POTSDAM INSTITUTE FOR CLIMATE IMPACT RESEARCH

Facing the Challenges of International Climate Policy: The Role of Science

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UAS Spring Campus, Freie Universität Berlin
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Leibniz Gemeinschaft

MCC
Mercator Research Institute on Global Commons and Climate Change

Technische Universität Berlin

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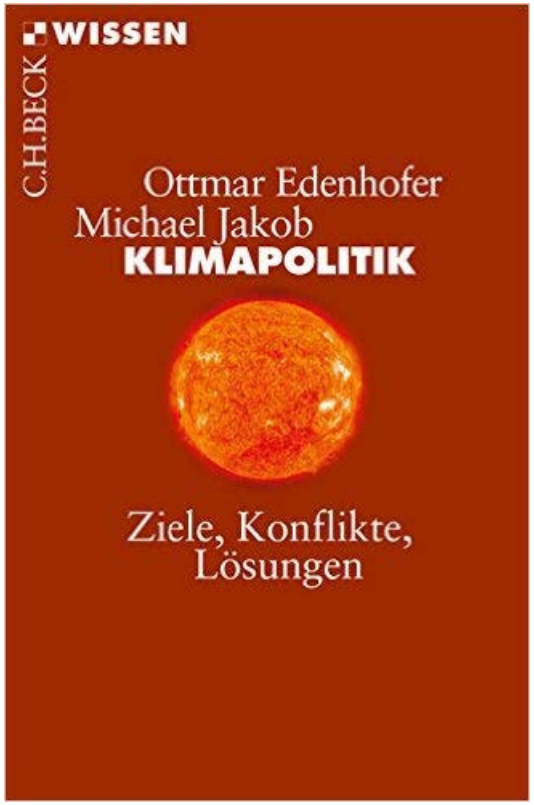
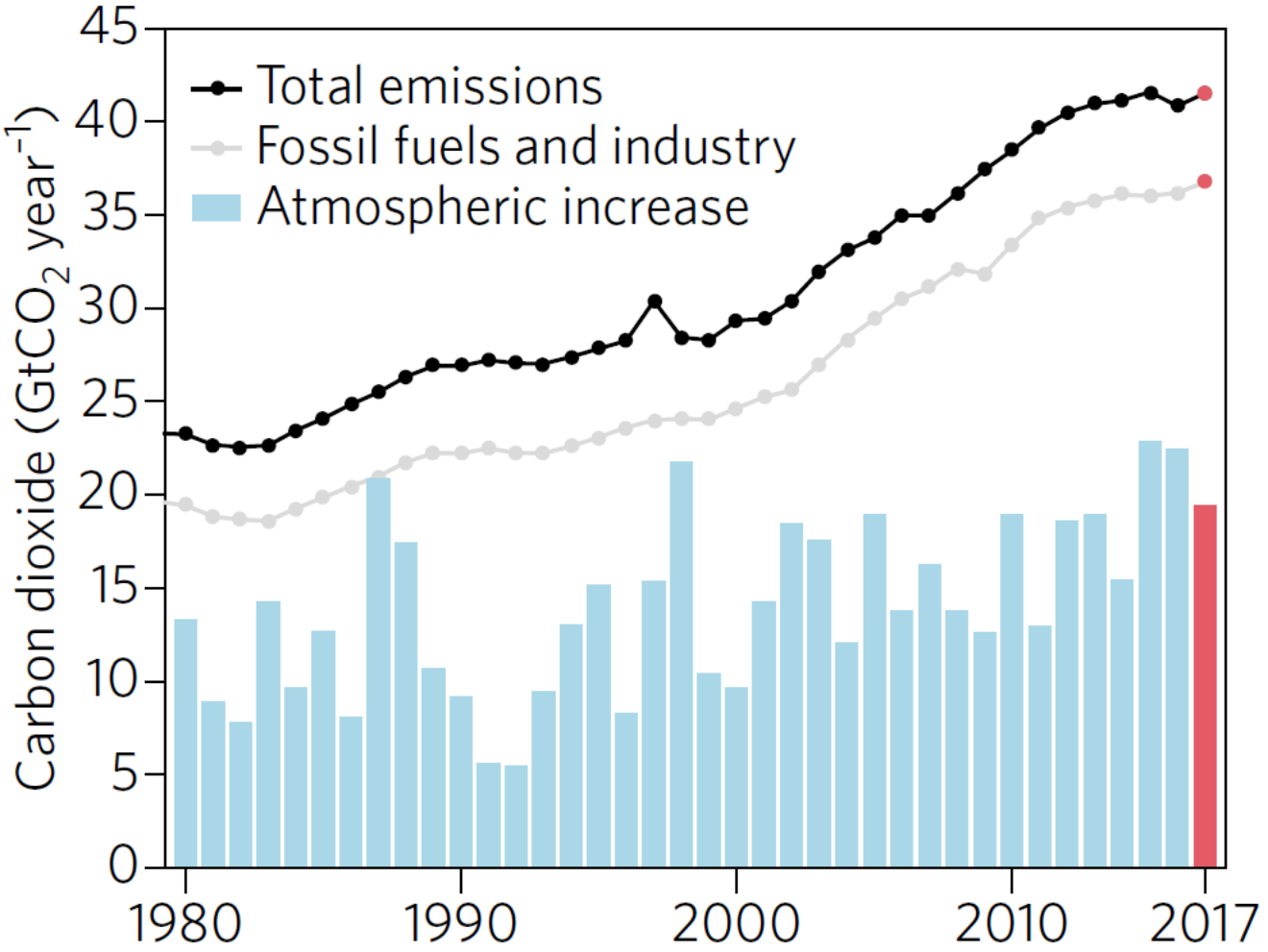


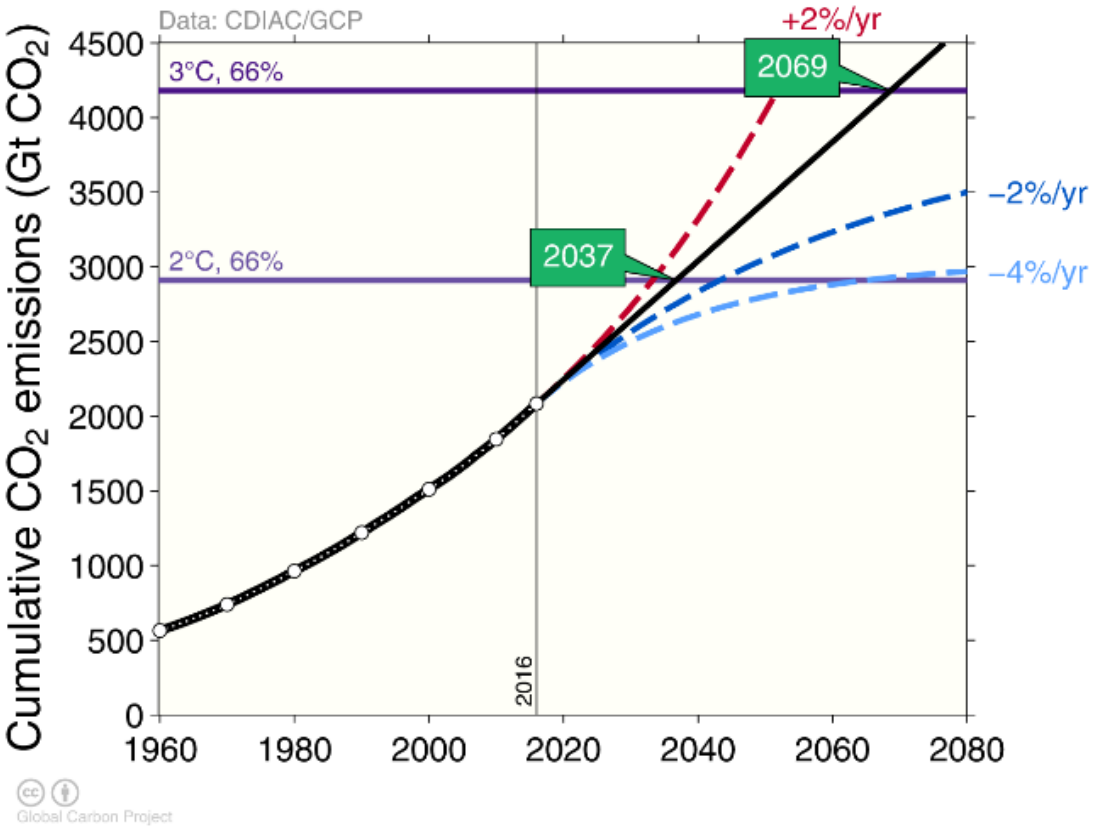
www.mcc-berlin.net/klimabuch

Emissions are rising.

