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INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2014

Mitigation of Climate Change

Key Insights from IPCC's AR5 and beyond

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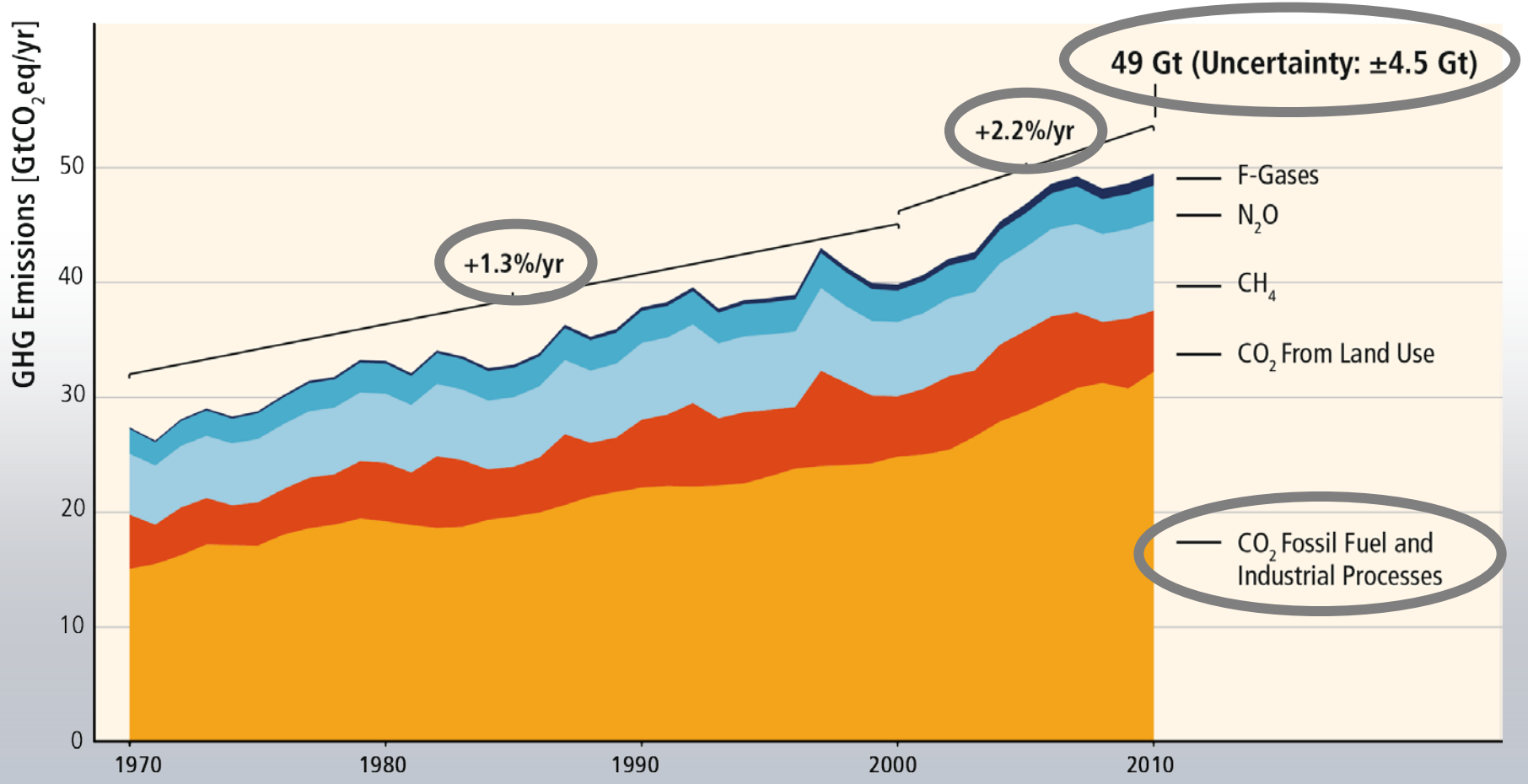
Our Common Future under Climate Change - CFCC
Plenary Session 3: Responding to Climate Change Challenges
Paris, 9 July 2015

Working Group III contribution to the
IPCC Fifth Assessment Report

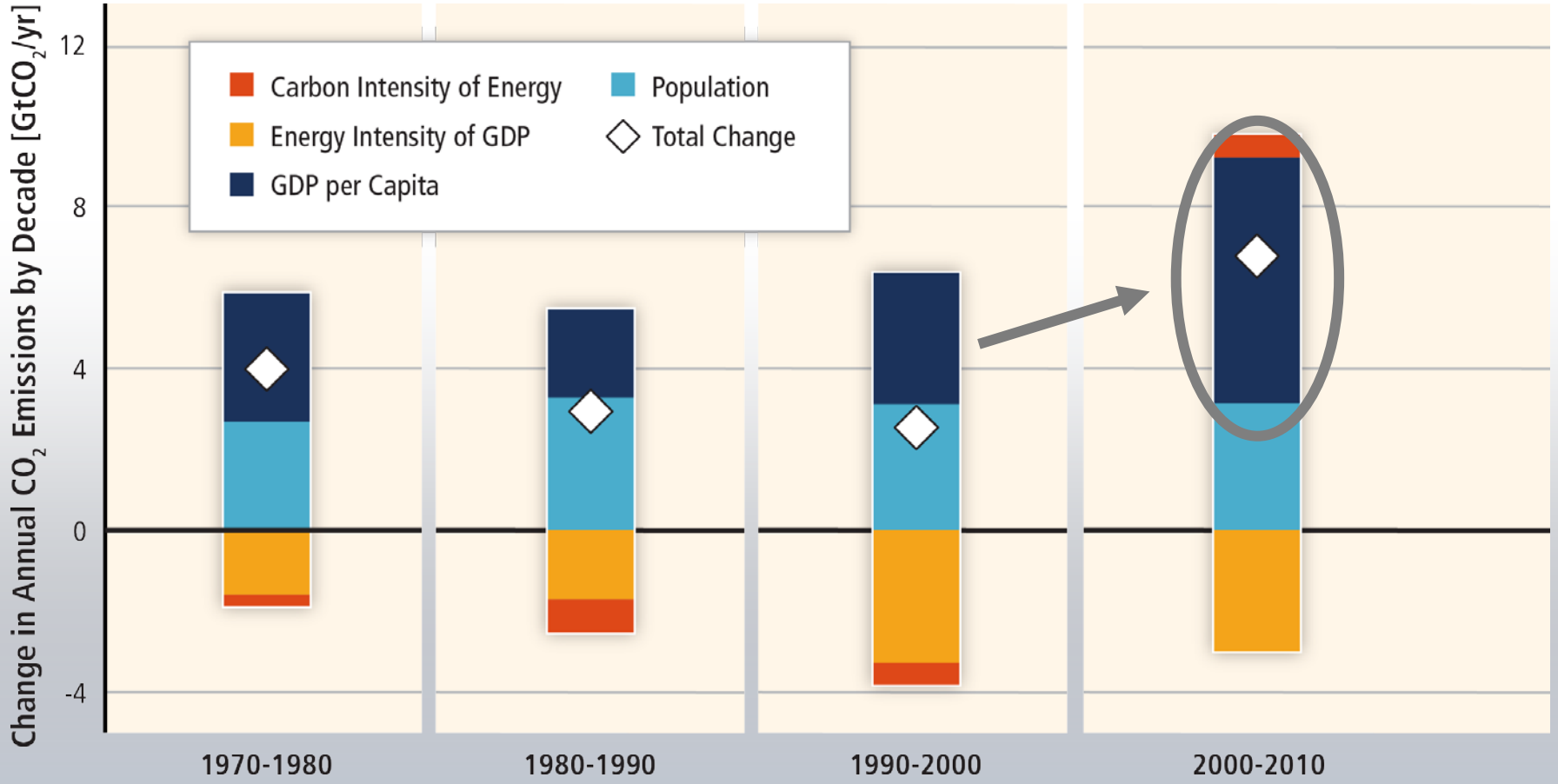
MCC PIK Technische Universität Berlin WMO UNEP

