

CLIMATE CHANGE 2014

Mitigation of Climate Change

**Overarching presentation on findings
and new approaches of AR5 WGIII
relevant for the review**

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Co-Chair, IPCC Working Group

Structured Expert Dialogue, SBSTA, Bonn

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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

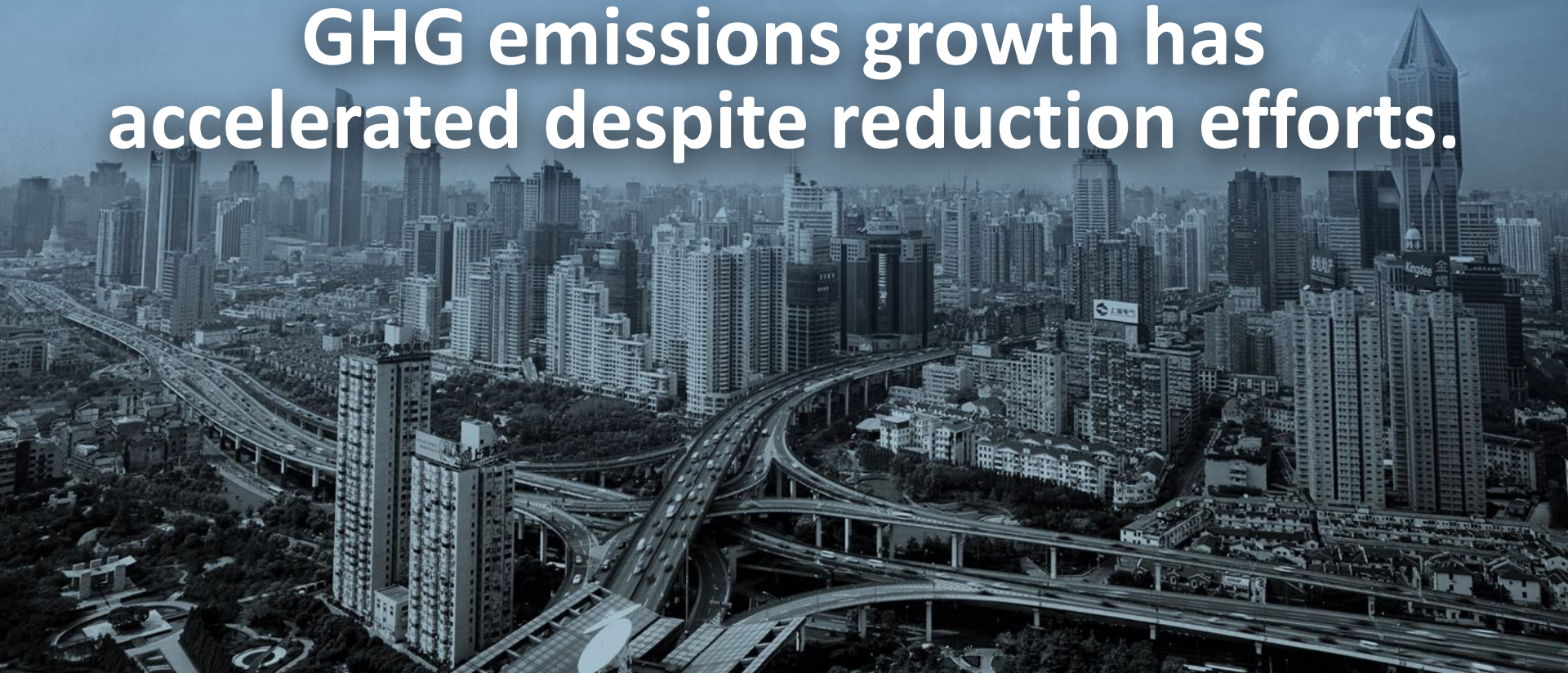


An aerial photograph of a dense urban landscape, likely Hong Kong, featuring a complex network of highways and numerous skyscrapers under a blue sky with light clouds. A large, semi-transparent blue circle is centered in the upper half of the image, containing the text "#1".

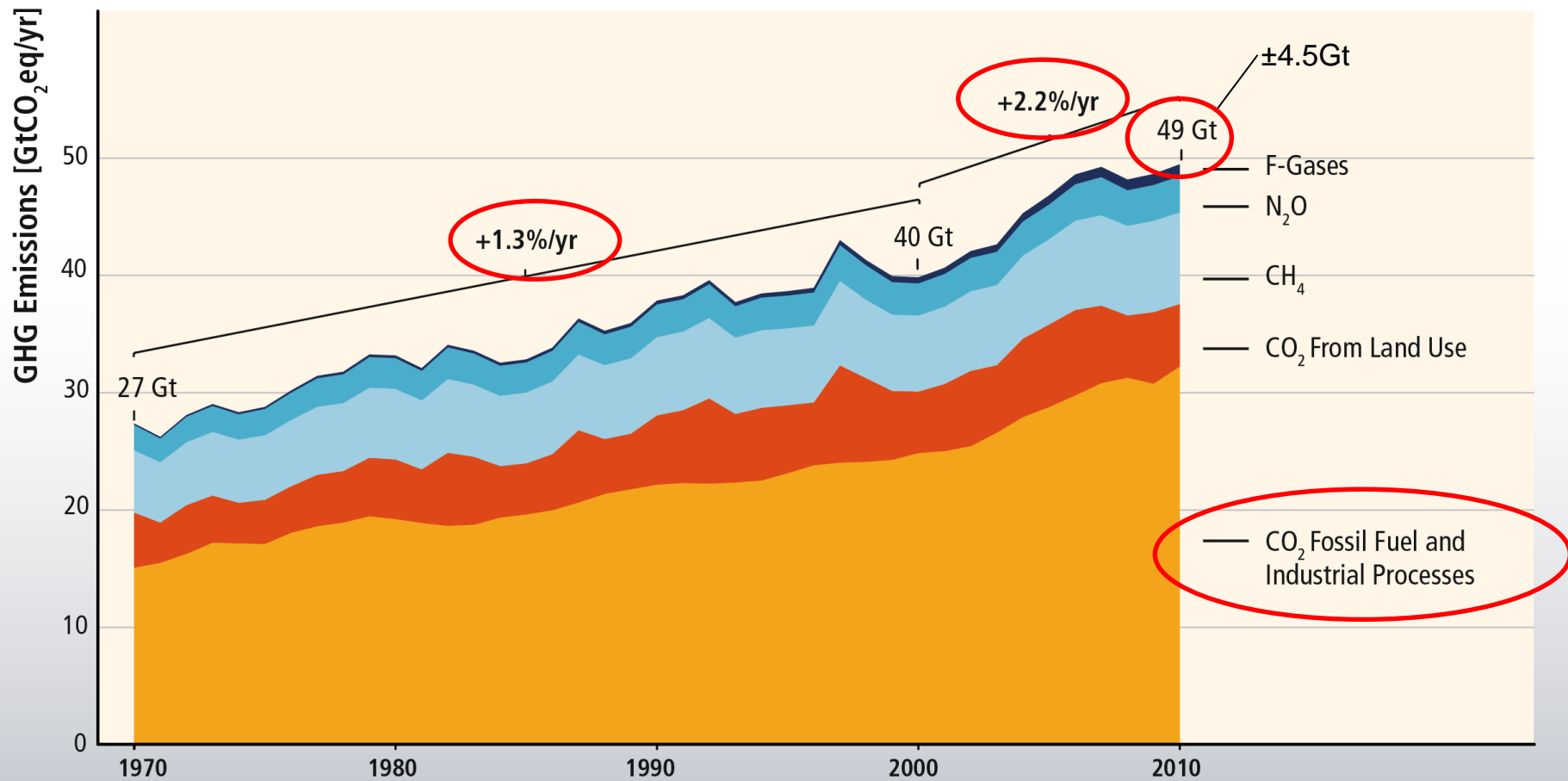
#1

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

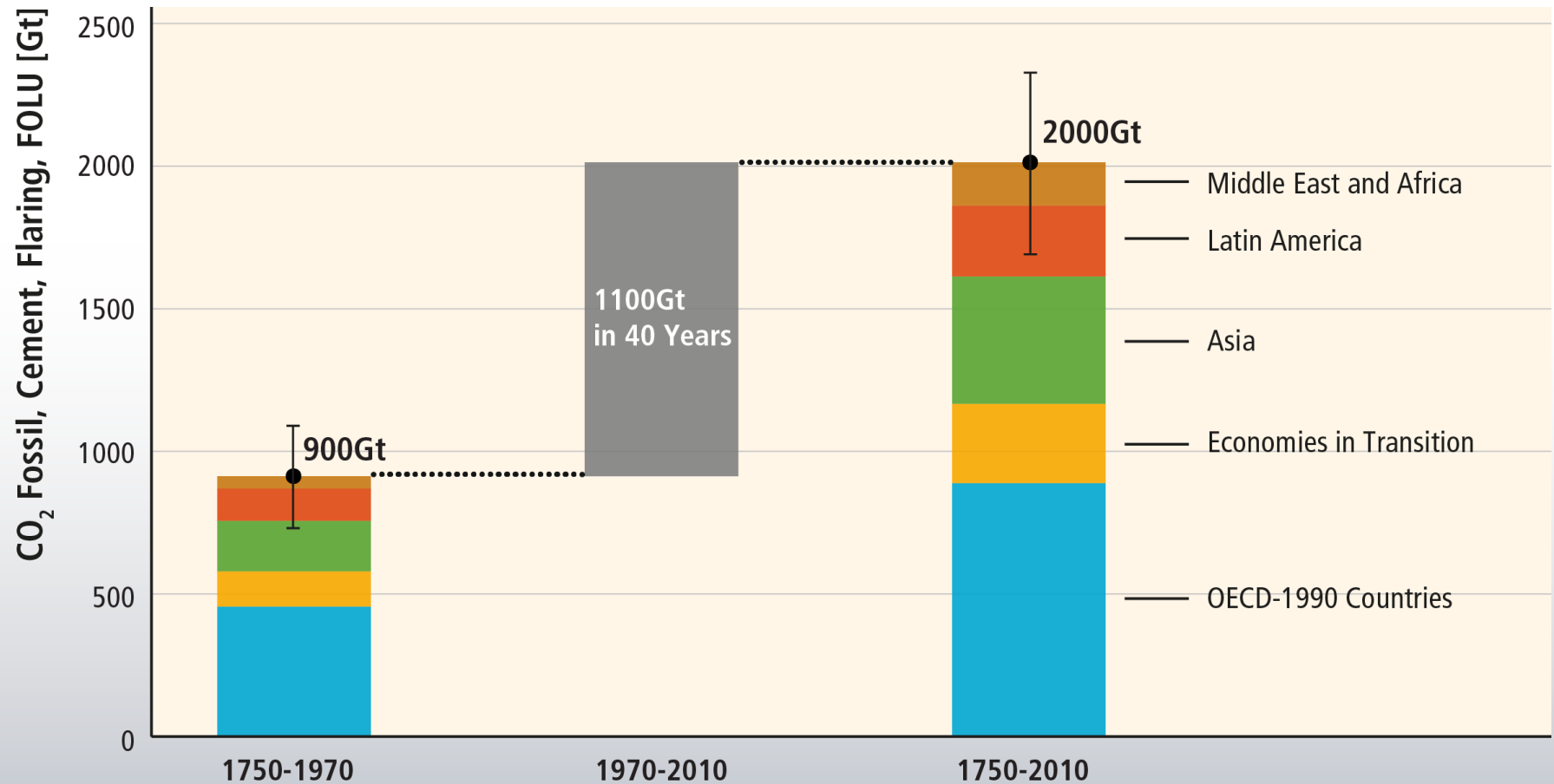
**GHG emissions growth has
accelerated despite reduction efforts.**