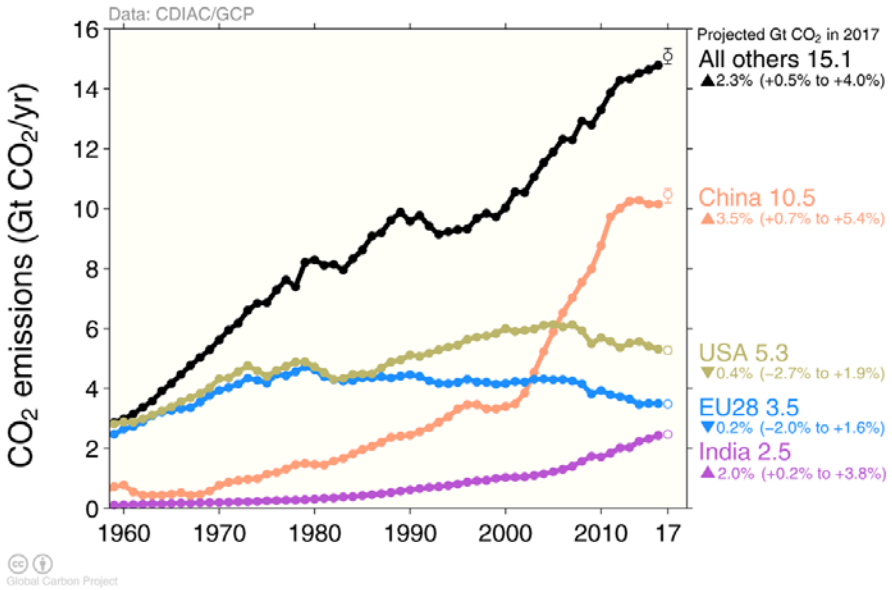


Quelle: Peters et al. (2017)

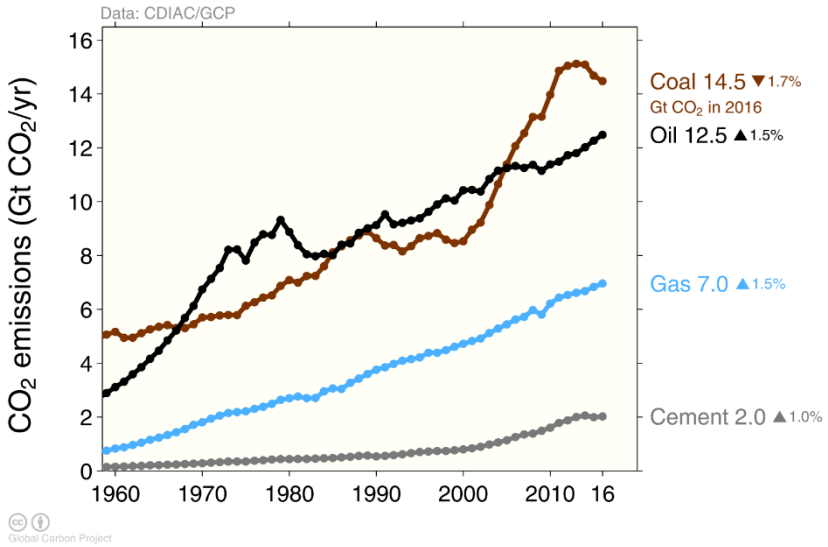
We are not on track.



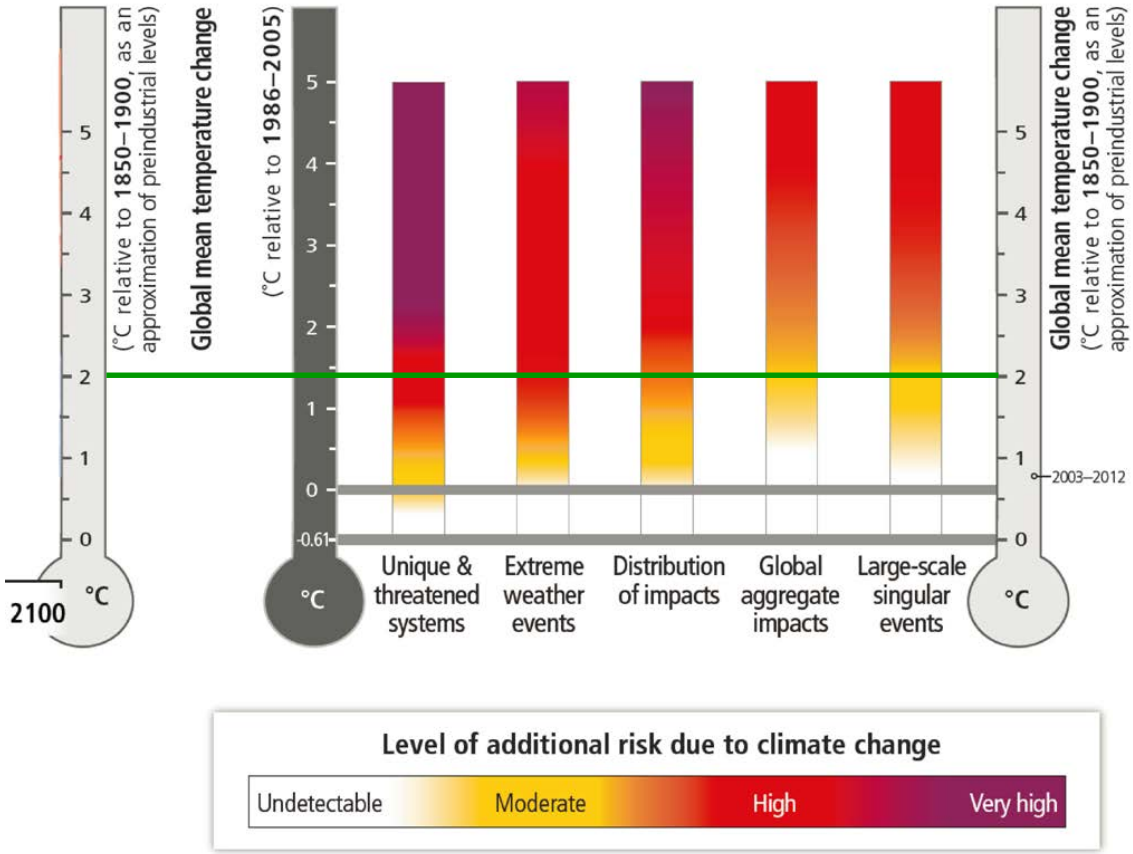
Does climate policy already show effects?



