d·i·e

Deutsches Institut für Entwicklungspolitik | German Development Institute

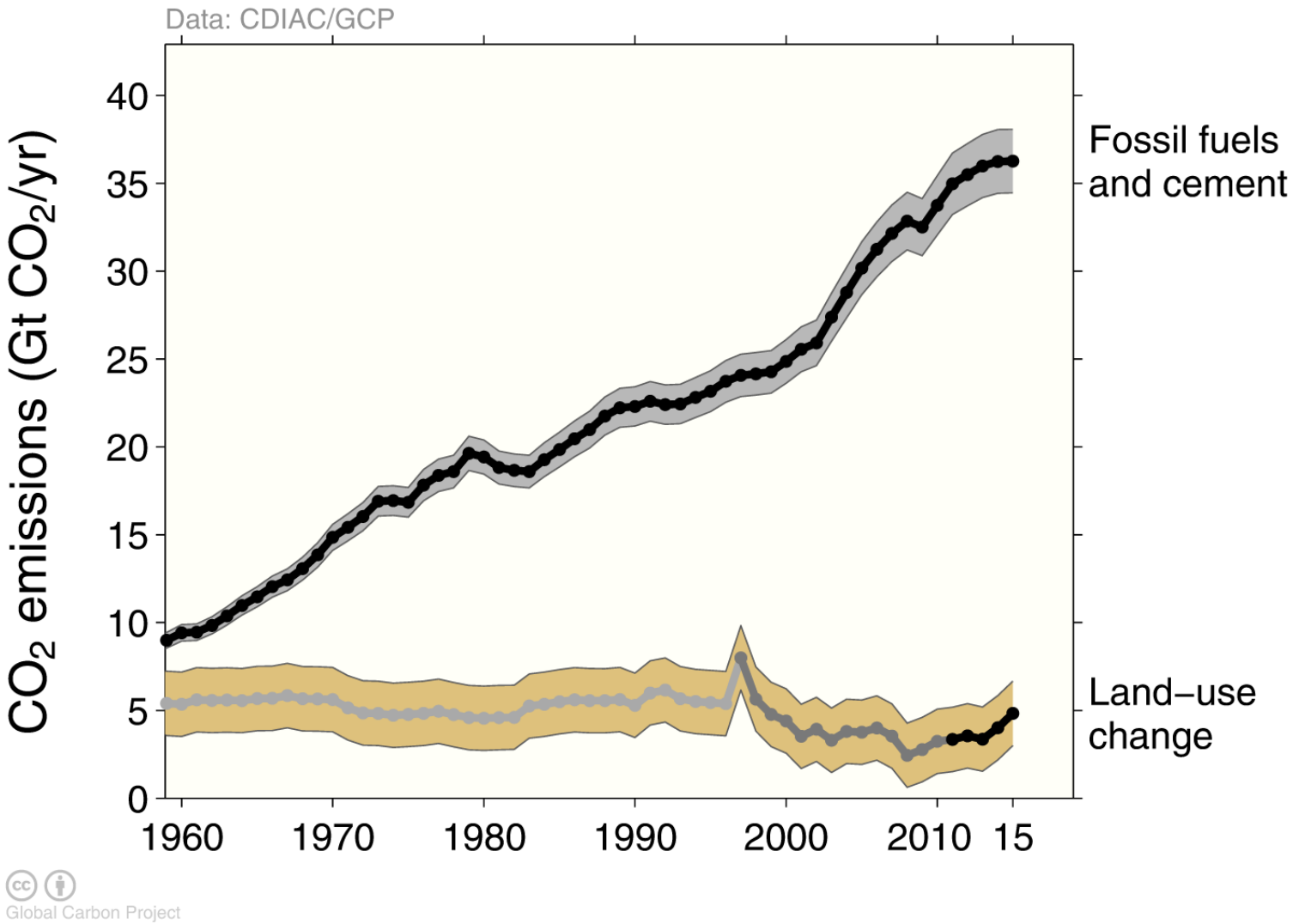
Transformation towards a low/ zero carbon economy

