



Working Group III

The challenge of mitigation

#climate2014

Working Group III: the challenge of mitigation

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Research Councils UK Energy Strategy Fellow,
Imperial College London
- Keynote: **Professor Ottmar Edenhofer**
Co-chair of Working Group III
- Commentators: **Professor Simon Caney**
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- Professor John Barrett**
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- Professor Catherine Mitchell**
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The challenge of mitigation

Professor Ottmar Edenhofer

Co-Chair of Working Group III

CLIMATE CHANGE 2014

Mitigation of Climate Change

Climate Change Adaptation and Mitigation: Key messages from IPCC's AR5
16 May 2014, University of Exeter, Great Britain

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

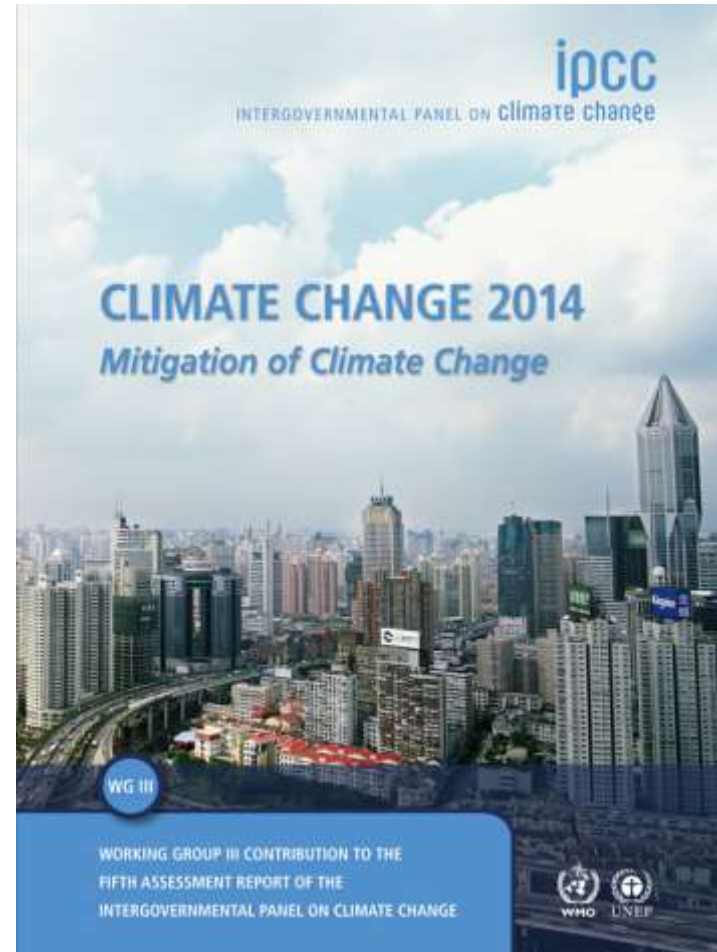
235 Authors

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 CO₂ from fossil fuel combustion.

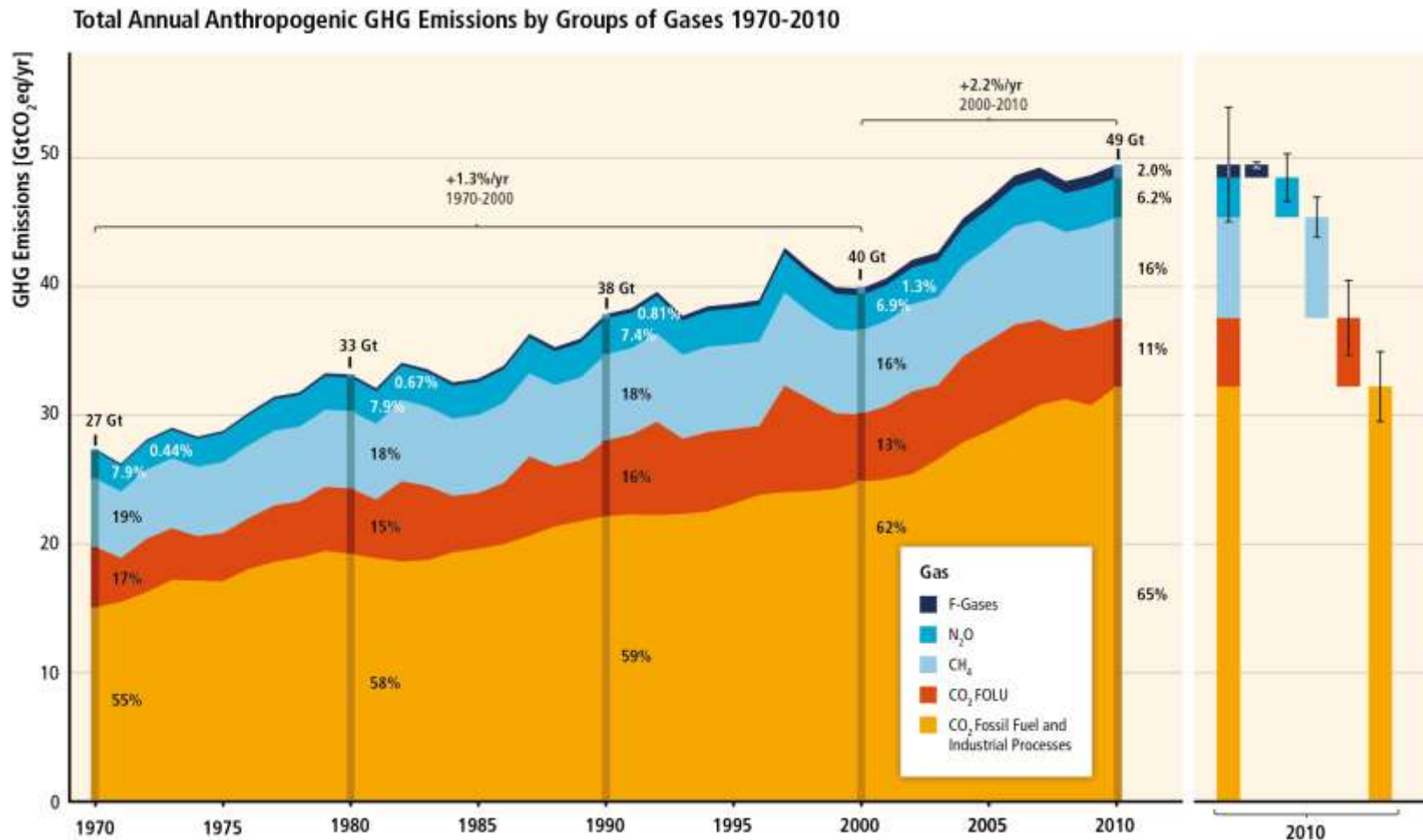


Figure SPM.1

Working Group III contribution to the
IPCC Fifth Assessment Report

Cumulative CO₂ emissions have more than doubled since 1970.