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



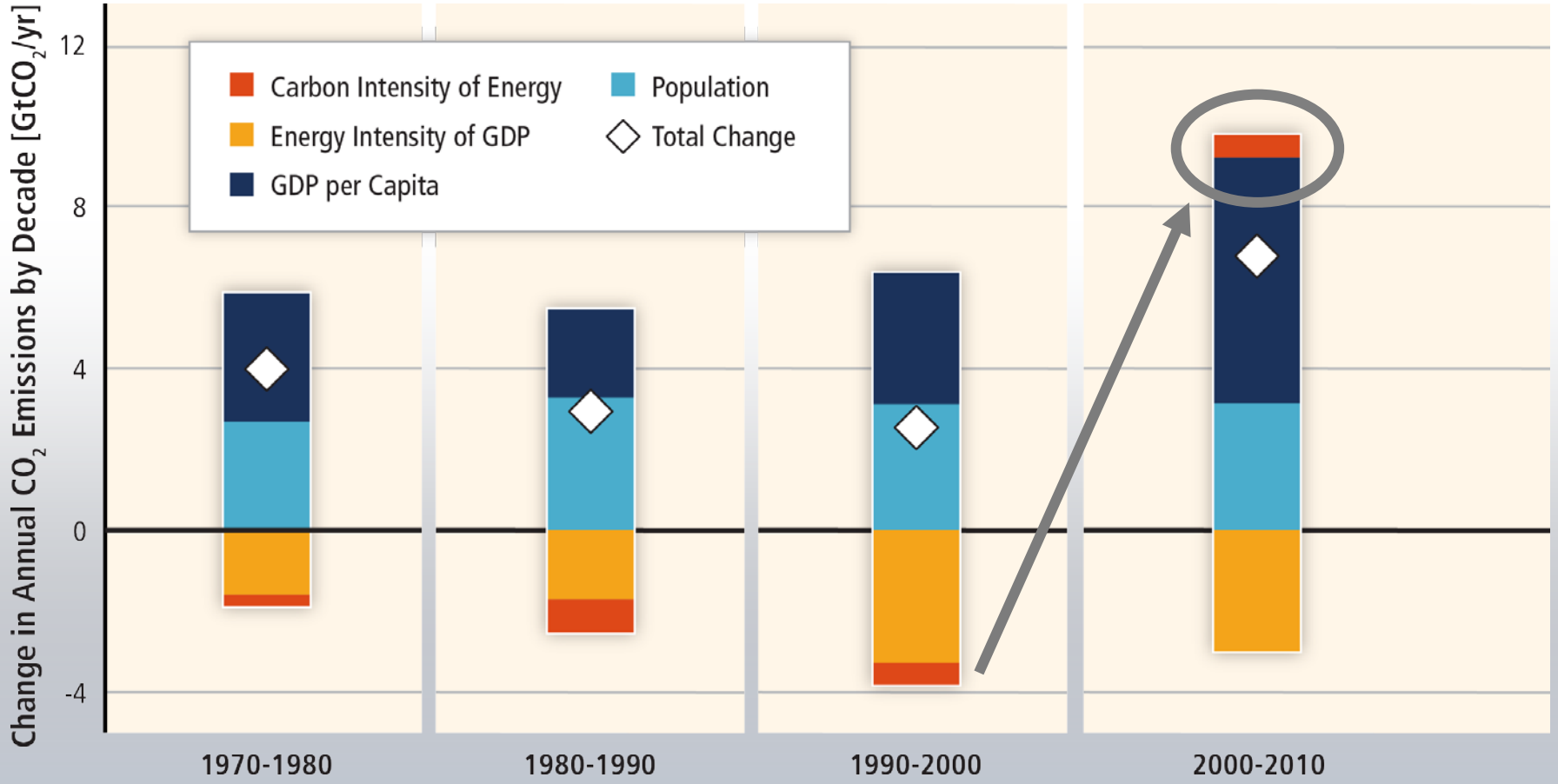
Based on Figure 1.3

GHG emissions rise with growth in GDP and population.



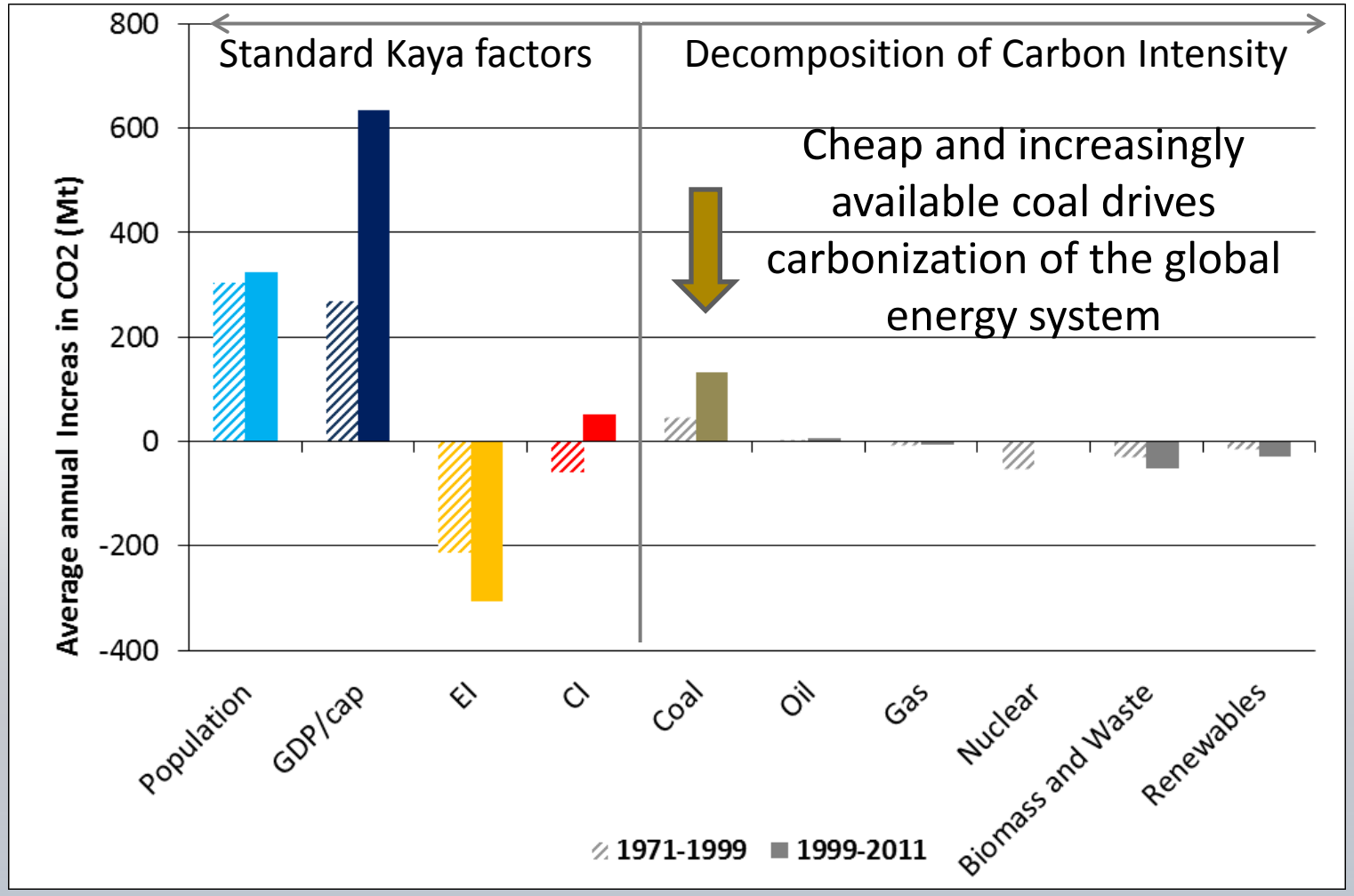
Based on Figure 1.7

The long-standing trend of decarbonization has reversed.