Dirk Messner

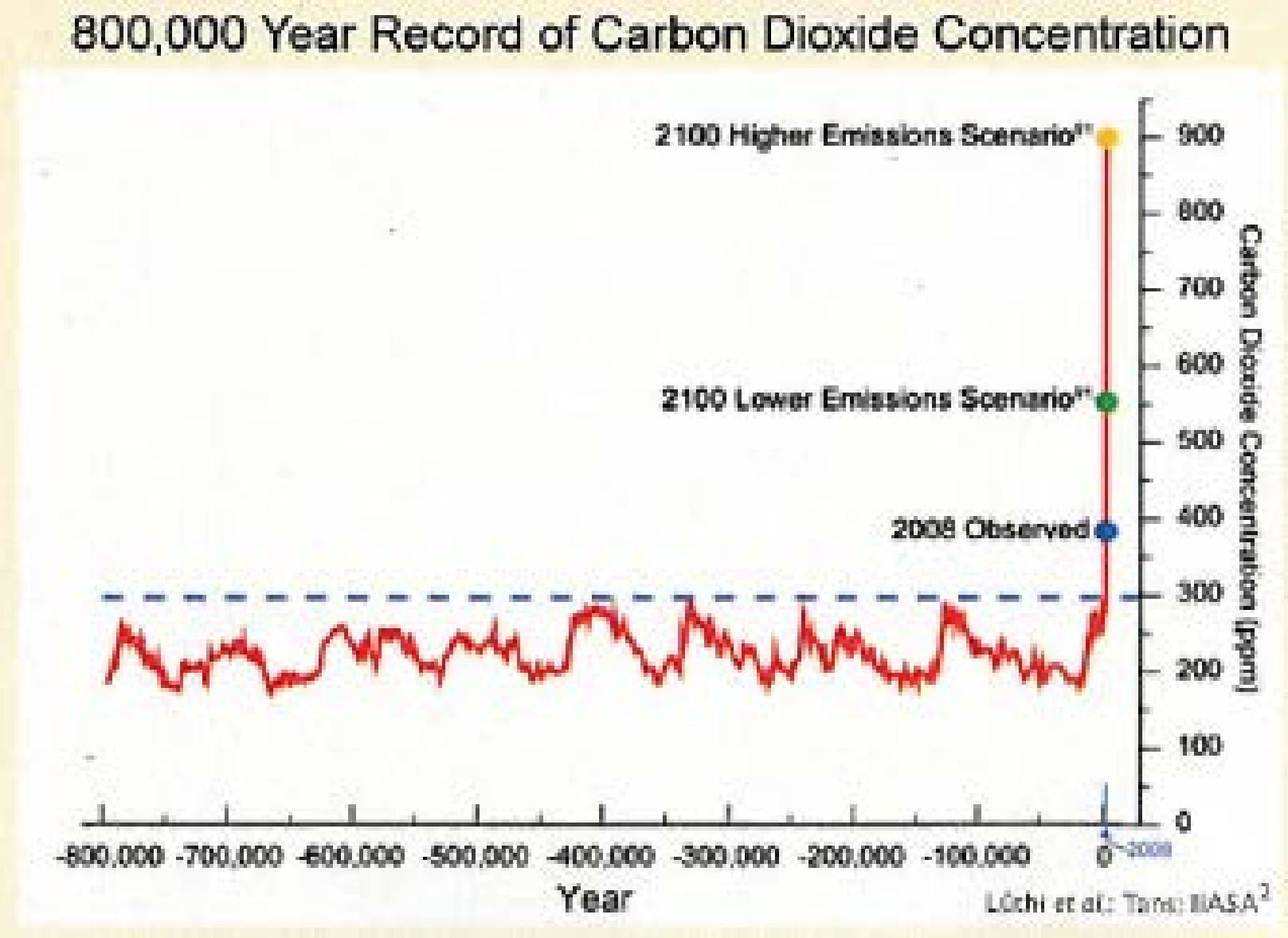
Bonn, November 2017

How does the problem look like?

