Working Group III contribution to the
IPCC Fifth Assessment Report

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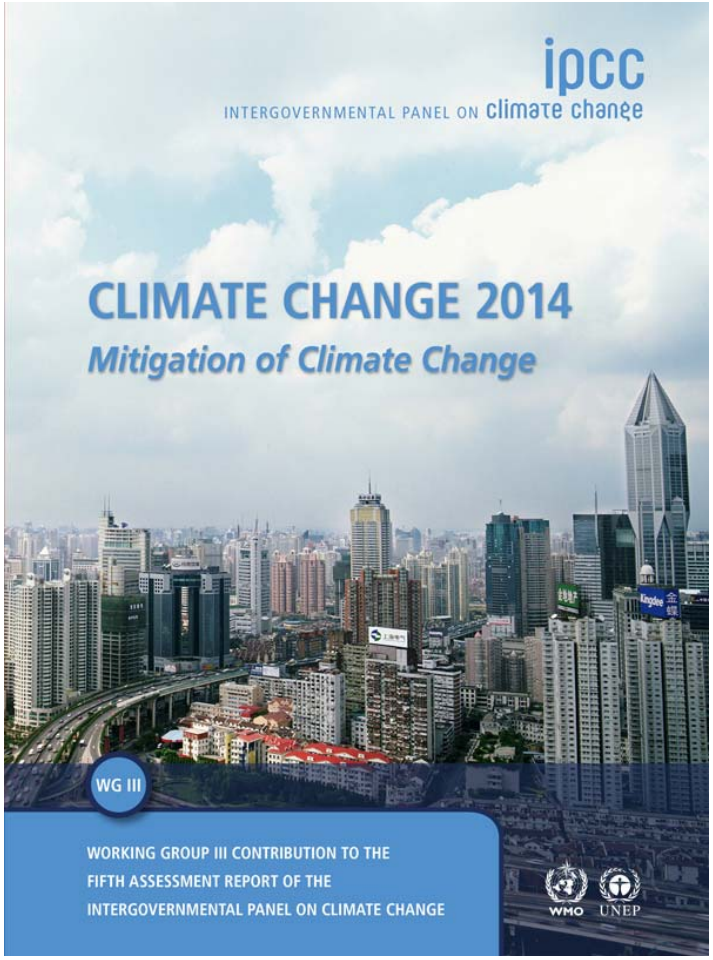
WMO UNEP

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



GHG emissions accelerate despite reduction efforts. Most emission growth is CO_2 from fossil fuel combustion.

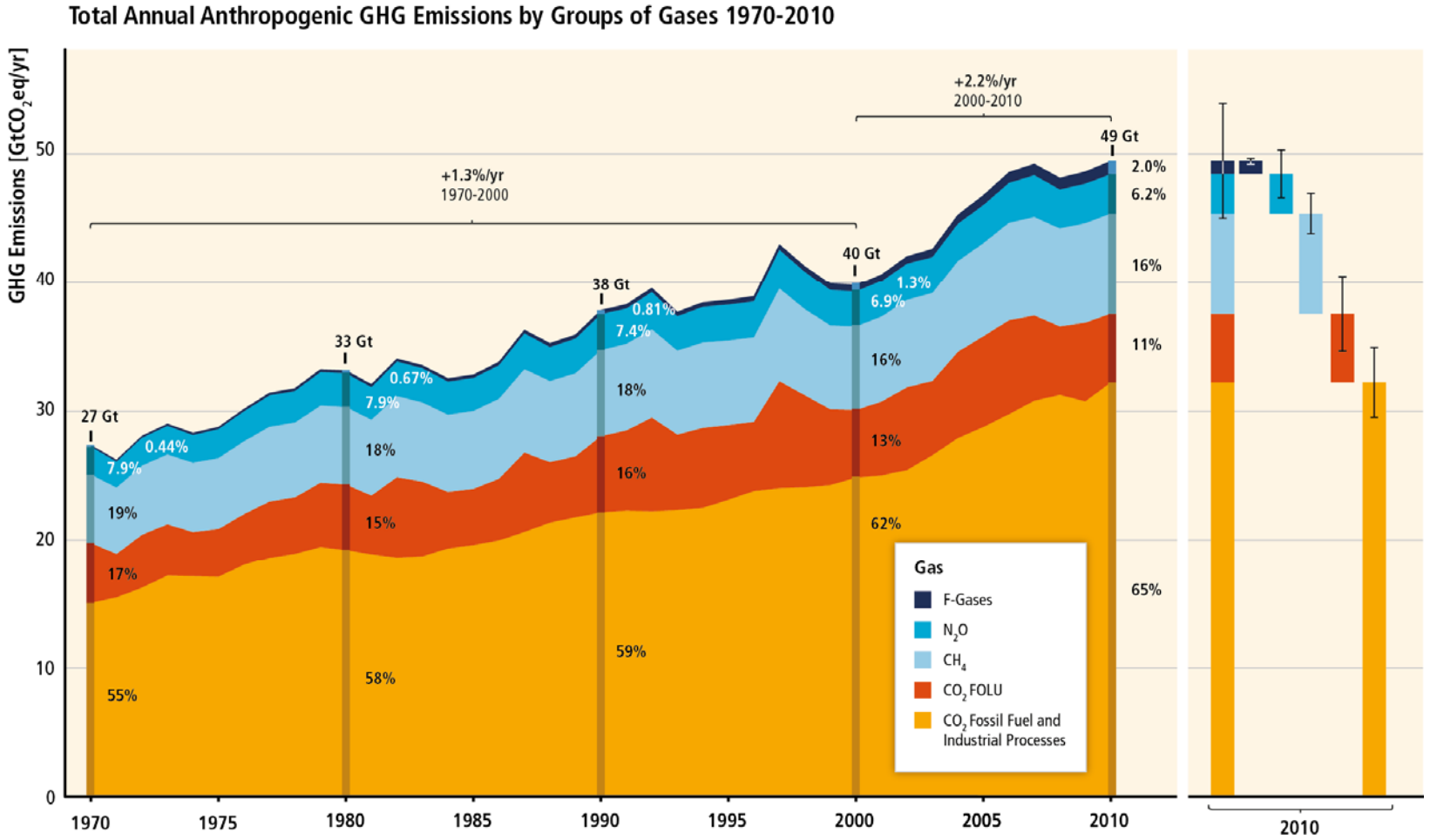


Figure SPM.1

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Cumulative CO_2 emissions have more than doubled since 1970.