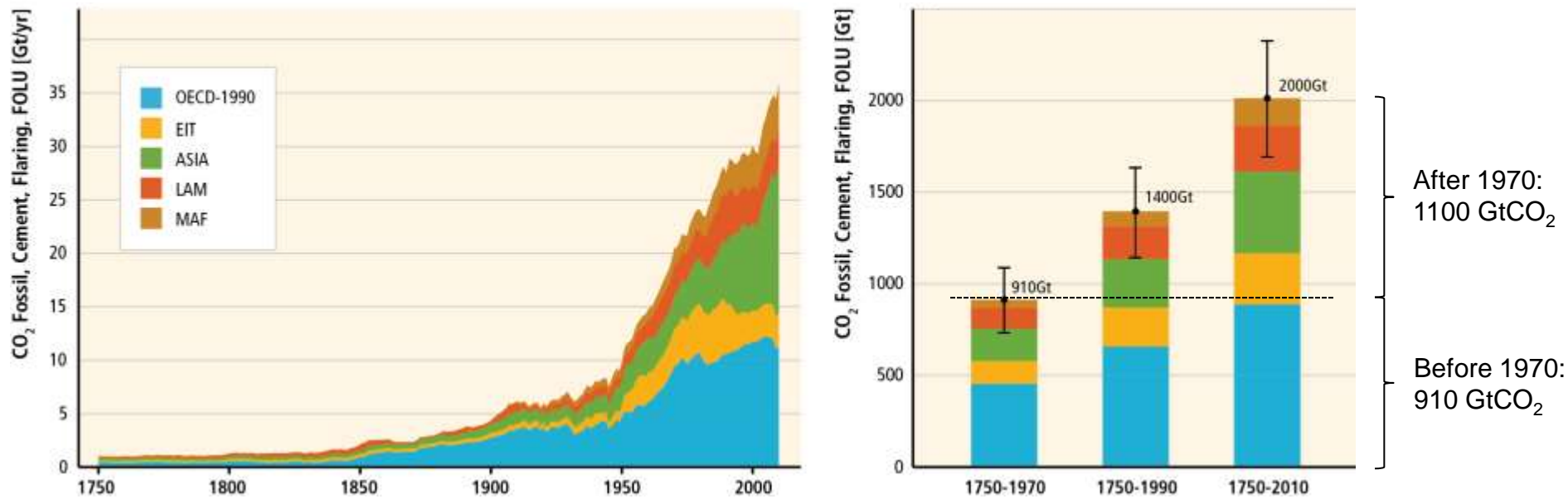


Figure TS.2

Working Group III contribution to the
IPCC Fifth Assessment Report

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

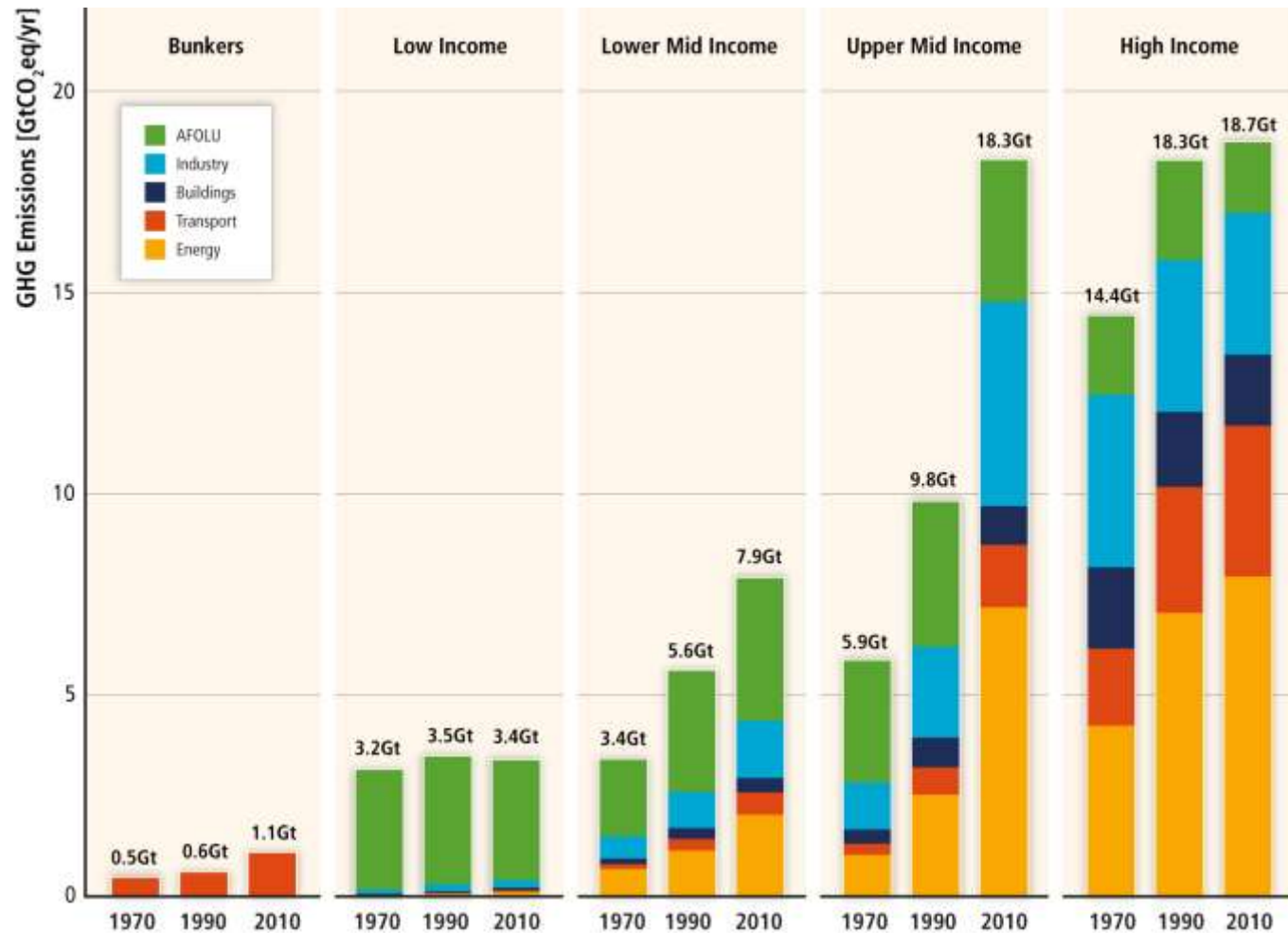


Figure TS.3

Working Group III contribution to the
IPCC Fifth Assessment Report

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

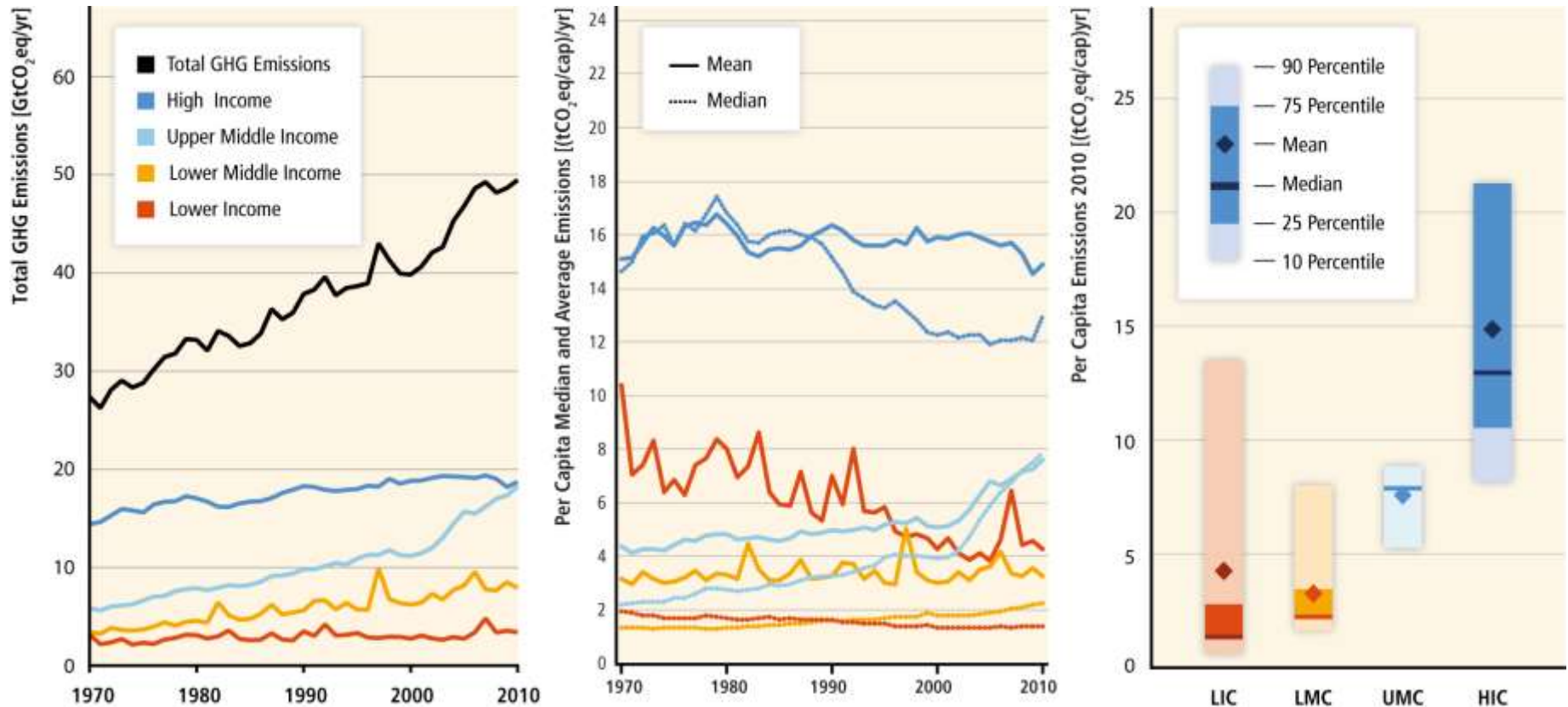
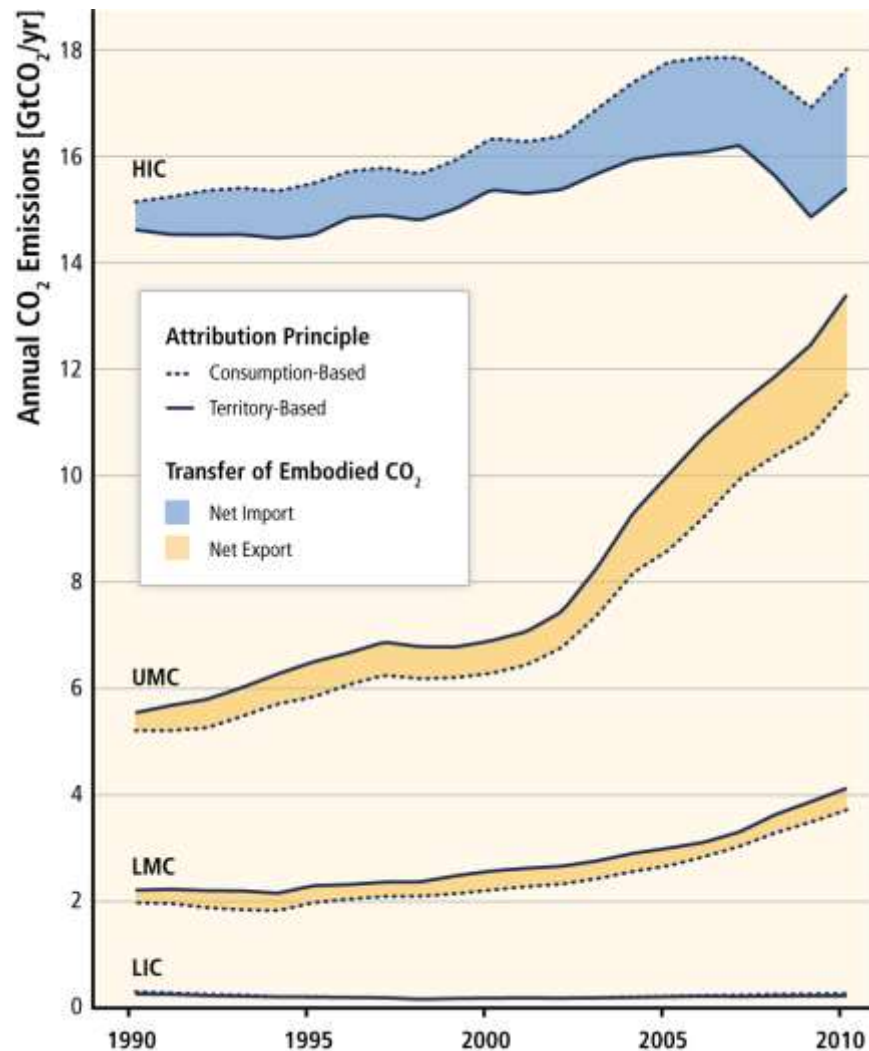