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

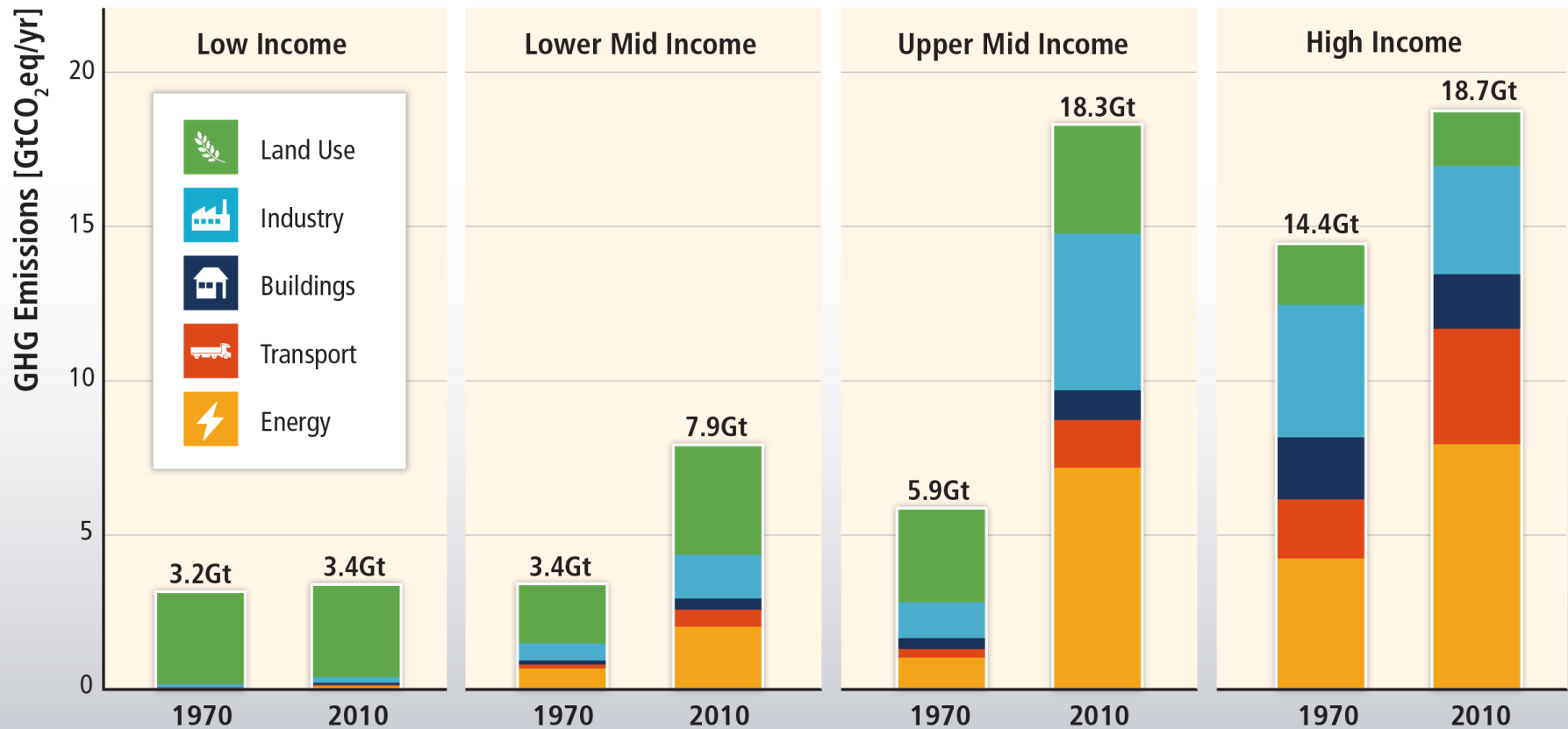


About half of cumulative anthropogenic CO₂ emissions between 1750 and 2010 have occurred in the last 40 years.

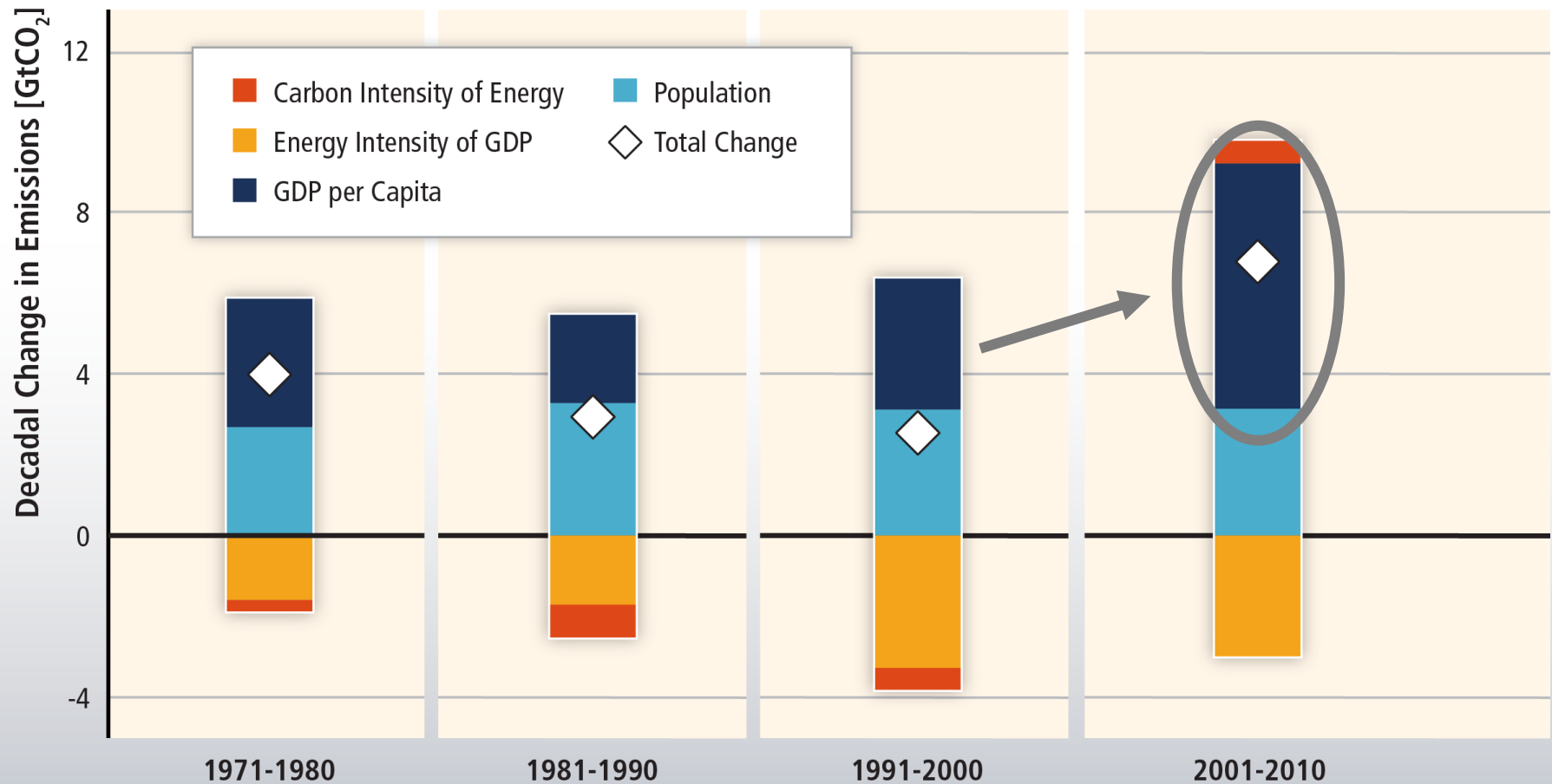


Regional patterns of GHG emissions are shifting along with changes in the world economy.

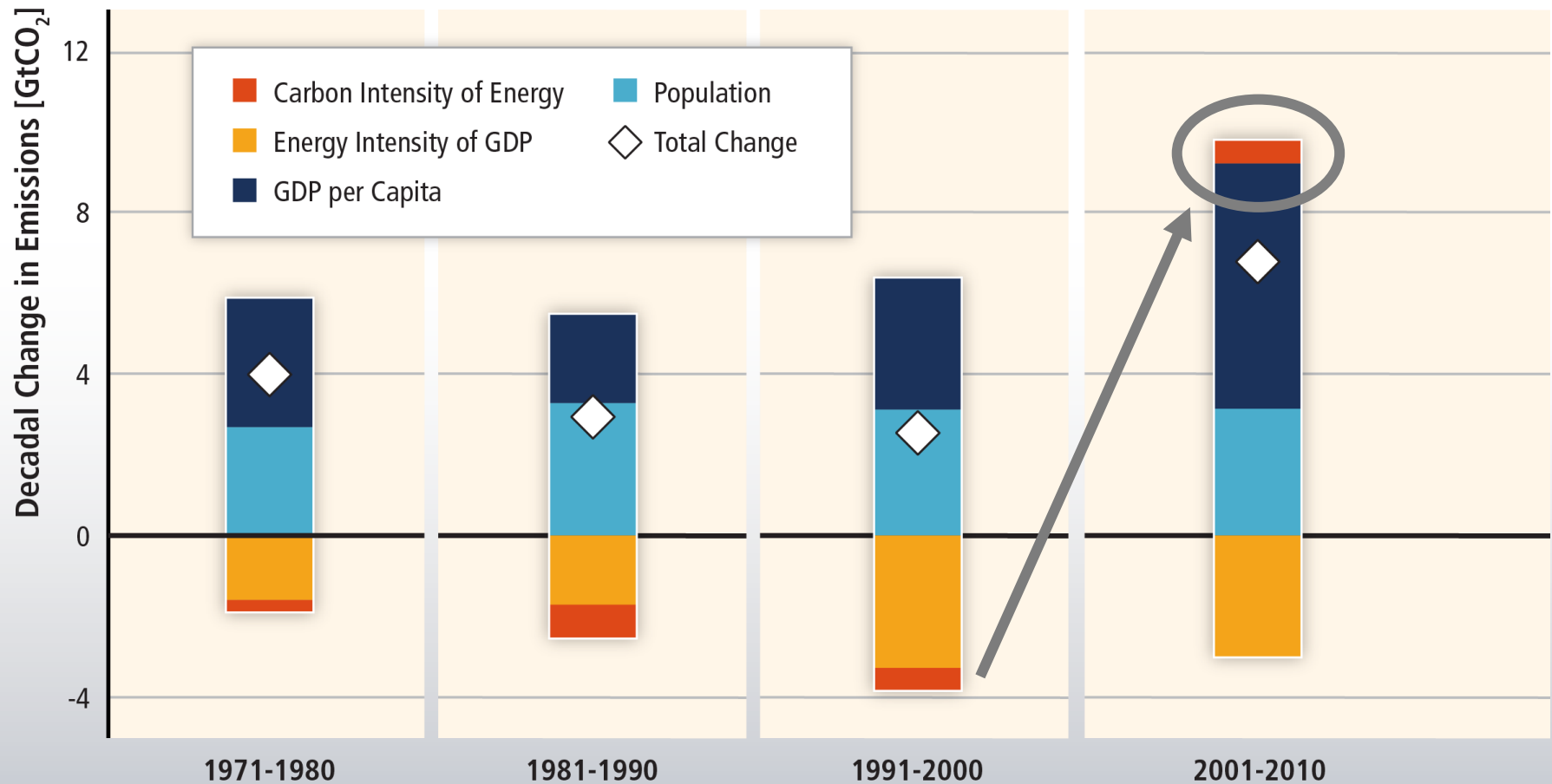
GHG Emissions by Country Group and Economic Sector



Most of the recent GHG emission growth has been driven by growth in economic activity.



The long-standing trend of gradual decarbonisation of energy has reversed recently.



An aerial photograph of a dense urban landscape, likely Hong Kong, featuring numerous skyscrapers and a complex network of elevated highways. A large, semi-transparent blue circle is centered in the upper half of the image, containing the white text "#2".