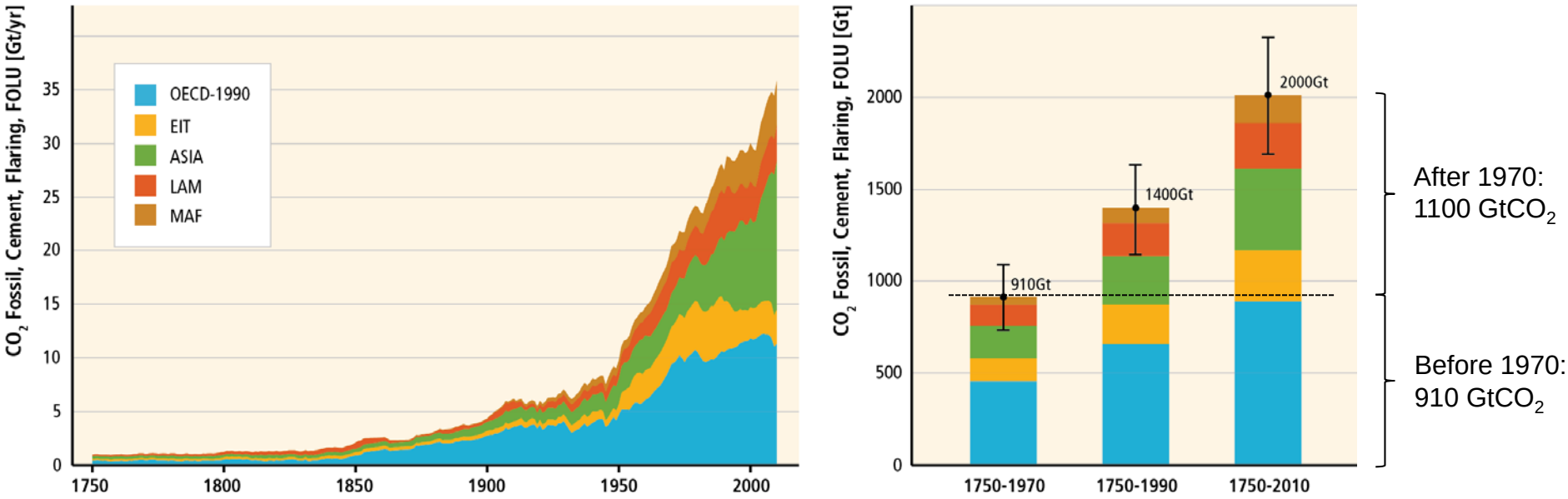

Figure TS.2

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

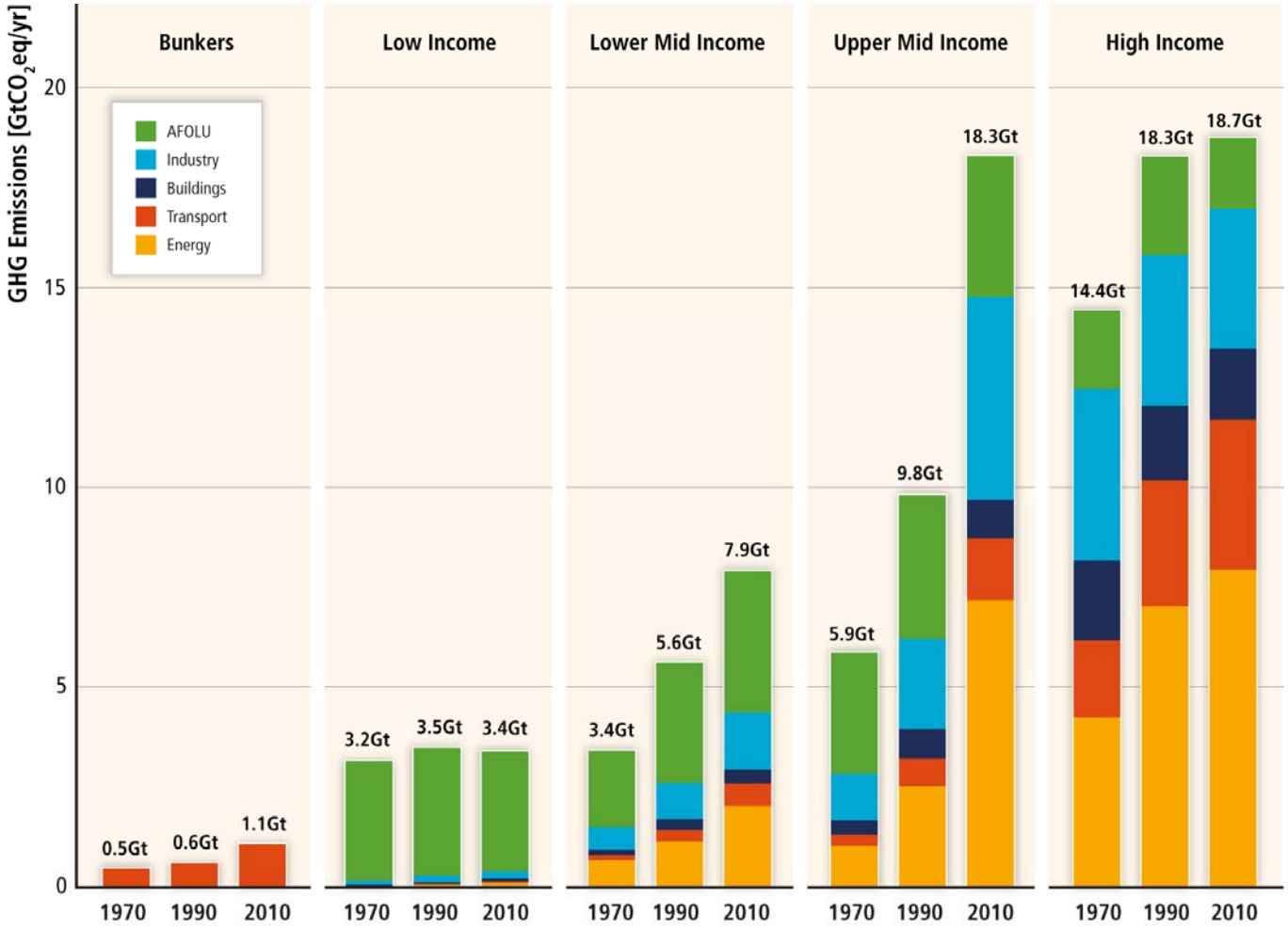

Figure TS.3

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National per-capita GHG emissions are highly variable within and between income groups.

