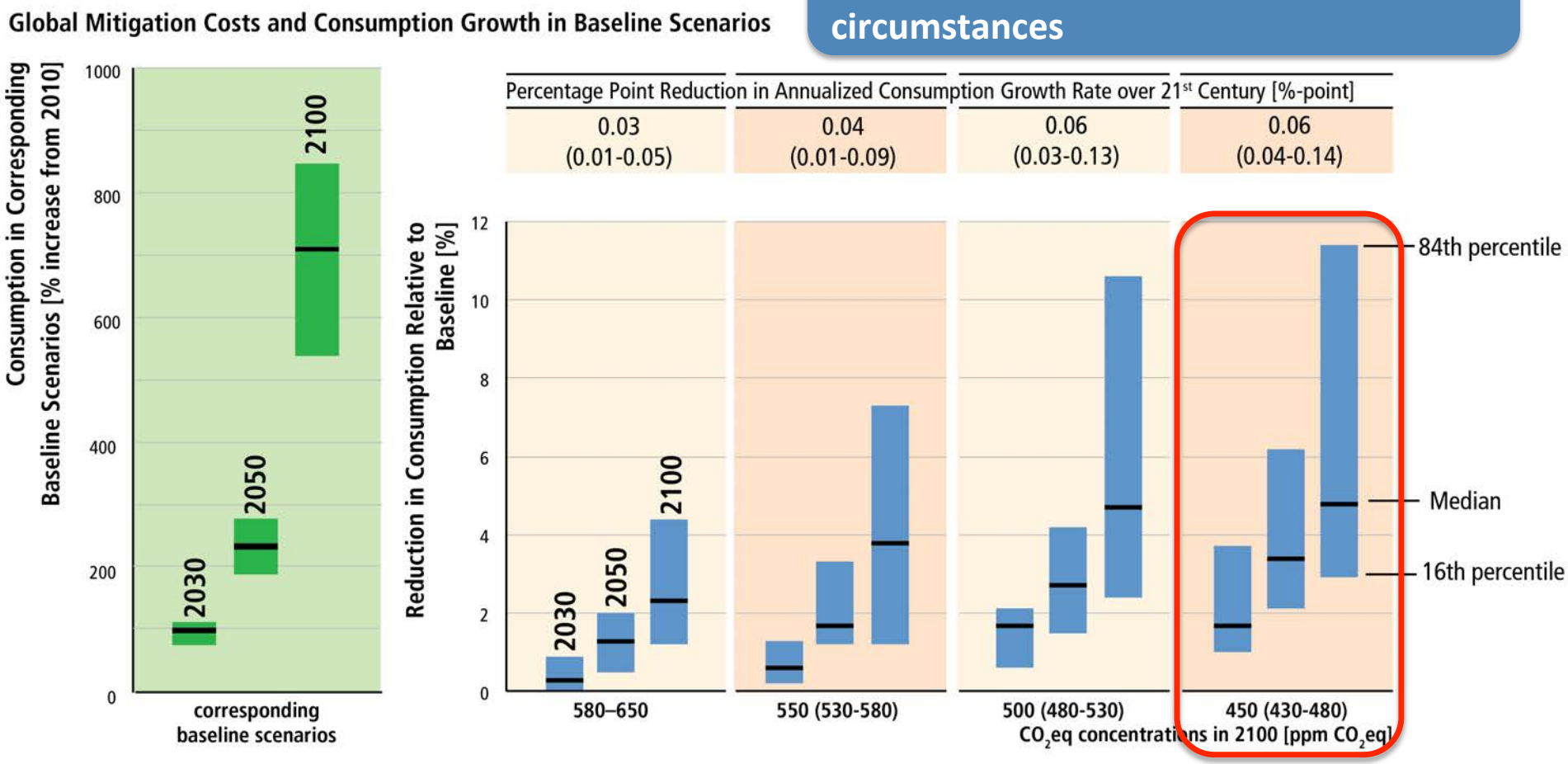
Both higher and lower costs have been estimated based on less idealized circumstances