Figure TS.4

Working Group III contribution to the
IPCC Fifth Assessment Report



A growing share of CO₂ 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

Working Group III contribution to the IPCC Fifth Assessment Report

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

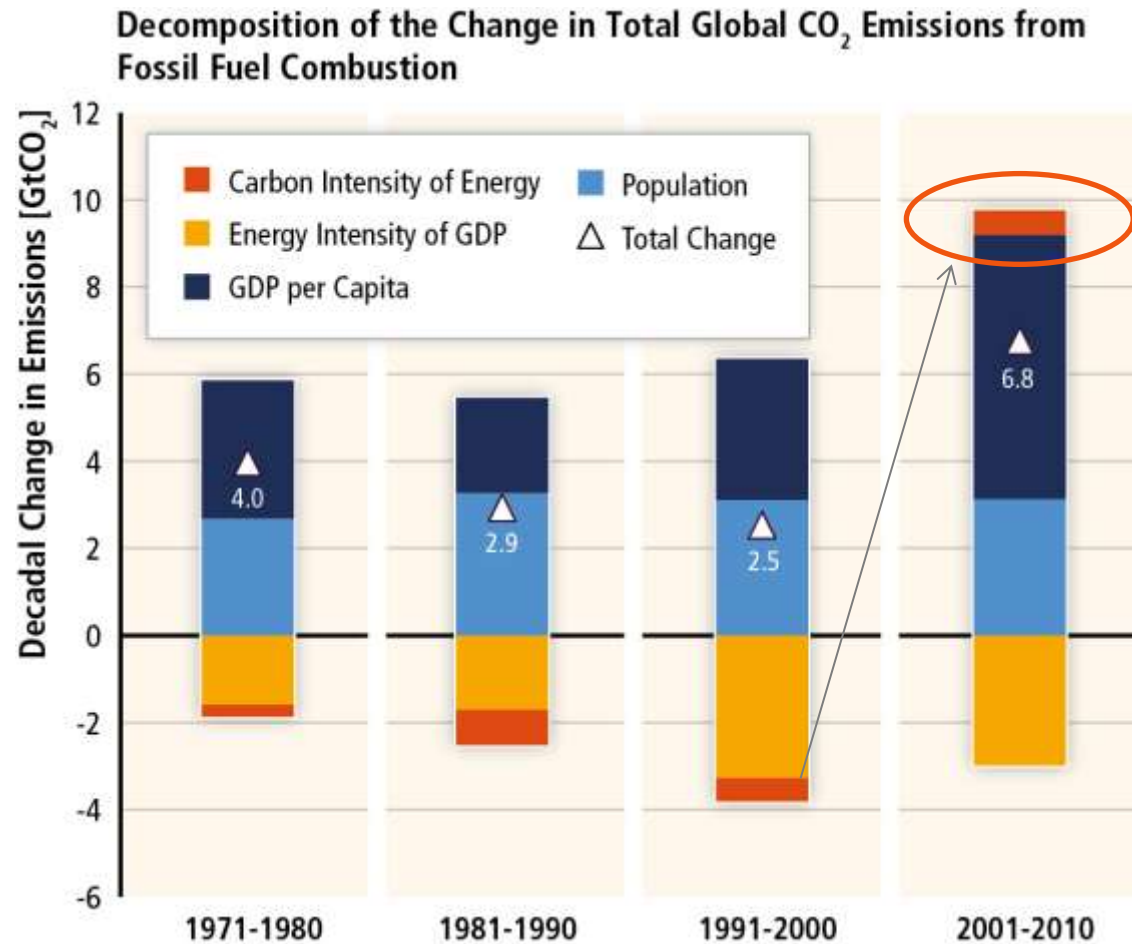


Figure SPM.3

Working Group III contribution to the
IPCC Fifth Assessment Report

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

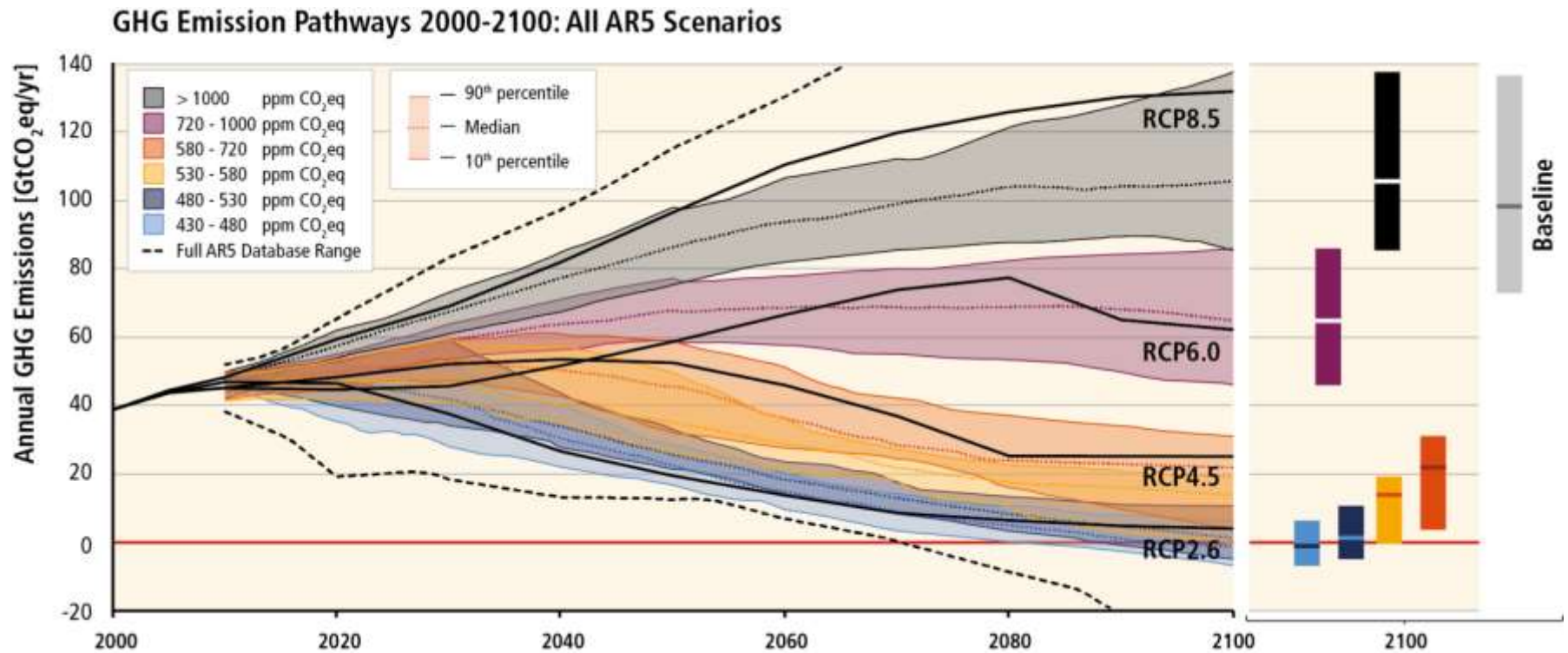


Figure SPM.4

Working Group III contribution to the
IPCC Fifth Assessment Report

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

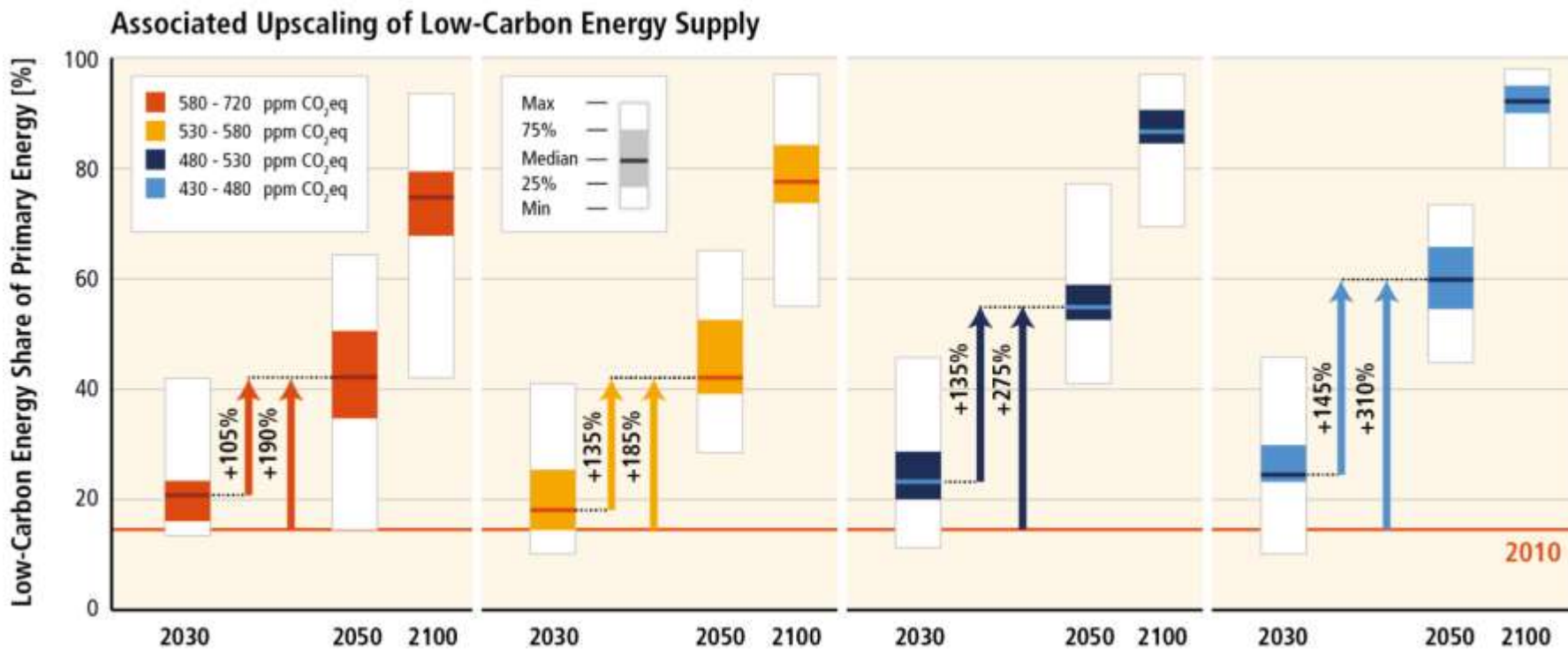


Figure SPM.4

Working Group III contribution to the
IPCC Fifth Assessment Report