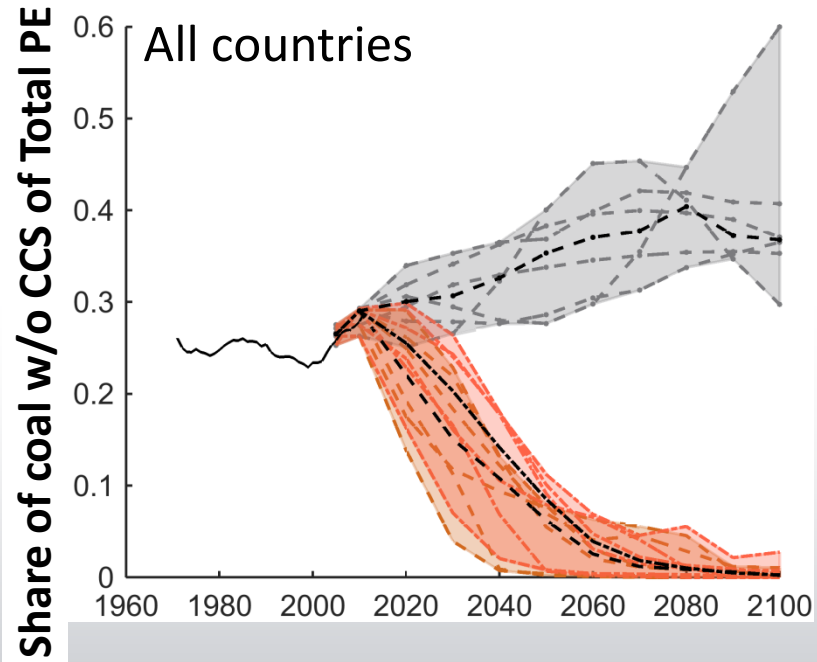
Based on Figure 1.7

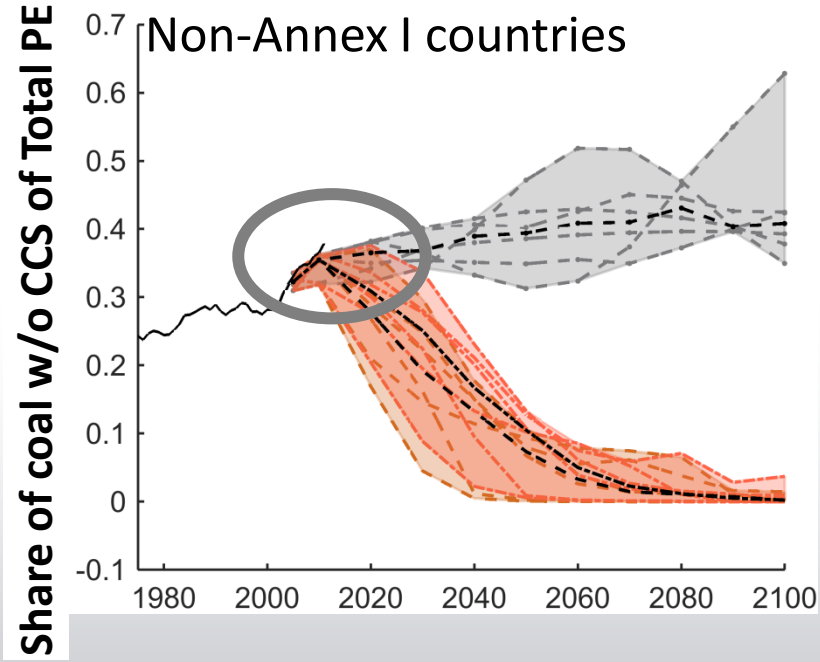
A renaissance of coal drives the global carbonization.



Steckel, Edenhofer and Jakob, in press

Renaissance of coal is majorly driven by poor, fast growing countries





Steckel, Edenhofer and Jakob, in press

- Non Annex I countries have increased their coal share in the energy mix **faster than foreseen in available baseline scenarios**
- Carbonization by coal is **not limited to China**, but applies structurally to poor, fast growing countries

Will the next wave of carbonization be triggered by Africa?

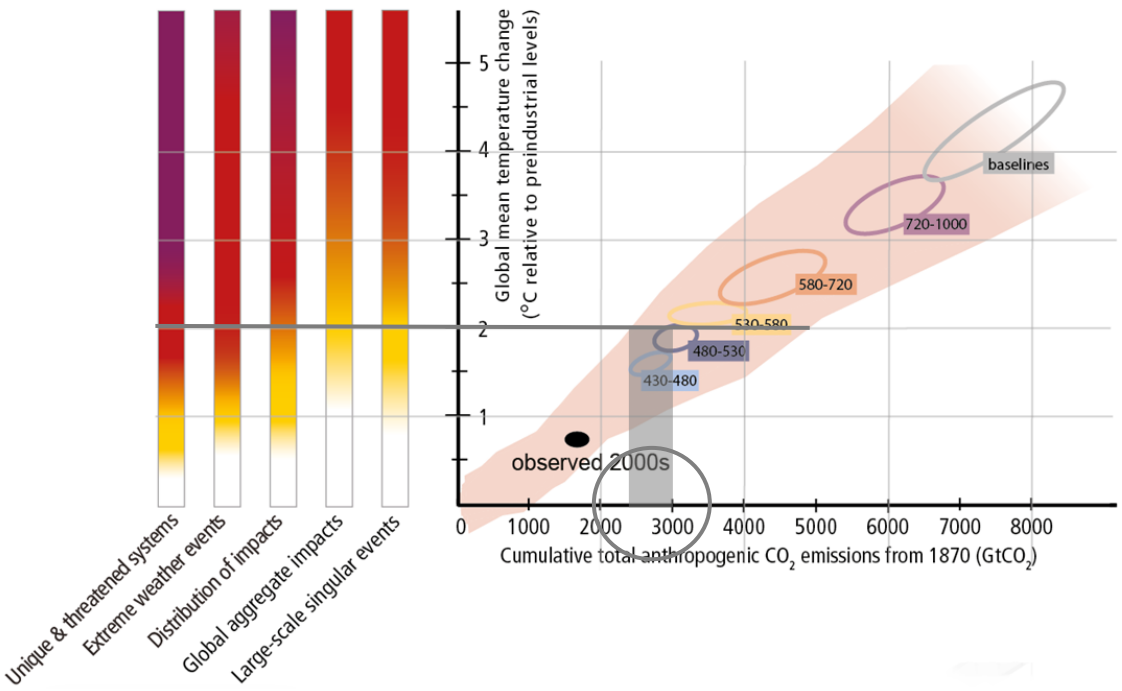
Country	Average Emission Growth 2000 – 2011	Global rank	Due to changes in carbon intensity only	New mining activites planned	New coal power plants under construction/ planned
Congo, Rep.	17.5%	1	9.2%	N/A	Yes
Benin	11.2%	3	6.8%	N/A	N/A
Angola	10.9%	4	5.2%	N/A	Yes
Tanzania	9.5%	7	5.2%	Yes	Yes
Sudan	9.0%	9	7.4%	N/A	Yes
Mozambique	8.4%	10	5.2%	Yes	Yes

Calculations by MCC based on IEA data

Six Sub-Saharan African countries are among the top 10 fastest growing emitters globally. Until now, their carbonization is majorly driven by natural gas and oil.

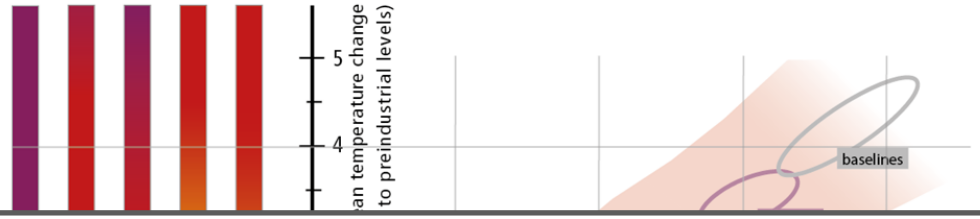
BUT: Coal is getting increasing attention, also in countries w/o own reserves!

Risks from climate change depend on cumulative CO_2 emissions...

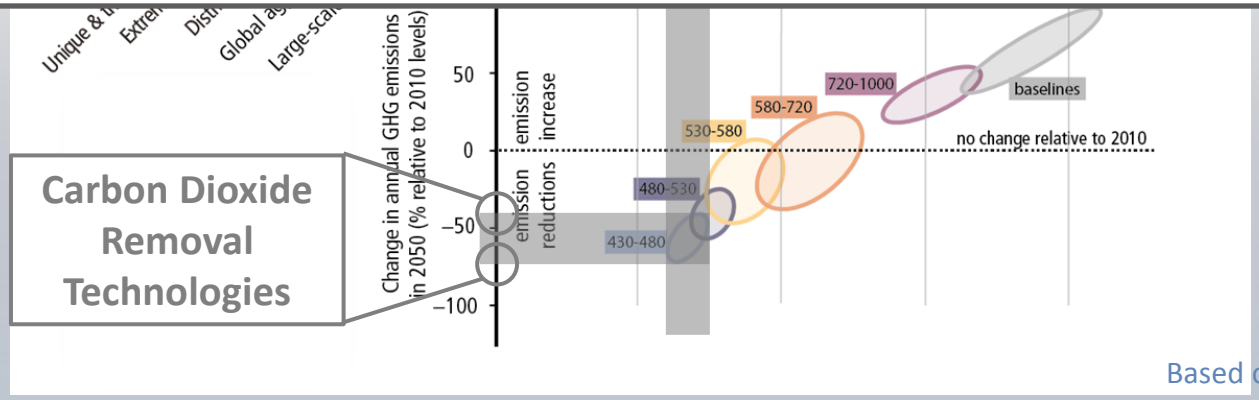


Based on SYR Figure SPM.10

...which in turn depend on annual GHG emissions over the next decades.