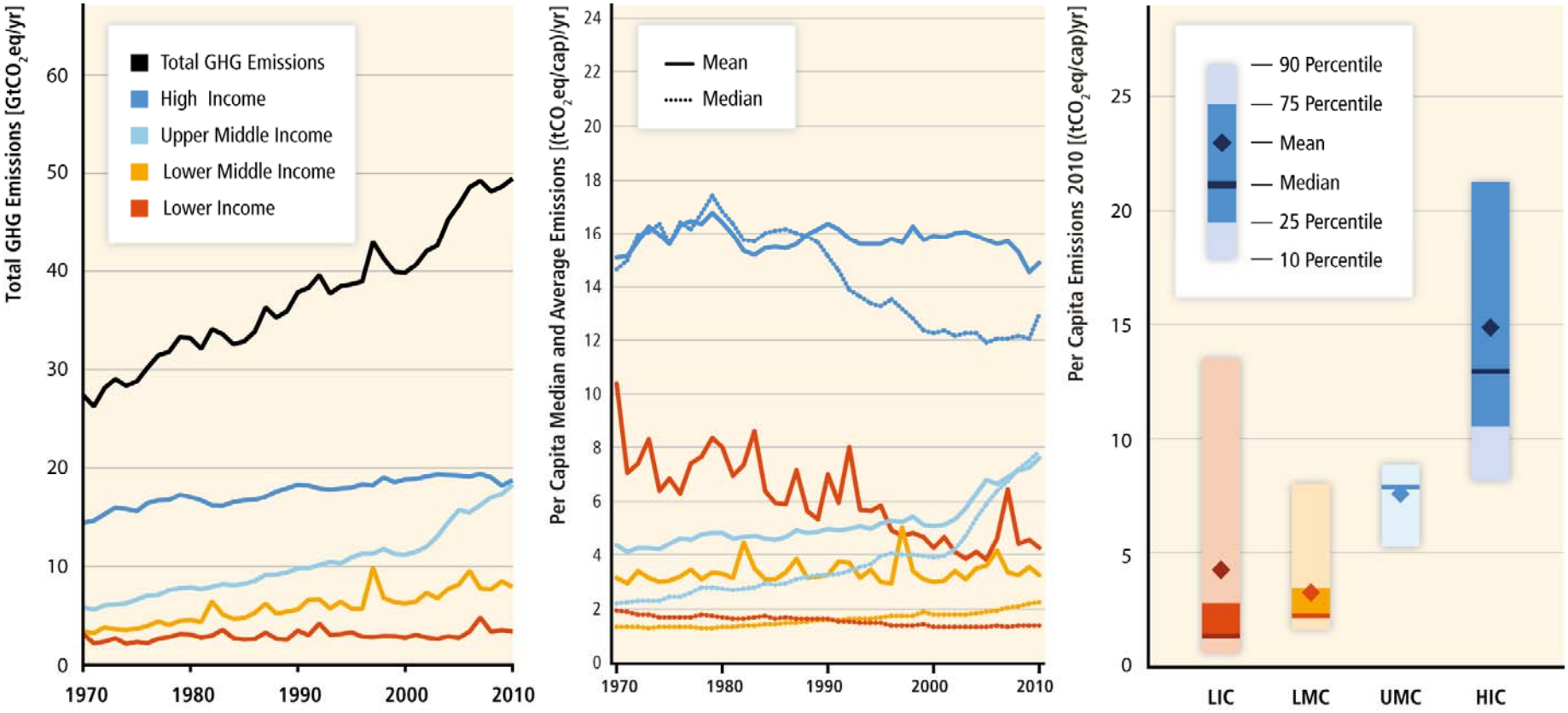

Figure TS.4

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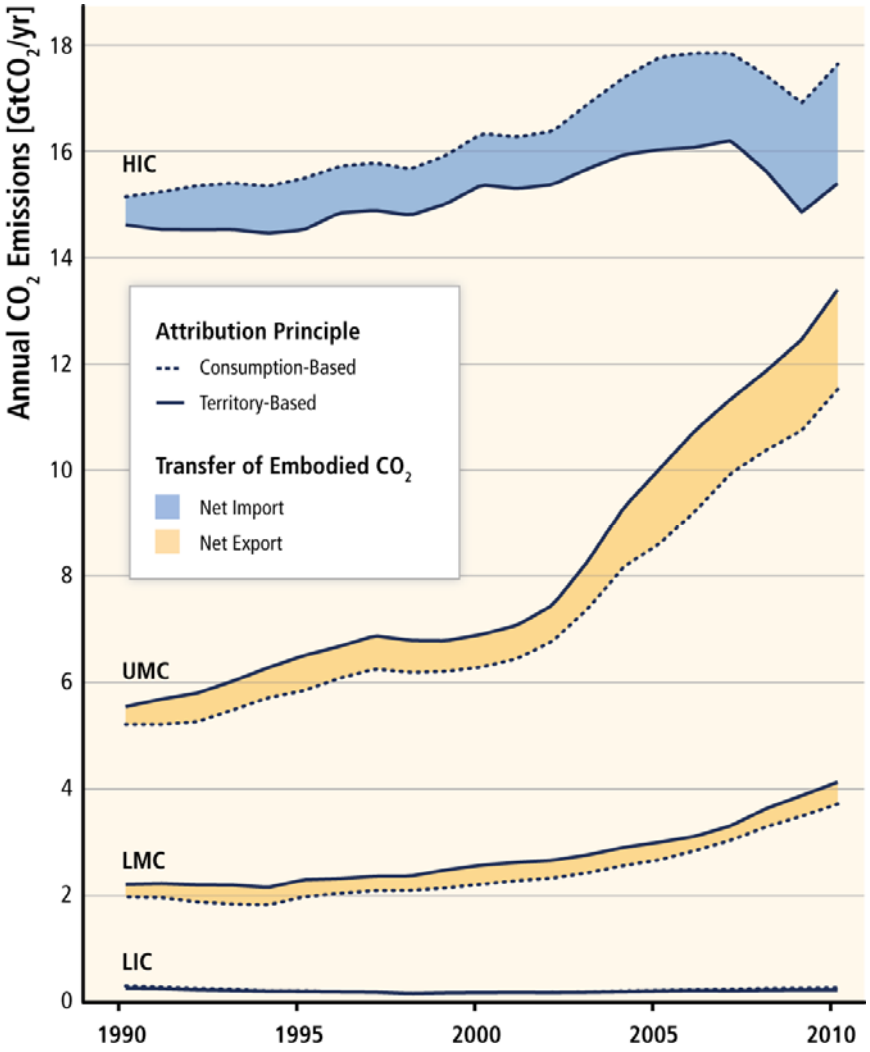

A growing share of CO_2 emissions from fossil fuel combustion and industrial processes in low and middle income countries has been released in the production of goods and services exported, notably from upper-middle income countries to high income countries.

Figure TS.5

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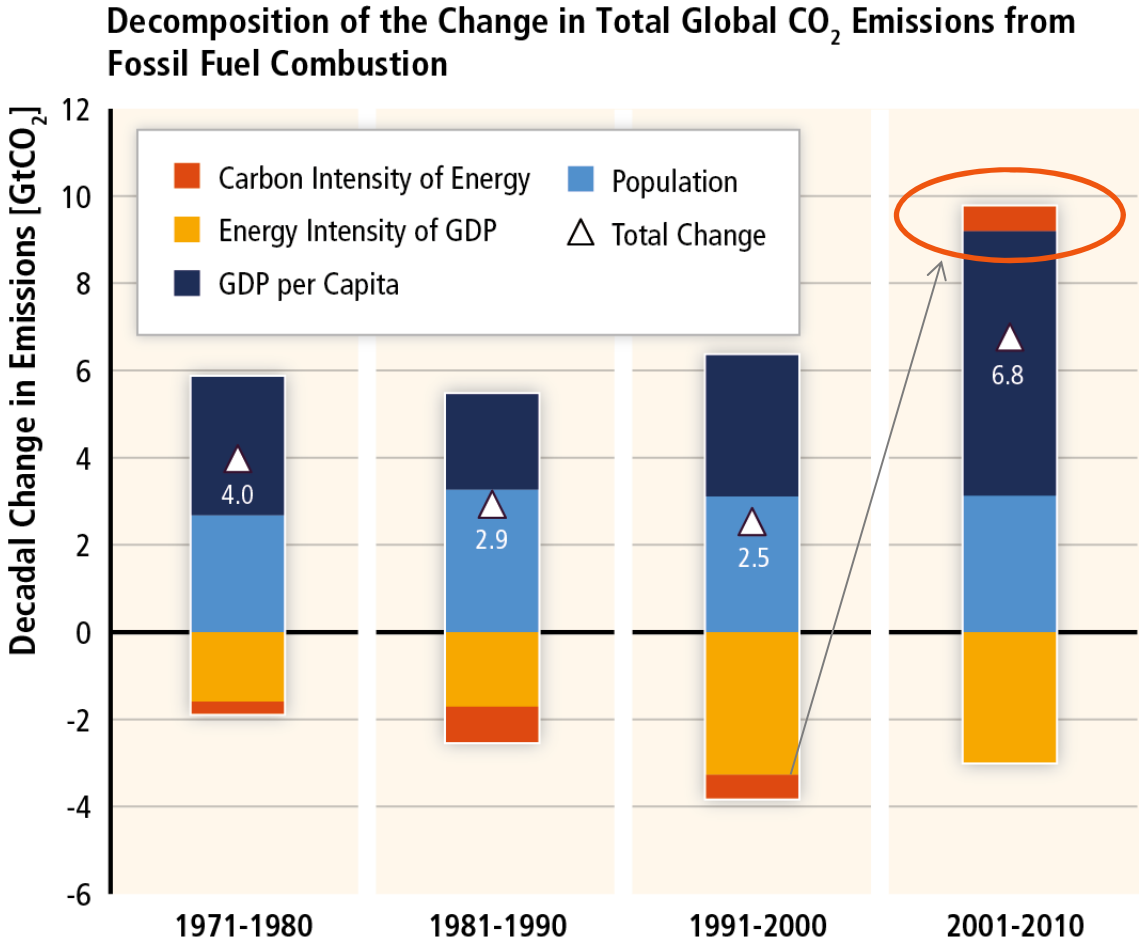
GHG emissions rise with growth in GDP and population; long-standing trend of decarbonisation of energy reversed.