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

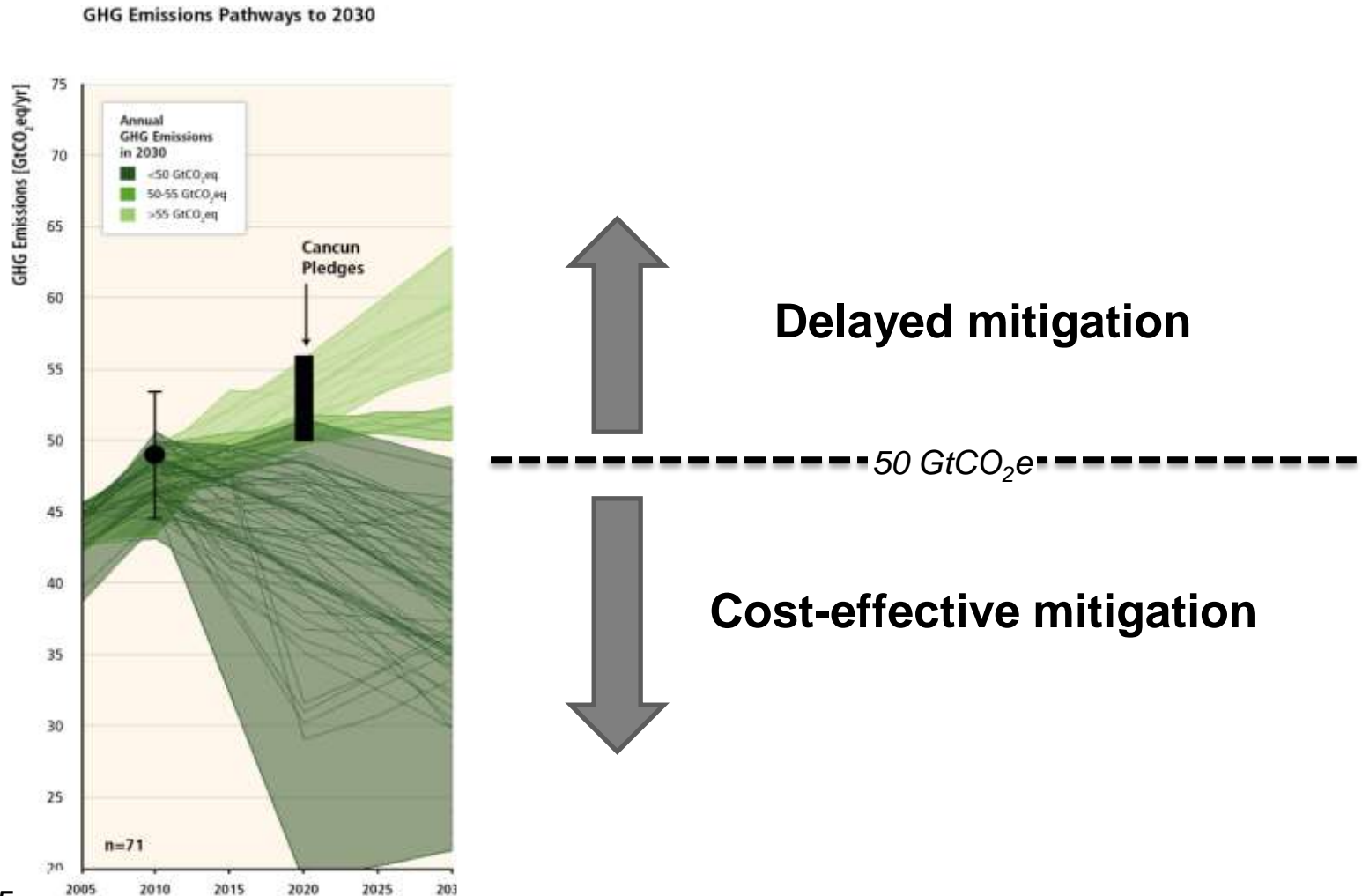


Figure SPM.5

Working Group III contribution to the
IPCC Fifth Assessment Report

Delayed mitigation significantly increases the challenge to reach low concentration targets

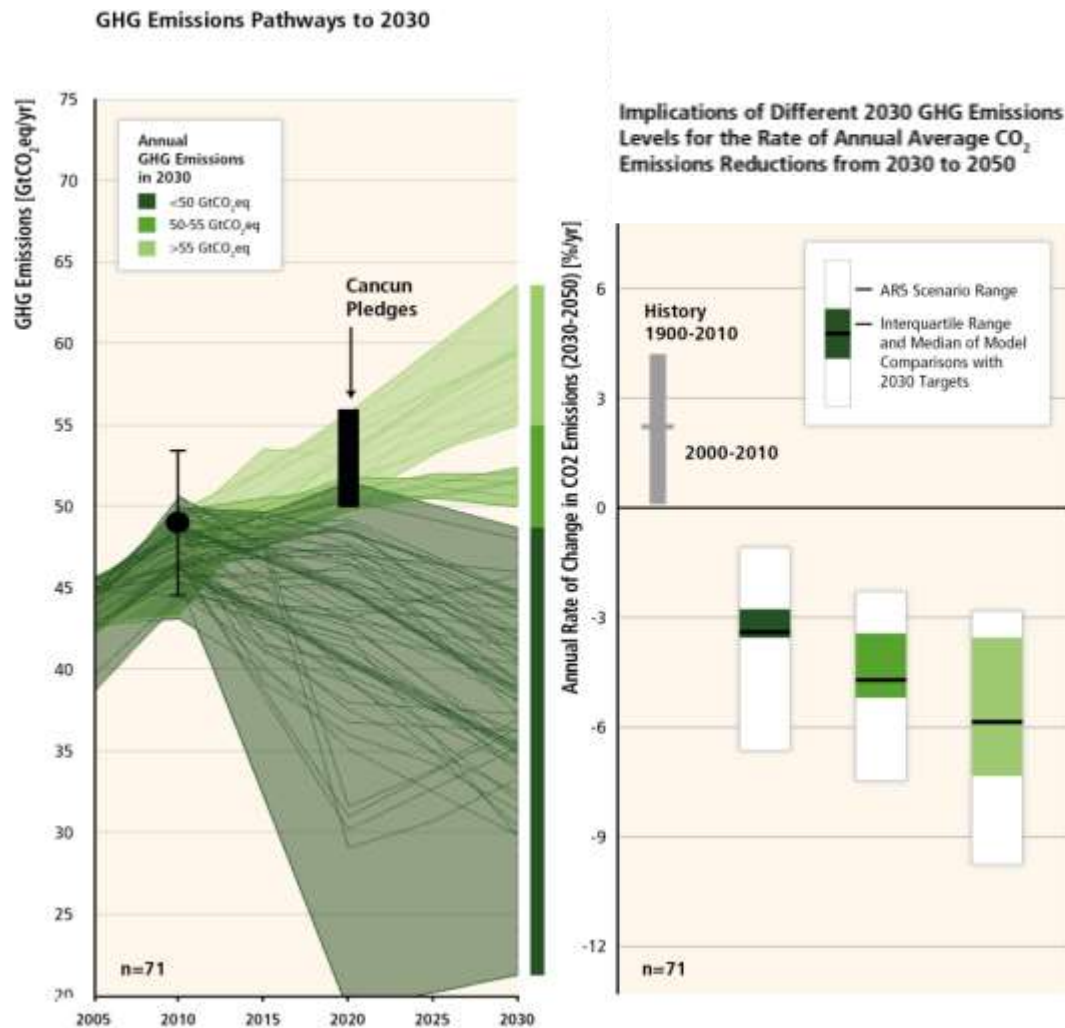


Figure SPM.5

Working Group III contribution to the
IPCC Fifth Assessment Report

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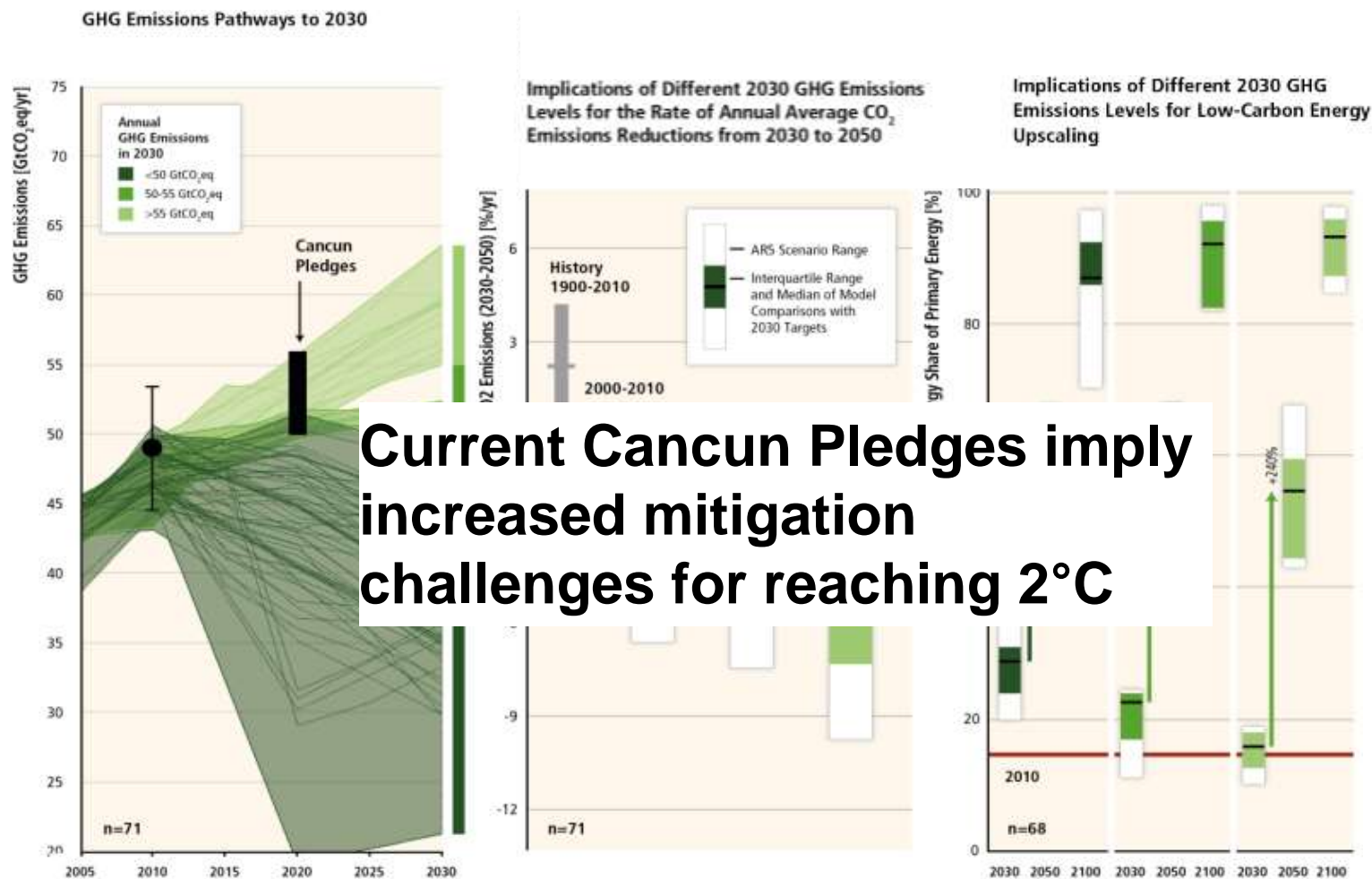


Figure SPM.5

Working Group III contribution to the
IPCC Fifth Assessment Report

Estimates for mitigation costs vary widely.

- Reaching 450ppm CO₂eq 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 exclude 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.