Quelle: Global Carbon Project 2017



Climate Projections and Associated Risks



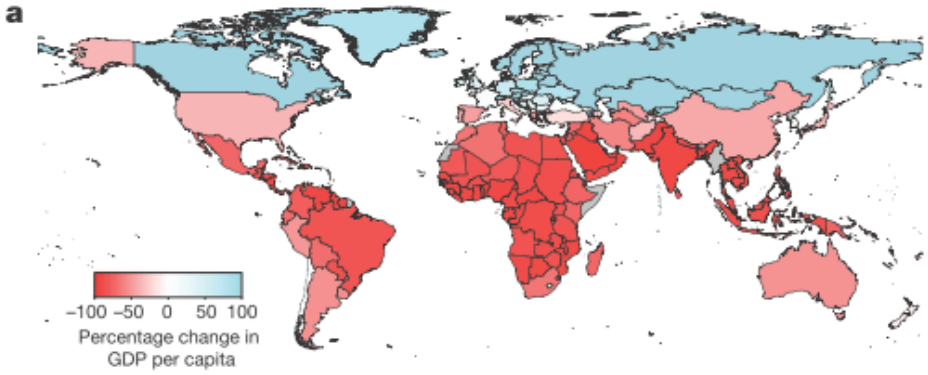
Source: Slide by H. J. Schellnhuber

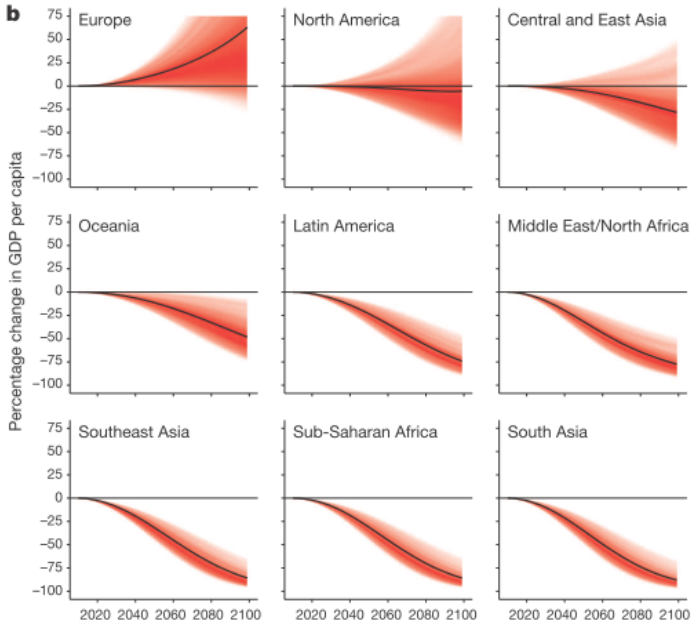
LETTER

nature

Global non-linear effect of temperature on economic production

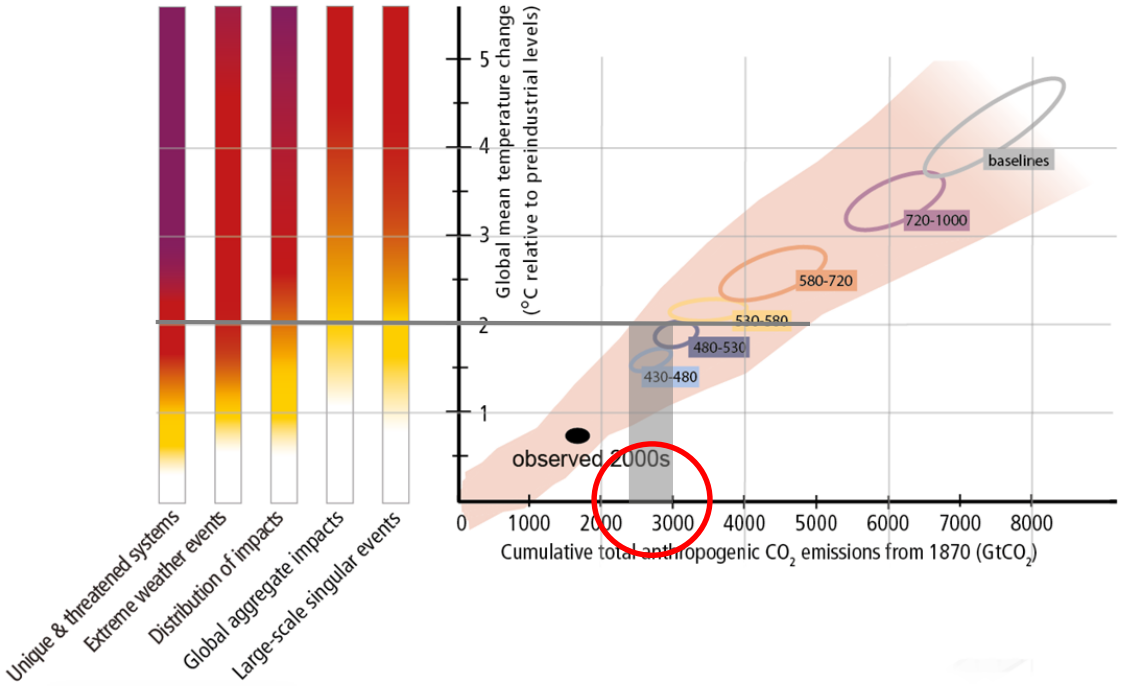
Marshall Burke[1,2]*, Solomon M. Hsiang[3,4]* & Edward Miguel[4,5]





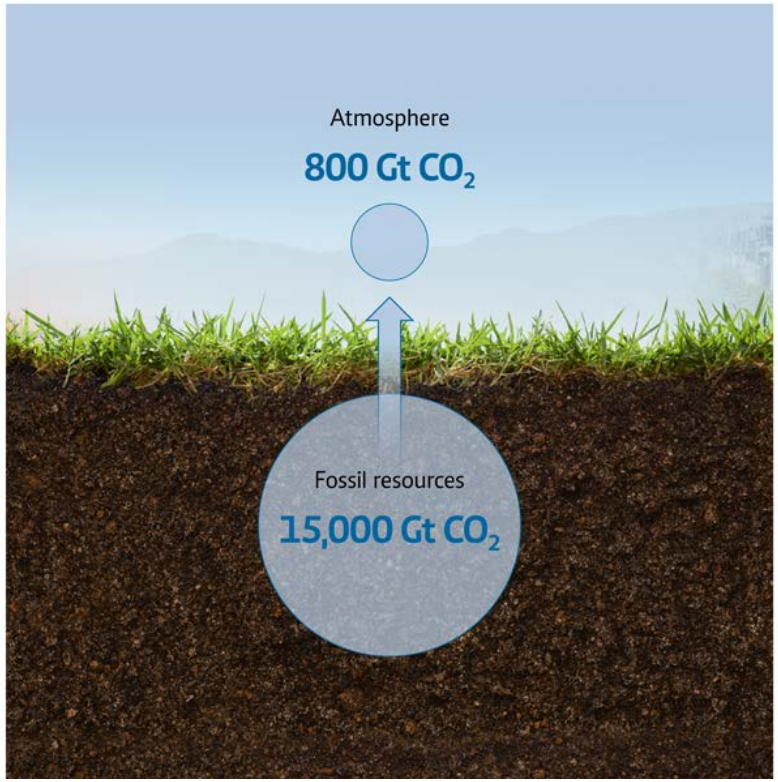
Source: Nature, doi: 10.1038/nature15725