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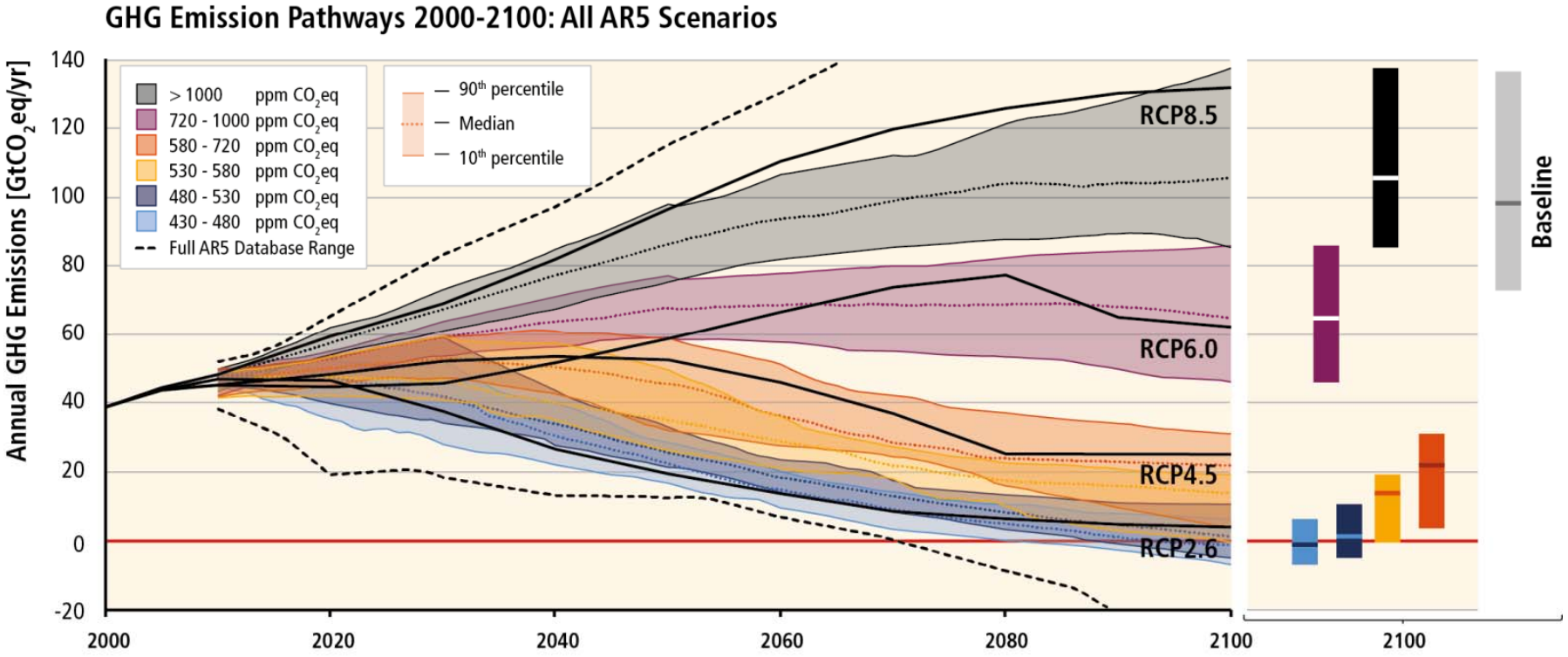
Without more mitigation, global mean surface temperature might increase by 3.7° to 4.8°C over the 21st century.



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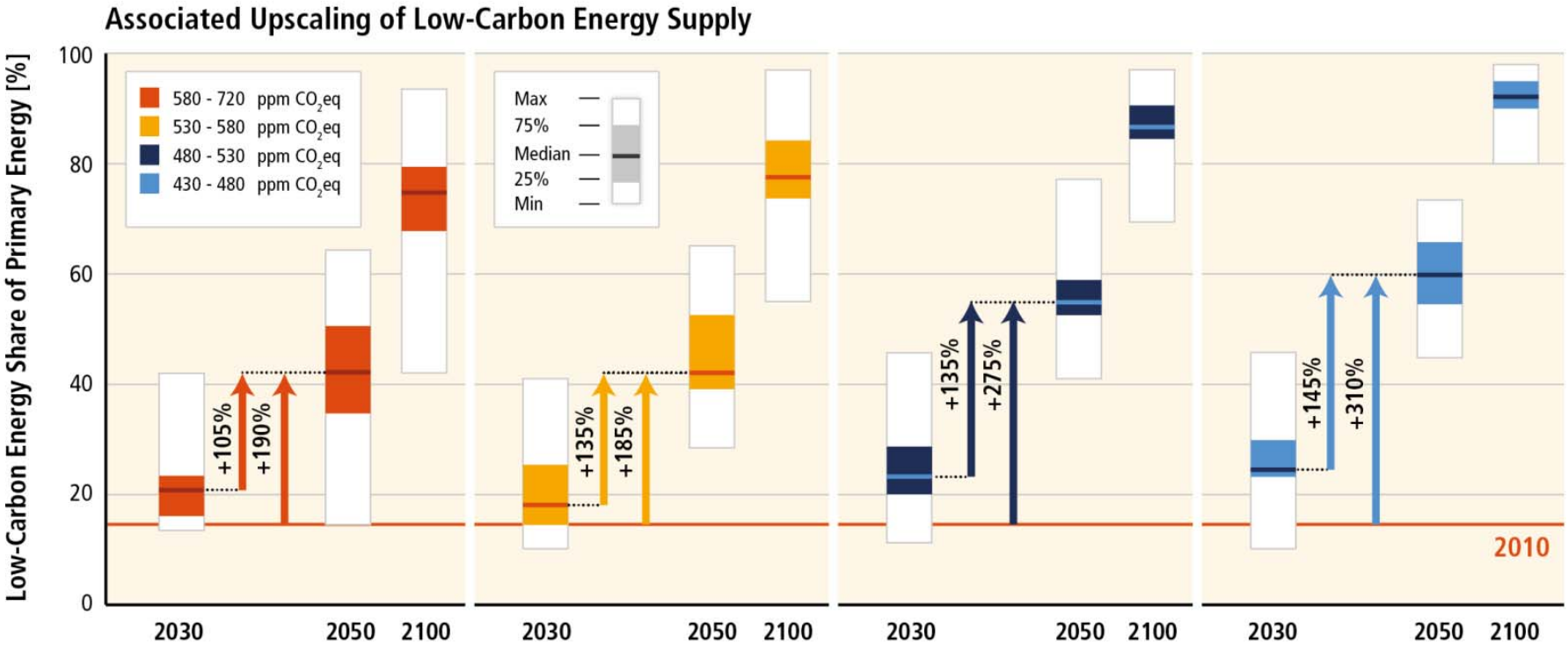
Mitigation requires major technological and institutional changes including the upscaling of low- and zero carbon energy.