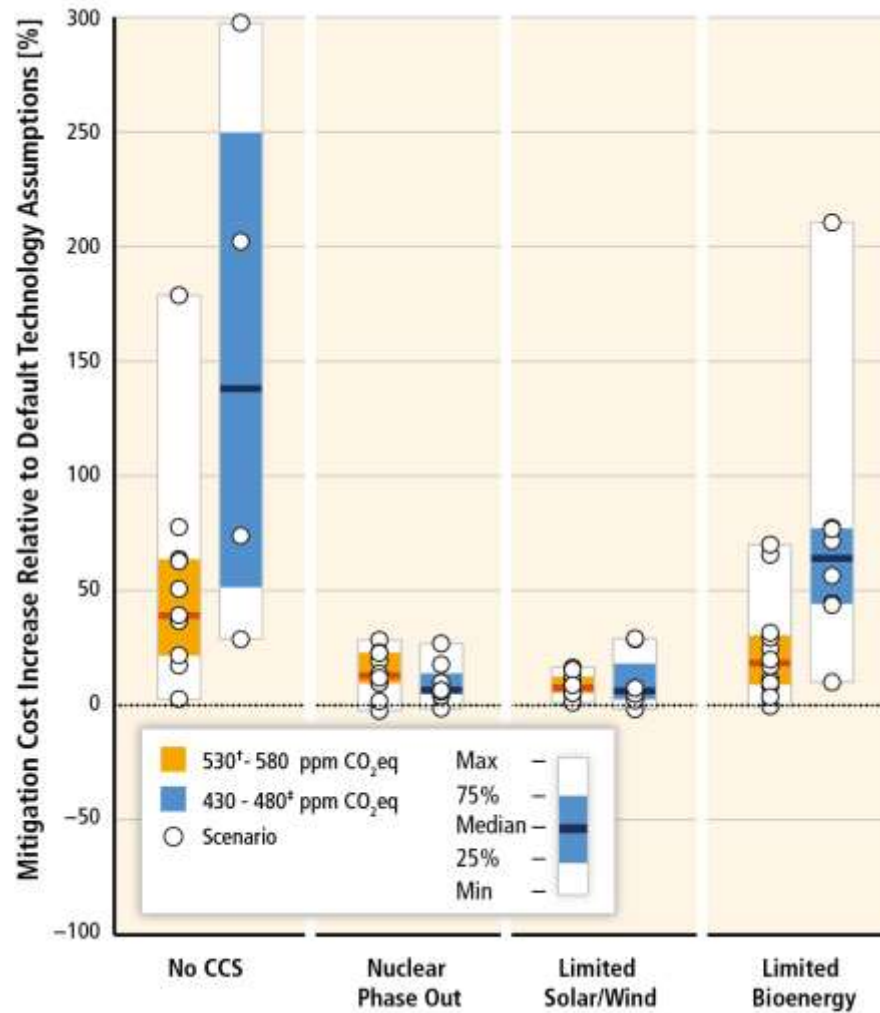
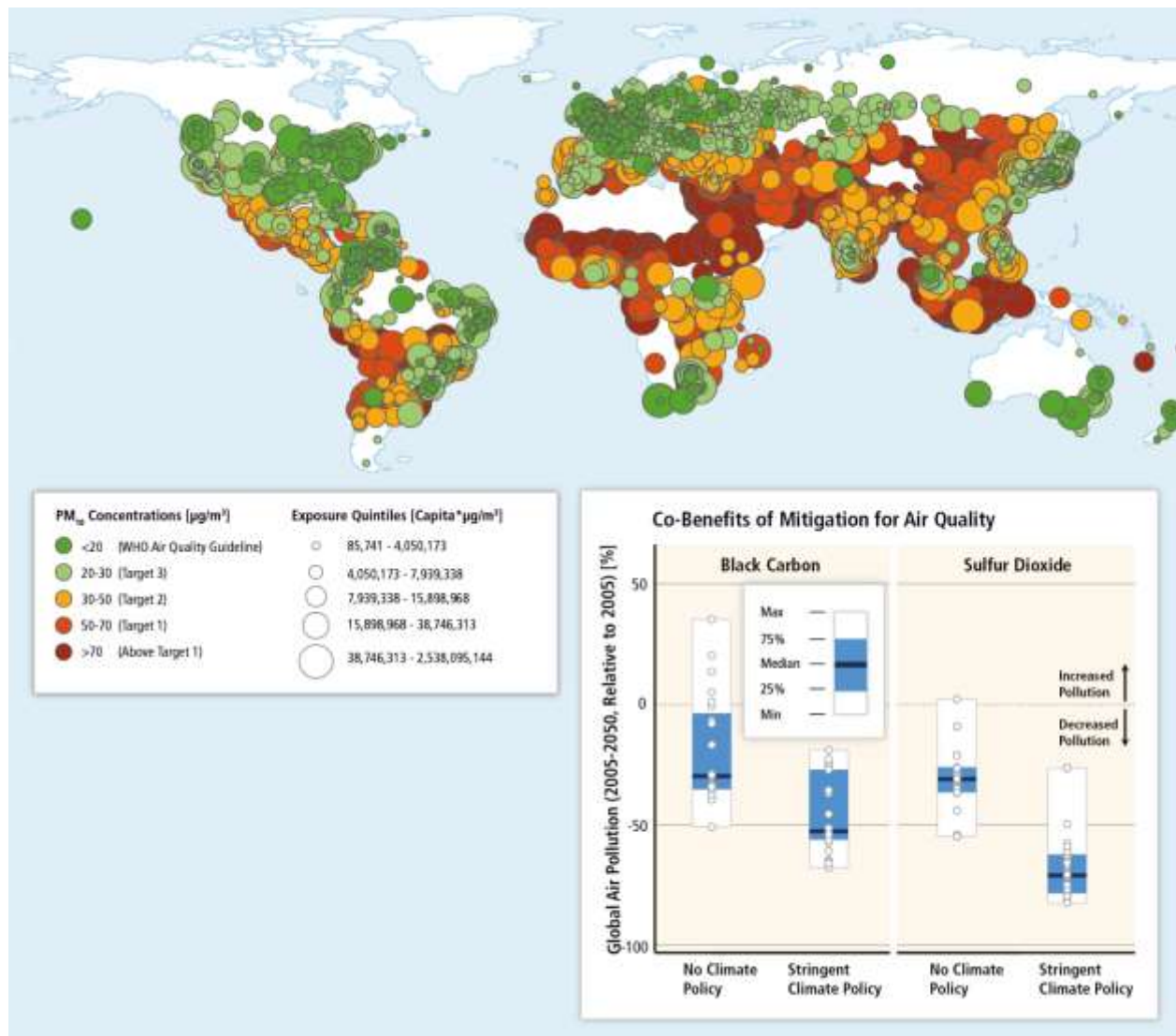


Figure TS.13

Working Group III contribution to the
IPCC Fifth Assessment Report



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

Figure TS.14
Figure 12.23

Working Group III contribution to the
IPCC Fifth Assessment Report

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

Direct Sectoral CO₂ and Non-CO₂ GHG Emissions in Baseline and Mitigation Scenarios with and without CCS