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



Based on SYR Figure SPM.10

The climate problem at a glance

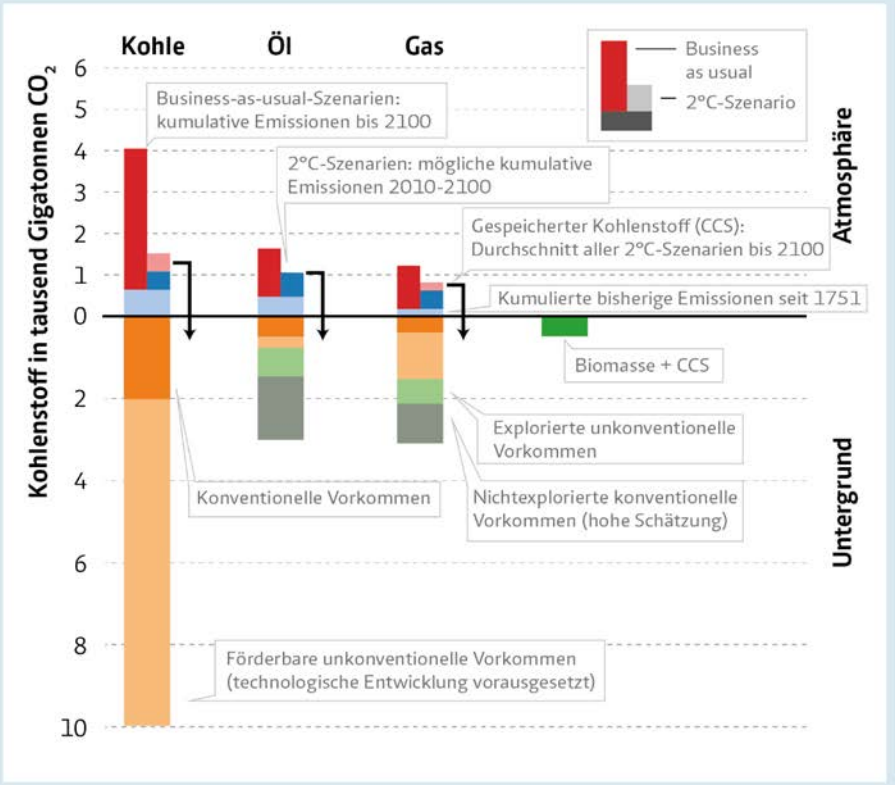


Resources and reserves to remain underground until 2100 (median values compared to BAU, AR5 Database)		
Until 2100	**With CCS [%]**	**No CCS [%]**
Coal	70	89
Oil	35	63
Gas	32	64

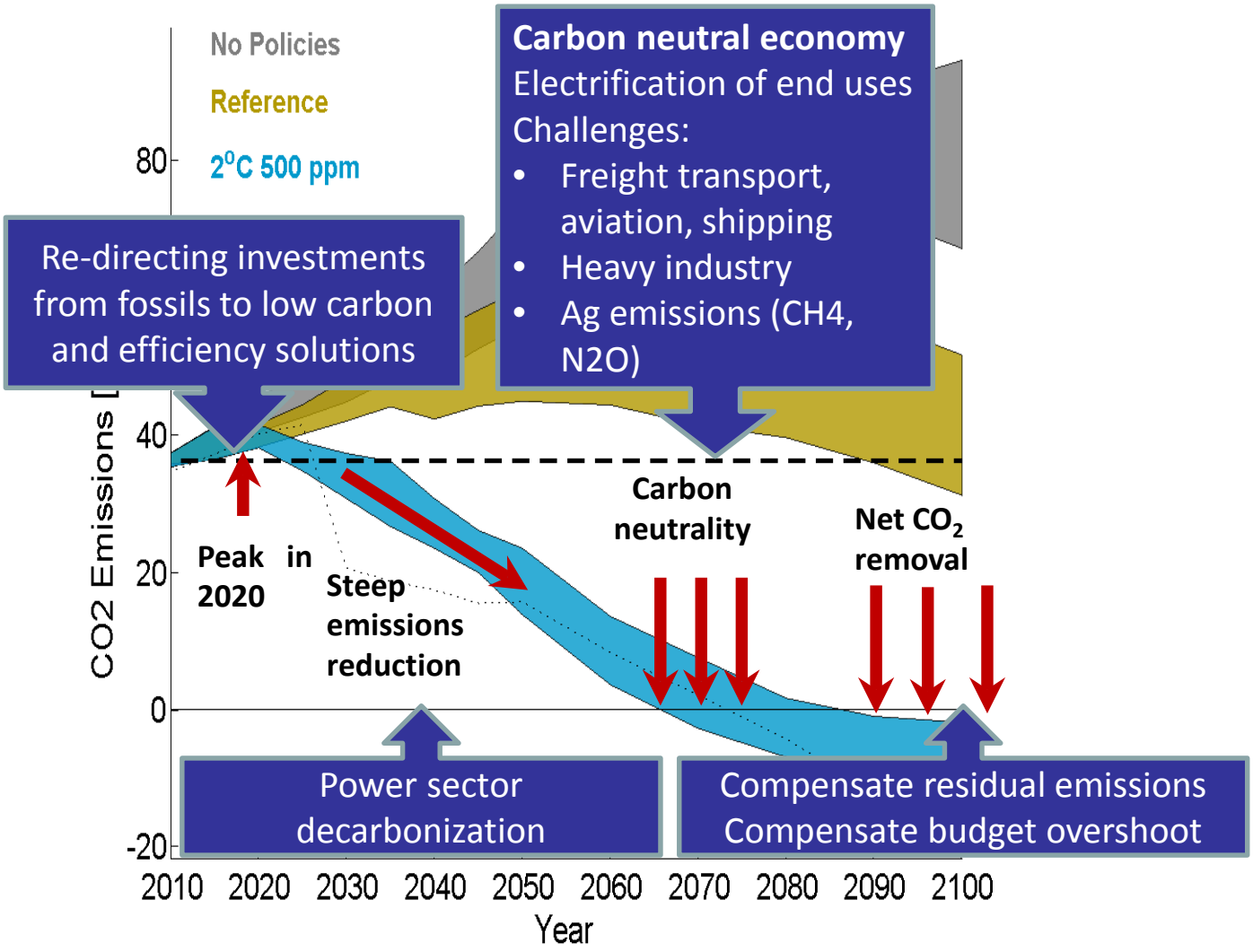
Source: Bauer et al. (2014); Jakob, Hilaire (2015)

Limited disposal space of the atmosphere – oversupply of fossil fuels

Vorhandene Reserven an fossilen Energieträgern im Vergleich mit der Menge, die noch benutzt werden kann, um das 2°C-Ziel zu erreichen