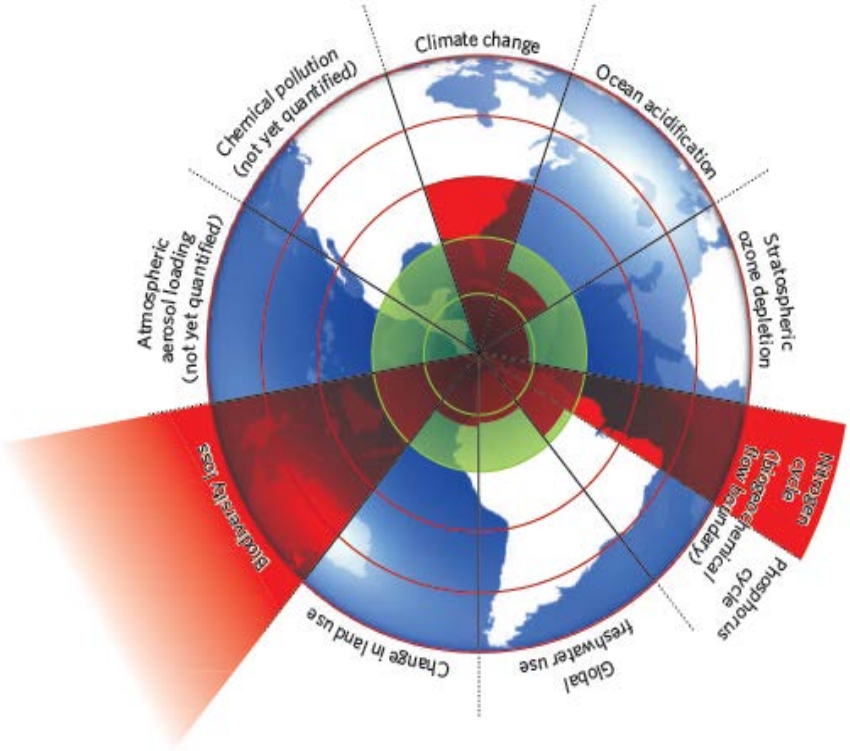
COP 23 - Emissions are rising



A different Earth system emerging