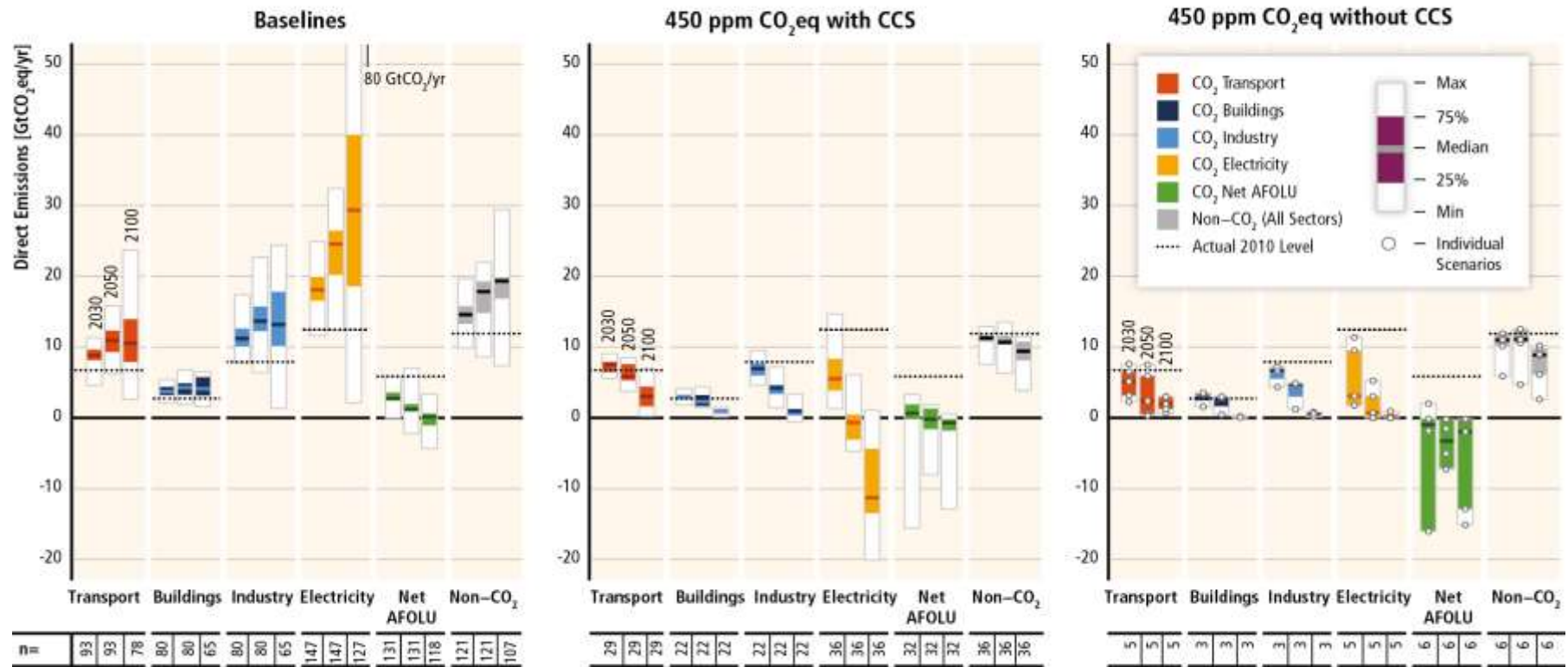


Figure SPM.7

Working Group III contribution to the
IPCC Fifth Assessment Report

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

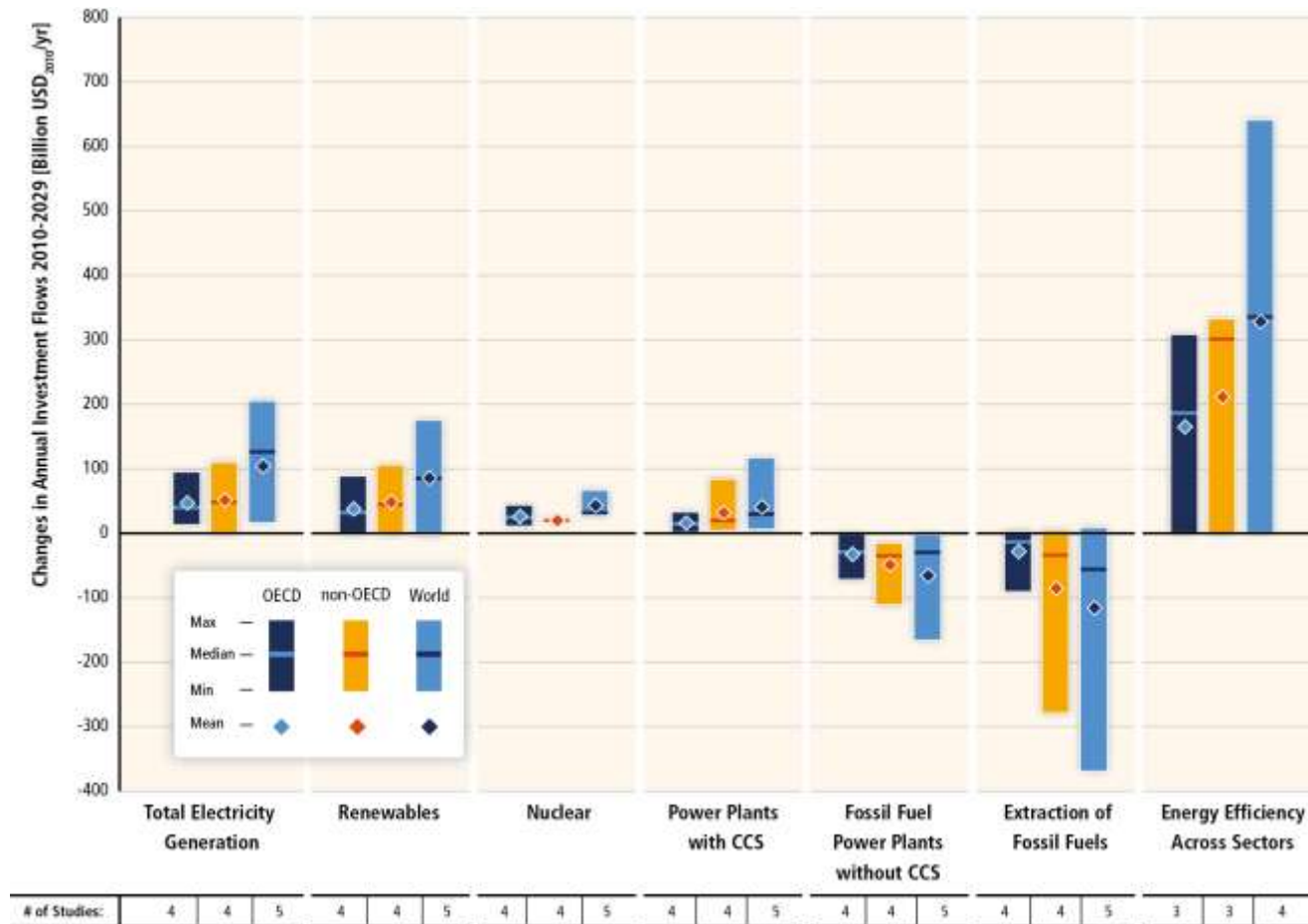


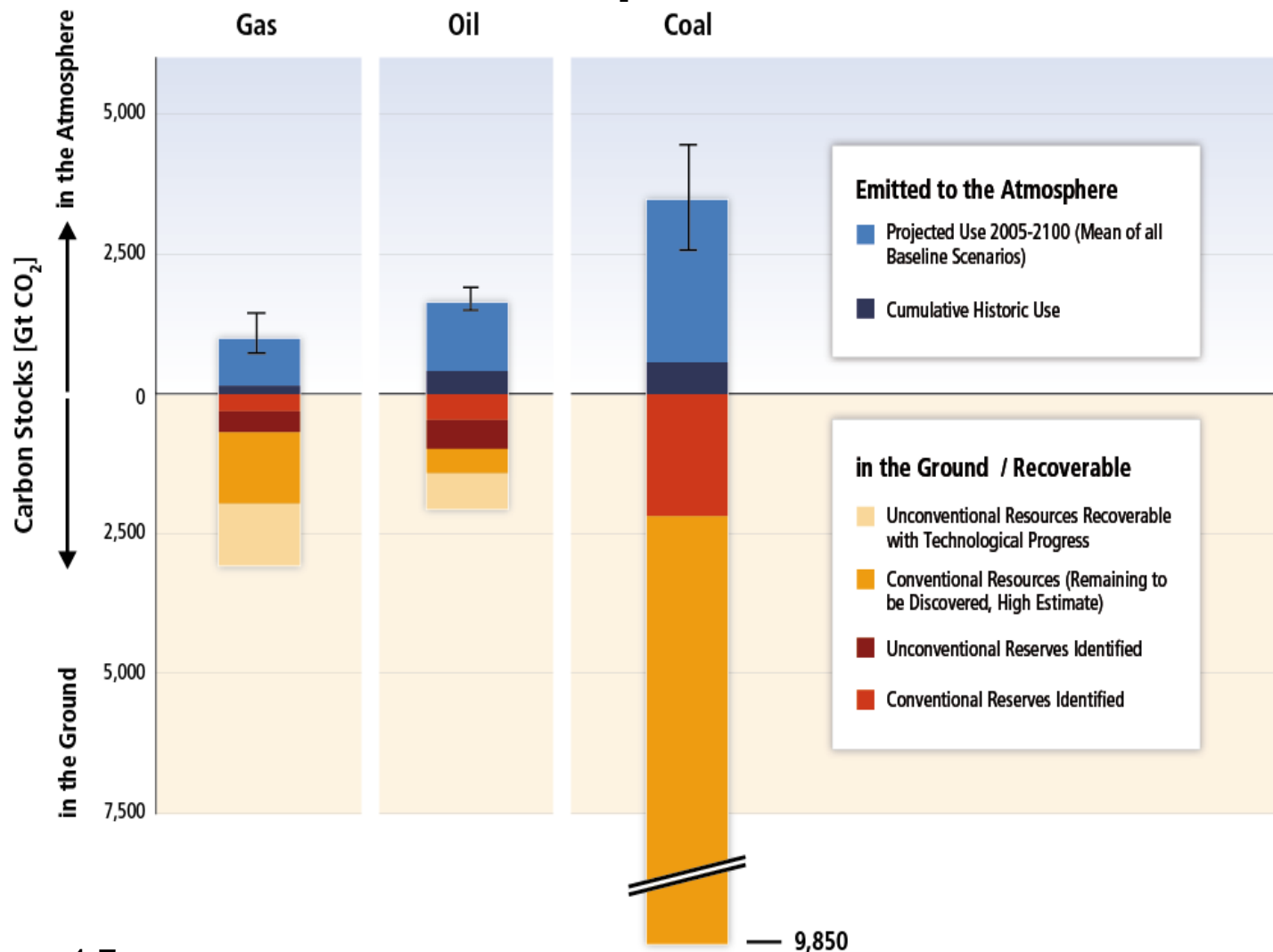
Figure SPM.9

Working Group III contribution to the IPCC Fifth Assessment Report

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

Working Group III contribution to the
IPCC Fifth Assessment Report

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.

www.mitigation2014.org

CLIMATE CHANGE 2014

Mitigation of Climate Change

The challenge of mitigation

Professor Simon Caney

Professor in Political Theory,
University of Oxford

Ethics, The Challenge of Mitigation, and the Future of Climate Research

16th May 2014

Professor Simon Caney
Department of Politics and International
Relations
University of Oxford

The Structure

I: Ethics and Climate Change

II: Ethics in AR5

III: Future Directions

I: Ethics and Climate Change

The role of ethics ... to guide

(1) What is “dangerous anthropogenic interference with the climate system” (UNFCCC, Article 2)

(2) What is a just response to risk and uncertainty? [“Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures” (UNFCCC, Article 3.3)]

(3) What is a just distribution of the burdens of mitigation and adaptation? “The Parties should protect the climate system ... on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.” (UNFCCC, Article 3.1)

(4) What is a just distribution of rights to emit greenhouse gases? Equal per capita view/contraction and convergence; greenhouse development rights; grandfathering.

(5) The ethical relevance of past emissions to (a) equitable burden sharing and (b) the just distribution of emission rights.

(6) What obligations does the current generation have to future generations both (a) in terms of preventing dangerous climate change and (b) distributing costs of mitigation and adaptation (“The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity” (UNFCCC Article 3.1)

(7) What moral constraints are there on mitigation policies (biofuels, nuclear, hydroelectric, hydraulic fracturing) or geoengineering (SRM or CDR)?

(8) Procedural Justice: Who has the right to be included in the decision making process (mitigation, adaptation)?

II: Ethics in AR5

Major Innovation

Ethics plays a key role in a IPCC Assessment Report for first time and moral and political philosophers included

Aim:

to outline some core concepts, justice, value, good (*conceptual* analysis)

to represent debates about nature of justice, equity and well-being (*normative* analysis)

Content of Chapter III

Justice, equity and responsibility

- Responsibility for burden sharing
- Intergenerational justice
- Historical responsibility and distributive justice
- Intra-generational distributive justice:
- compensatory justice and historical responsibility
- ethics of geoengineering
- nature of well-being
- nonhuman values

Findings (chapter 3)

Executive Summary

“Duties to pay for some climate damages can be grounded in compensatory justice and distributive justice” (p.5)

“principles of compensatory justice will apply to only some of the harmful emissions [3.3.5]” (p.5)

“Duties to pay for climate damages can, however, also be grounded in distributive justice [3.3.4, 3.3.5]”. (p.6)

Comments: Relation to SPM

Summary for Policy Makers:

“Issues of equity, justice, and fairness arise with respect to mitigation and adaptation.” (p.4)

“Sustainable development and equity provide a basis for assessing climate policies and highlight the need for addressing the risks of climate change.” (p.4)

“Many areas of climate policy-making involve value judgements and ethical considerations. “ (p.4)

III: Future Directions

#1. More systematic integration of ethical principles into analysis of mitigation; more on distributive impacts of mitigation policies; more on comprehensive normative framework for comparing mitigation options that goes beyond monetary impacts and enables comparisons and trade-offs.

#2. Developing accounts of energy justice that does not focus simply on rights to emit, but focuses instead on serving persons' capabilities (Sen)

#3. more on non-Western ethical perspectives for analysing climate change (Given it is a global problem, should not ethical analysis be informed by analysis of all ethical traditions?)

#4. Institutional design and the politics of climate change

(a) combining effectiveness with procedural justice

(b) incentivising longterm policymaking (courts, ombudsman, committee for the future, longterm performance indicators, UN High Commissioner for Future Generations)

Thank you!

Professor Simon Caney

Co-Director of *Human Rights for Future Generations*, Oxford
Martin School, University of Oxford.

Director of *Centre for the Study of Social Justice*, University
of Oxford.