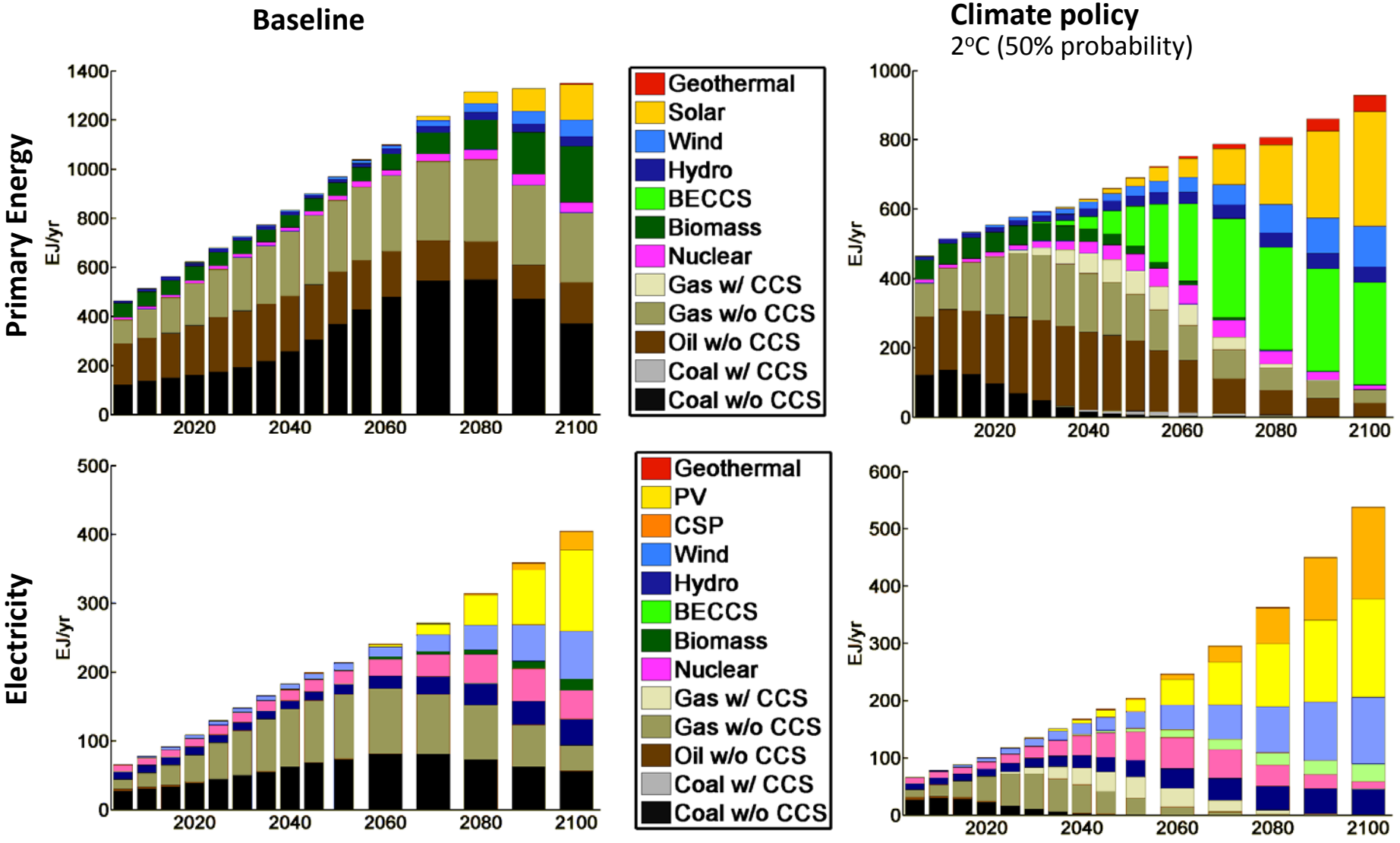


General structure of mitigation pathways



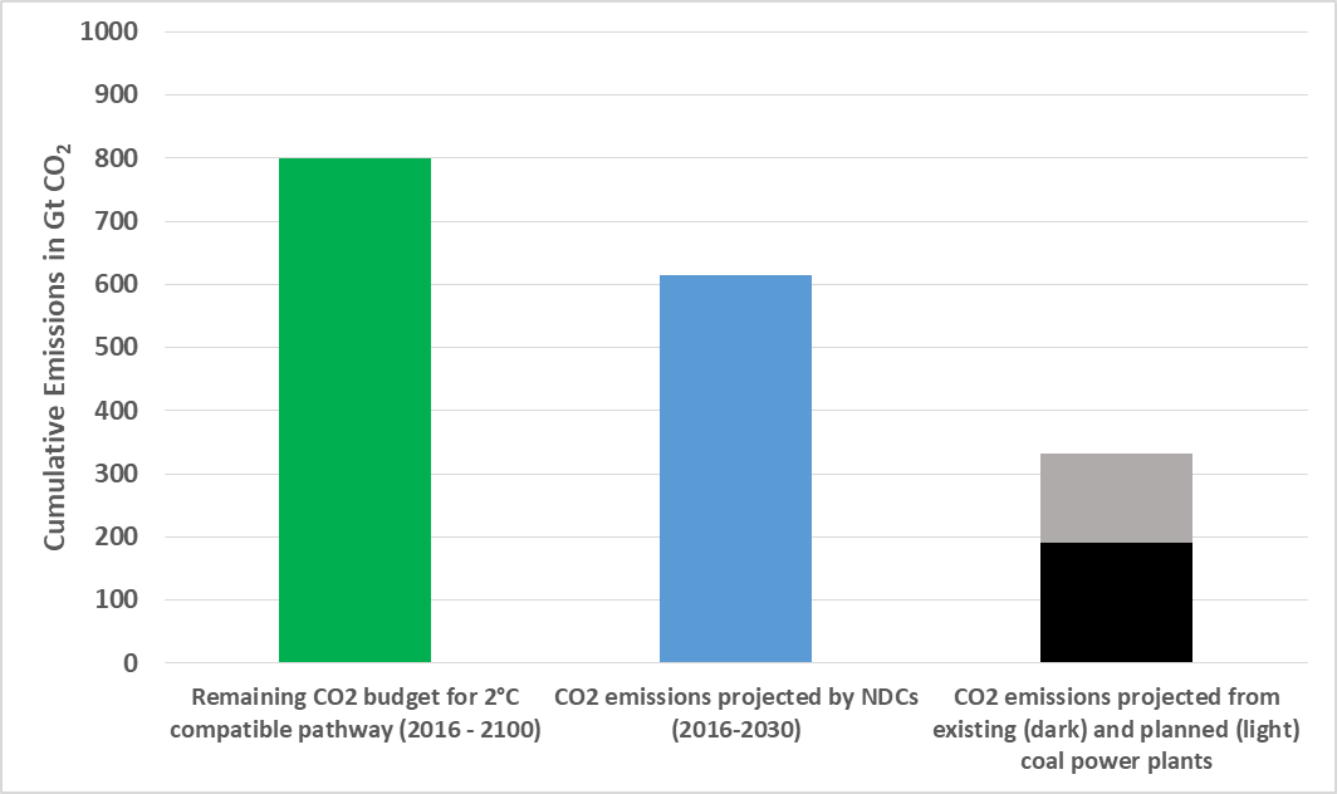
LIMITS Study: Kriegler, Tavoni et al., 2013, Clim Change Econ 04:1340008