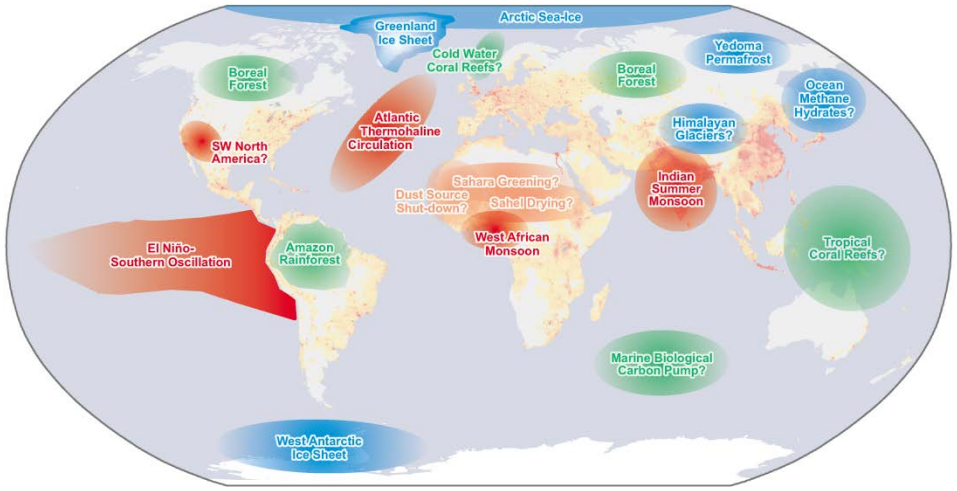


Planetary scale



Planetary boundaries

Tippping points