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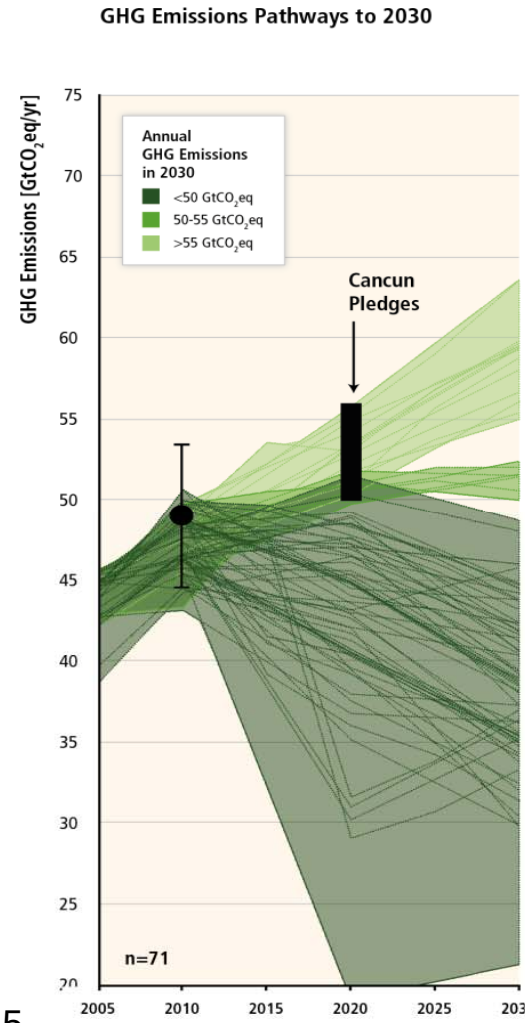
In cost-effective 2°C mitigation strategies, emissions have peaked and emission levels in 2030 tend to be lower than today



Delayed mitigation

50 $GtCO_2e$

Cost-effective mitigation

Figure SPM.5

Delayed mitigation significantly increases the challenge to reach low concentration targets