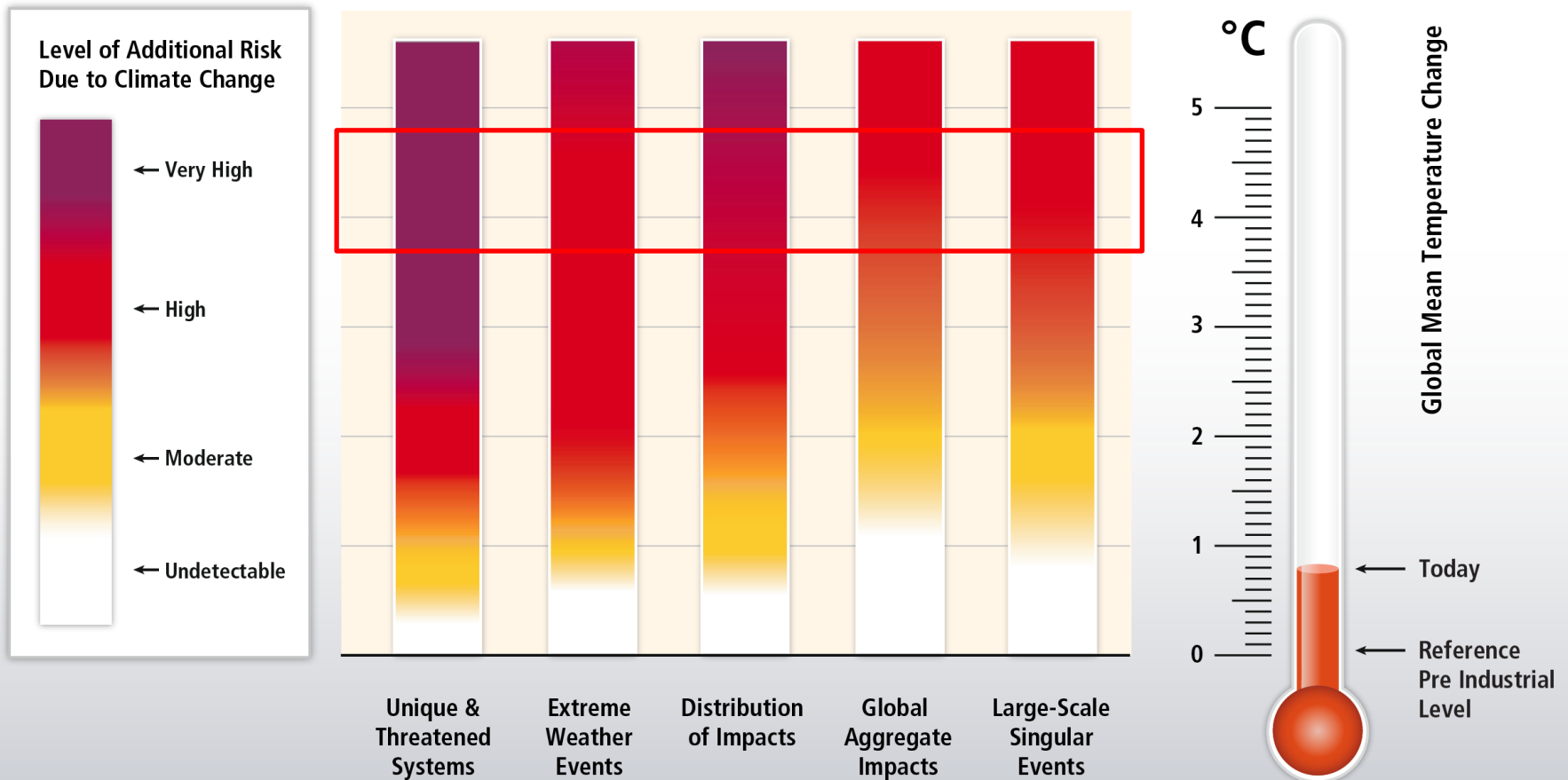
#2

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

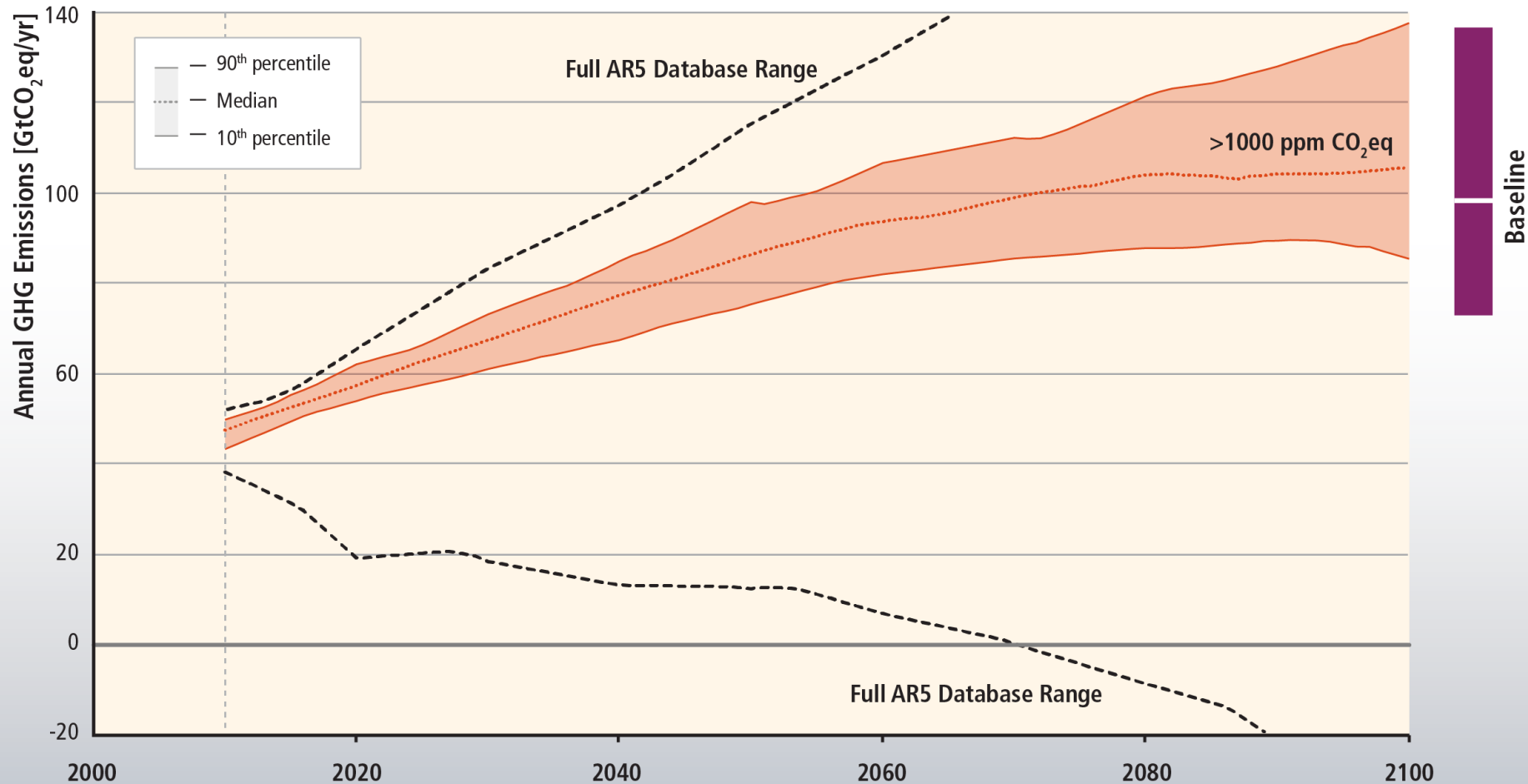


Limit warming to 2°C relative to pre-industrial levels involves substantial technological, economic and institutional challenges.

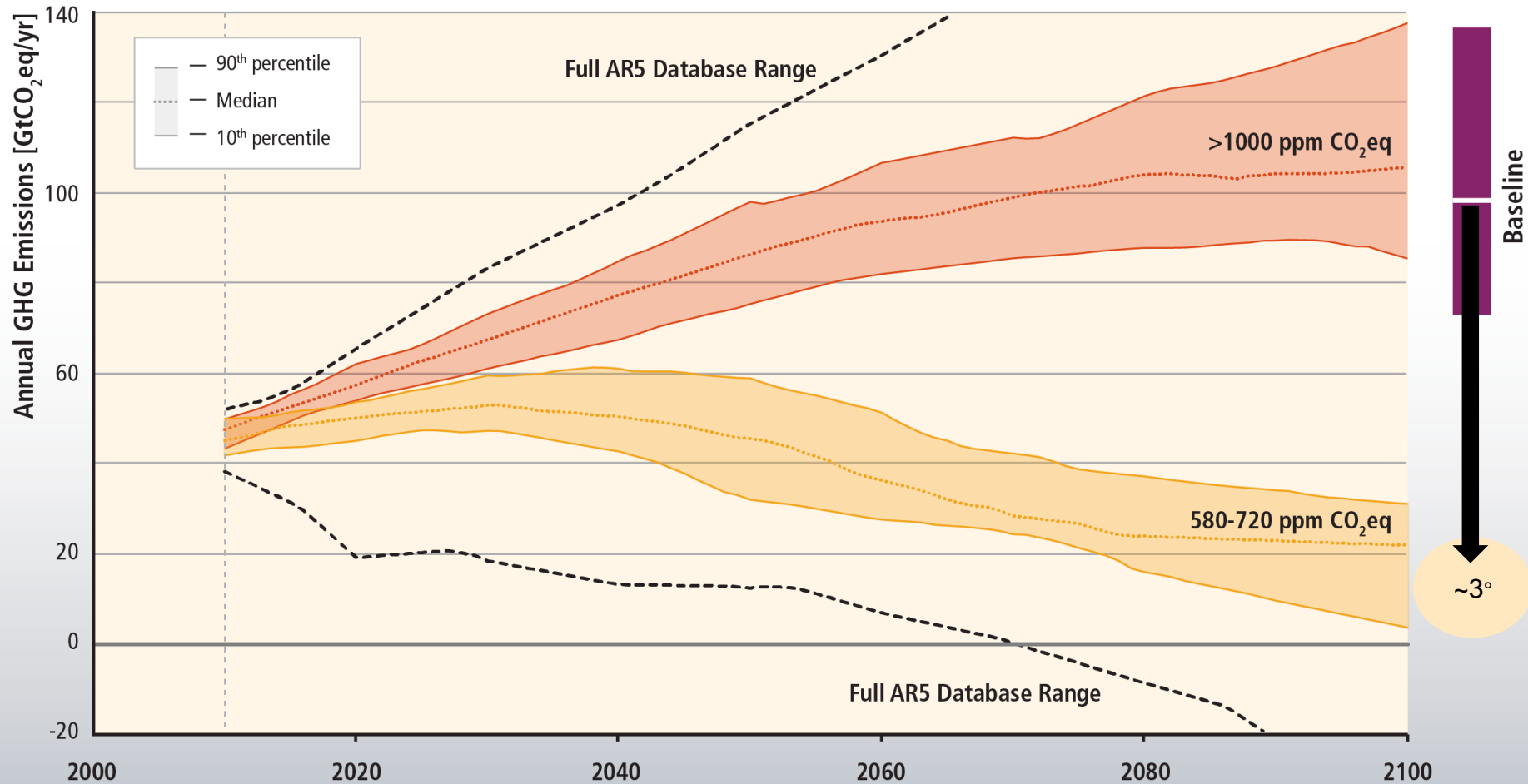
Without additional mitigation, global mean surface temperature is projected to increase by 3.7 to 4.8°C (2.5 - 7.8 °C) over the 21st century.



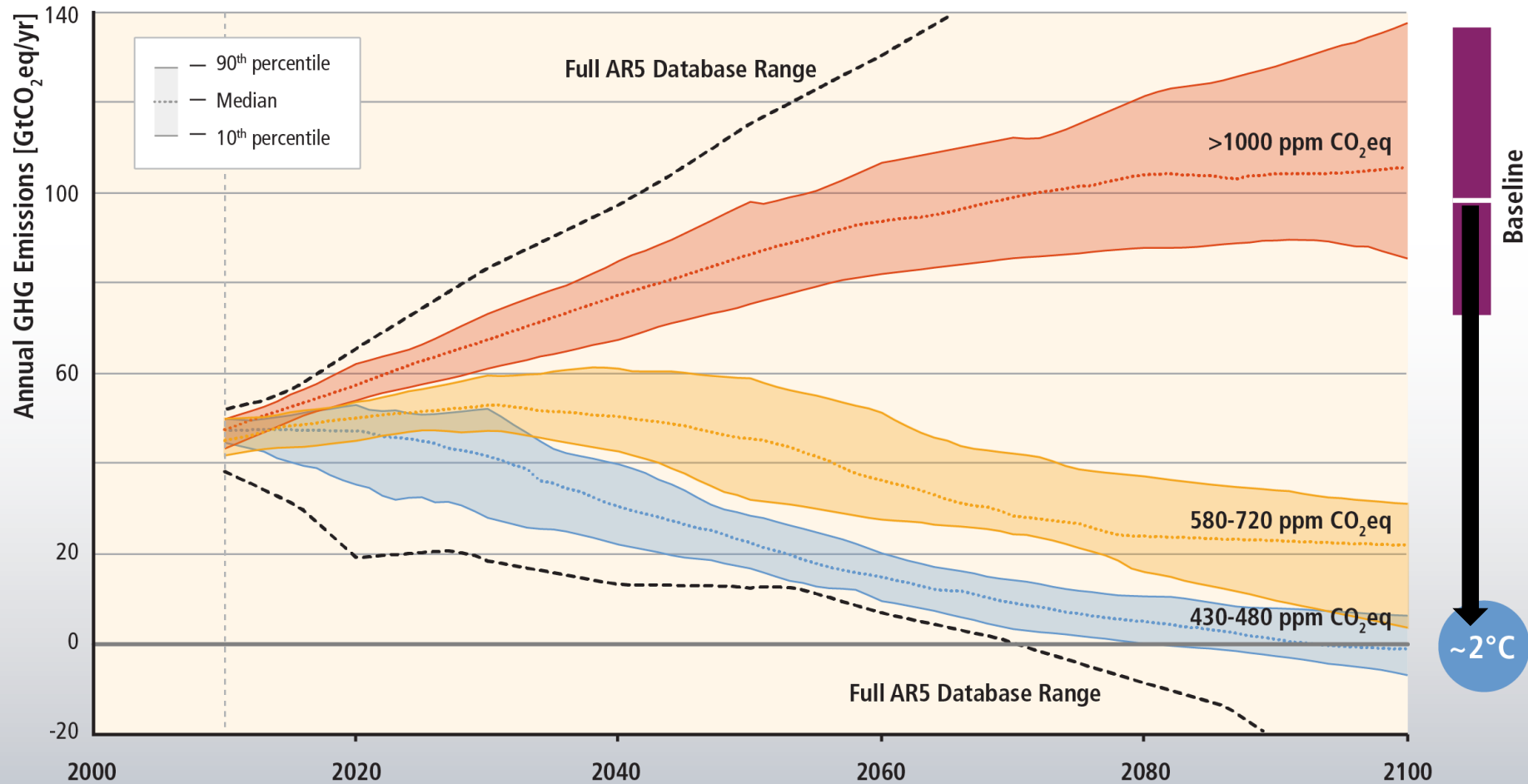
Stabilization of atmospheric concentrations requires moving away from the baseline – regardless of the mitigation goal.