Human
Rights FOR FUTURE
GENERATIONS

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Professor John Barrett

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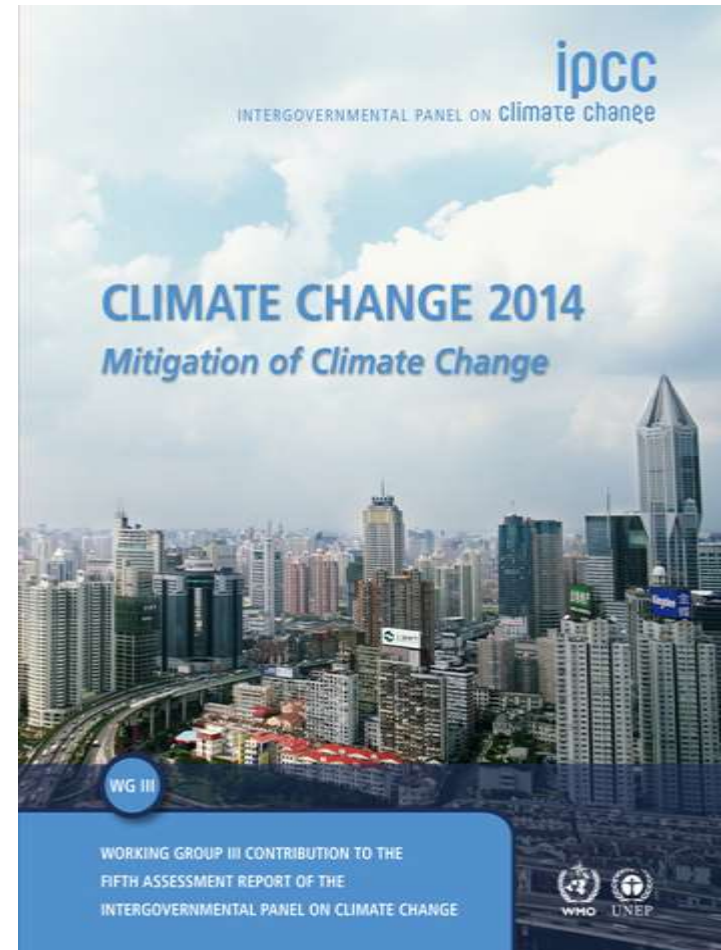


WG3 and policy for climate change

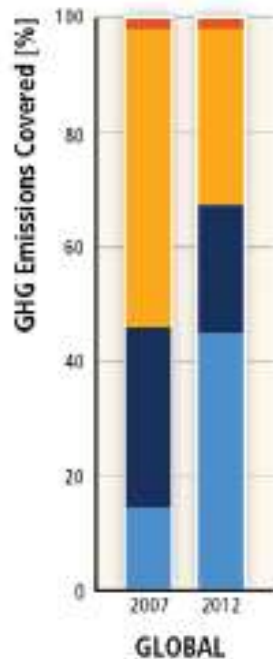
Catherine.mitchell@exeter.ac.uk, Energy Policy Group

Discussion of mitigation policies runs through the WG3 Report

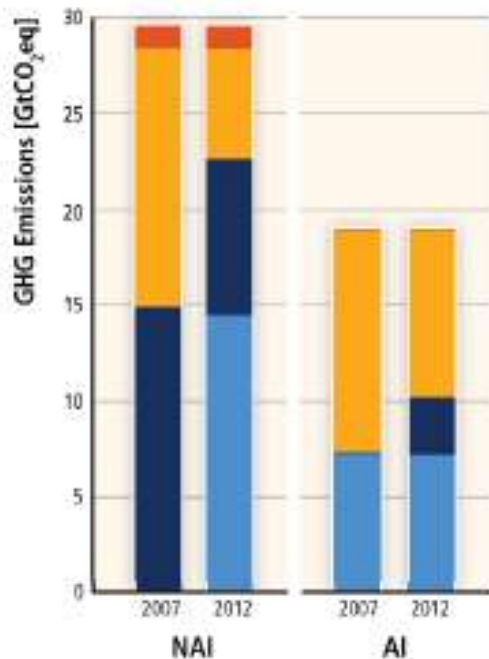
- The sector-specific chapters include policies specific to their sector, for example transport or buildings
- The policy chapters provide more general overviews of policy instruments
 - Chapter 13 International Cooperation
 - Chapter 14 Regional Development and Cooperation
 - Chapter 15 National and Sub-national Policies and Institutions
 - Chapter 16 Cross-cutting Investment and Finance issues



More countries have climate policies now than they did in AR4

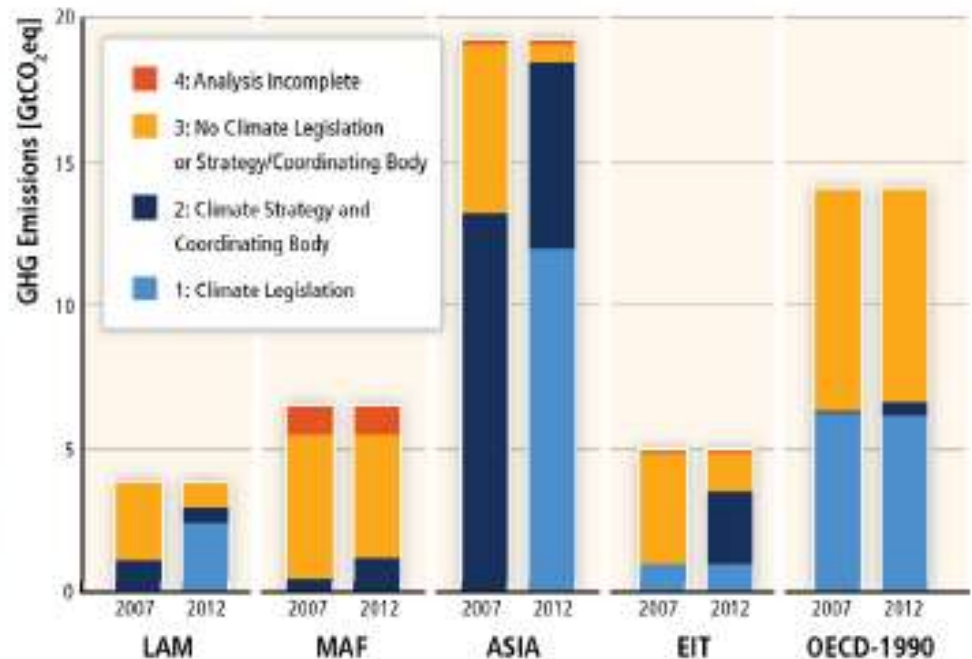


1	7 (15%)	22 (44%)
2	15 (30%)	11 (23%)
3	25 (52%)	15 (30%)
4	1 (3%)	1 (3%)



1	0 (0%)	14 (49%)
2	15 (50%)	8 (28%)
3	14 (46%)	6 (19%)
4	1 (4%)	1 (4%)

1	7 (38%)	7 (38%)
2	0 (0%)	3 (16%)
3	12 (61%)	9 (46%)
4	0 (1%)	0 (1%)



1	0 (2%)	2 (63%)
2	1 (28%)	1 (13%)
3	3 (70%)	1 (23%)
4	0 (0%)	0 (0%)

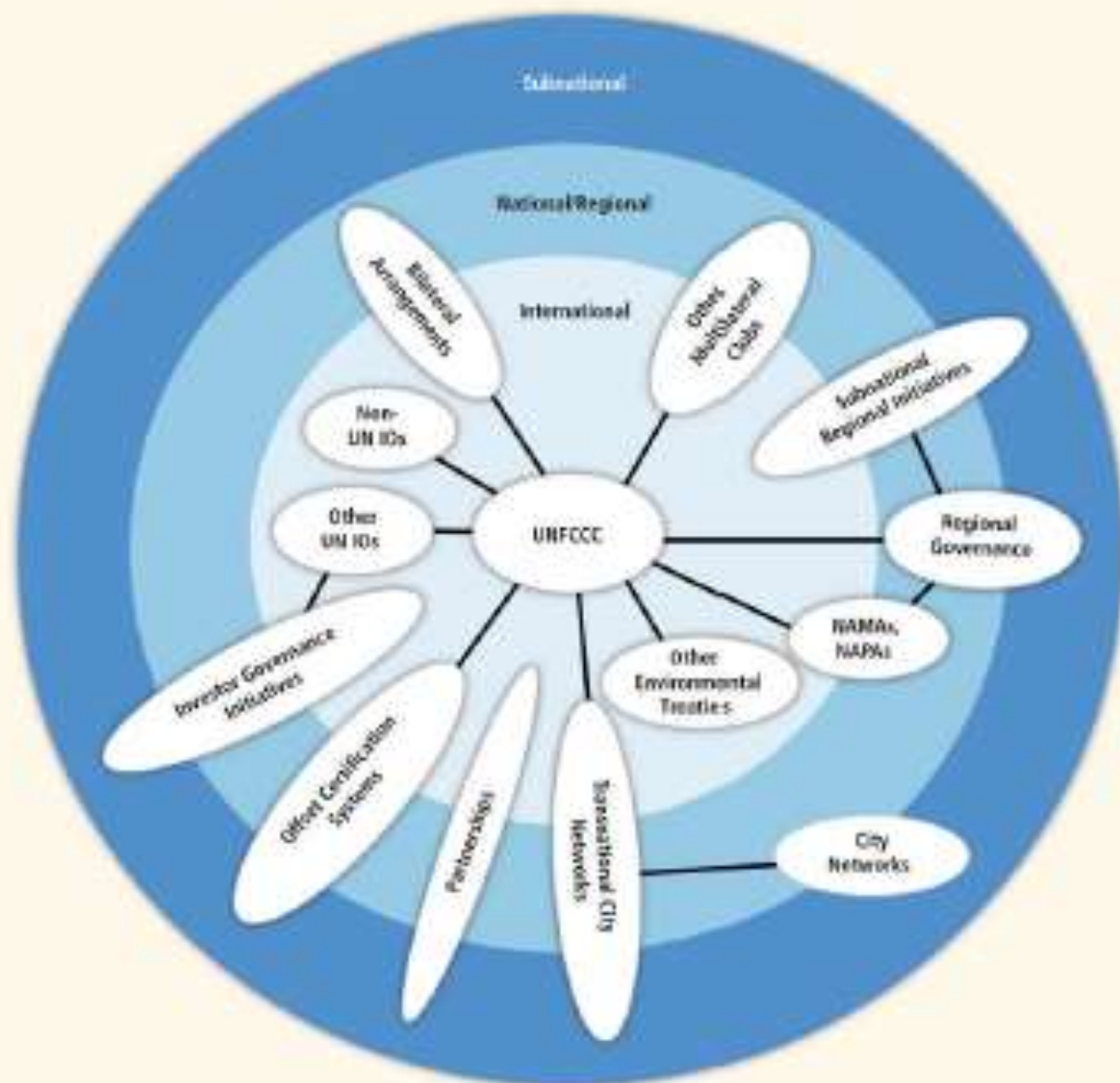
1	0 (0%)	0 (0%)
2	1 (8%)	1 (19%)
3	5 (76%)	4 (63%)
4	1 (16%)	1 (16%)