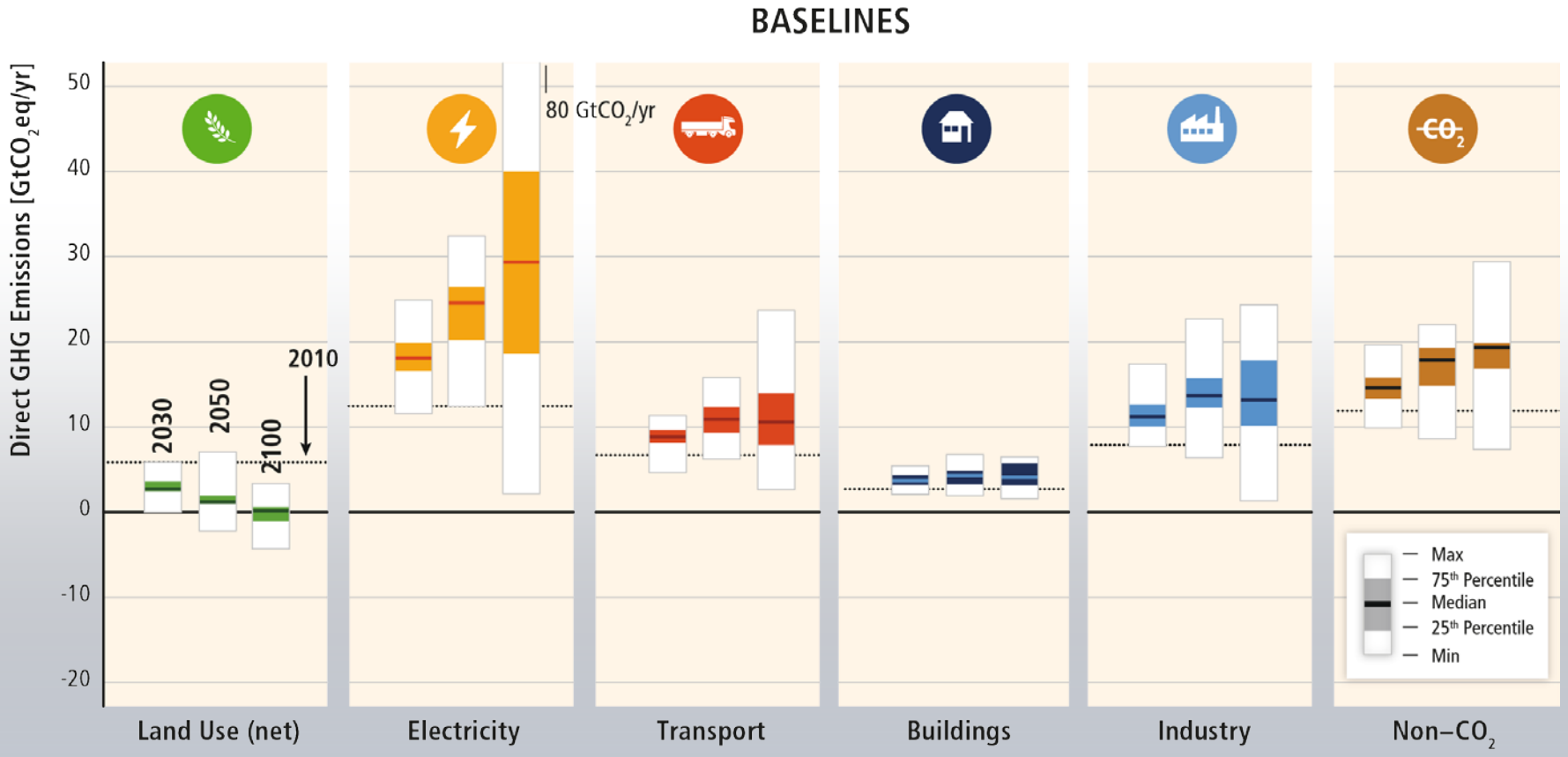


Mitigation involves some level of co-benefits and of risks due to adverse side-effects, but these risks do not involve the same possibility of severe, widespread and irreversible impacts as risks from climate change.