Tipping points & levels of global warming

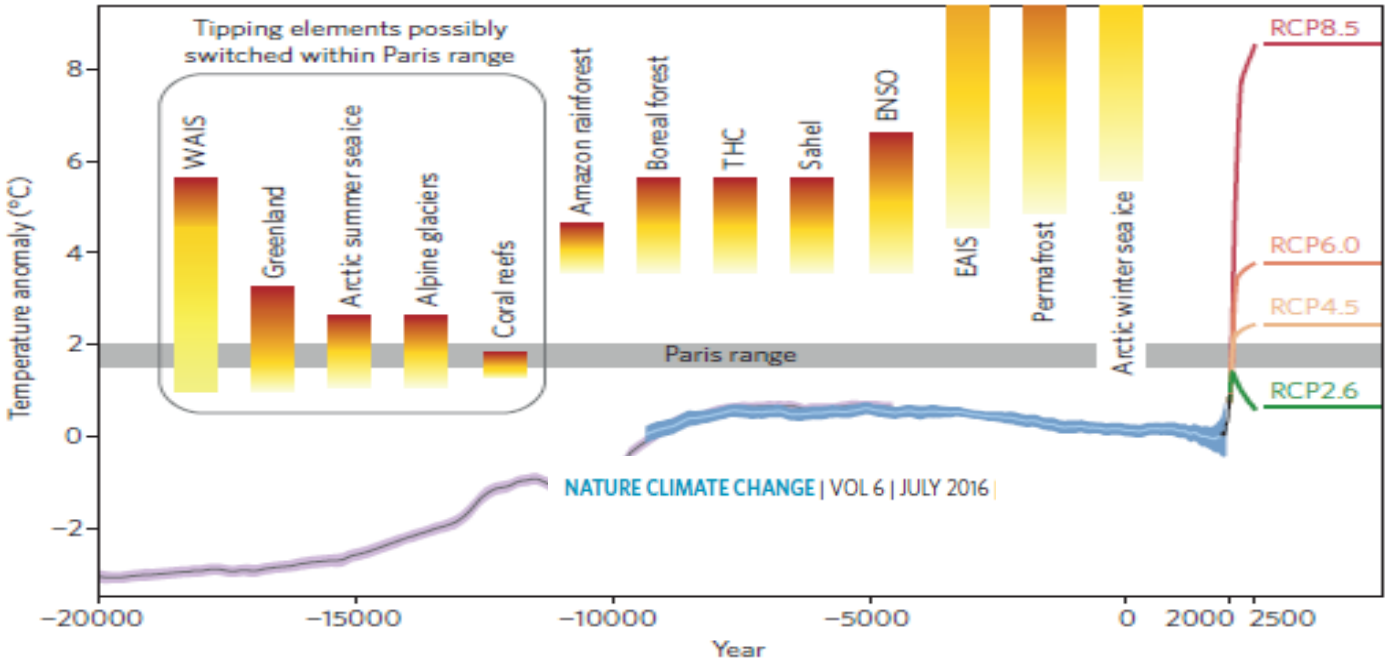
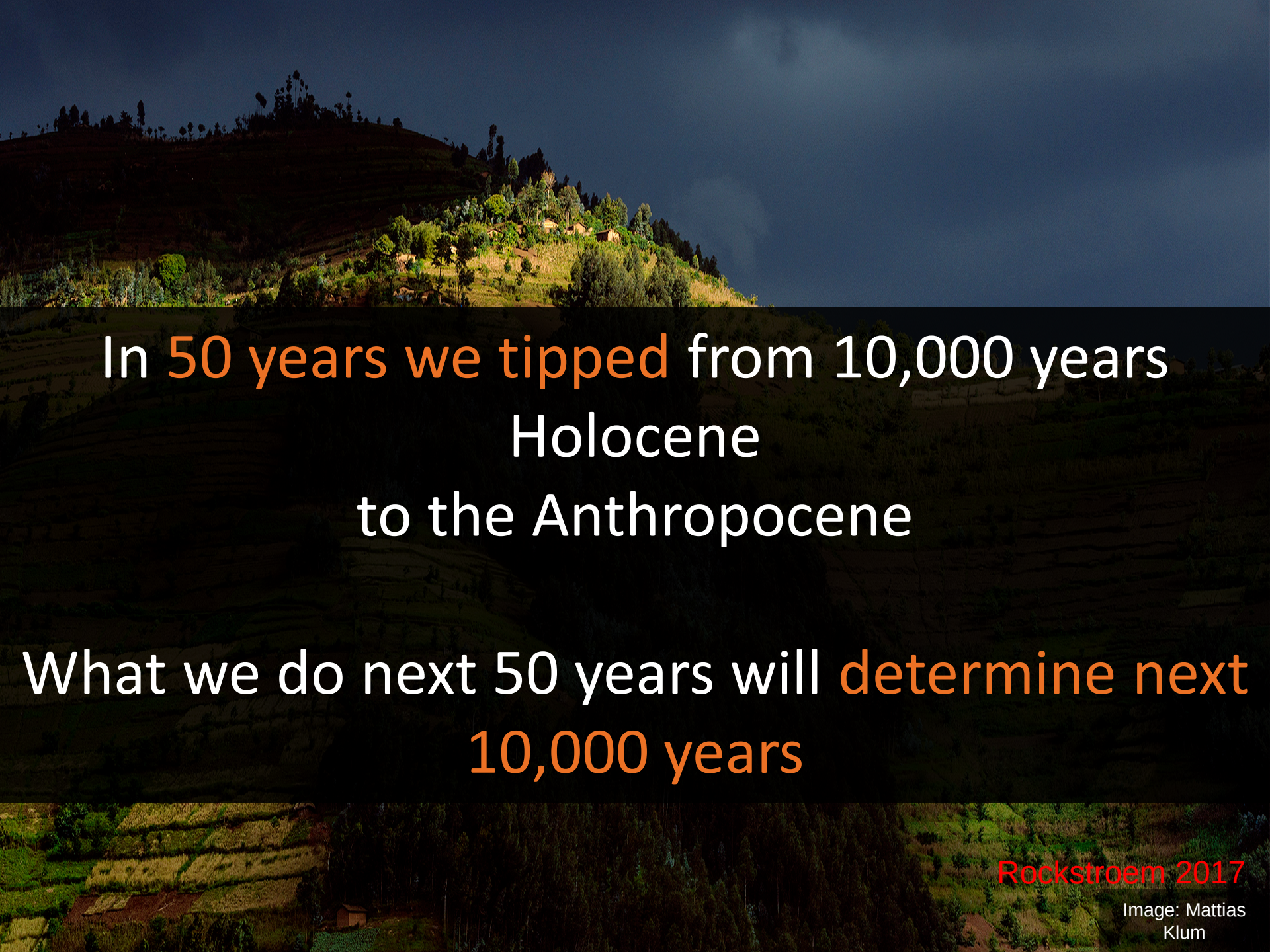