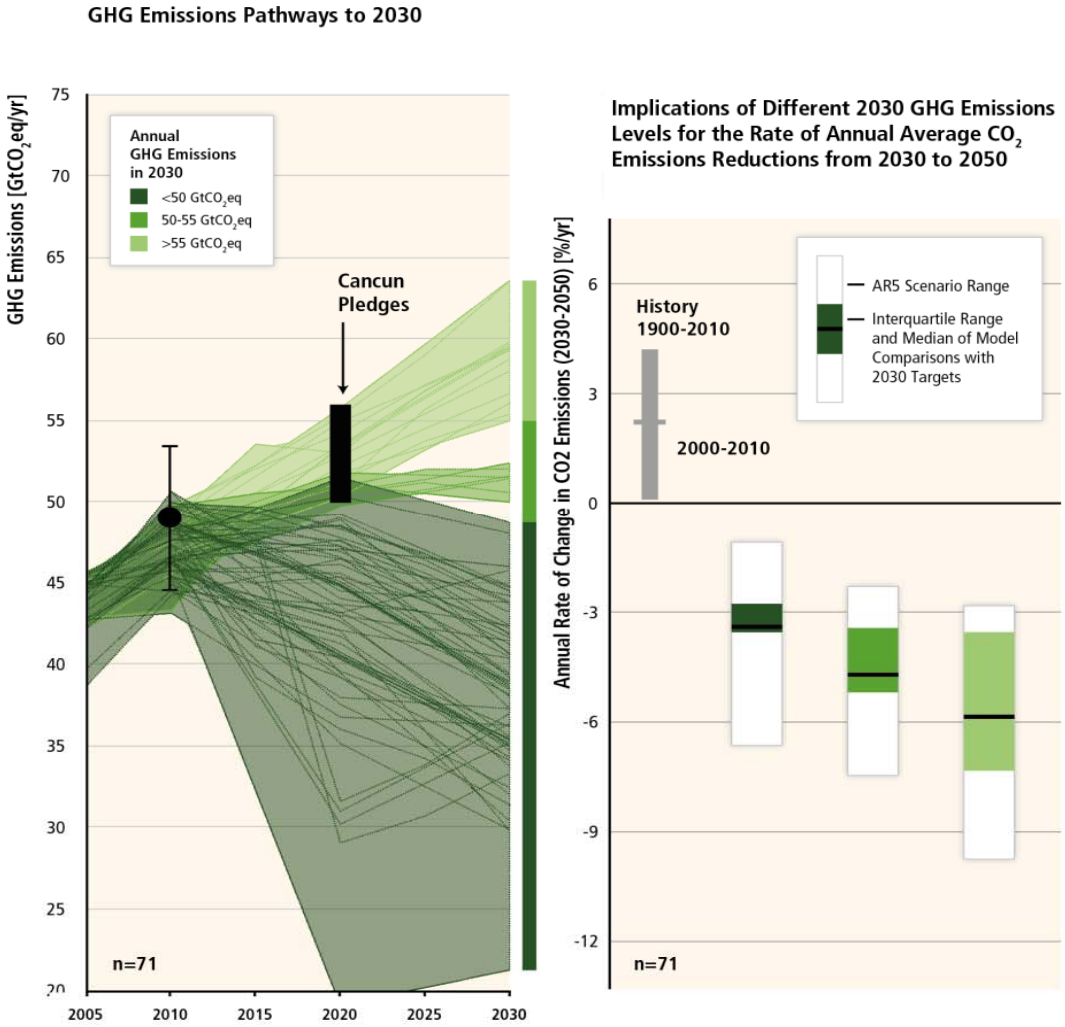


Figure SPM.5

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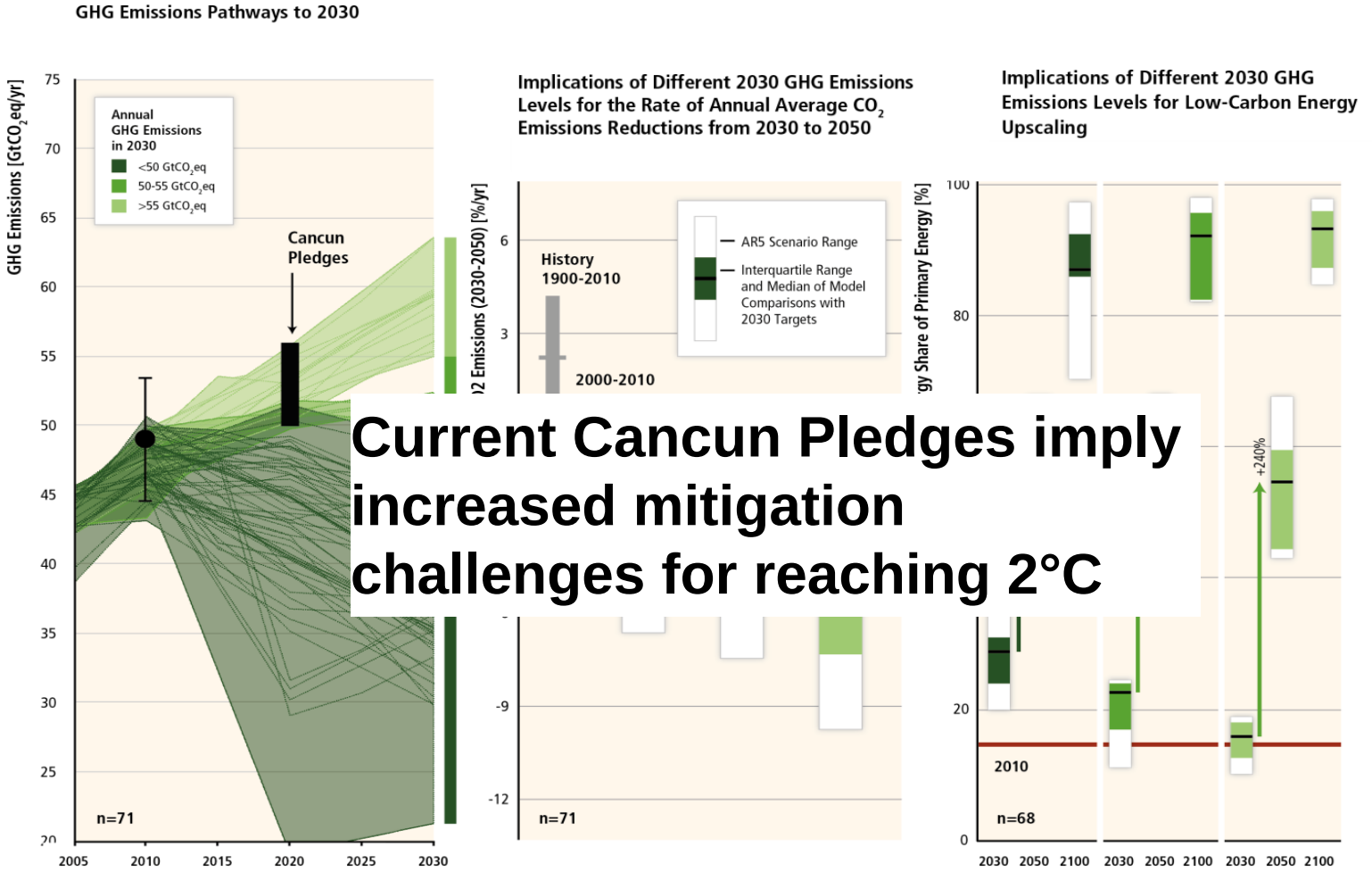

Current Cancun Pledges imply increased mitigation challenges for reaching 2°C

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Estimates for mitigation costs vary widely.

- Reaching 450ppm CO_2eq entails consumption losses of 1.7% (1%-4%) by 2030, 3.4% (2% to 6%) by 2050 and 4.8% (3%-11%) by 2100 relative to baseline (which grows between 300% to 900% over the course of the century).
- This is equivalent to a reduction in consumption growth over the 21st century by about 0.06 (0.04-0.14) percentage points a year (relative to annualized consumption growth that is between 1.6% and 3% per year).
- Cost estimates exlude benefits of mitigation (reduced impacts from climate change). They also exclude other benefits (e.g. improvements for local air quality).
- Cost estimates are based on a series of assumptions.

Limited availability of technologies increases costs.