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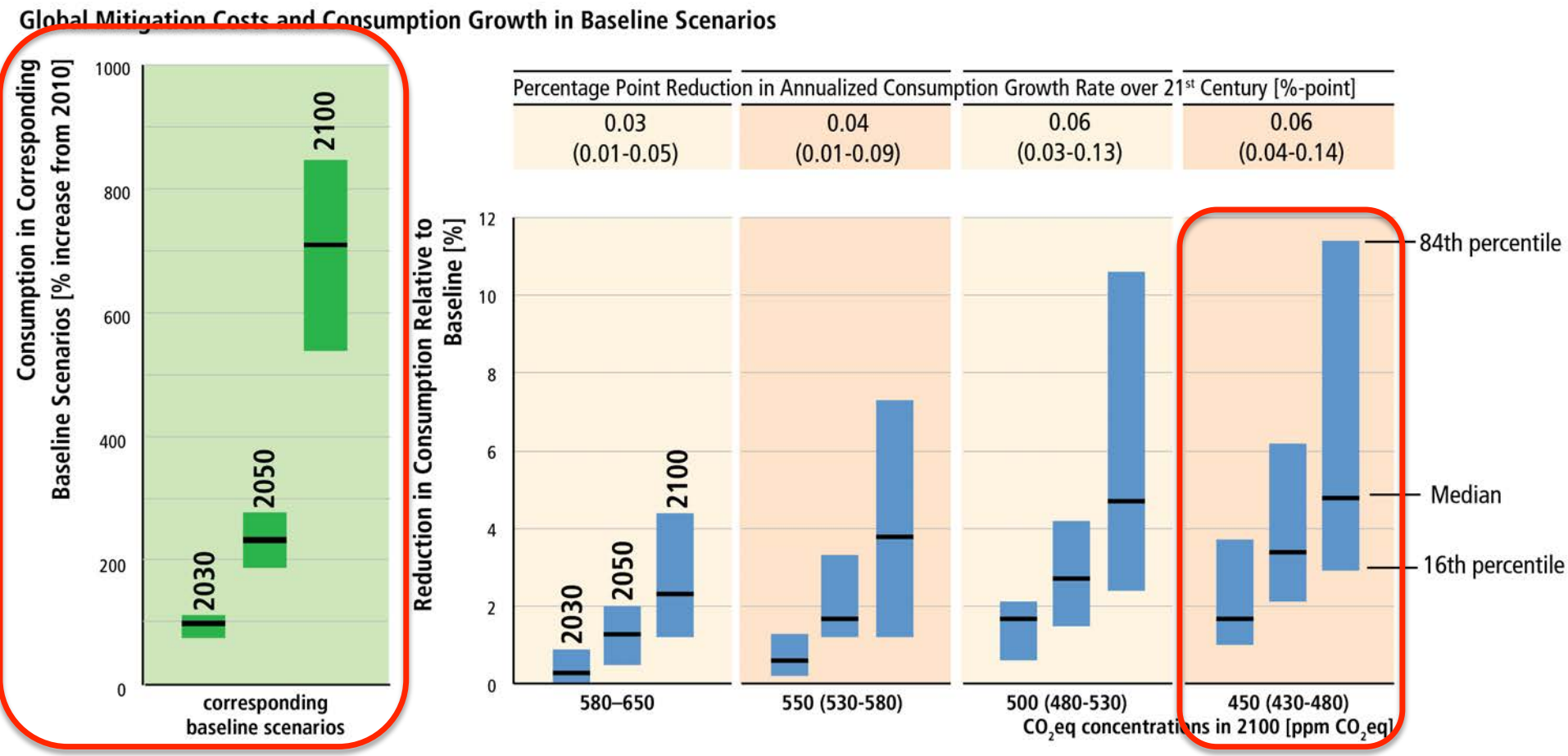