Figure 1 | Tipping elements in context of the global mean temperature evolution. Shown is the global-mean surface temperature evolution from the Last Glacial Maximum through the Holocene, based on palaeoclimatic proxy data[35,36] (grey and light blue lines, with the purple and blue shading showing one standard deviation), instrumental measurements since 1750 AD (HadCRUT data, black line) and different global warming scenarios for the future (see ref. 37 for the latter). Threshold ranges for crossing various tipping points where major subsystems of the climate system are destabilized have been added from ref. 8, 14 and 37–40. (Note that we follow the tipping point definition of Lenton *et al.*[8] which does not require irreversibility, so that sea ice cover is included here.) The range for the West Antarctic Ice Sheet (WAIS) has been adapted to account for the observation that part of it has probably tipped already[10,11]. THC, thermohaline circulation; ENSO, El Niño–Southern Oscillation; EAIS, East Antarctic Ice Sheet.

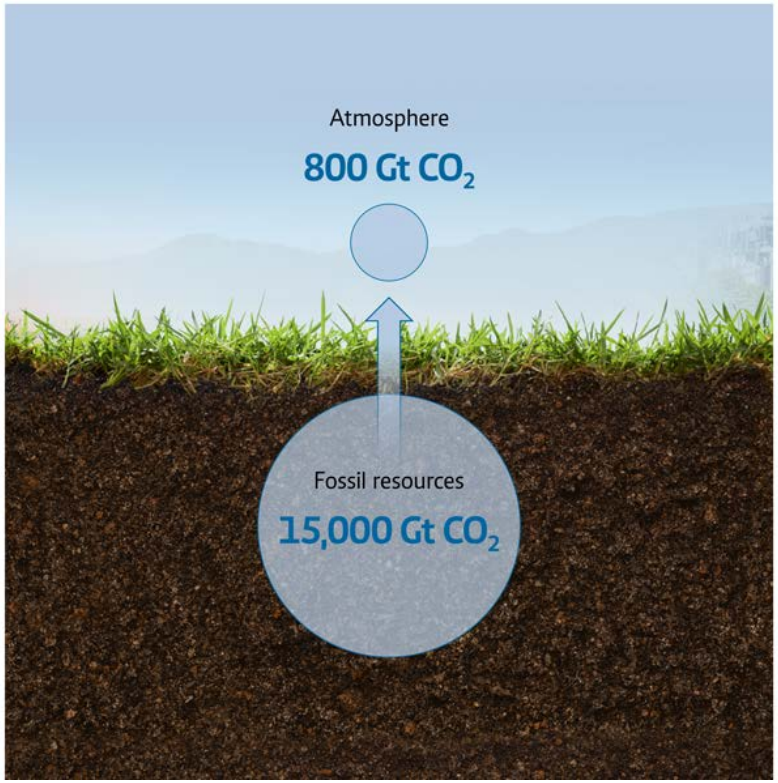

In 50 years we tipped from 10,000 years Holocene
to the Anthropocene
What we do next 50 years will determine next 10,000 years
Rockstroem 2017
Image: Mattias Klum

2015: Globale Nachhaltigkeit und Multilateralismus

Global Governance:
From top down to bottom up

What needs to be done after the „Paris – Moment“ … the elements to make the transformation happen, are there

The climate problem at a glance



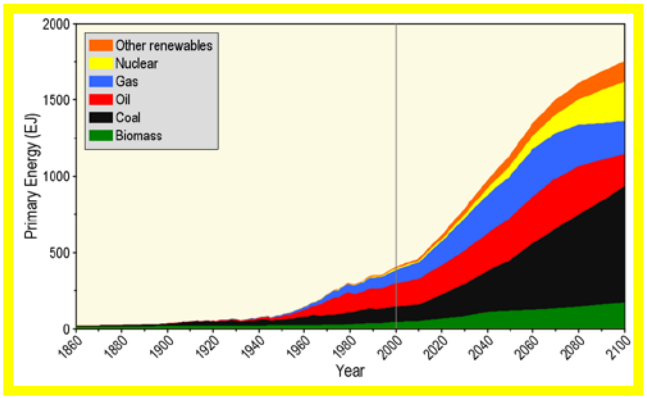
Source: Bauer et al. (2014); Jakob, Hilaire (2015)

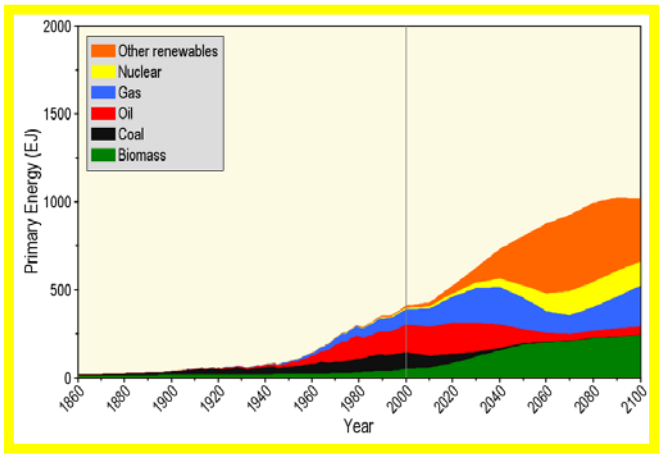
What needs to be transformed?