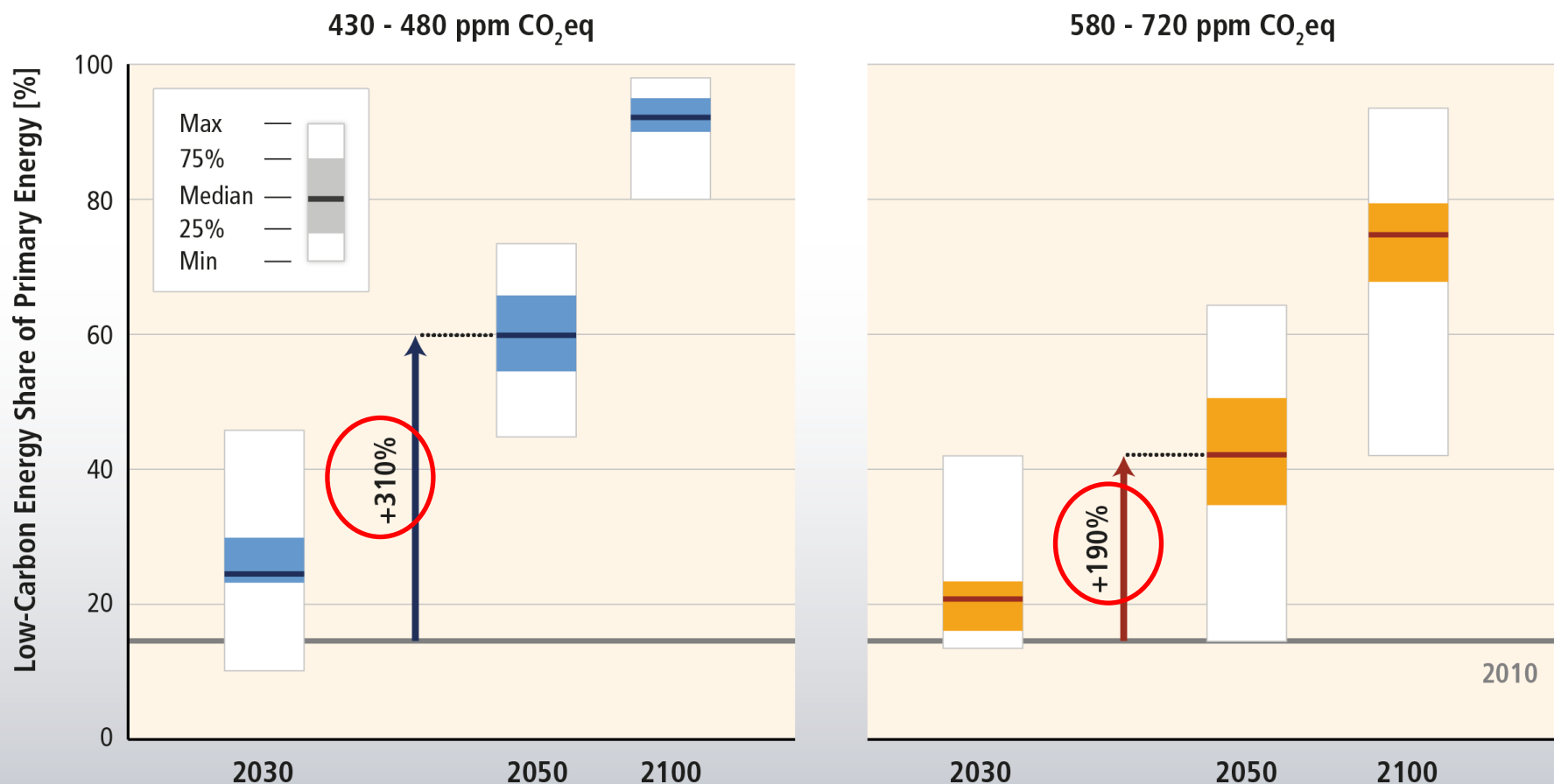
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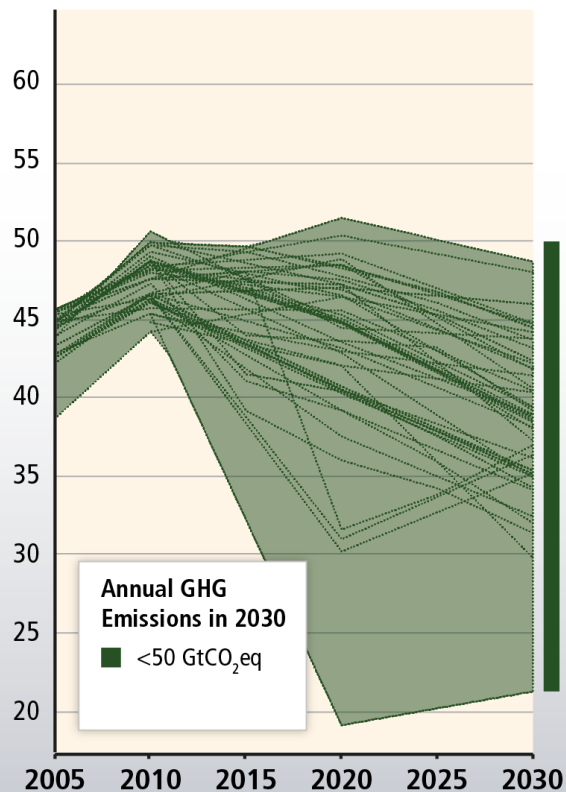
Mitigation involves substantial upscaling of low carbon energy.



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

Before 2030

GHG Emissions Pathways [GtCO₂eq/yr]

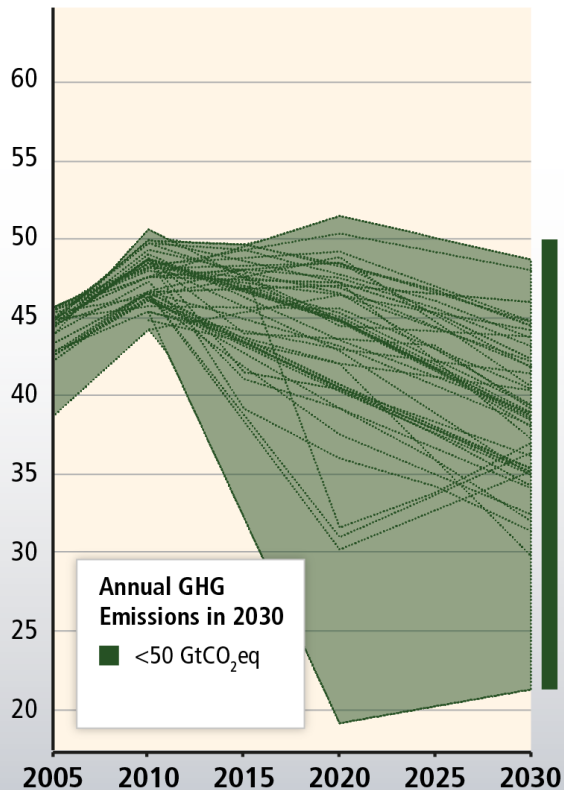


„immediate action“

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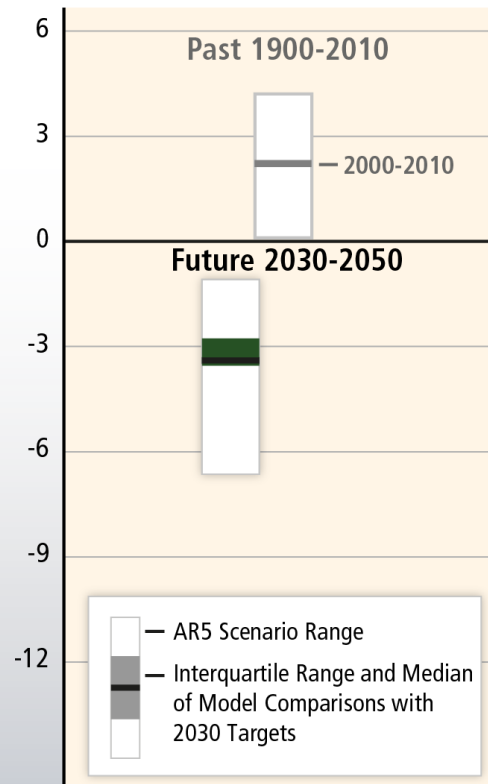
Before 2030

GHG Emissions Pathways [GtCO₂eq/yr]



After 2030

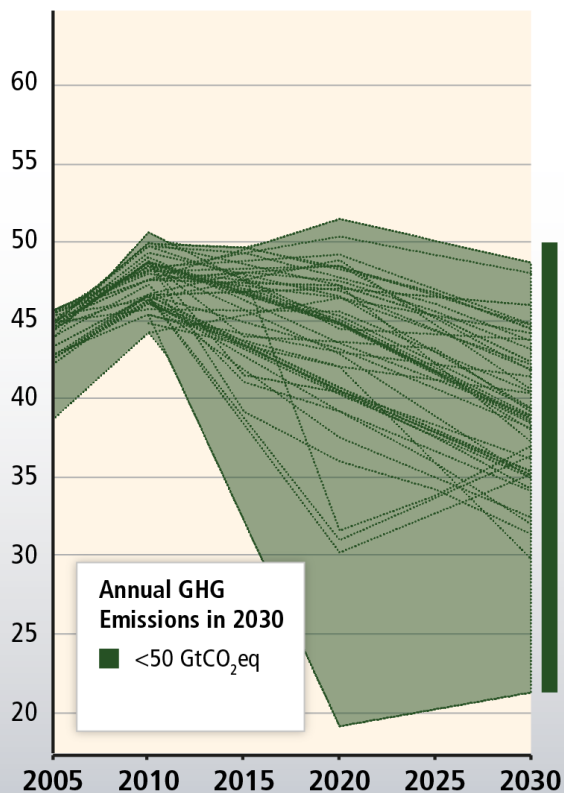
Rate of CO₂ Emission Change [%/yr]



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

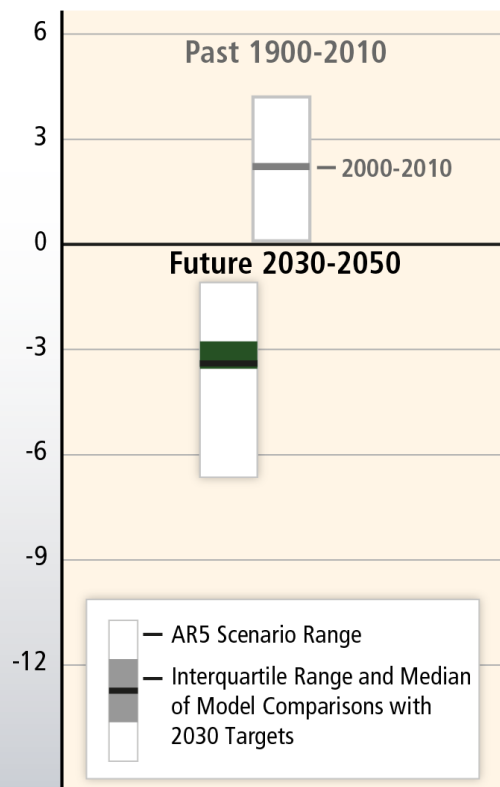
Before 2030

GHG Emissions Pathways [GtCO₂eq/yr]

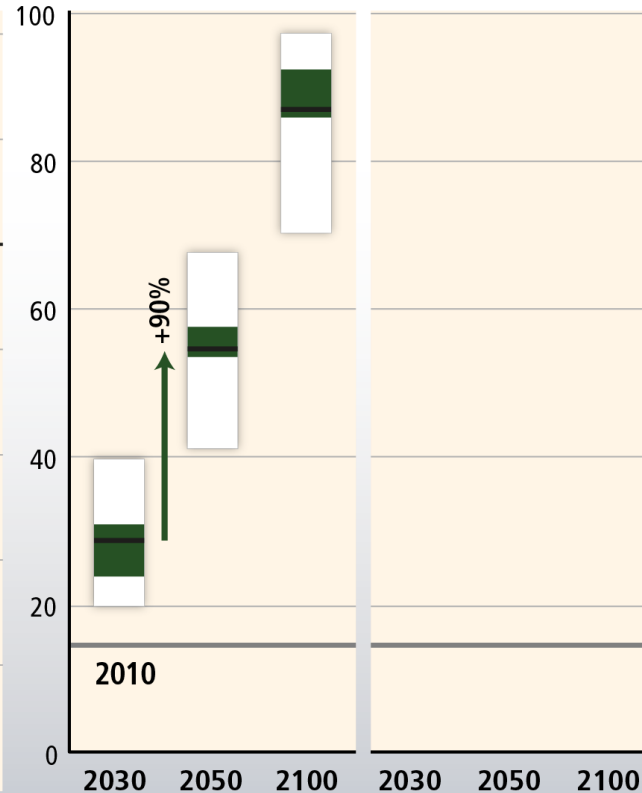


After 2030

Rate of CO₂ Emission Change [%/yr]