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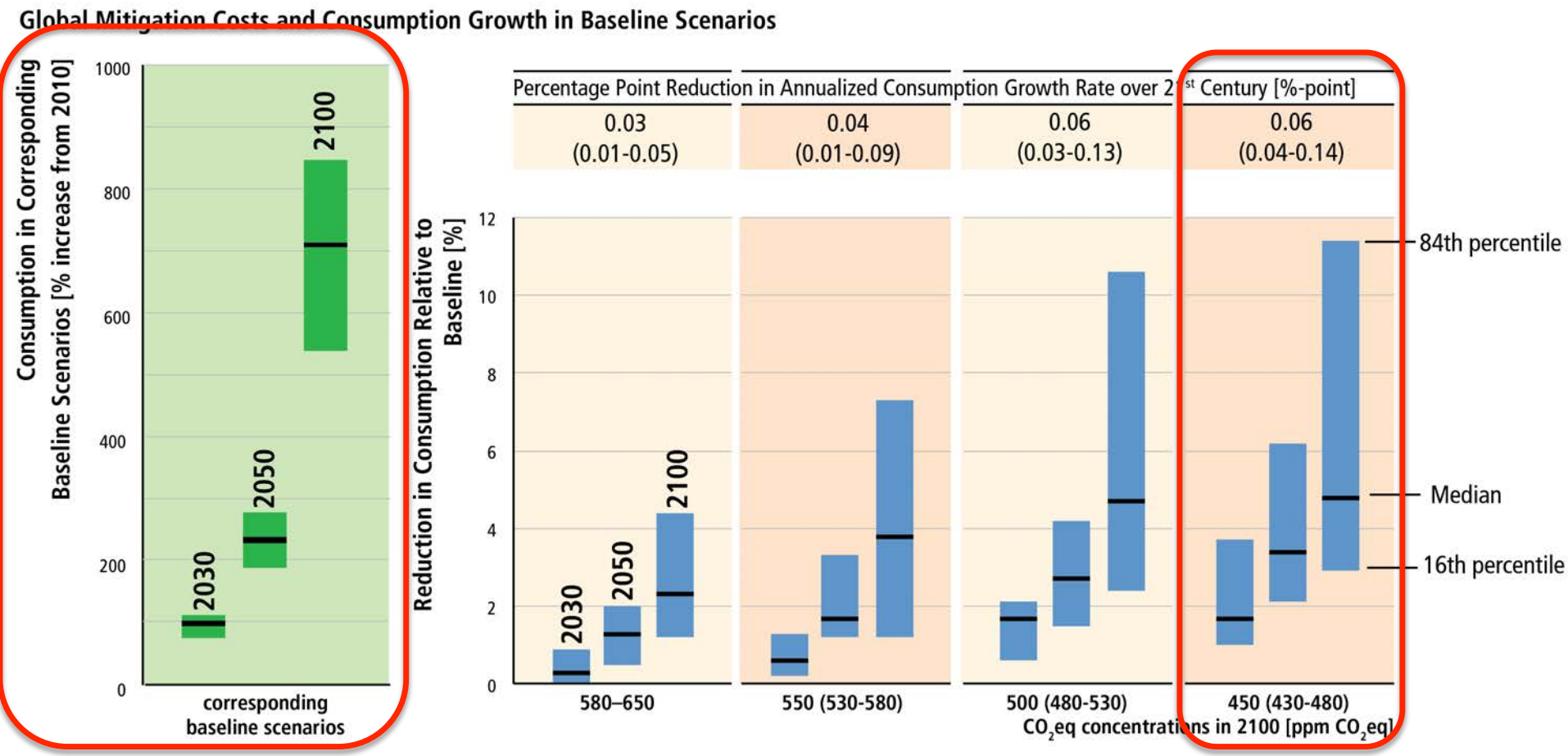
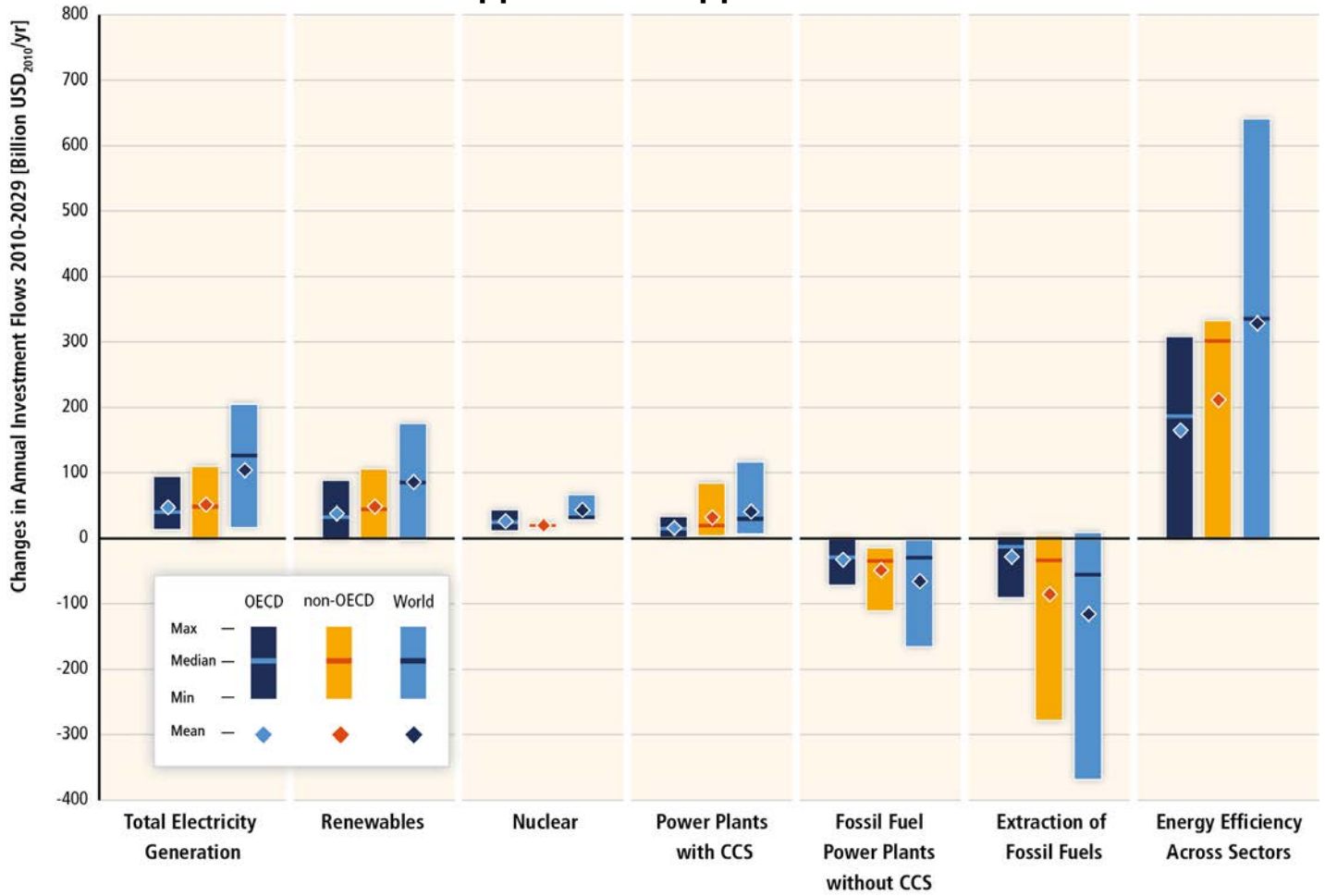