The global energy system



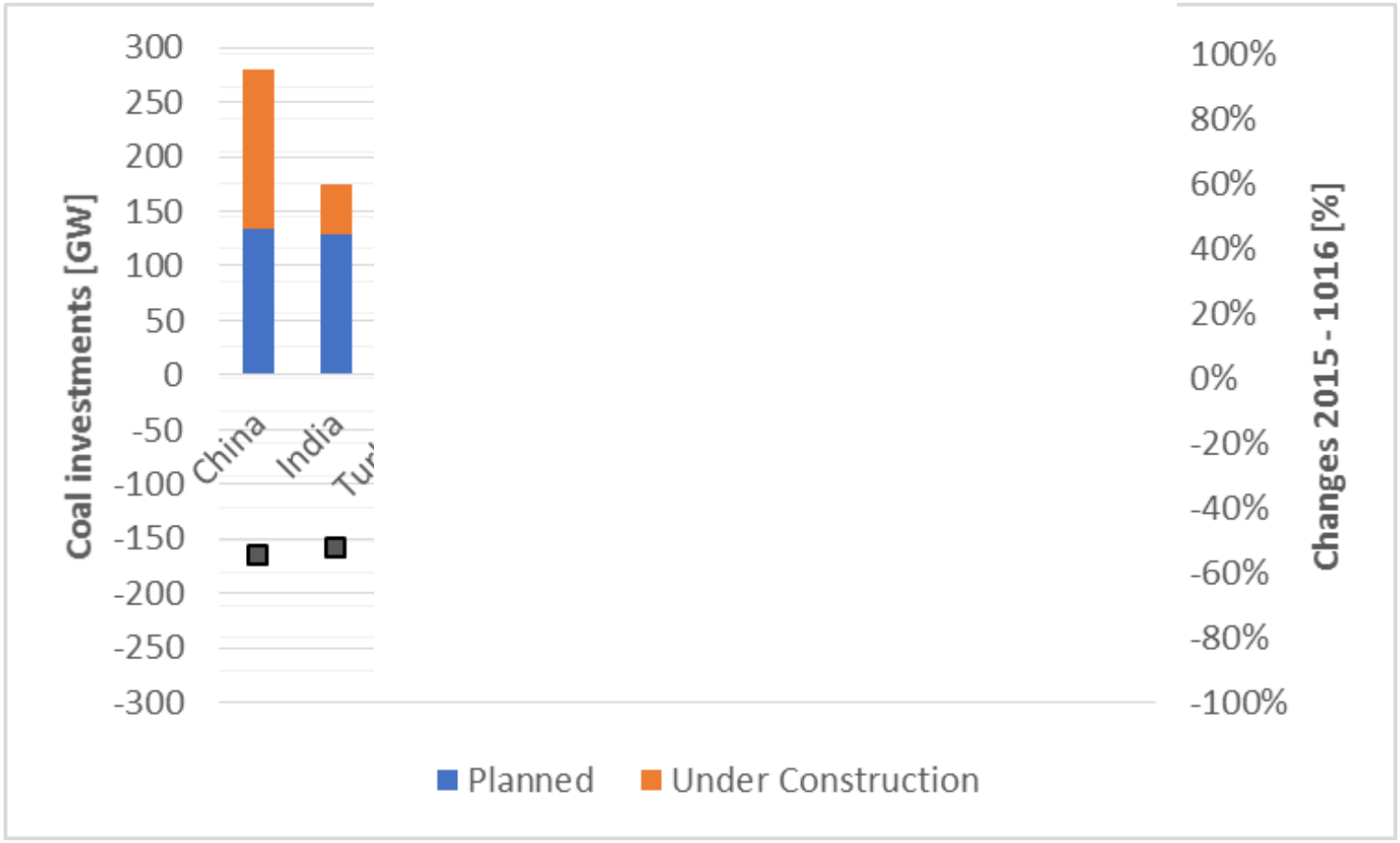
The 2°C budget does not leave any leeway

Cheap and abundant coal is the driver of a „re-carbonisation“ of the energy system in some parts of the world



*All budgets are are subject to considerable uncertainty, see Edenhofer et al. (2017)

The coal pipeline in 2016



Report of the High-Level Commission on Carbon Prices

PIK

MCC Mercator Research Institute on Global Commons and Climate Change

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Results obtained by Stiglitz-Stern-Commission

- Based on the analysis of three approaches:
  technical roadmaps, national roadmaps, global models

- Necessary carbon price for implementing the Paris Agreement:
  40-80 $/t CO_2 until 2020 and 50-100 $/t CO_2 until 2030

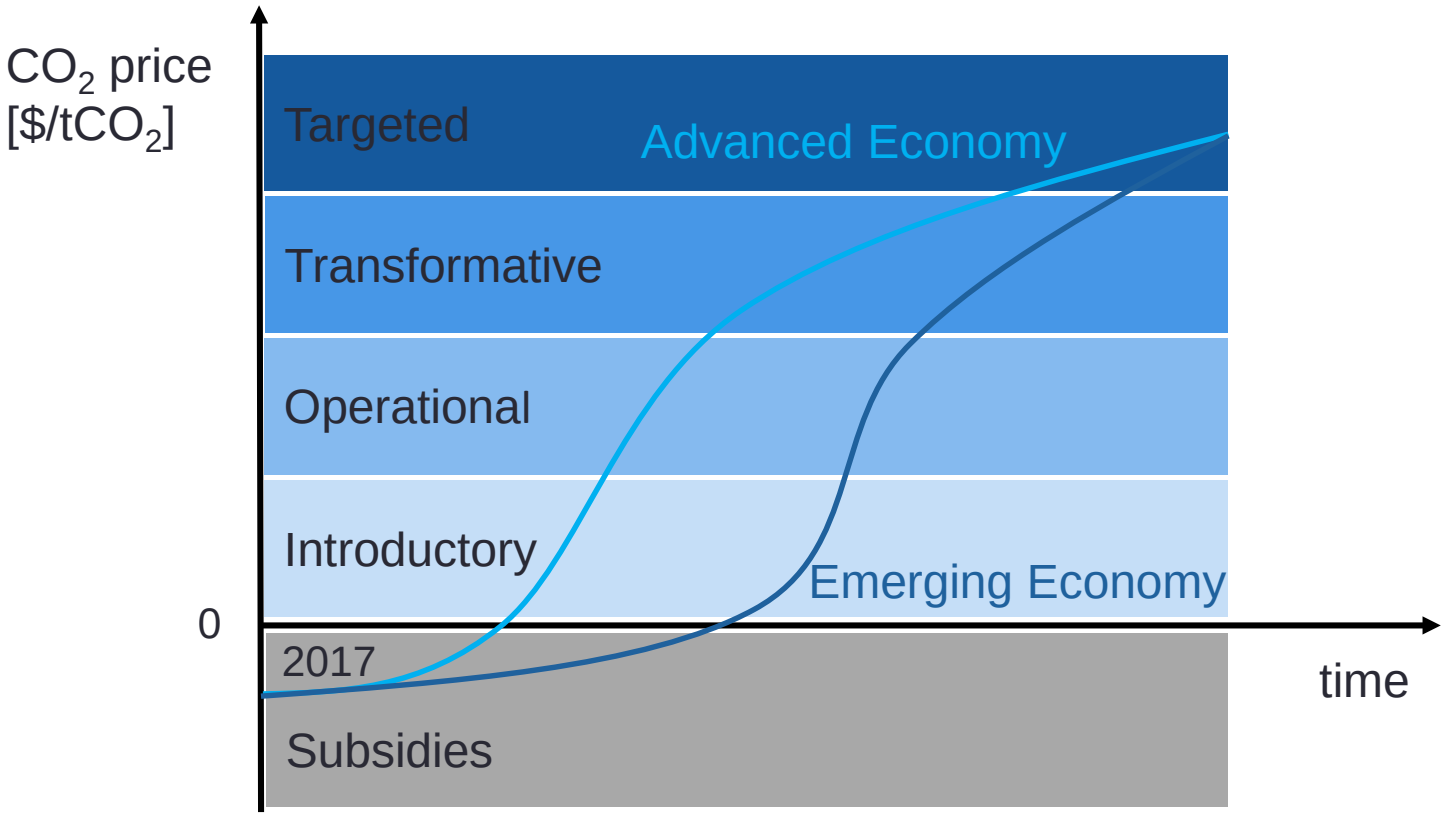
- This assumes that carbon pricing will be complemented by activities and policies such as efficiency standards, R&D, urban development, healthy climate for investments, etc.

- Stress on the relevance of the income side. Put to use in order to reduce other taxes, invest in clean infrastructure, etc.