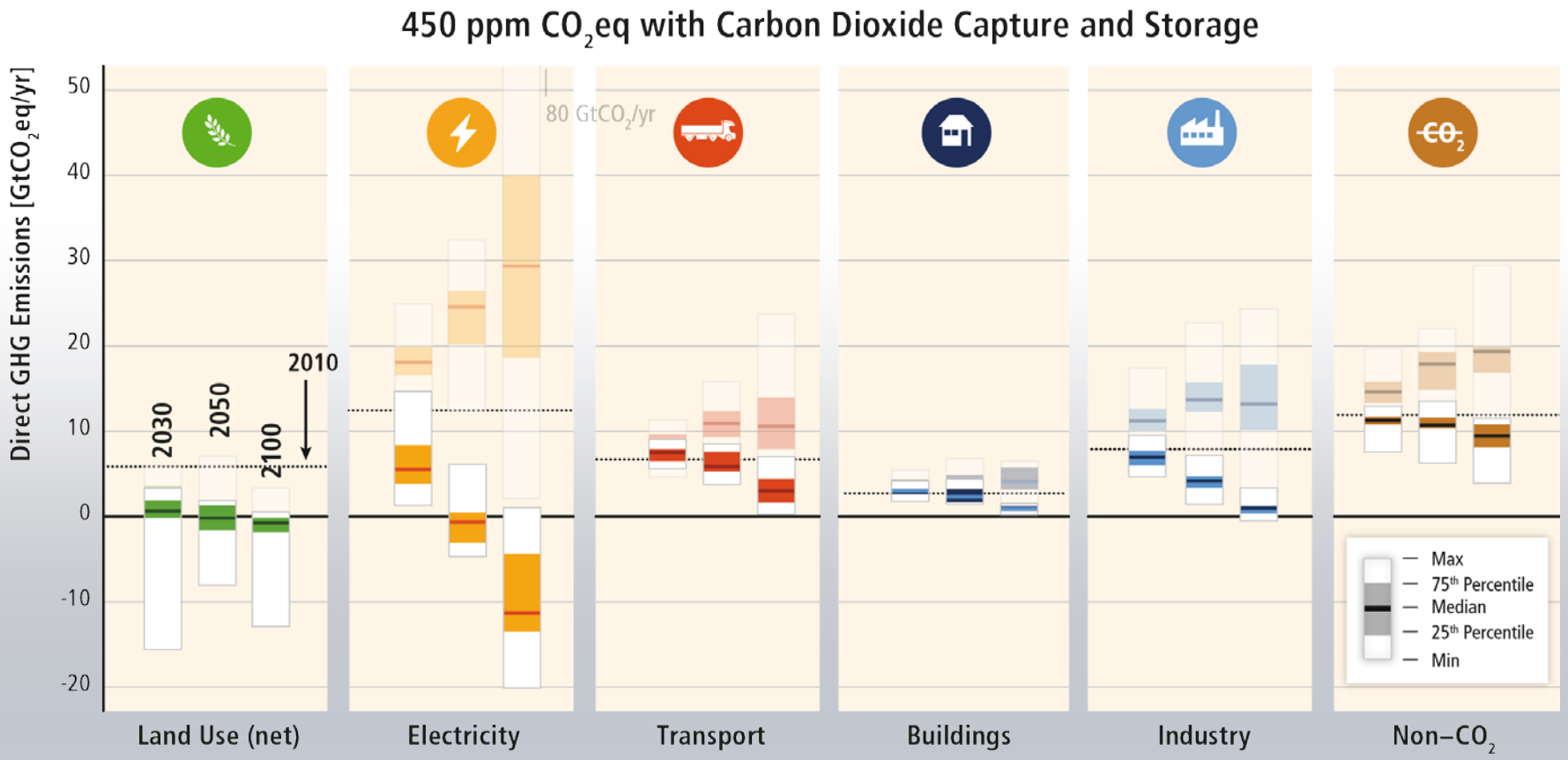
Based on SYR Figure SPM.10

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



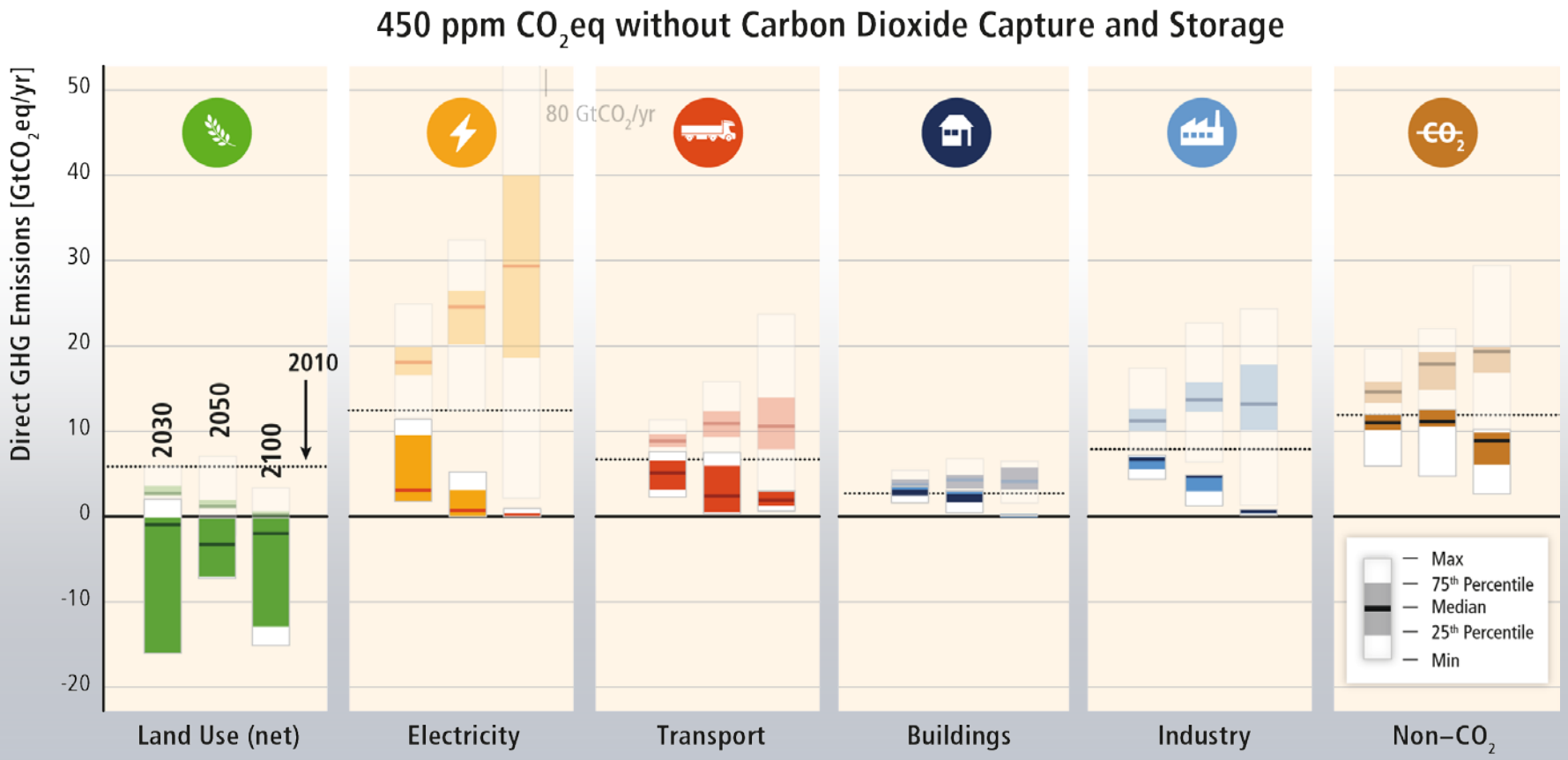
Based on Figure TS.15

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



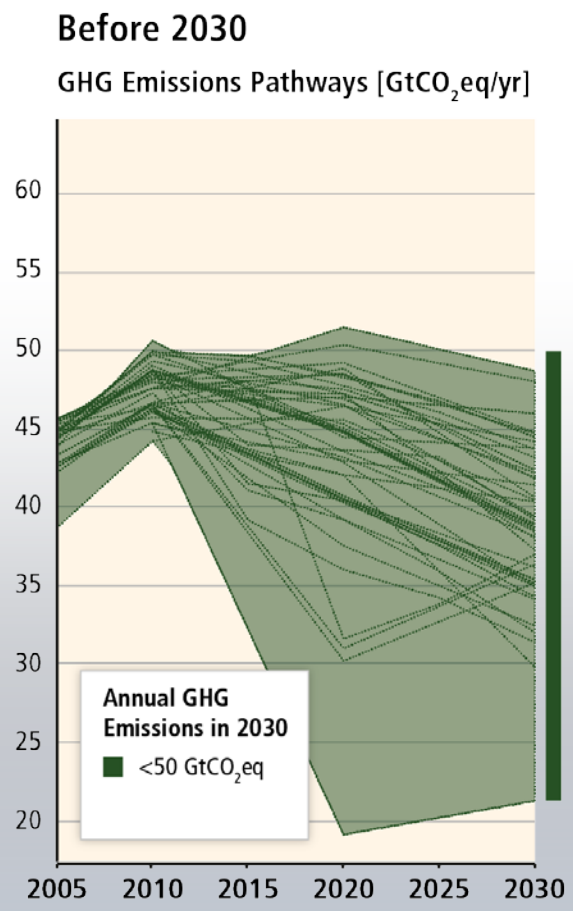
Based on Figure TS.17

Mitigation efforts in one sector determine efforts in others.



Based on Figure TS.17

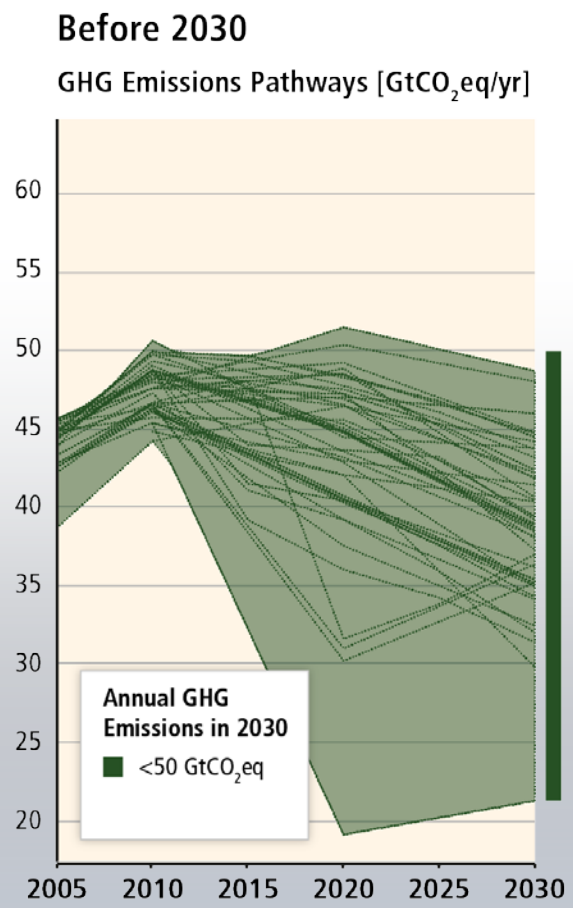
Many scenarios make it at least *about as likely as not* that warming will remain below 2°C relative to pre-industrial levels.

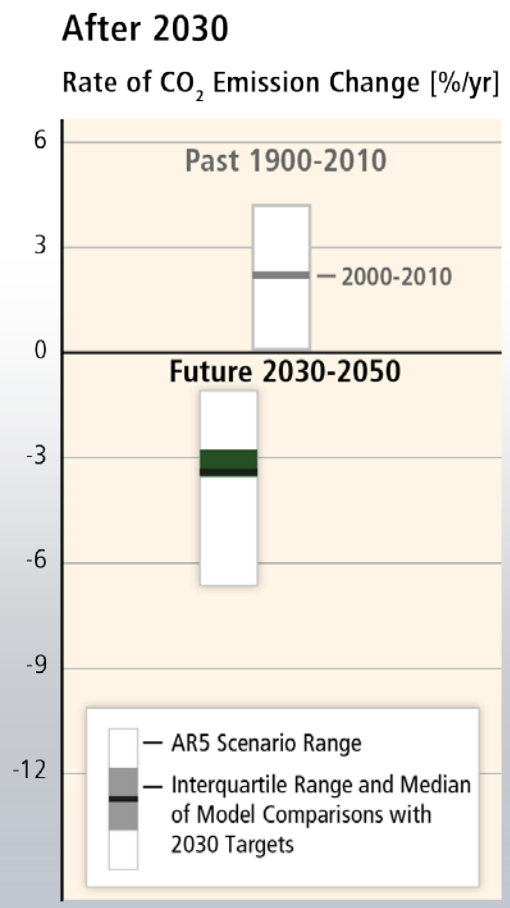


"Immediate Action"