1	0 (0%)	12 (62%)
2	13 (68%)	6 (34%)
3	6 (30%)	1 (3%)
4	0 (1%)	0 (1%)

1	1 (20%)	1 (20%)
2	0 (0%)	3 (50%)
3	4 (76%)	1 (26%)
4	0 (3%)	0 (3%)

1	6 (44%)	6 (44%)
2	0 (0%)	0 (3%)
3	8 (55%)	7 (53%)
4	0 (0%)	0 (0%)

The Landscape of Agreements on Climate Change



There are lots of policies that work

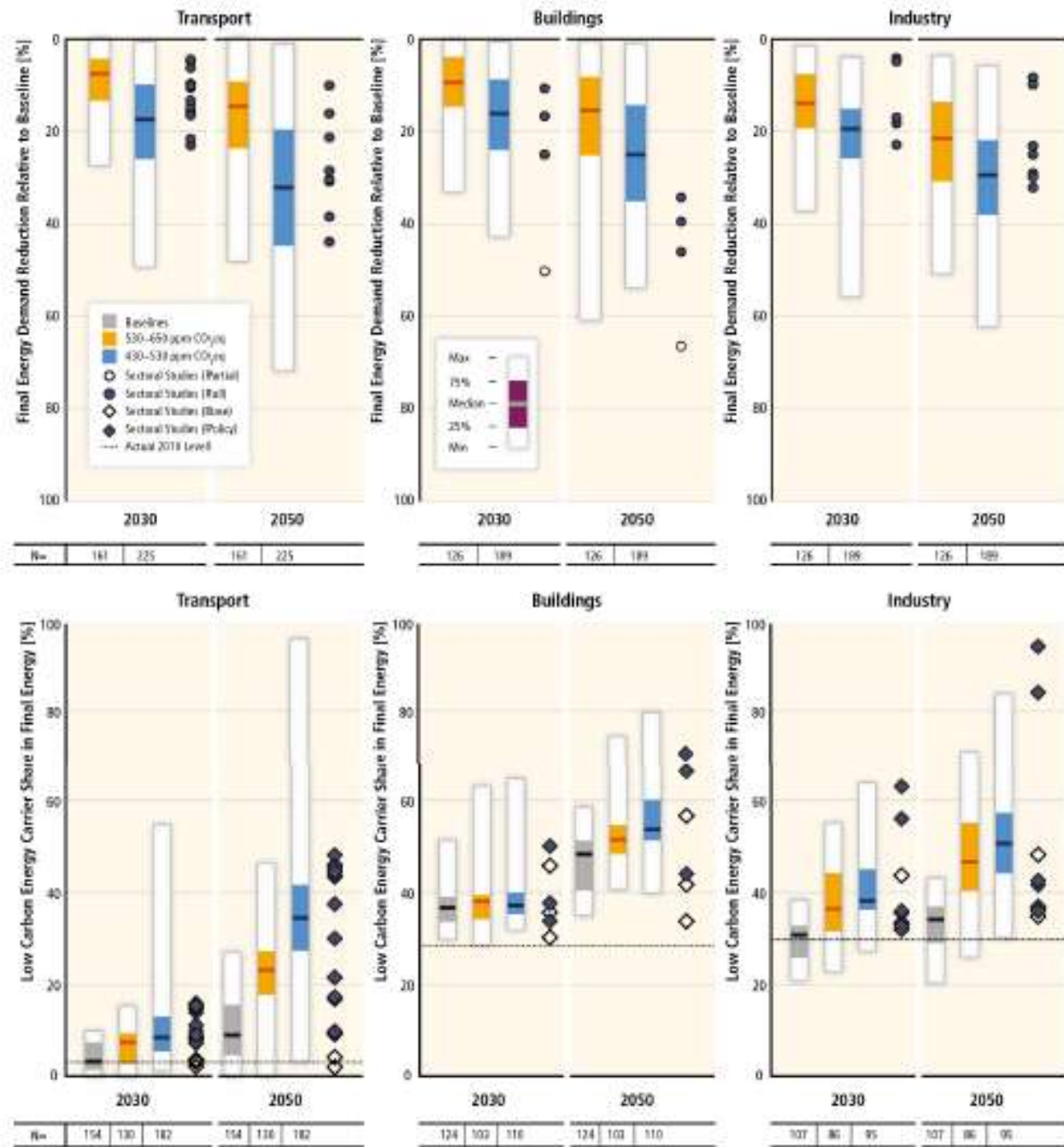
- There is an increasing focus on policies designed to integrate multiple objectives and increase co-benefits
 - For example, combined development and GHG reduction targets; combined energy security and energy reduction policies
- Economy –wide policies, for example carbon taxes, have been implemented in some countries, and long with technology policies, have contributed to decoupling of emissions from GDP
- Sector-specific policies have been more widely used than economy wide policies, for example policies to increase the stringency of building regulation; policies to encourage change of modalities in transport
- Regulatory approaches (eg only allowing installation of efficient boilers) and information measures are widely used, and often environmentally effective
- There is a distinct role for technology and innovation policy to complement other climate mitigation policies
 - Technology push (eg R&D) and demand pull (eg support mechanisms) can complement each other in a virtuous cycle

Policies have to take account of other factors if they are to be successfully implemented

- Delayed mitigation significantly increases the challenge to reach low concentration targets
- A lot of inertia in the system and successful policies require an enabling environment
- Infrastructure developments, spatial planning and long lived products can lock societies into pathways which are difficult to change
 - On the other hand, if undertaken as part of early action they can act as a facilitator for mitigation
- The regions with the greatest potential and flexibility to leapfrog to low carbon development trajectories are the poorer development regions where there are few lock-in effects but they also have the lowest financial, technological and human capacities

Policies that reduce substantially emissions will have major technological, institutional, business and social/ experiential/ attitudinal/ behavioural impacts

Final Energy Demand Reduction and Low-Carbon Energy Carrier Shares in Energy End-Use Sectors



Substantial reductions in emissions would require large changes in investment patterns and will have distributional impacts

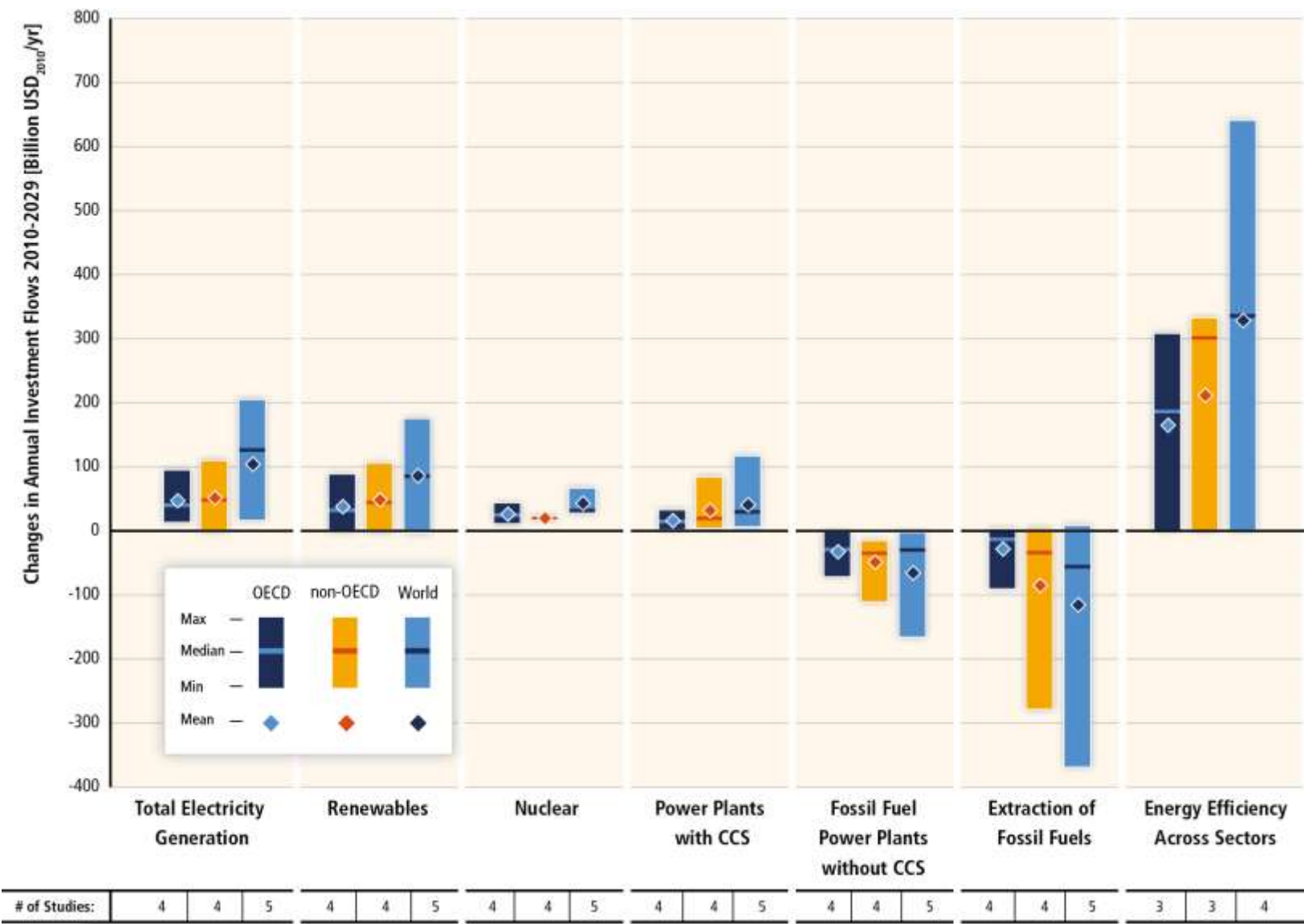


Figure SPM.9

Conclusion

- There are now more climate policies in place than there was at AR4.
- GHG are still rising, and the rate is getting faster – in this sense, there is insufficient policy stringency.
- There is a lot of evidence about successful policies for emission reduction.
- There is a lot of examples of new actors and new ways of doing things which reduce emissions
- Achieving substantial emission reductions requires change and will have distributional etc impacts
- The role of government in policy is multifaceted:
 - signing up to international agreements
 - putting in place the enabling environment for climate change policies; but also
 - helping to break the inertia in the system
 - managing change and distributional impacts (both positive and negative) on business and society
 - enabling inclusion and innovation

Transformational Climate Science

The future of climate change research
following the IPCC Fifth Assessment Report