Source: Stiglitz, Stern et al. CPLC (2017)

About negative and positive CO_2-pricing

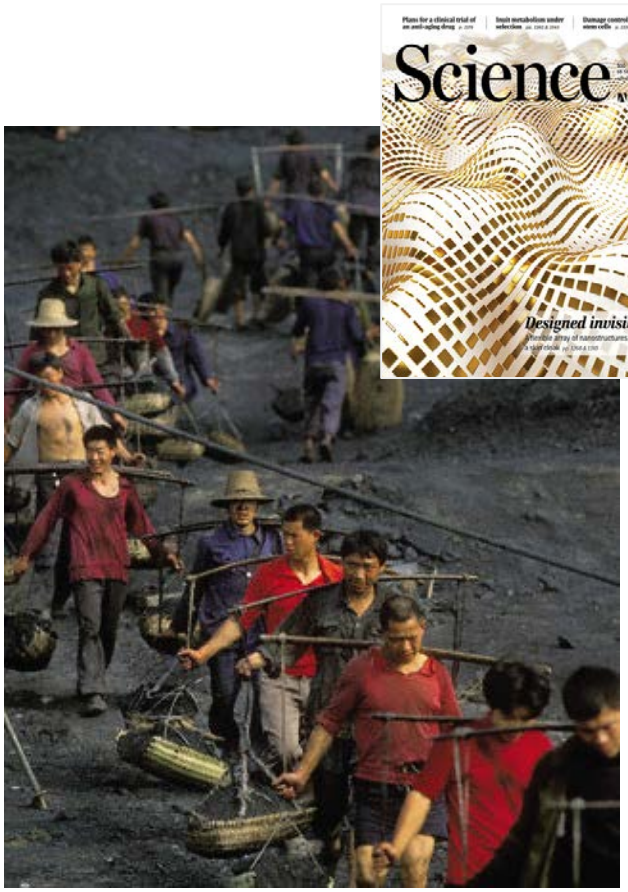
Carbon pricing (with taxes or emission trading systems) is essential because of the oversupply of fossil fuels.



Own presentation, based on @CDP

Renaissance of Coal

Social Costs vs subsidies



ENERGY

King Coal and the Queen of Subsidies

The window for fossil fuel subsidy reform is closing fast

By **Ottmar Edenhofer**

Coal is the most important energy source for the Chinese economy (see the photo). Other rapidly growing economies in Asia and Africa also increasingly rely on coal to satisfy their growing appetite for energy. This renaissance of coal is expected to continue in the coming years (*1*) and is one of the reasons that global greenhouse gas (GHG) emissions are increasing despite the undisputed worldwide technological progress and expansion of wide emissions are expected to continue to rise. After all, a reduction in coal demand in one region reduces world market prices, incentivizing an increasing demand in other regions (*6*).

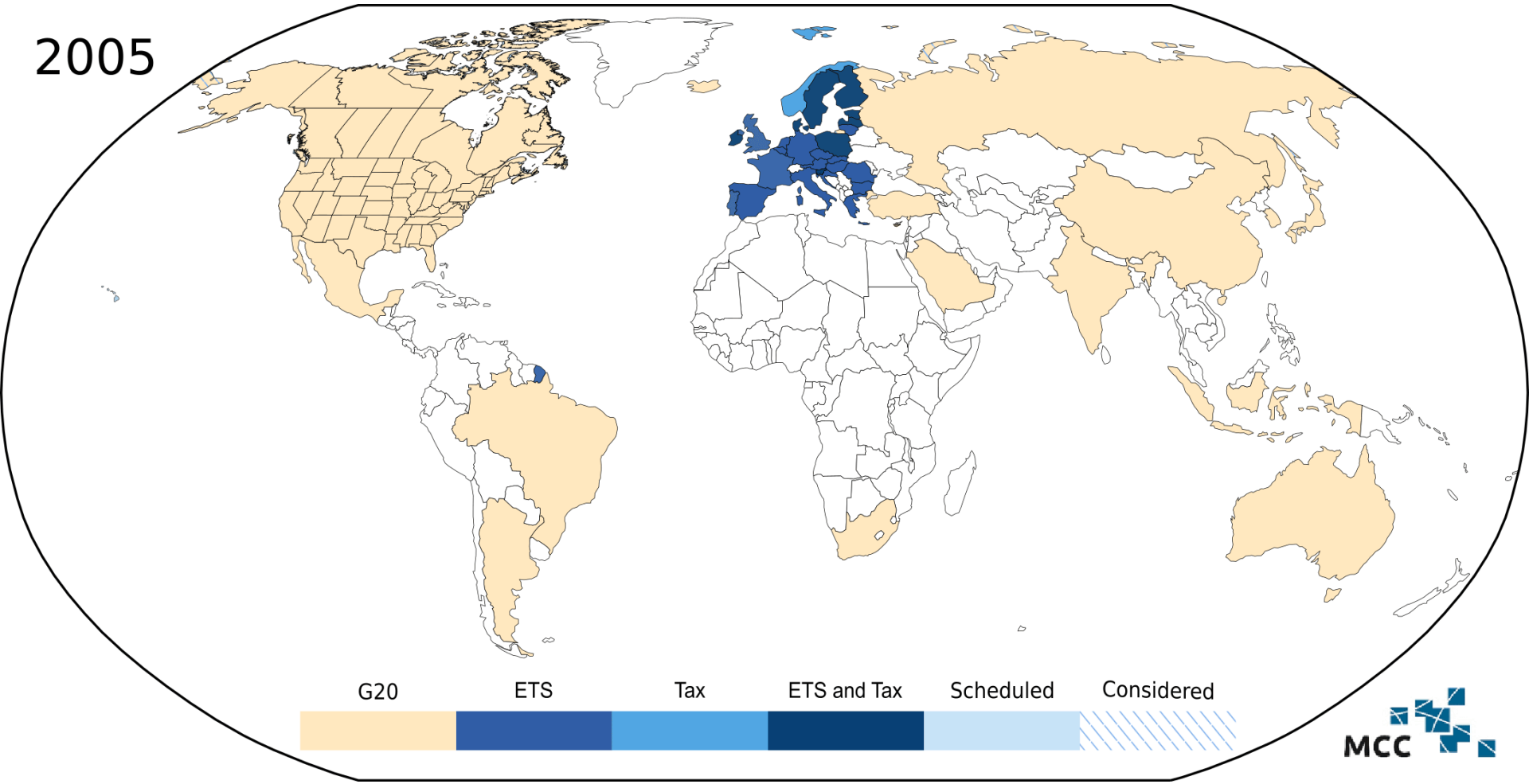
What explains this renaissance of coal? The short answer is the relative price of coal. The price of coal-based electricity generation remains much lower than that of renewable power when the costs of renewable intermittency are taken into account.