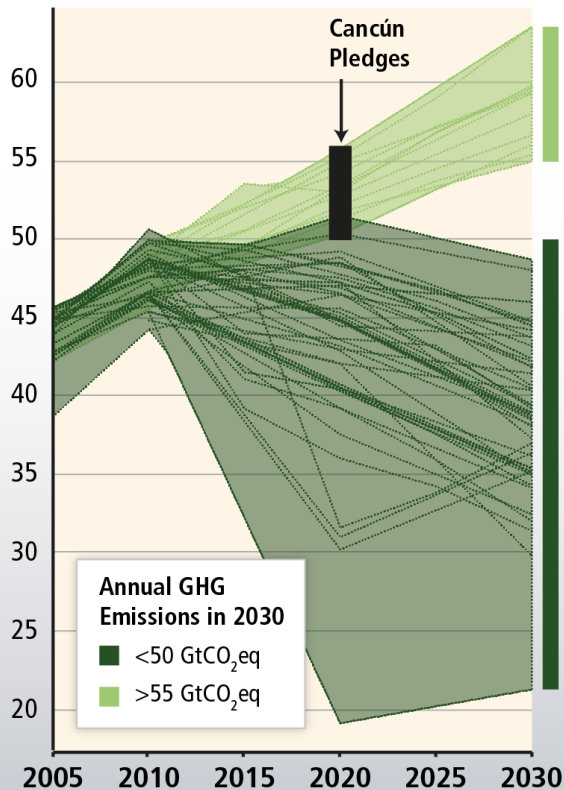
Share of Low Carbon Energy [%]



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

Before 2030

GHG Emissions Pathways [GtCO₂eq/yr]



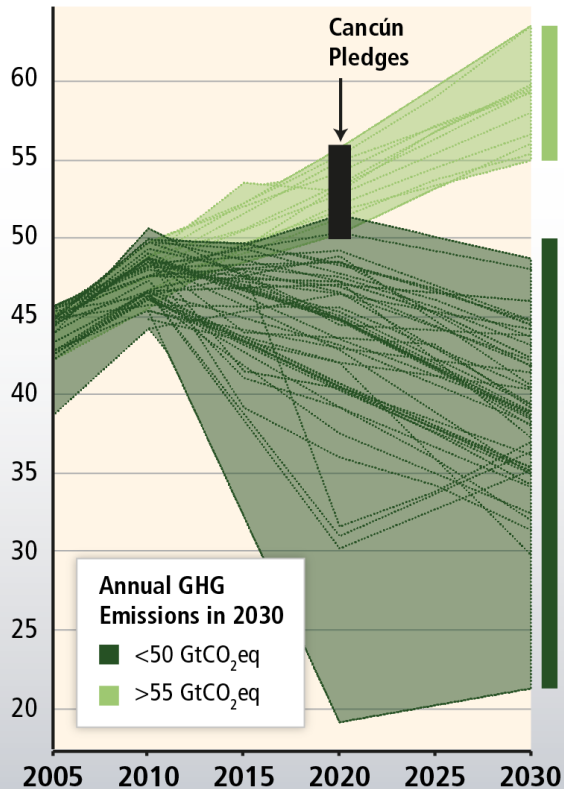
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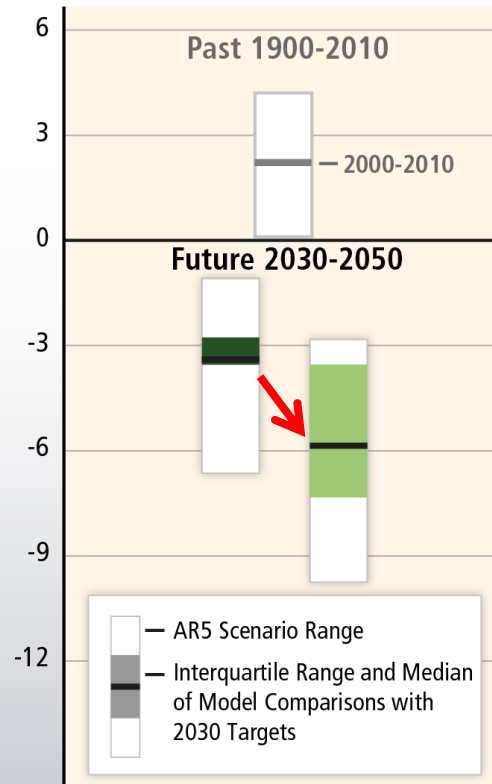
Before 2030

GHG Emissions Pathways [GtCO₂eq/yr]

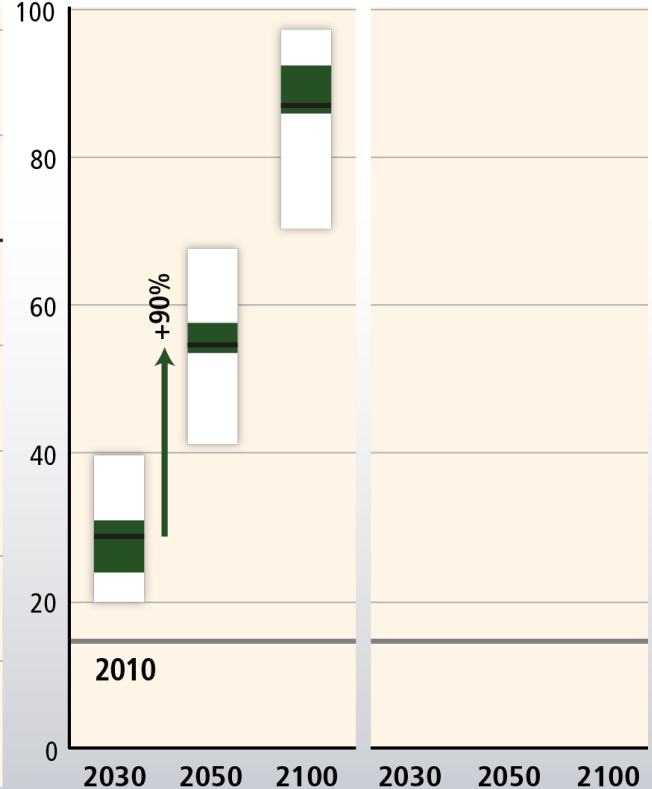


After 2030

Rate of CO₂ Emission Change [%/yr]



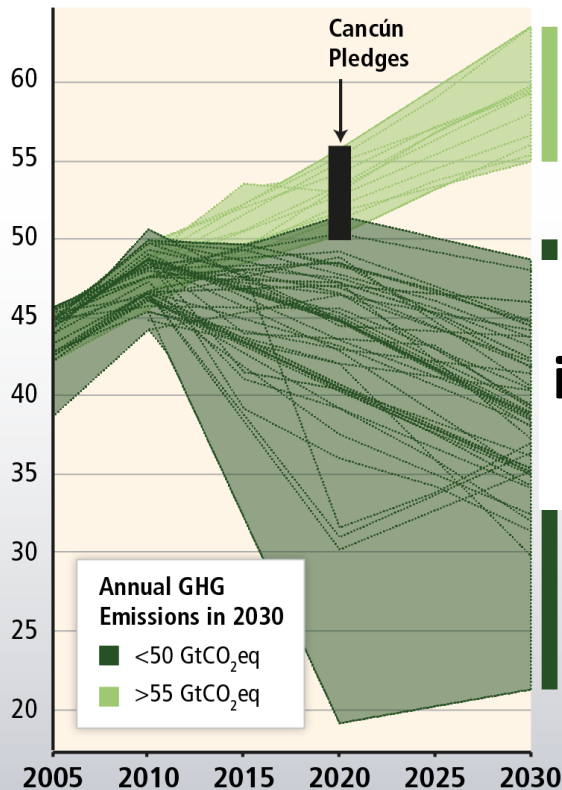
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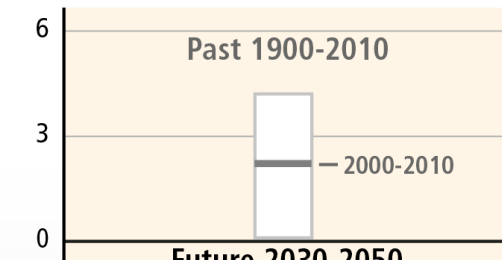
Before 2030

GHG Emissions Pathways [GtCO₂eq/yr]

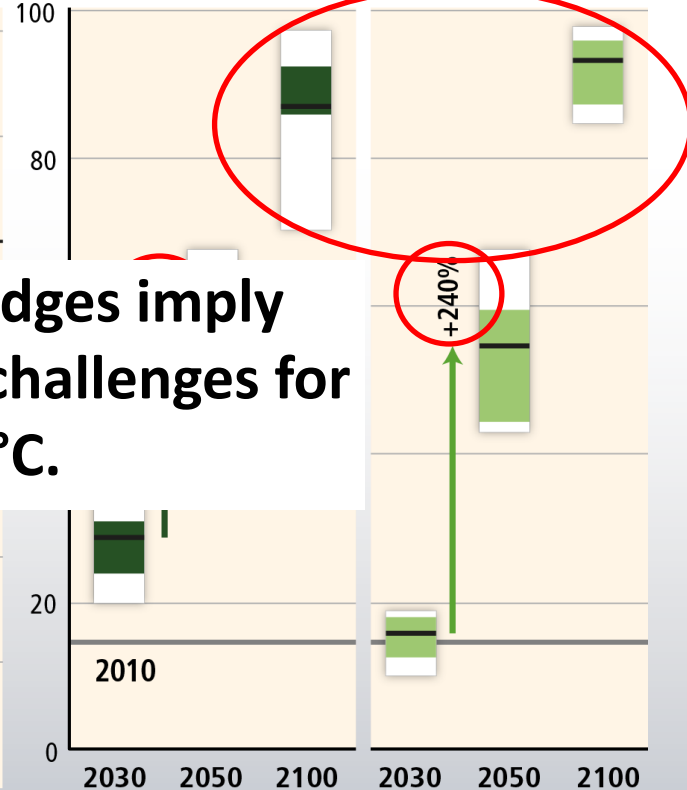


After 2030

Rate of CO₂ Emission Change [%/yr]



Share of Low Carbon Energy [%]



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

Scientific evidence on the 1.5°C goal remains limited

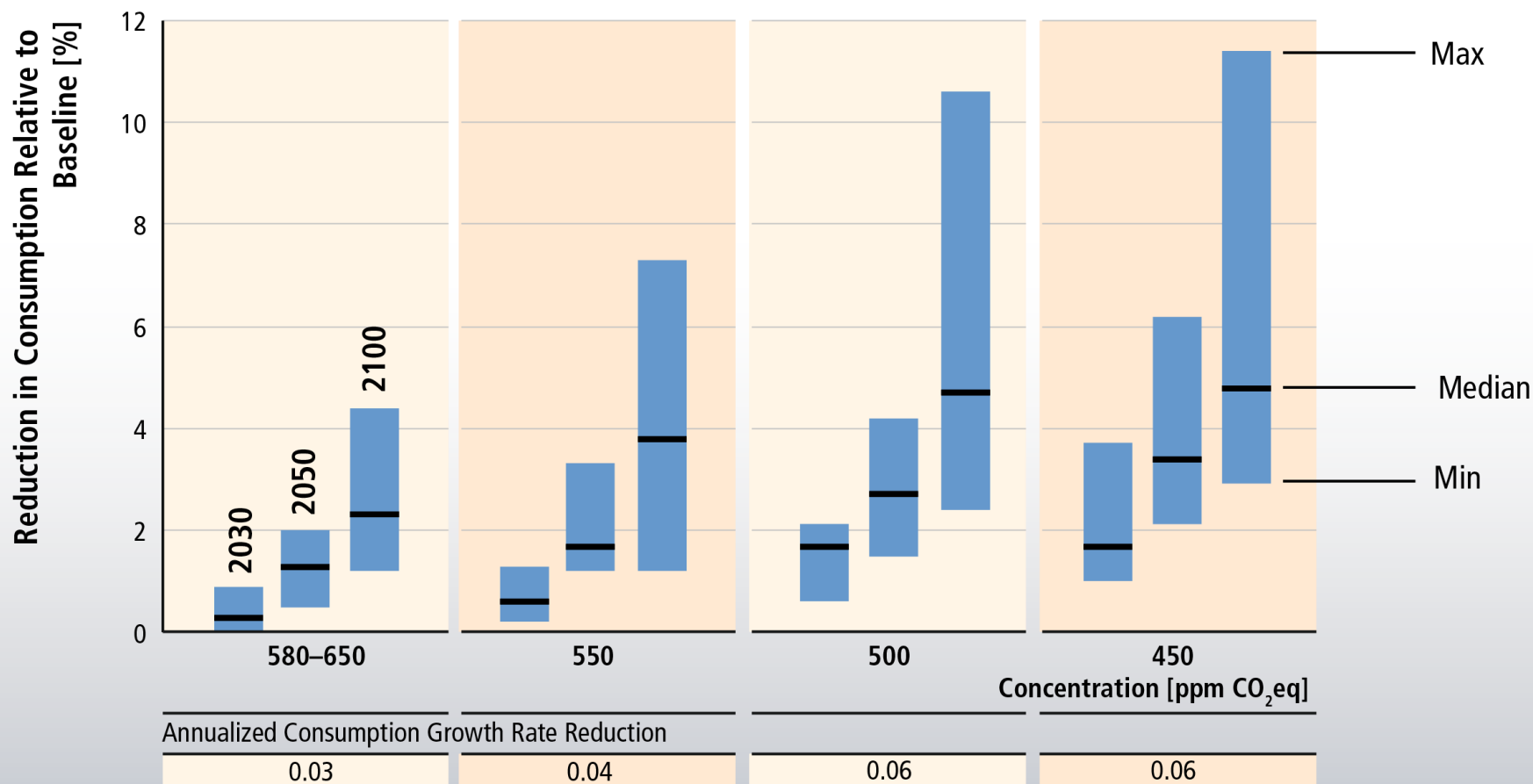
Comprehensive assessment difficult in the absence of multi-model comparison study and limited number of studies. Studies characterized by:

- Temperature overshoot & large scale application of CDR technologies
- Immediate mitigation action
- Rapid upscaling of FULL set of technologies
- Development along a low energy demand pathway

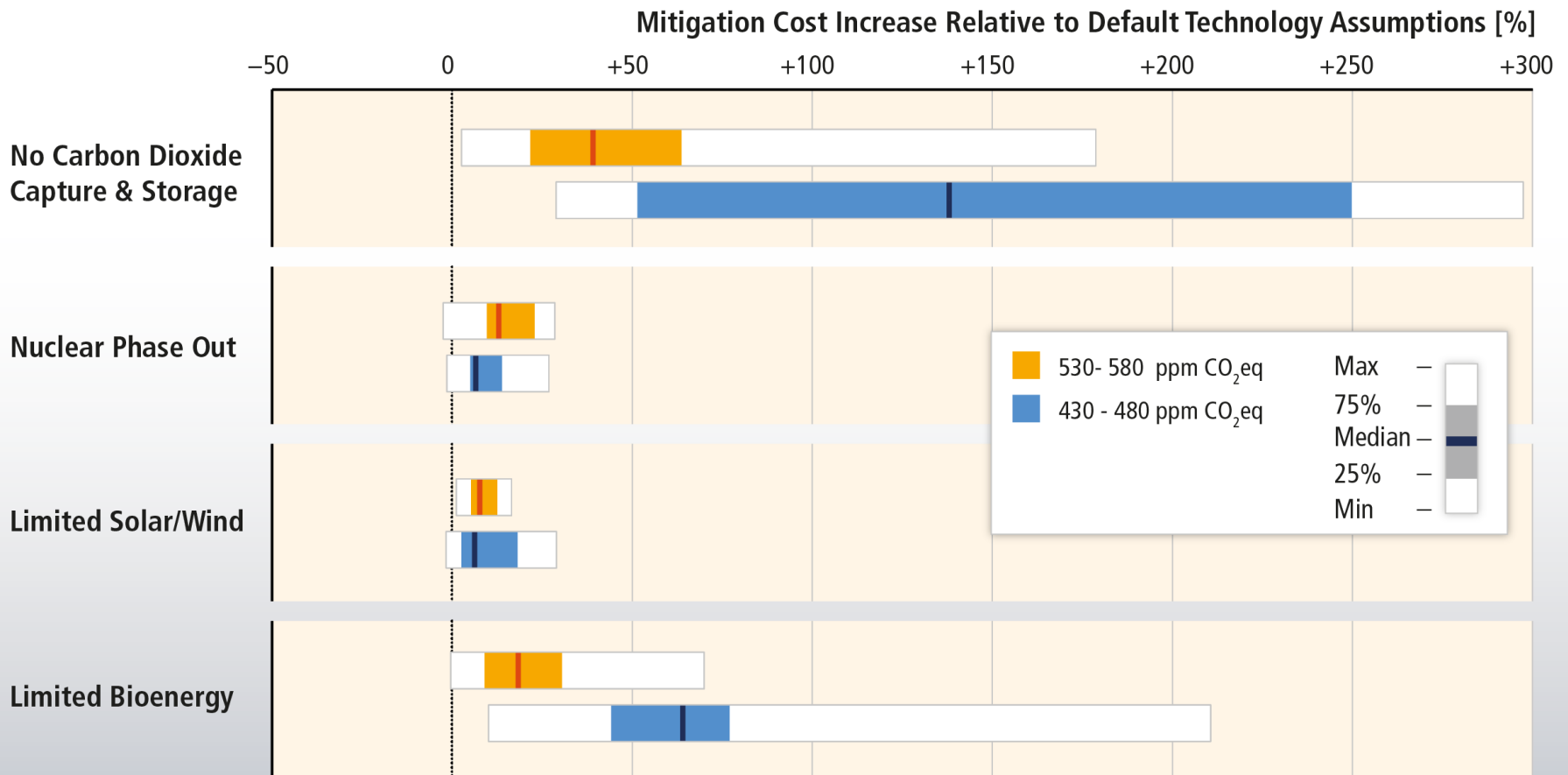
Mitigation cost estimates vary, but do not strongly affect global GDP growth.



Global costs rise with ambition of mitigation goal



Limited availability of technologies can greatly increase mitigation costs.



An aerial photograph of a dense urban landscape, likely Hong Kong, featuring a complex network of highways and numerous skyscrapers. A large, semi-transparent blue circle is positioned in the upper center of the frame, containing the white text "#3".

#3

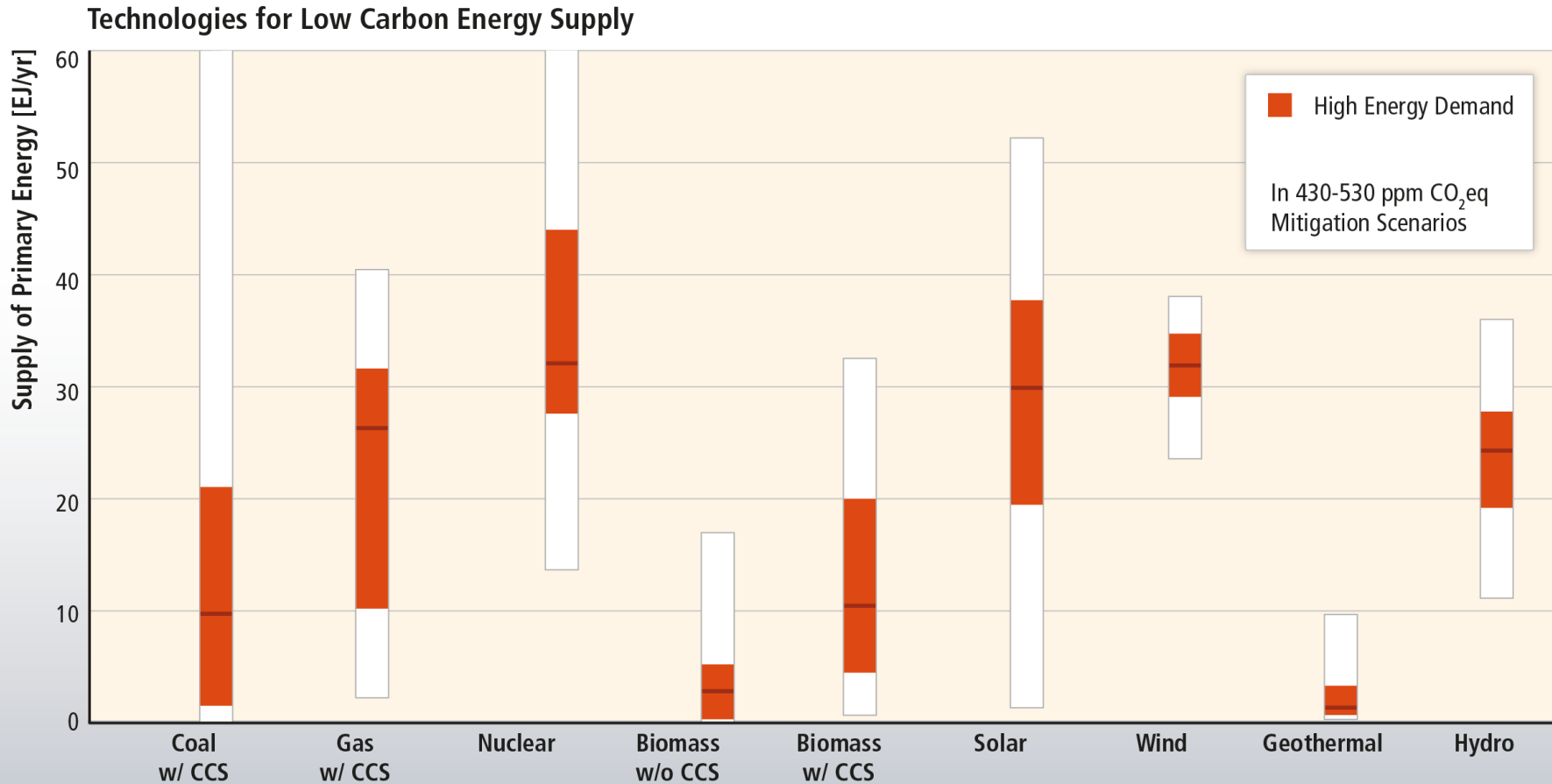
What are the options for reducing GHG emissions?

Ambitious mitigation scenarios require a full decarbonisation of energy supply.

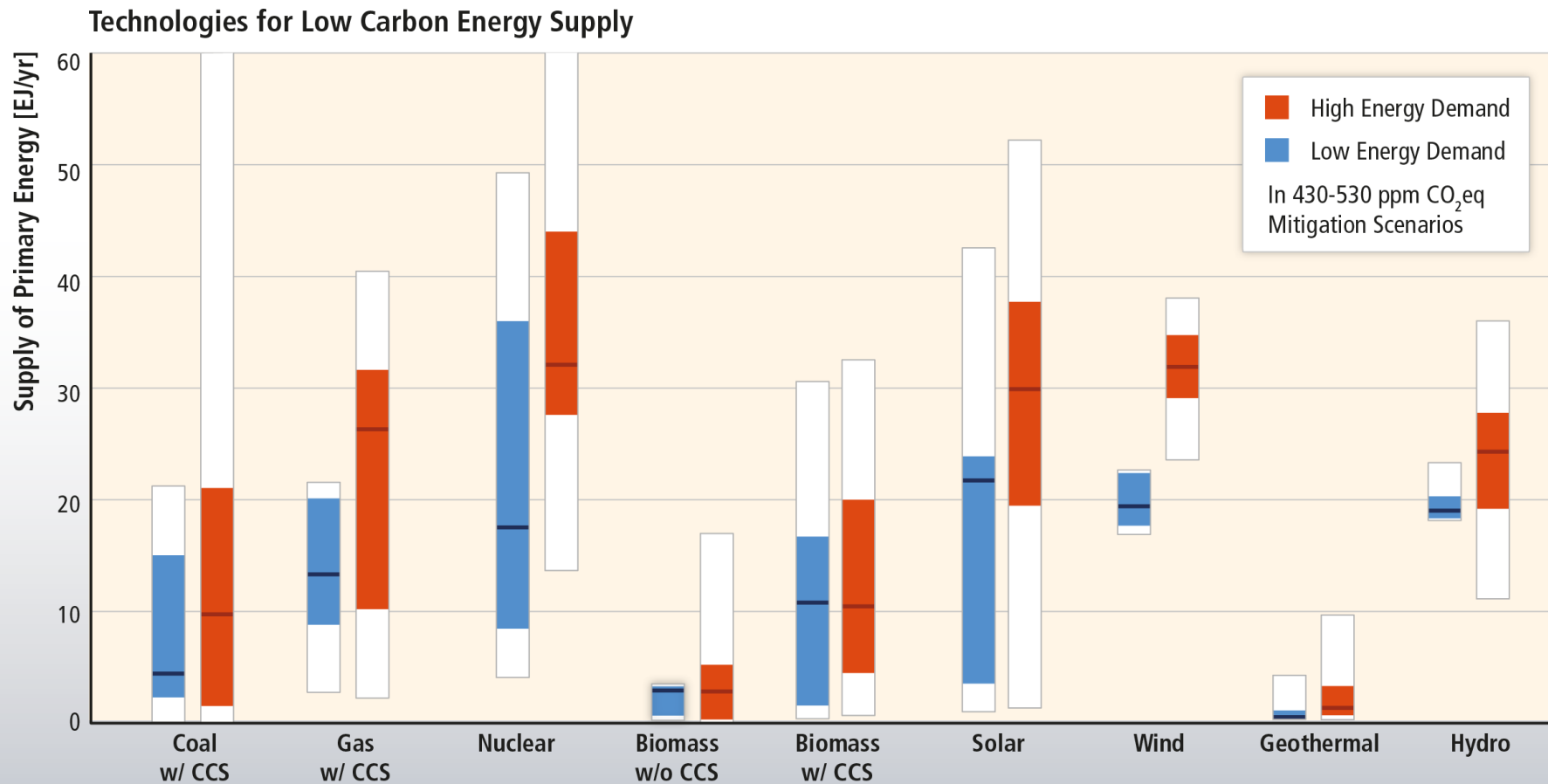
Energy demand reductions can help to reduce emissions in the medium term and are kept for hedging supply side risks in the long-run.