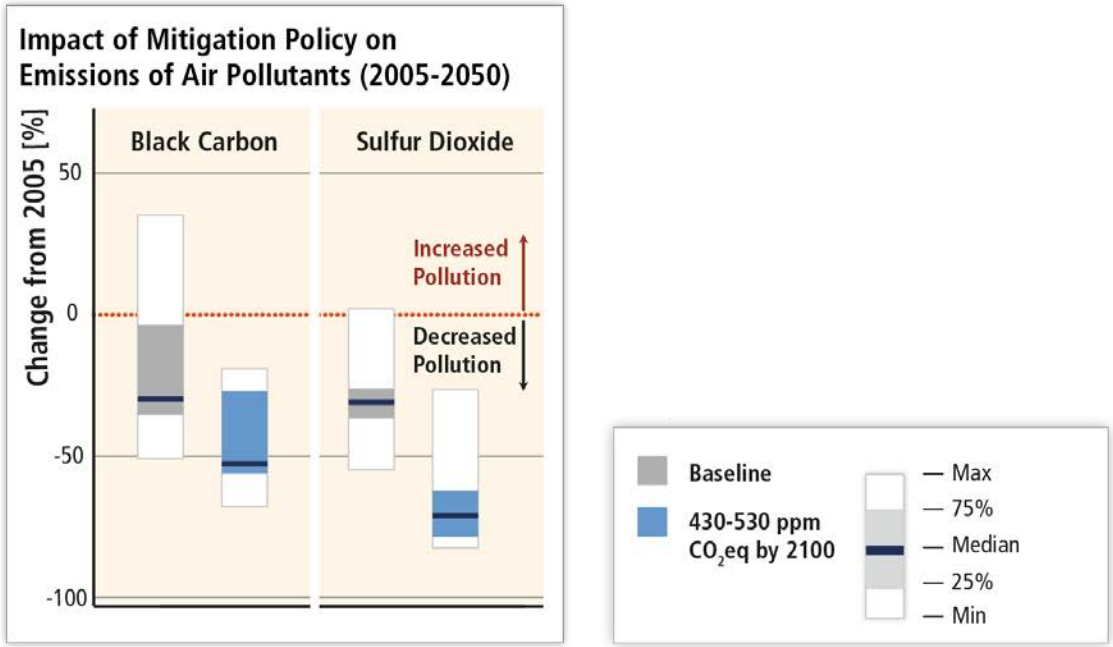
Substantial reductions in emissions would involve large changes in investment patterns.