Based on Figures 6.32 and 7.16

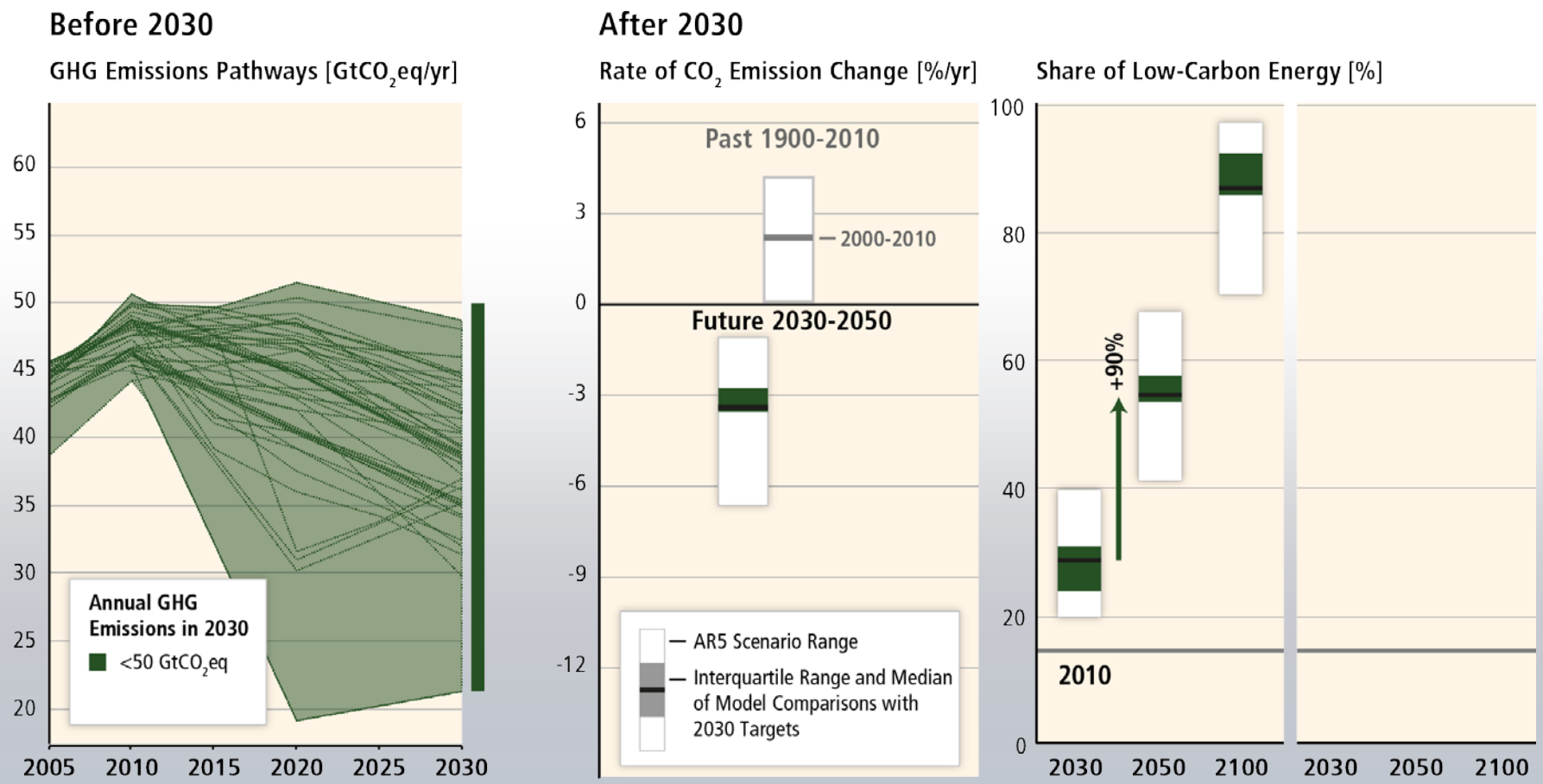
Still, between 2030 and 2050, emissions would have to be reduced at an unprecedented rate...





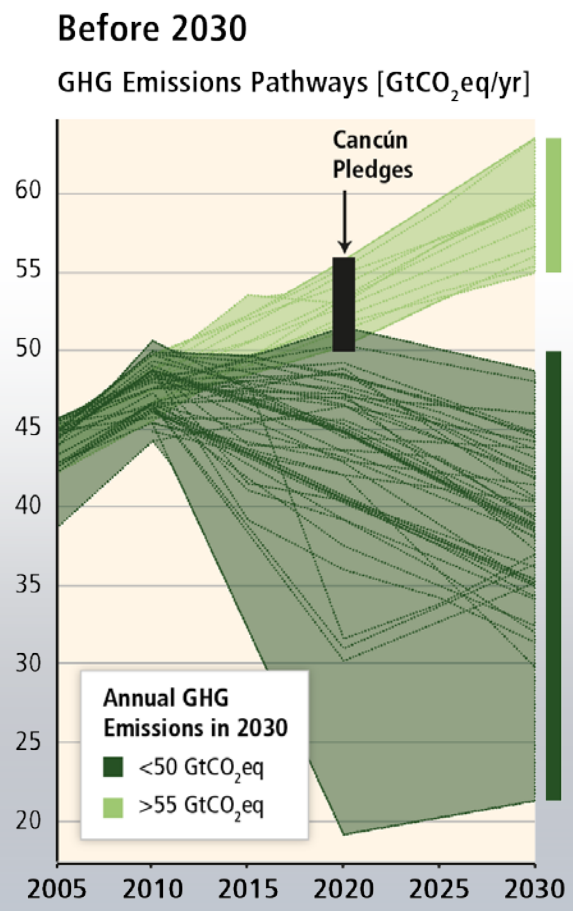
Based on Figures 6.32 and 7.16

...implying a rapid scale-up of low-carbon energy.



Based on Figures 6.32 and 7.16

Delaying emissions reductions increases the difficulty and narrows the options for mitigation.



"Delayed Mitigation"

"Immediate Action"

Based on Figures 6.32 and 7.16

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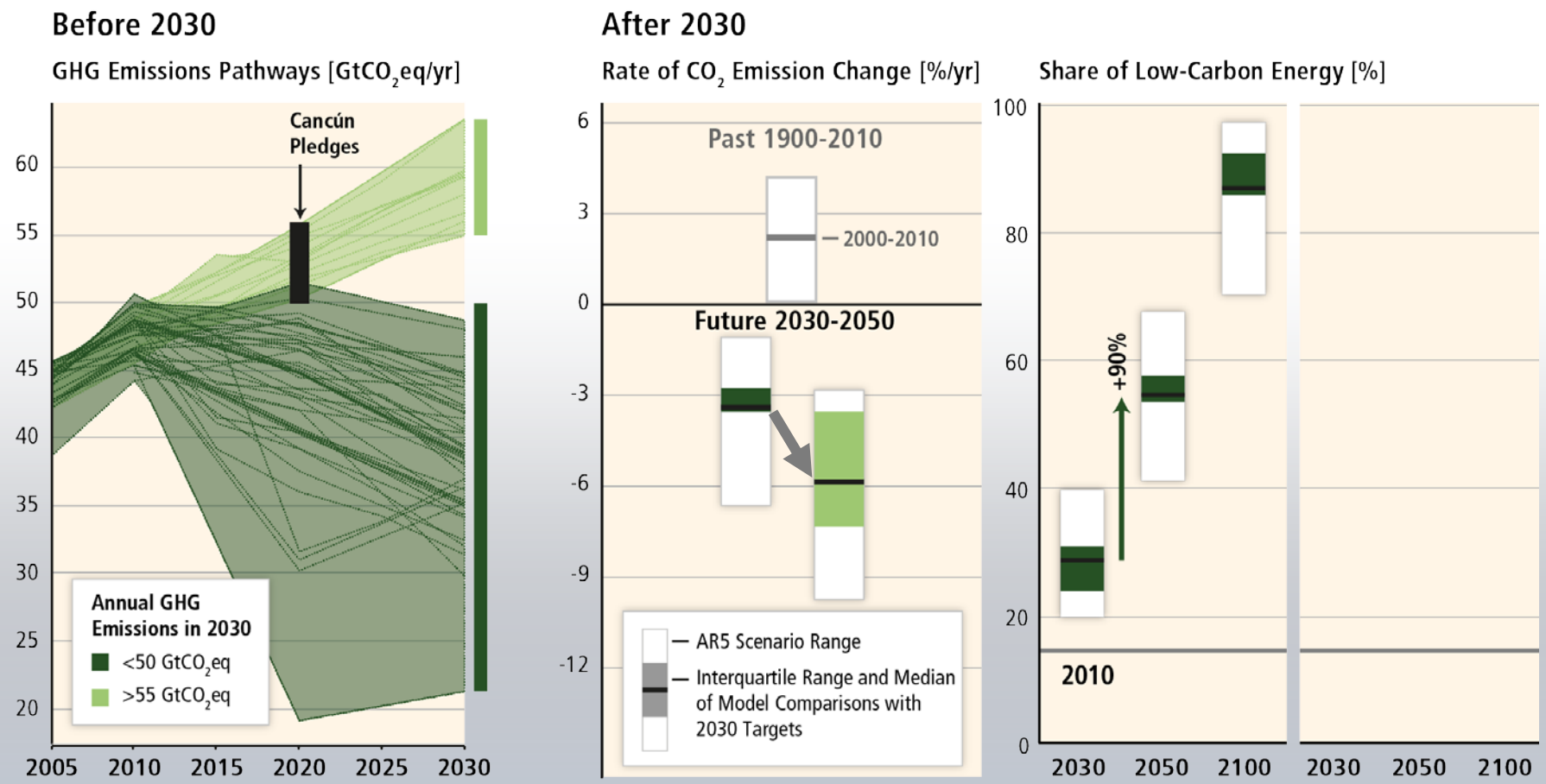