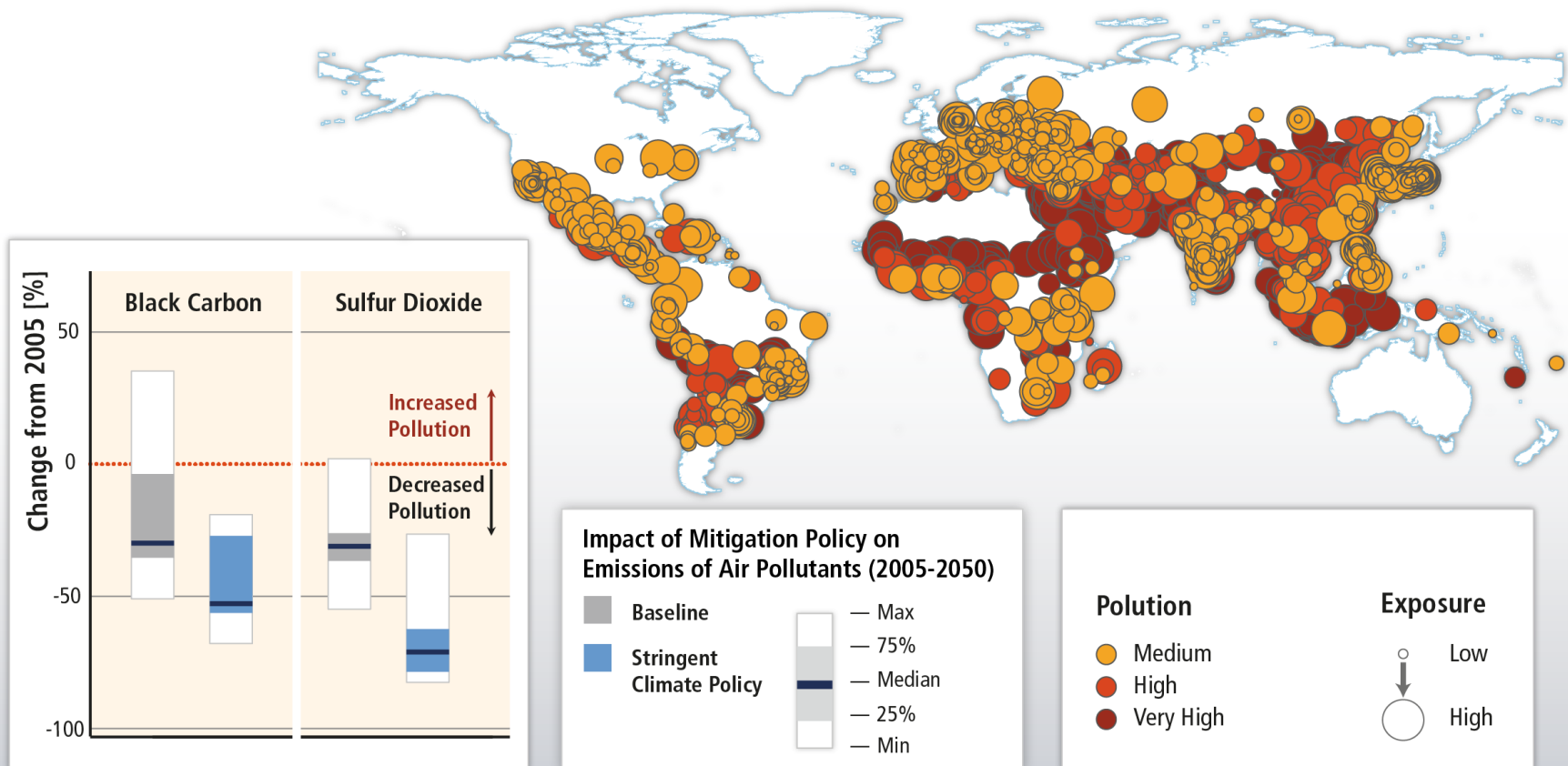
Mitigation scenarios show there is a lot of flexibility in how to decarbonize energy supply.



Scale of energy demand reductions determine 1) flexibility in decarbonizing energy; 2) hedge against supply side-risks; 3) avoid infrastructure lock-in; 4) co-benefits of mitigation.



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



An aerial photograph of a city skyline, likely Hong Kong, with numerous skyscrapers and a complex highway interchange. A large blue circle is superimposed in the upper center of the image, containing the white text "#4".

#4

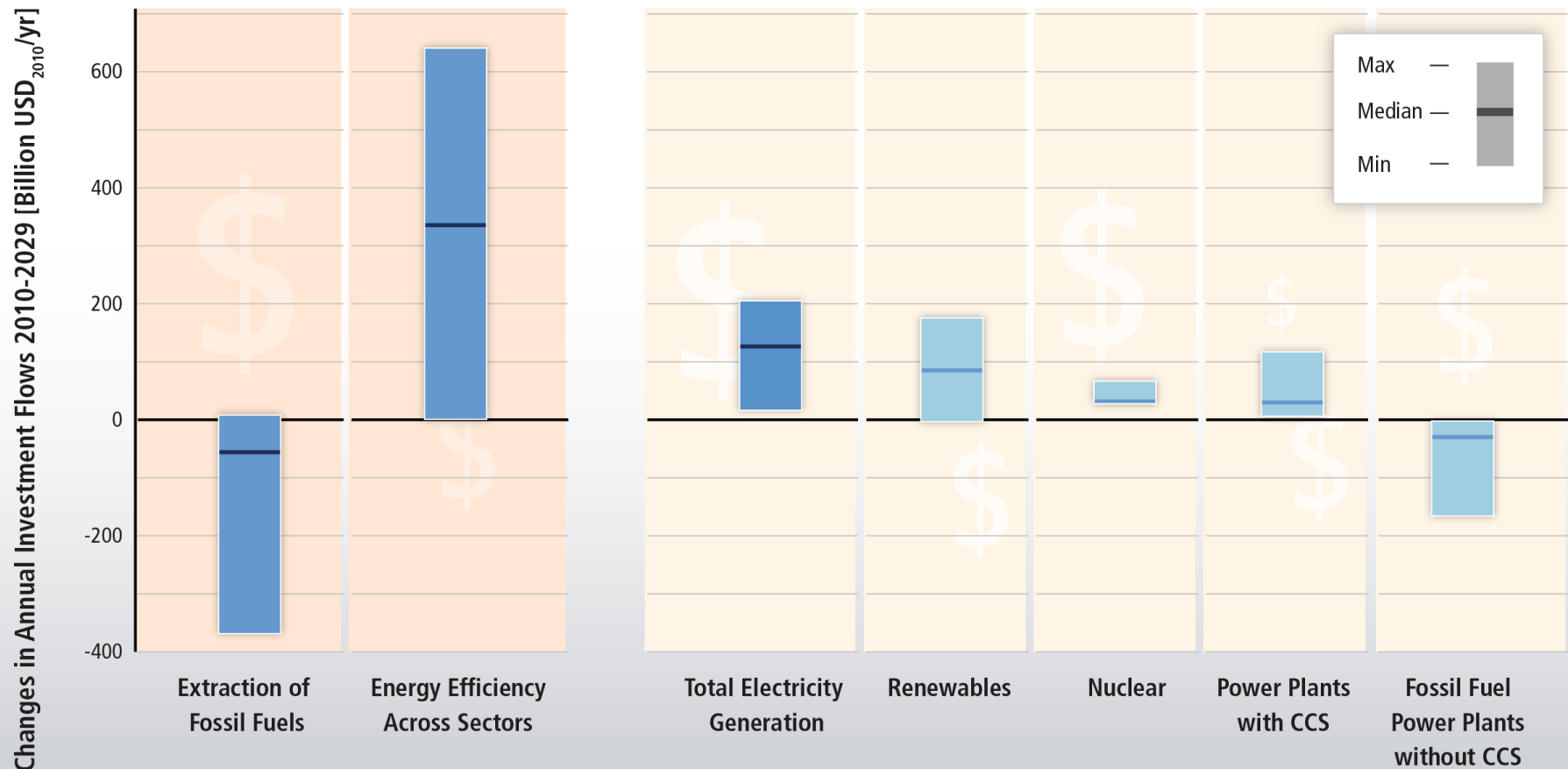
**What policies have attracted the greatest attention?
How can we maximize climate policy co-benefits and
reduce adverse side effects?**

**What is the role of international climate change
cooperation and subnational actors in
reaching the long-term global goal?**

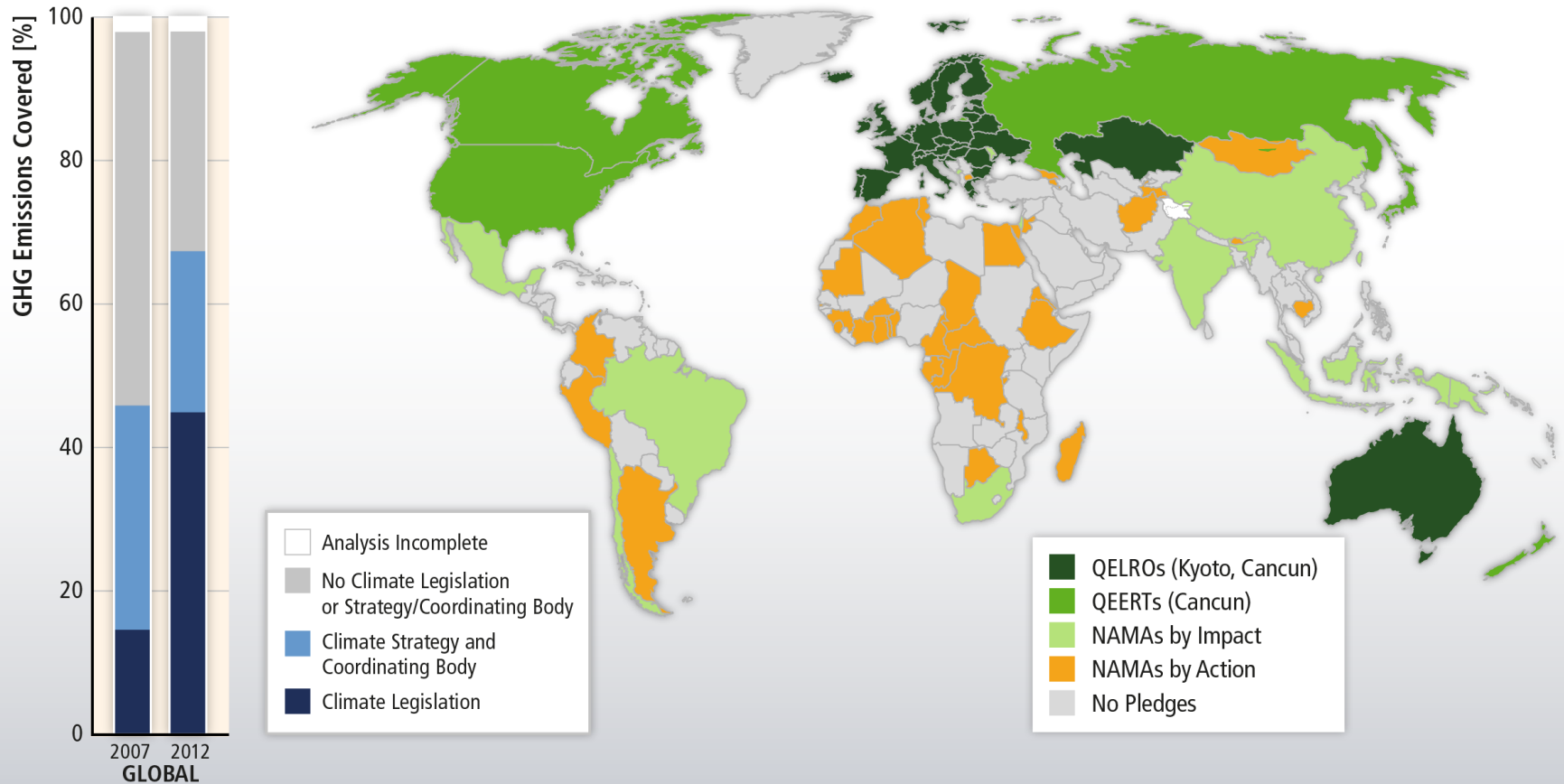
Climate change mitigation is a global commons problem that requires international cooperation and coordination across scales.



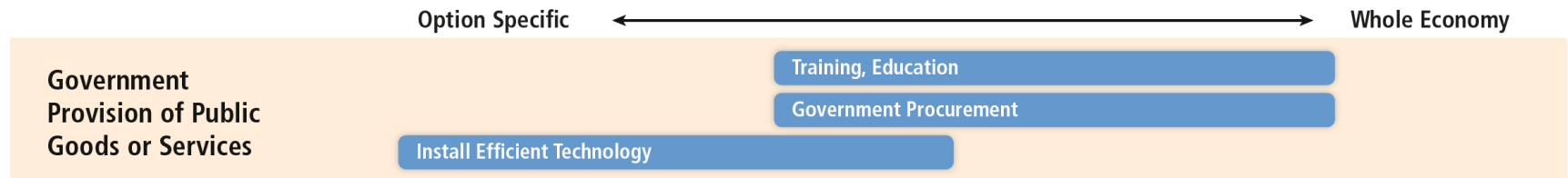
Substantial reductions in emissions would require large changes in investment patterns.