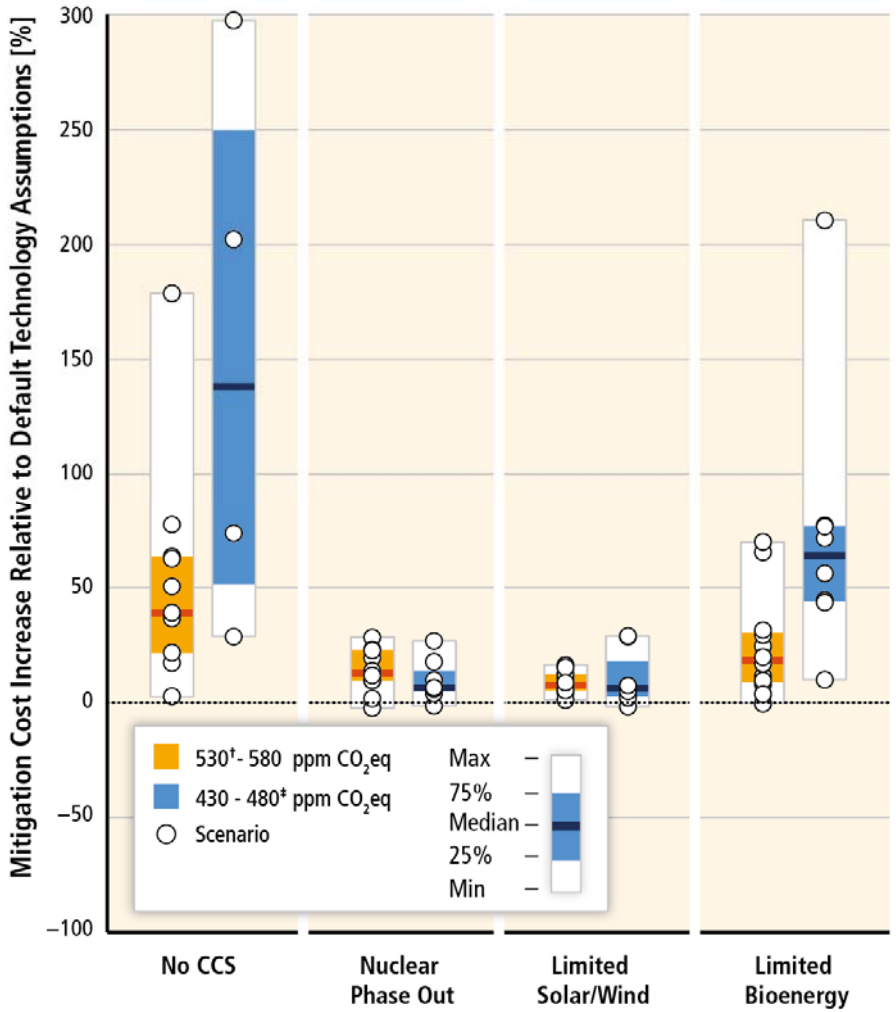

Figure TS.13

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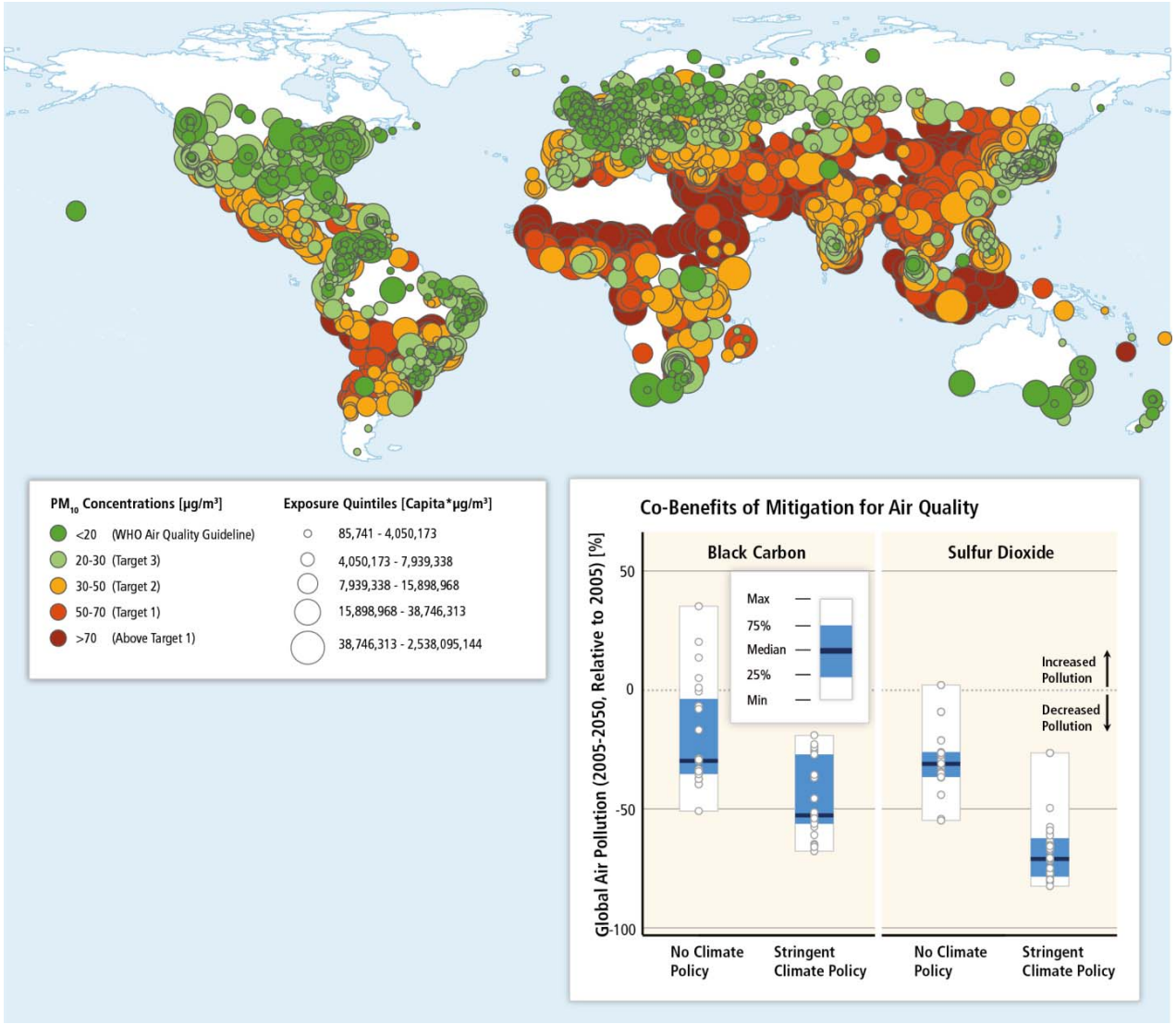

Mitigation can result in large co-benefits for human health and other societal goals.

Figure TS.14
Figure 12.23

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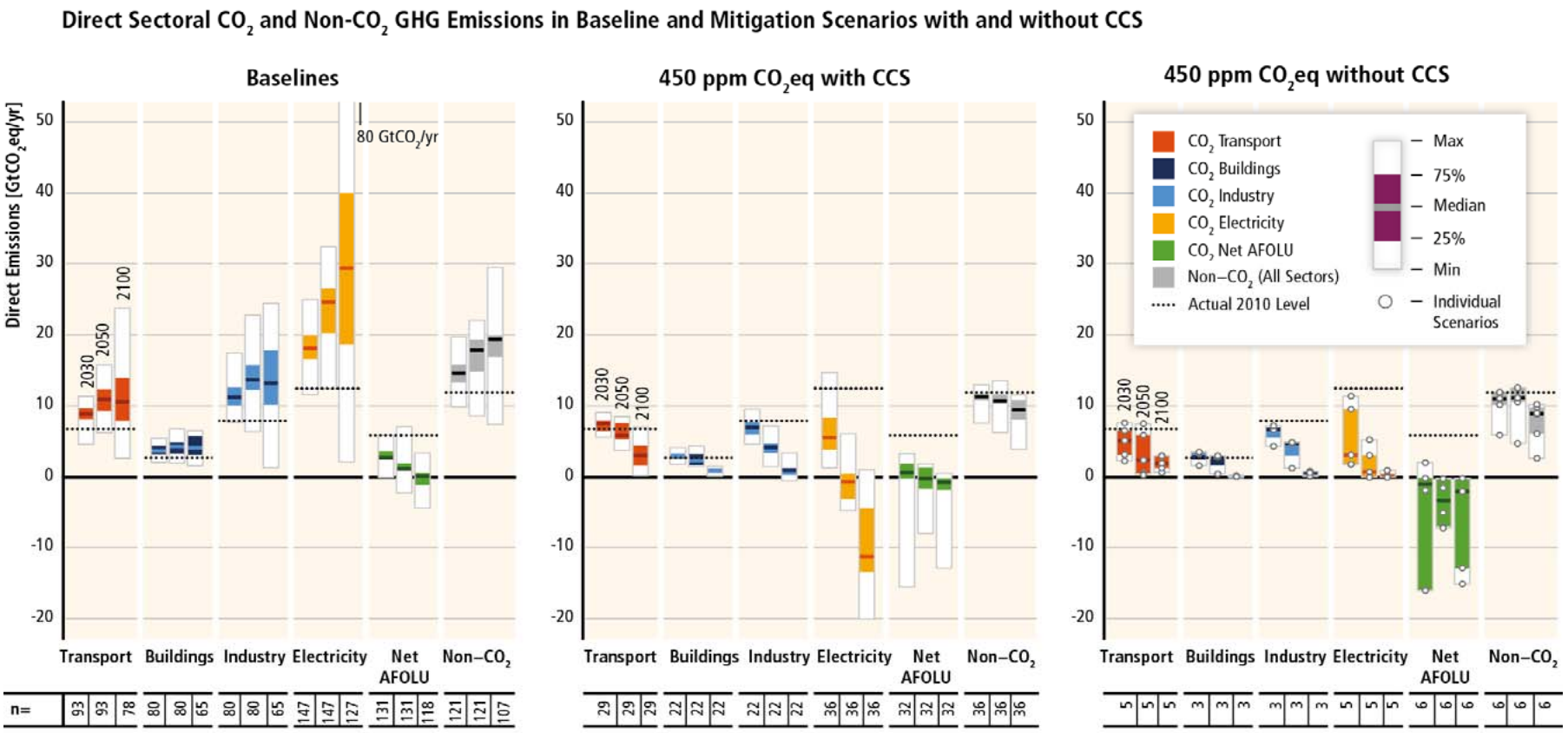
Mitigation requires changes throughout the economy. Efforts in one sector determine mitigation efforts in others.