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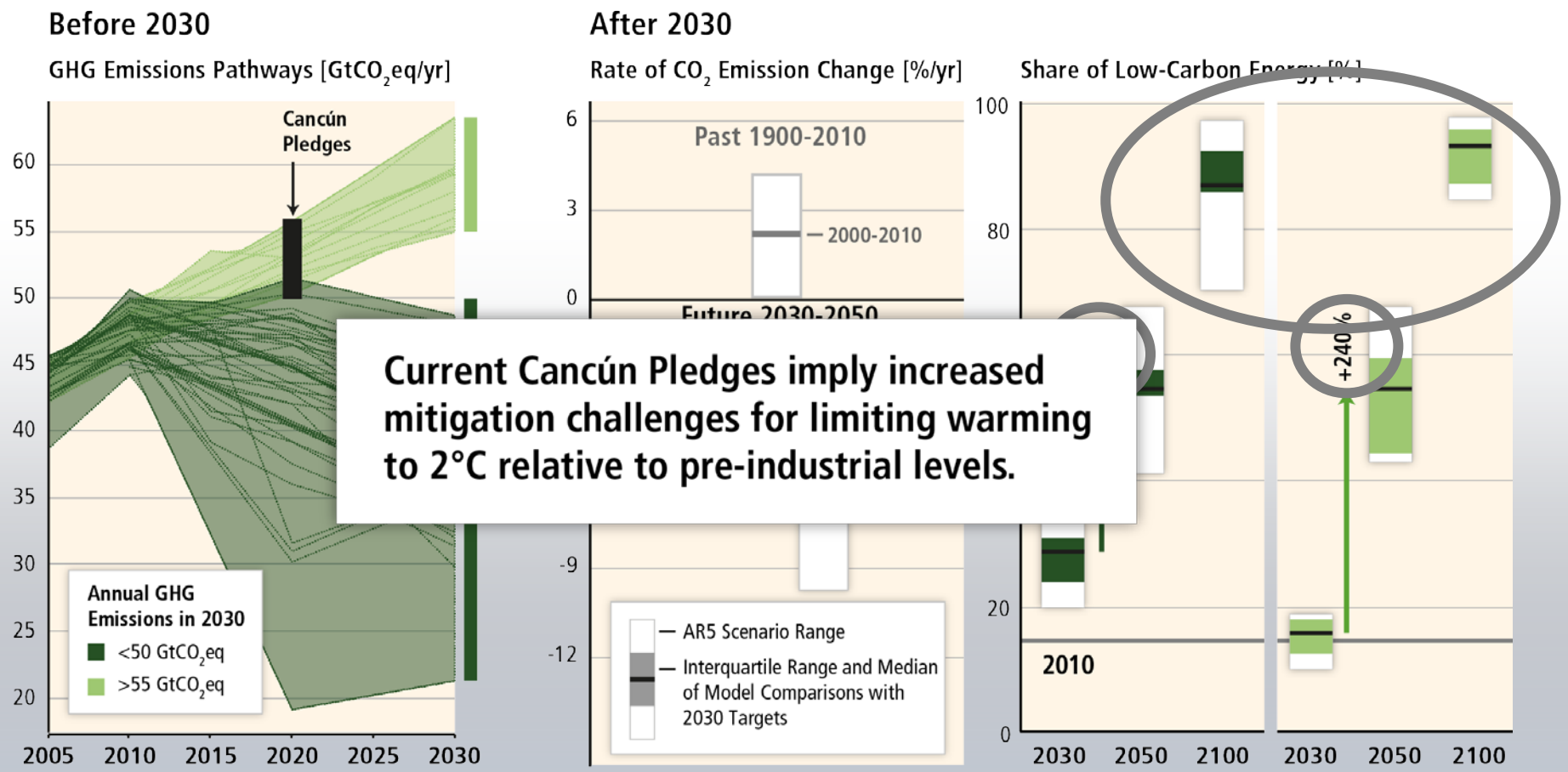
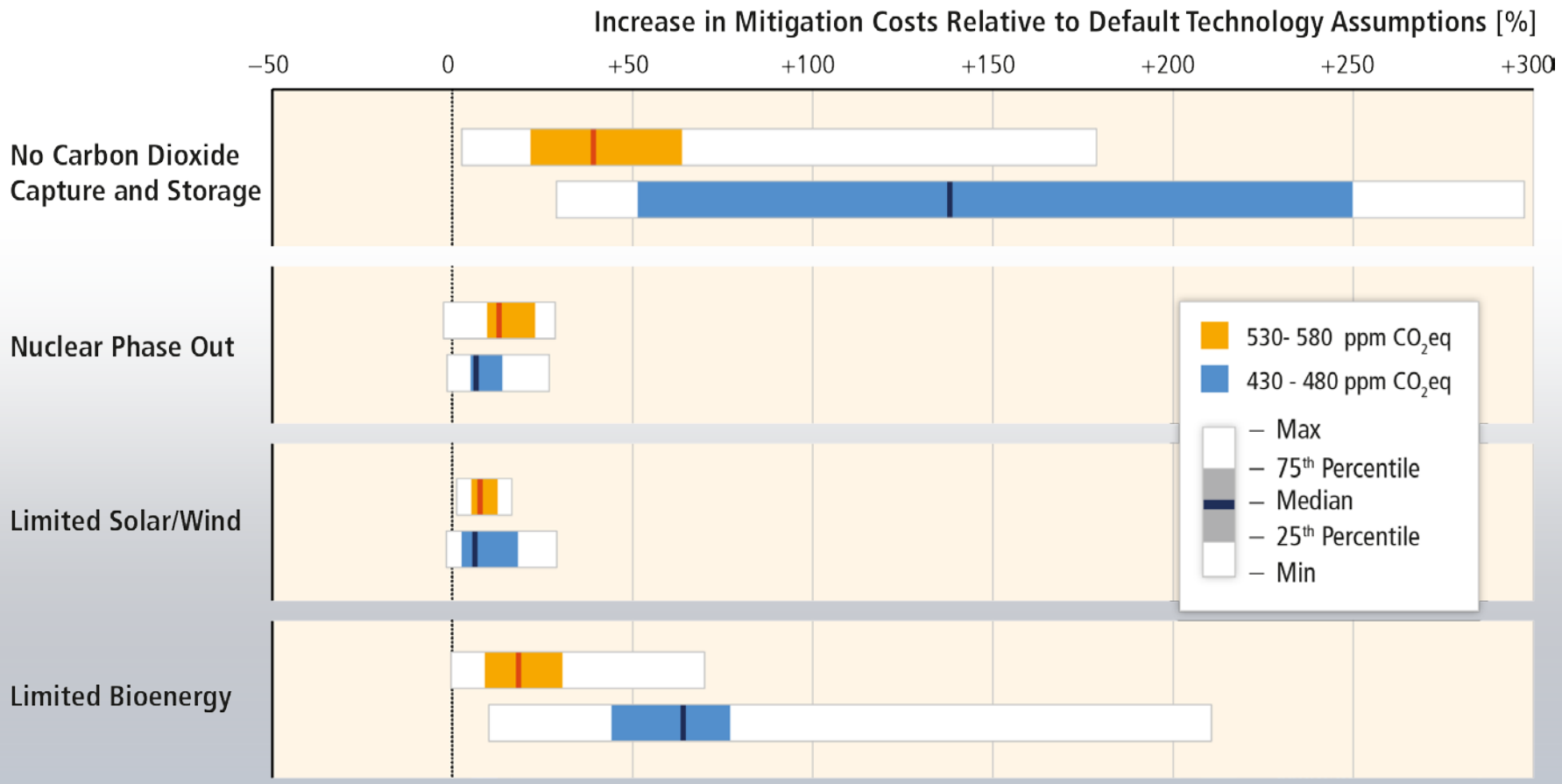


Current Cancún Pledges imply increased mitigation challenges for limiting warming to 2°C relative to pre-industrial levels.

Based on Figures 6.32 and 7.16

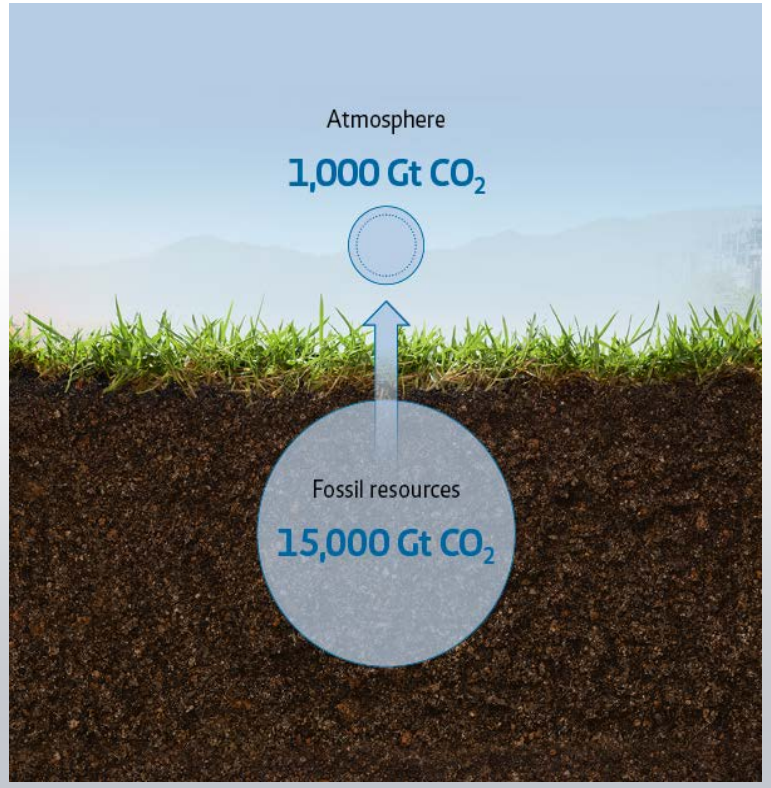
Technological limitations can increase mitigation costs.