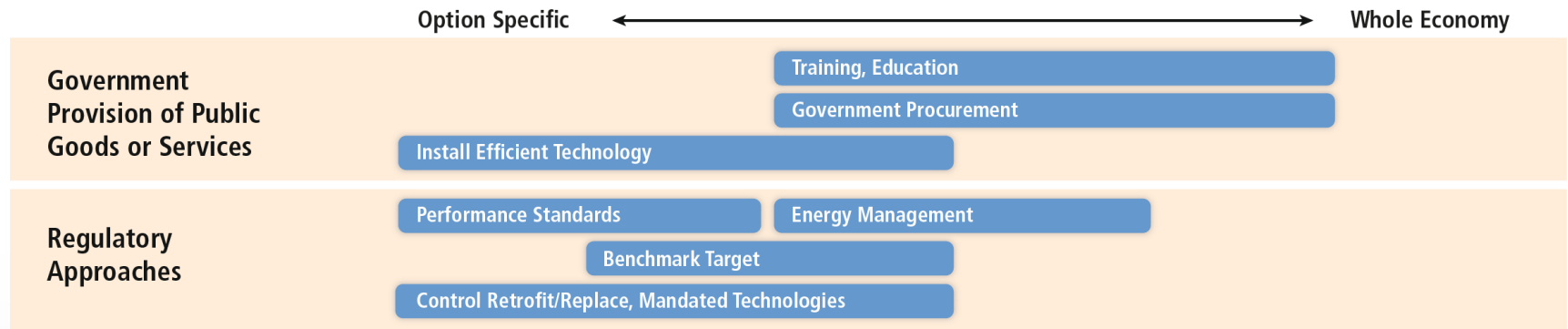
A growing number of climate change policies at the national and international level



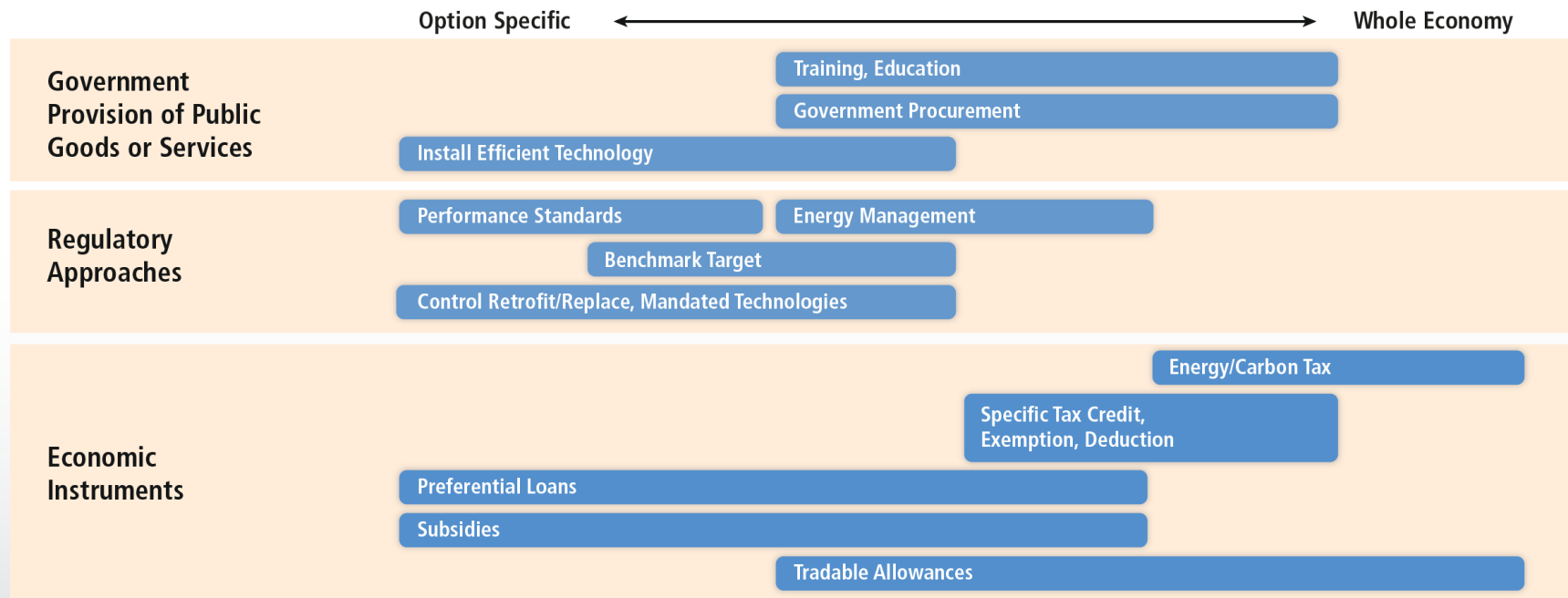
Since AR4, there has been an increased focus on policies designed to integrate multiple objectives, increase co-benefits and reduce adverse side-effects



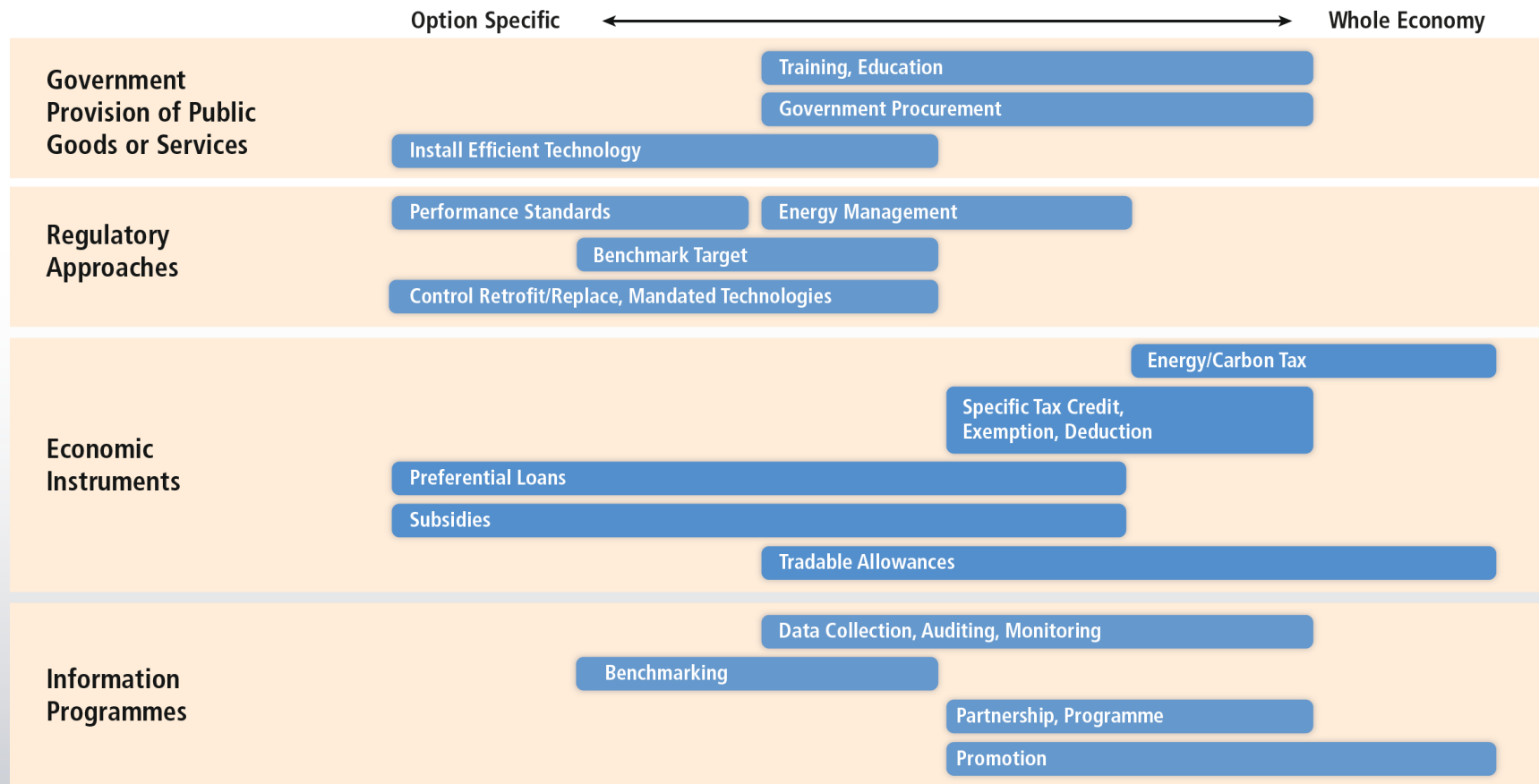
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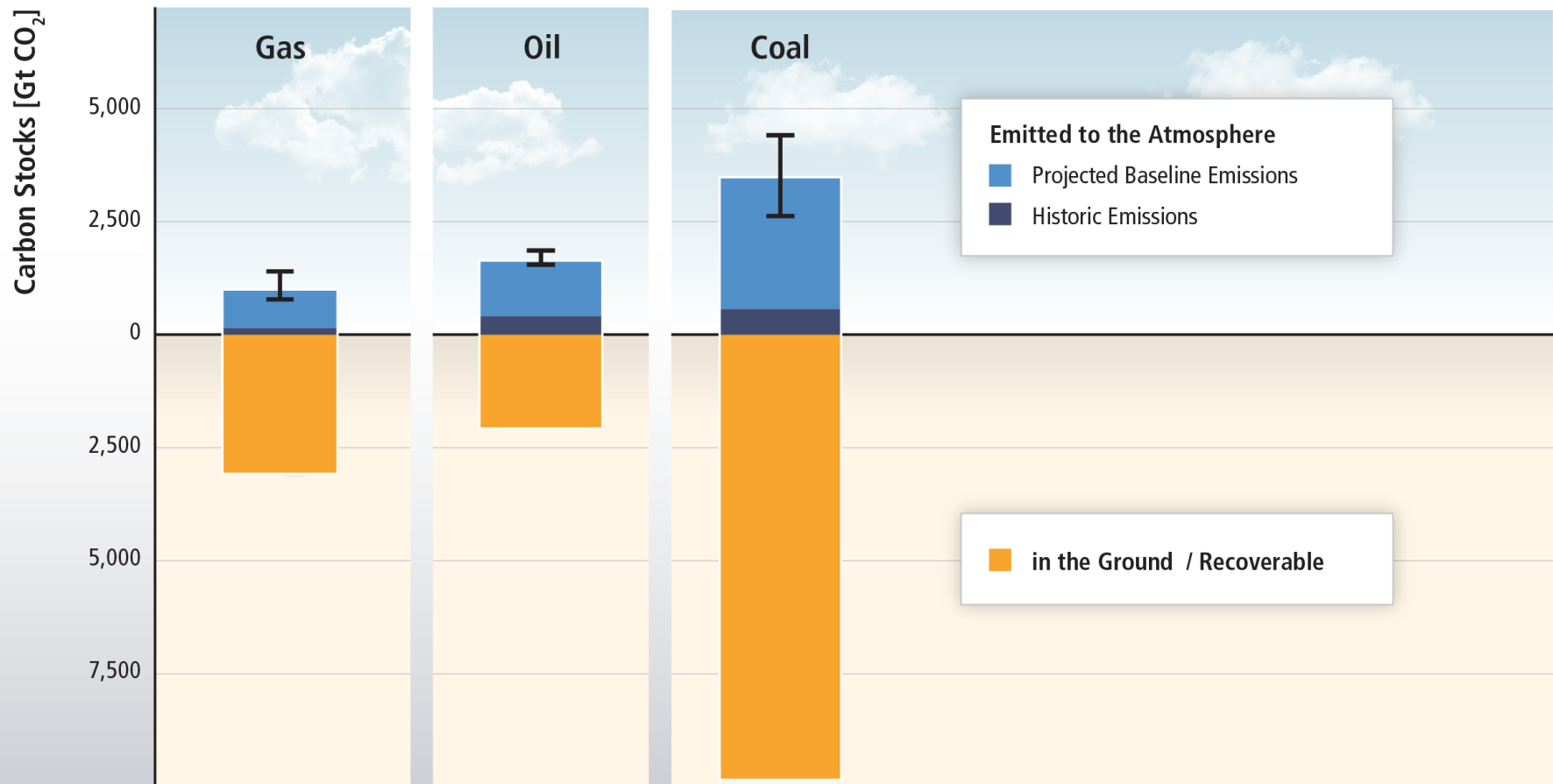
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There is far more carbon in the ground than emitted in any baseline scenario.



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www.mitigation2014.org