As a result of technological progress and economies of scale, the costs of generating

"one ton of CO_2 receives, on average, more than 150 US$ in subsidies "

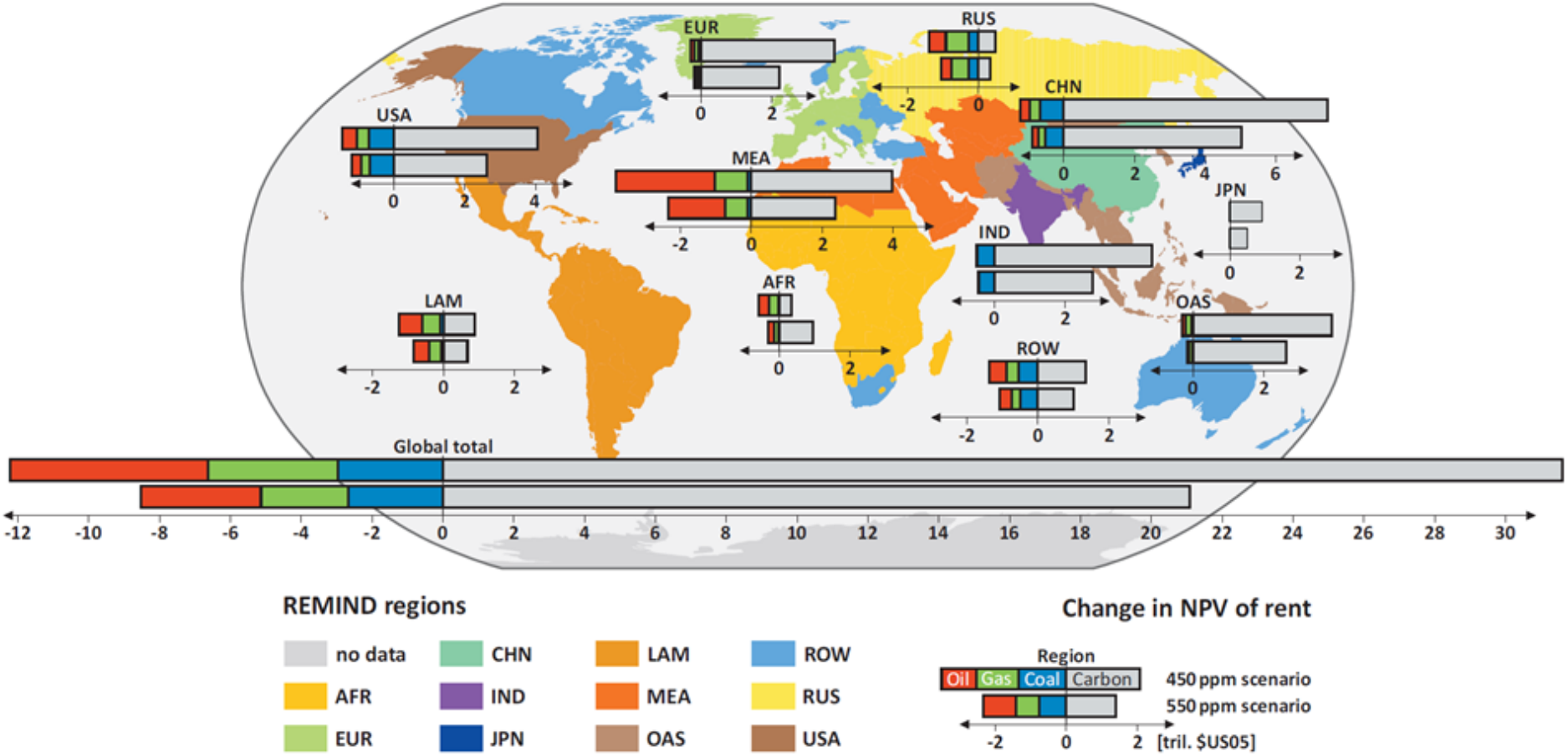
Source: Science, 18 September 2015, Vol. 349, Issue 6254, 1286 ff.

Carbon Pricing in G20 Countries



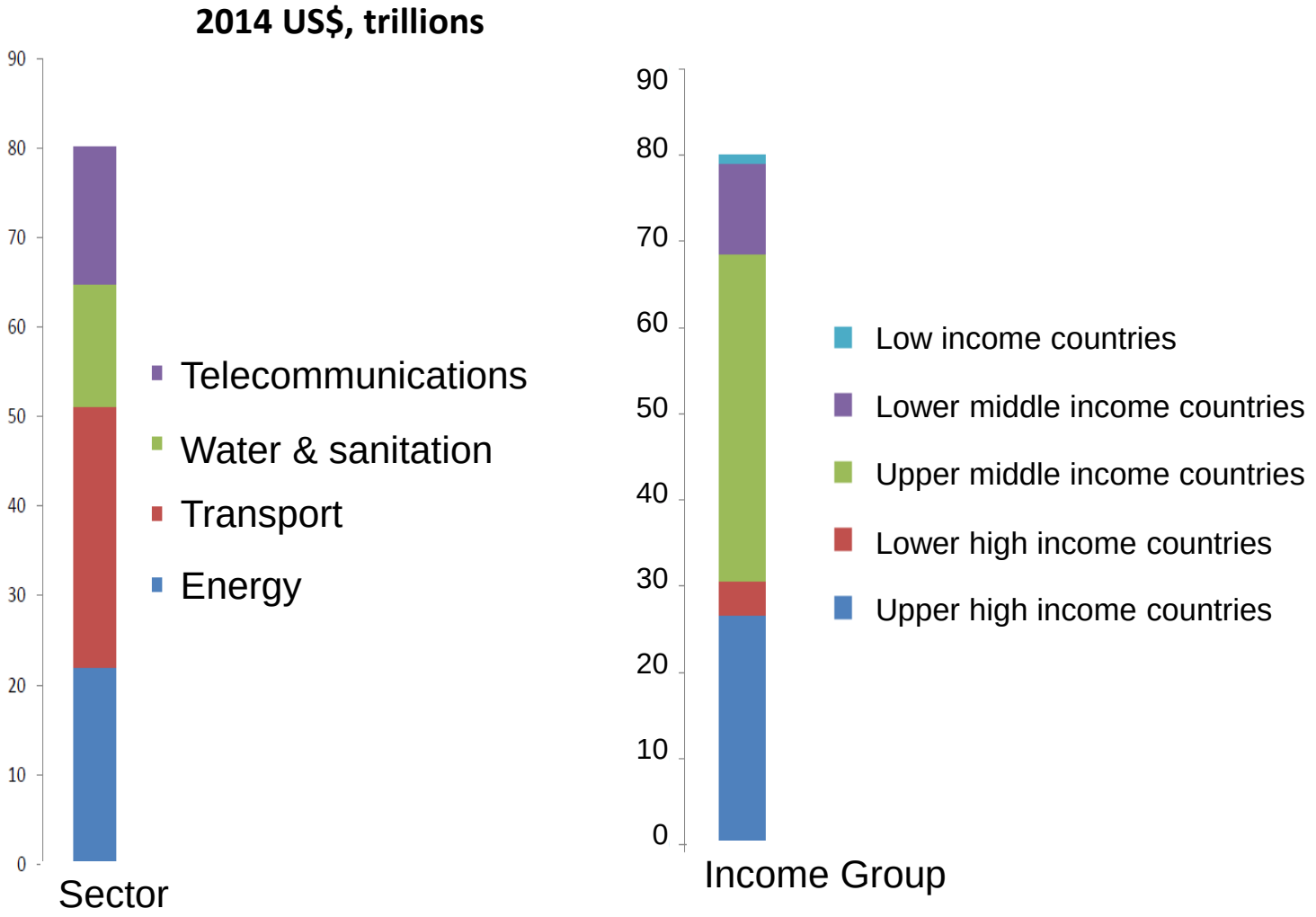
Own presentation, based on Worldbank (2016)

The Climate Rent



Source: Own presentation / MCC / PIK

Projected cumulative infrastructure demand, 2015-2030



Source: Bhattacharya, Chattopadhyay, and Nagrah (forthcoming)

Conclusions

- Unabated climate change will cause high economic costs; the cost of mitigating climate change will be substantially smaller.
- The necessary reduction of global carbon emissions could be regulated efficiently by introducing carbon price on emissions.
- Weak INDCs as well as the observed renaissance of coal are inconsistent with the 2°C target.
- Allocation of the investments necessary for decarbonization is a joint challenge for climate policy and the financial system.