Based on Figure 6.24

What are the consequences for international energy and climate policy?

The climate problem at a glance



Resources and reserves to remain underground until 2100 (median values compared to BAU, AR5 Database)

Until 2100	With CCS [%]	No CCS [%]
Coal	70	89
Oil	35	63
Gas	32	64

Source: Bauer et al. (2014); Jakob, Hilaire (2015)

Climate Policy and Poverty reduction - A contradiction?

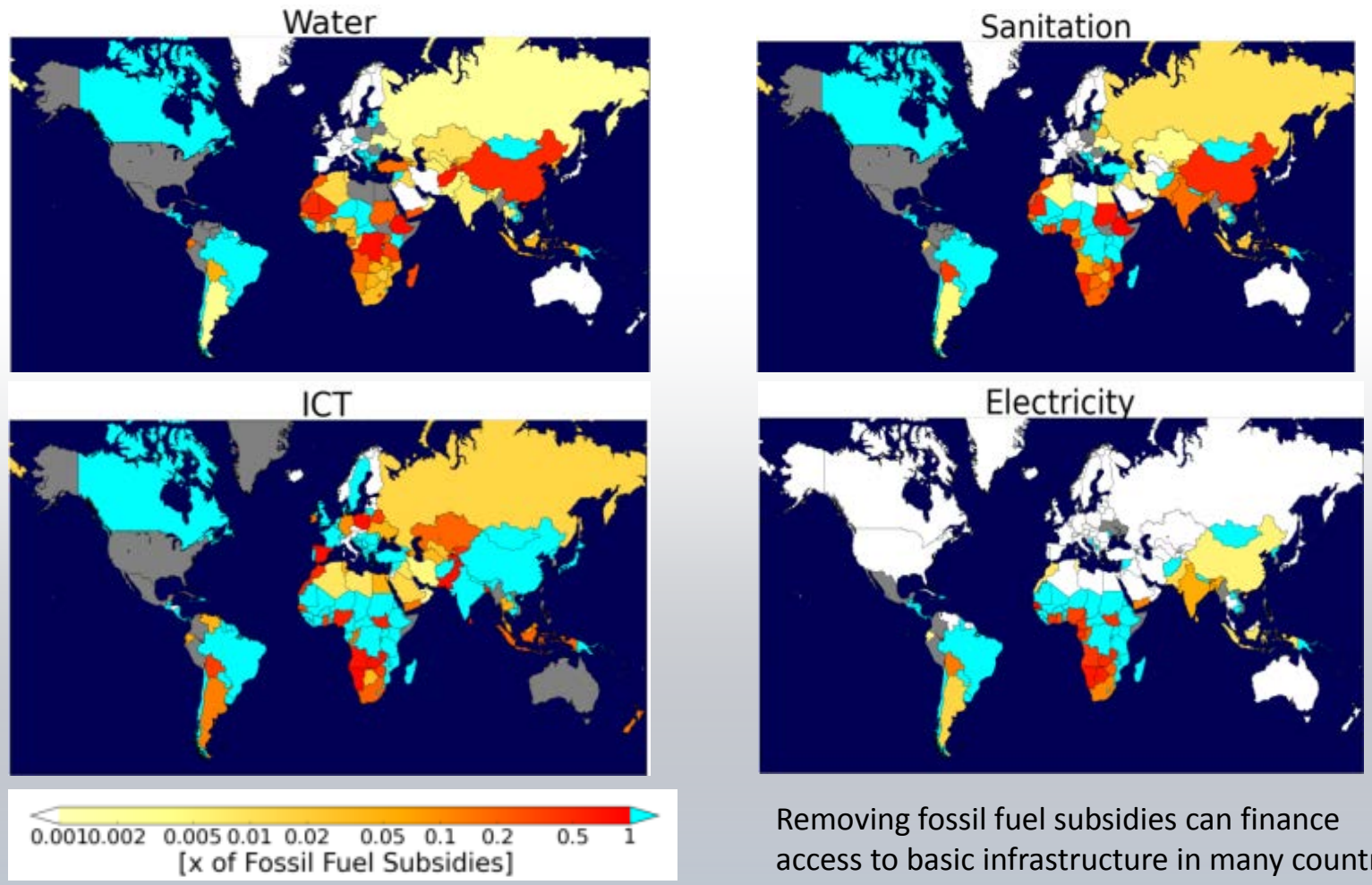
Water availability

Sanitation

Telecommunication

Access to electricity

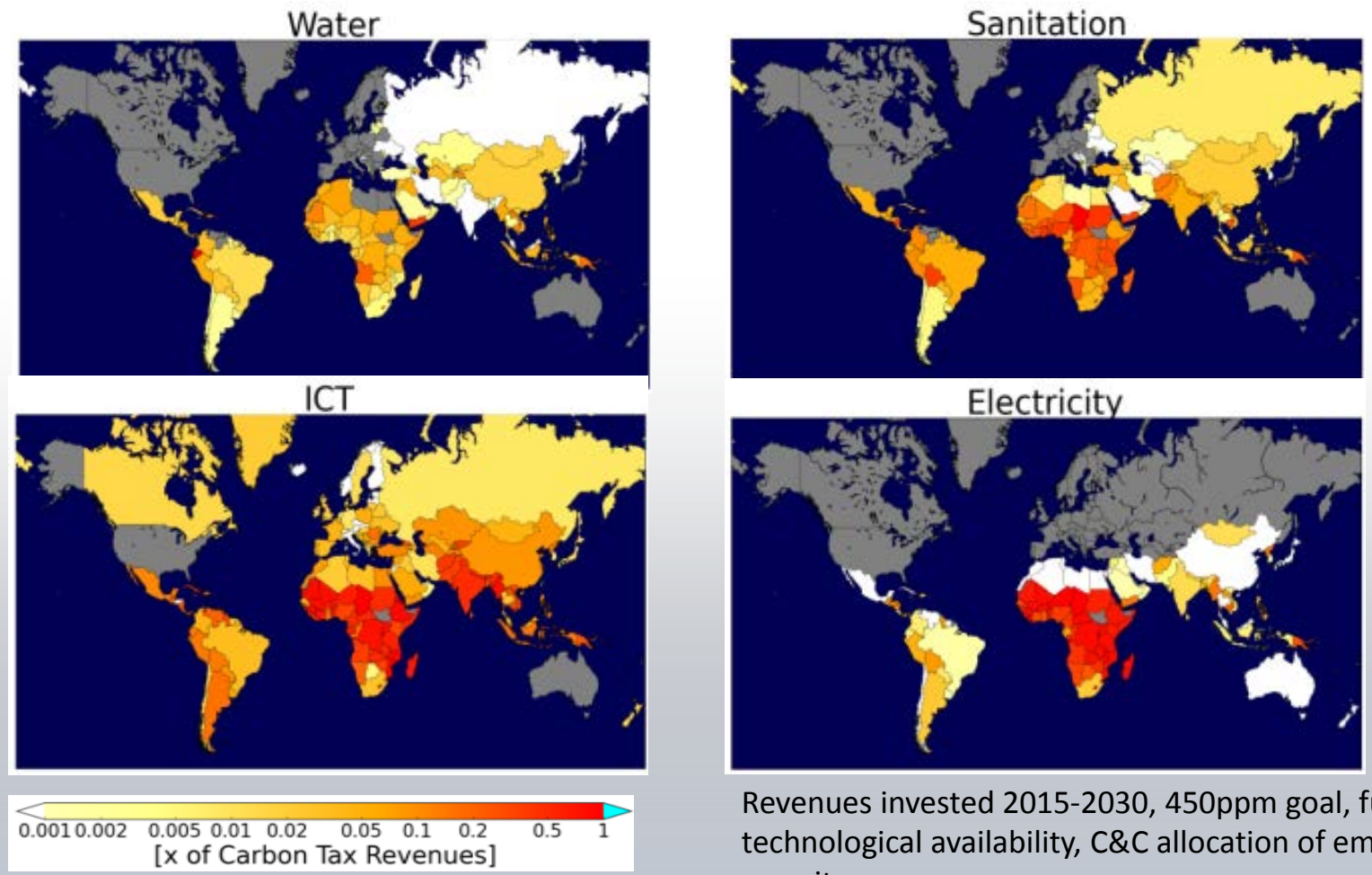
Removing fossil fuel subsides to close infrastructure gaps



Source: Jakob et al., in press

Removing fossil fuel subsidies can finance access to basic infrastructure in many countries

Carbon pricing revenues to close infrastructure gaps



Revenues invested 2015-2030, 450ppm goal, full technological availability, C&C allocation of emission permits

Source: Jakob et al., in press

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