Change of average annual investment in mitigation scenarios (2010–2029)
450 ppm and 500 ppm scenarios



How does mitigation interact with other societal goals?

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



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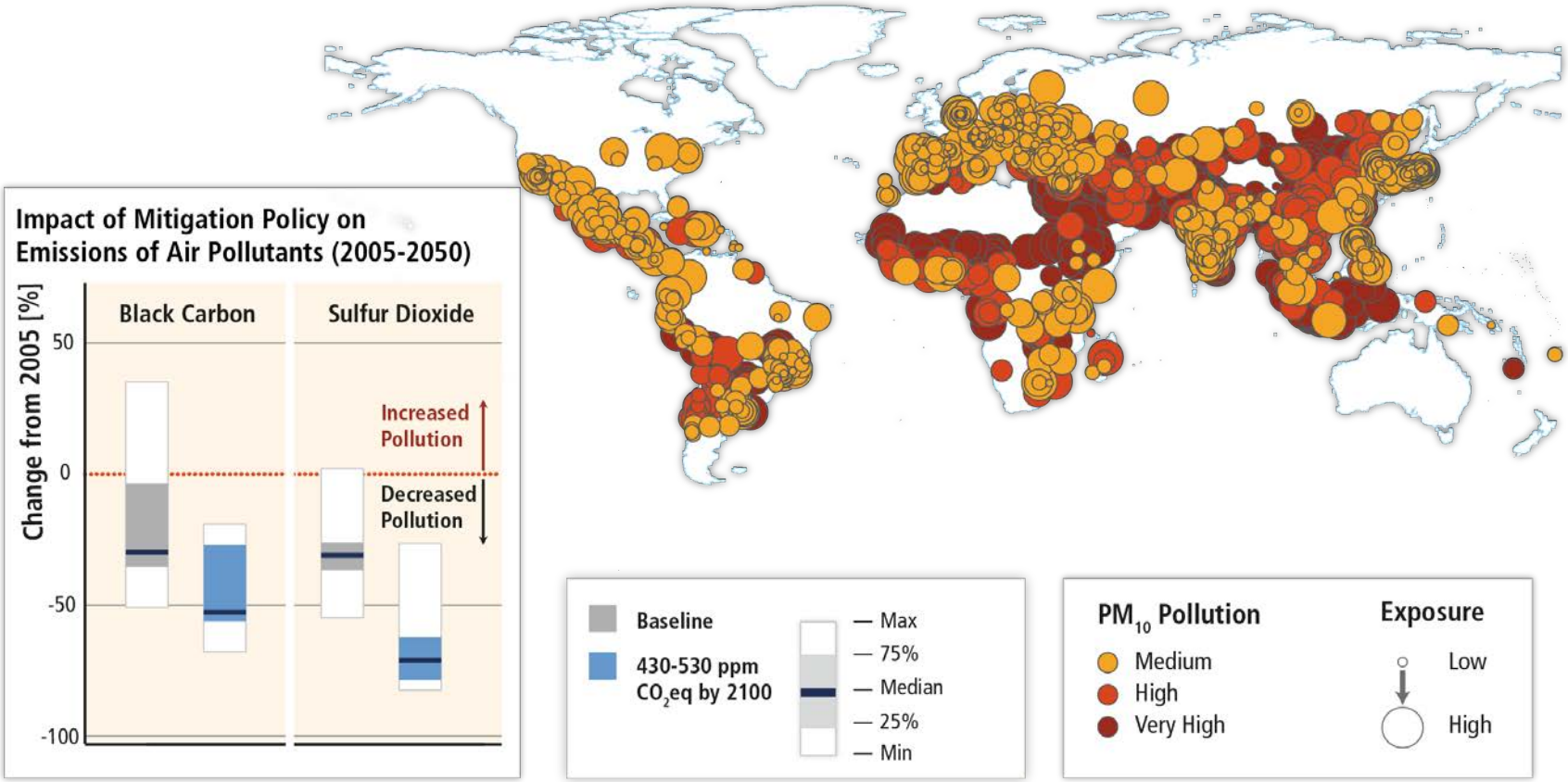
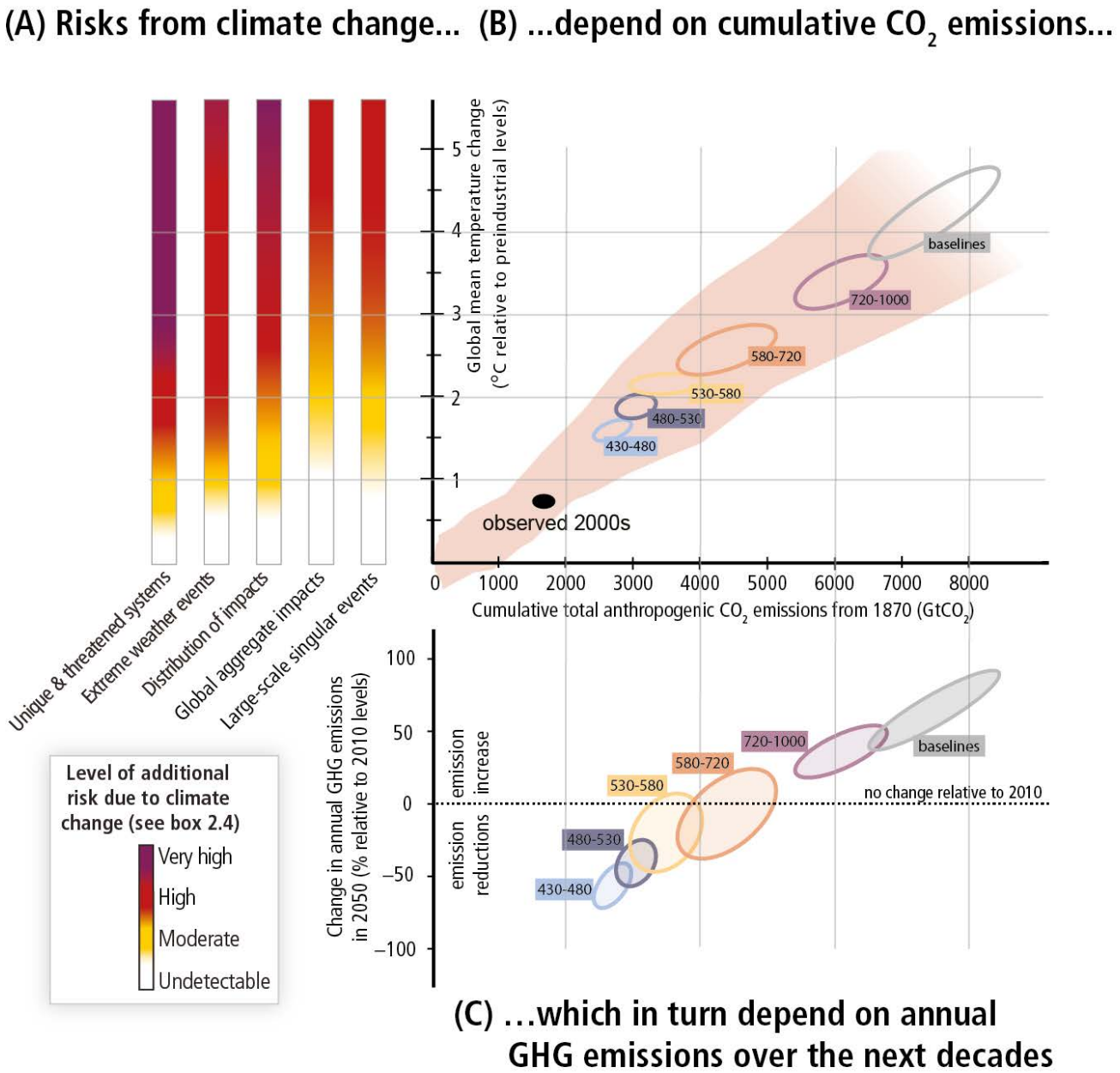


Based on Figures 6.33 and 12.23

Linking from impacts to emissions reductions

Figure SPM.10

Linking across Working Groups



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