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

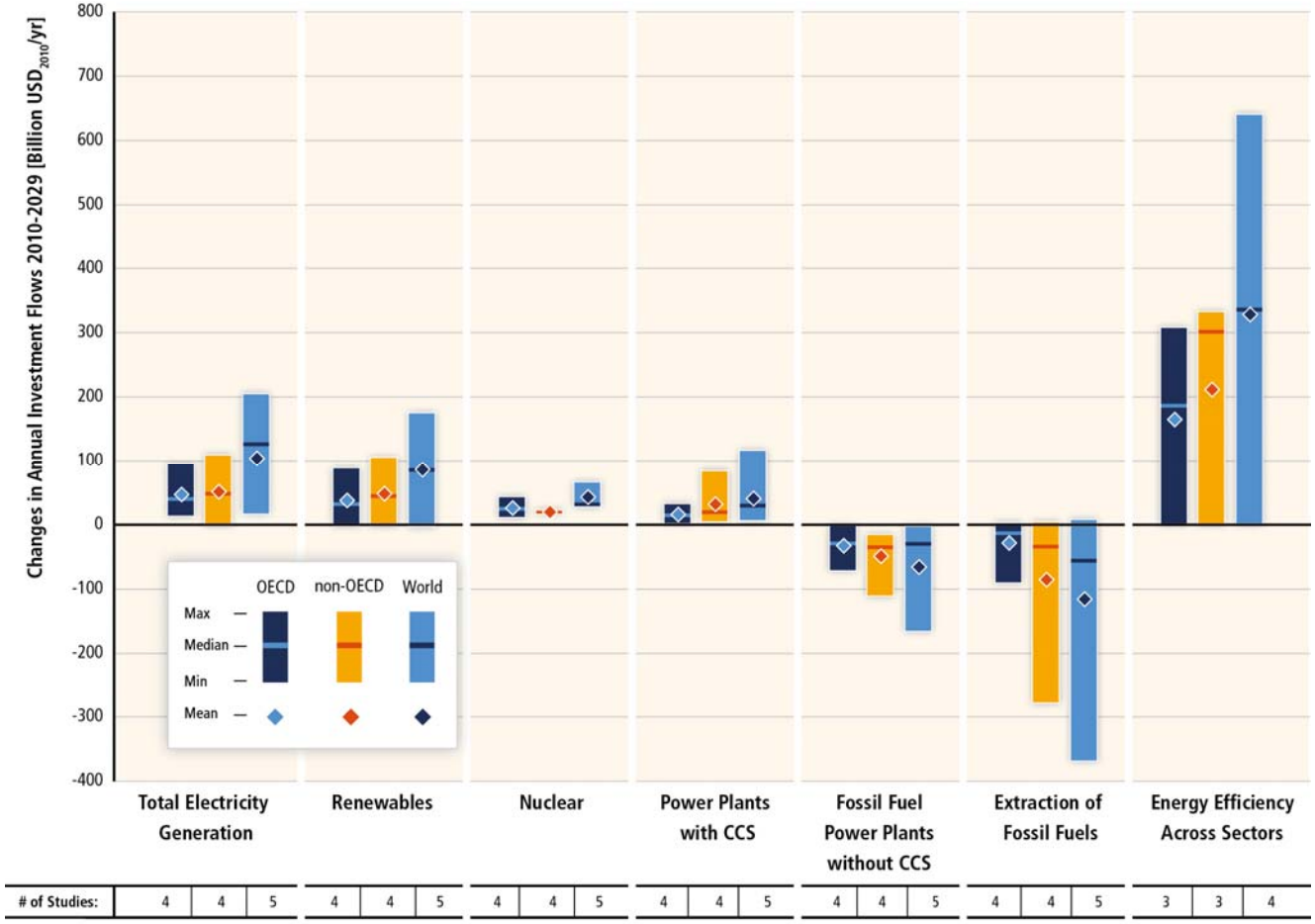

Figure SPM.9

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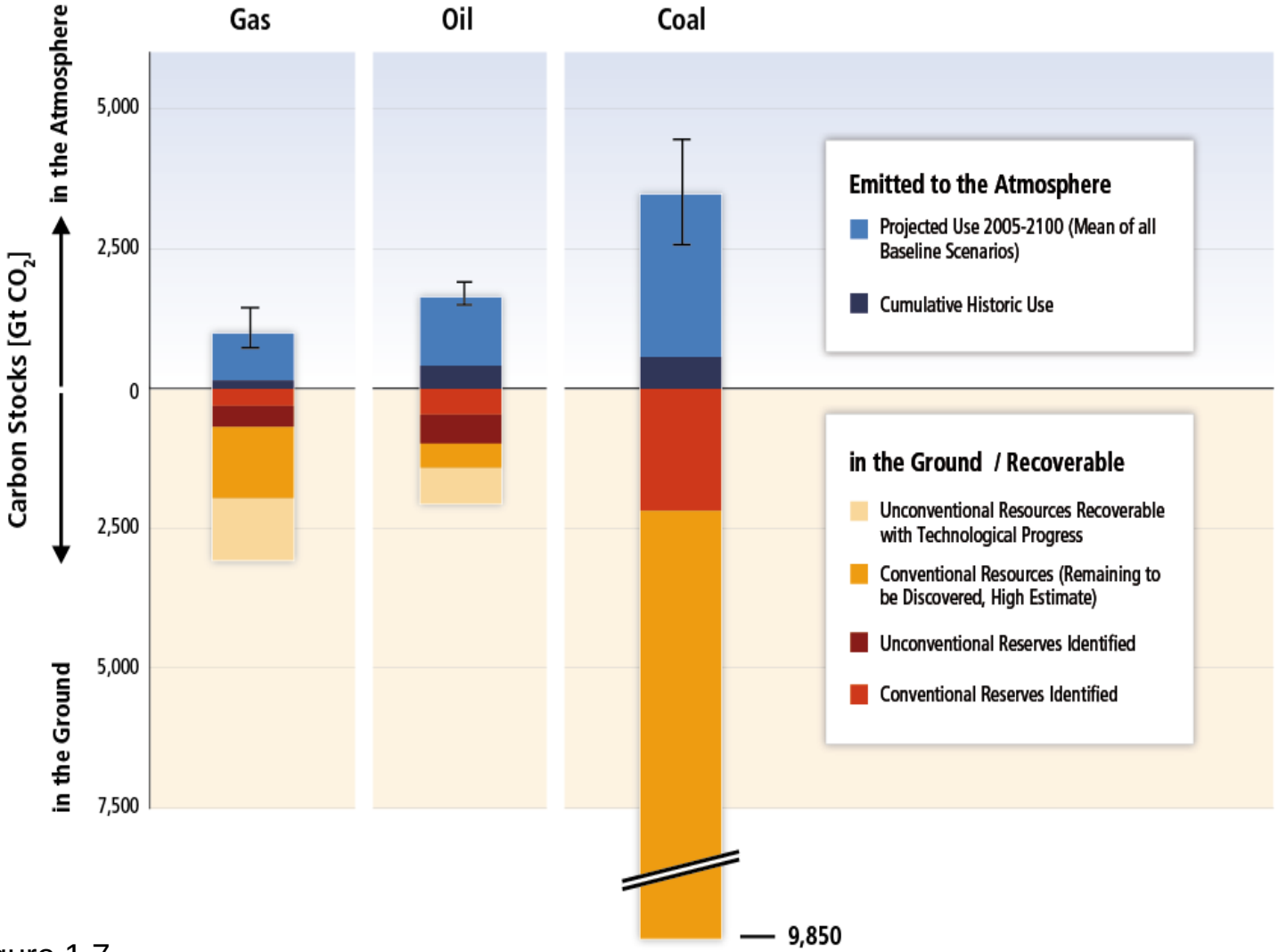
Since AR4, there has been an increased focus on policies designed to integrate multiple objectives, increase co-benefits and reduce adverse side-effects.

- Sector-specific policies have been more widely used than economy-wide policies.
- Regulatory approaches and information measures are widely used, and are often environmentally effective.
- Since AR4, cap and trade systems for GHGs have been established in a number of countries and regions.
- In some countries, tax-based policies specifically aimed at reducing GHG emissions–alongside technology and other policies–have helped to weaken the link between GHG emissions and GDP.
- The reduction of subsidies for GHG-related activities in various sectors can achieve emission reductions, depending on the social and economic context.

Climate change is a global commons problem that implies the need for international cooperation.



SRREN, Figure 1.7

Effective mitigation will not be achieved if individual agents advance their own interests independently.

- Existing and proposed international climate change cooperation arrangements vary in their focus and degree of centralization and coordination.
- Issues of equity, justice, and fairness arise with respect to mitigation and adaptation.
- Climate policy may be informed by a consideration of a diverse array of risks and uncertainties, some of which are difficult to measure, notably events that are of low probability but which would have a significant impact if they occur.

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