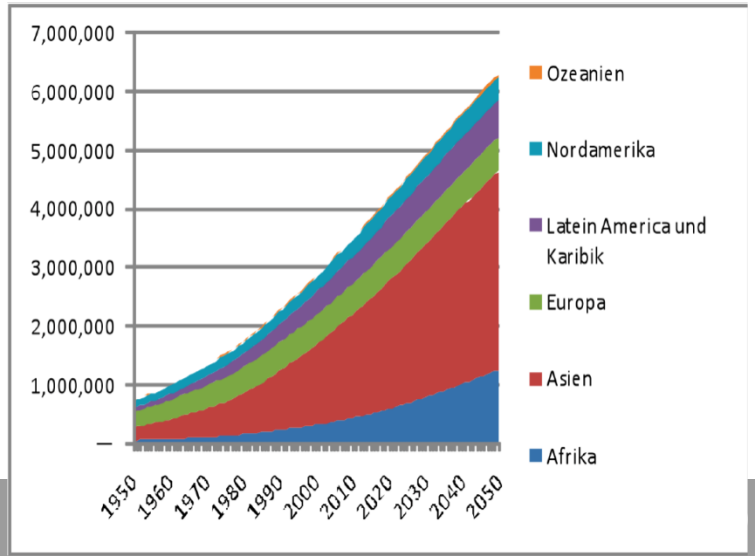
Energy

Urbanization

Land use







Can we finance the trafo? 2,5 – 3 % of global GDP needed

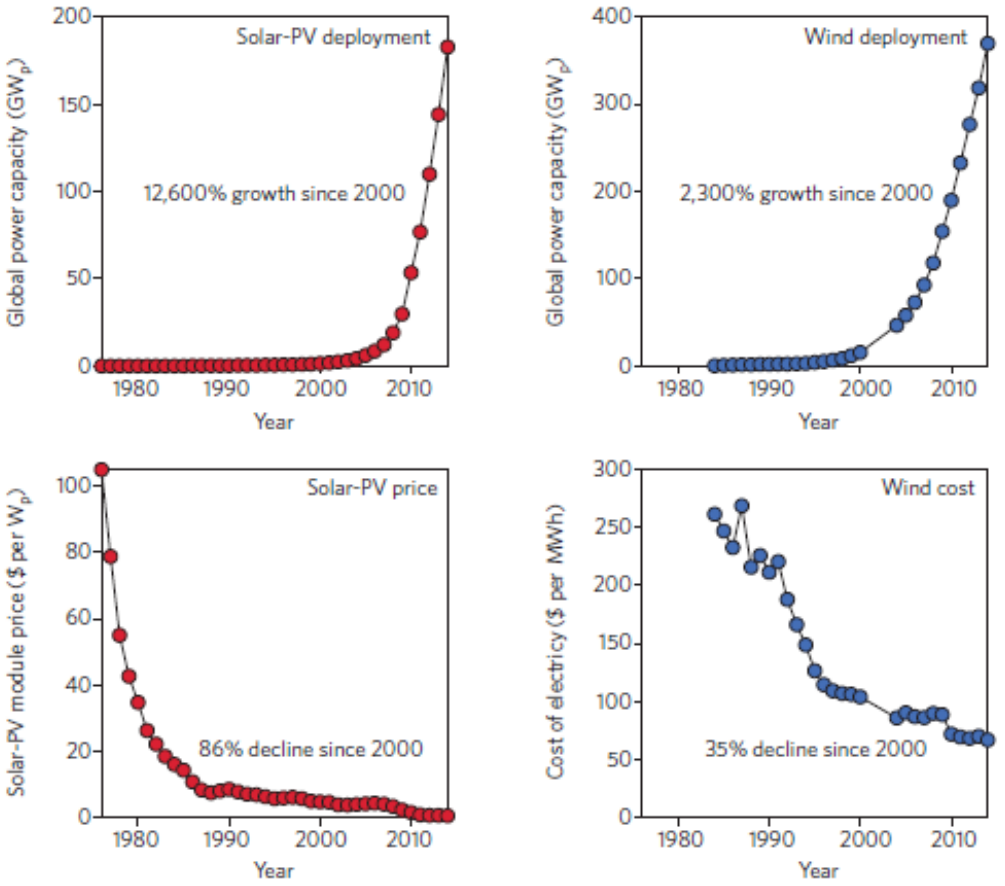


Figure 3 | Beginning of induced implosion? The installed capacity of solar and wind power generation has grown at rates far exceeding expectations. At the same time, the costs for solar and wind power have dropped rapidly, by 35% since the year 2000 for wind electricity, and by 86% for solar modules. Figure adapted with permission from ref. 30; © 2015 MIT.

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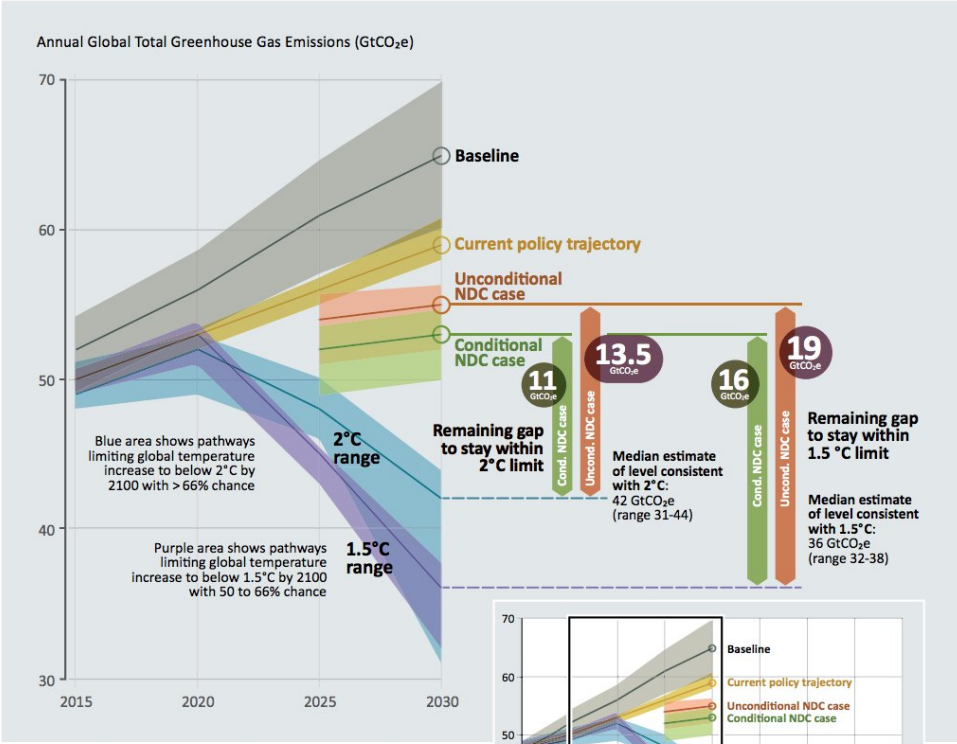
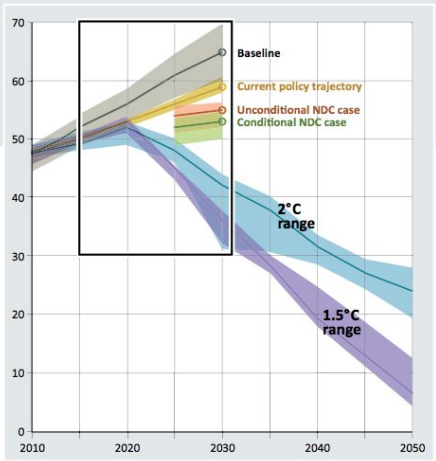
COP - NDCs … what we know about cognitive gaps, policy gaps, emission reduction gaps …



Note: the emissions range for 1.5°C is smaller than for 2°C, as a smaller number of studies for 1.5°C are available. For current policy, the minimum–maximum across all assessed studies are provided.



Moving beyond RE infrastructure

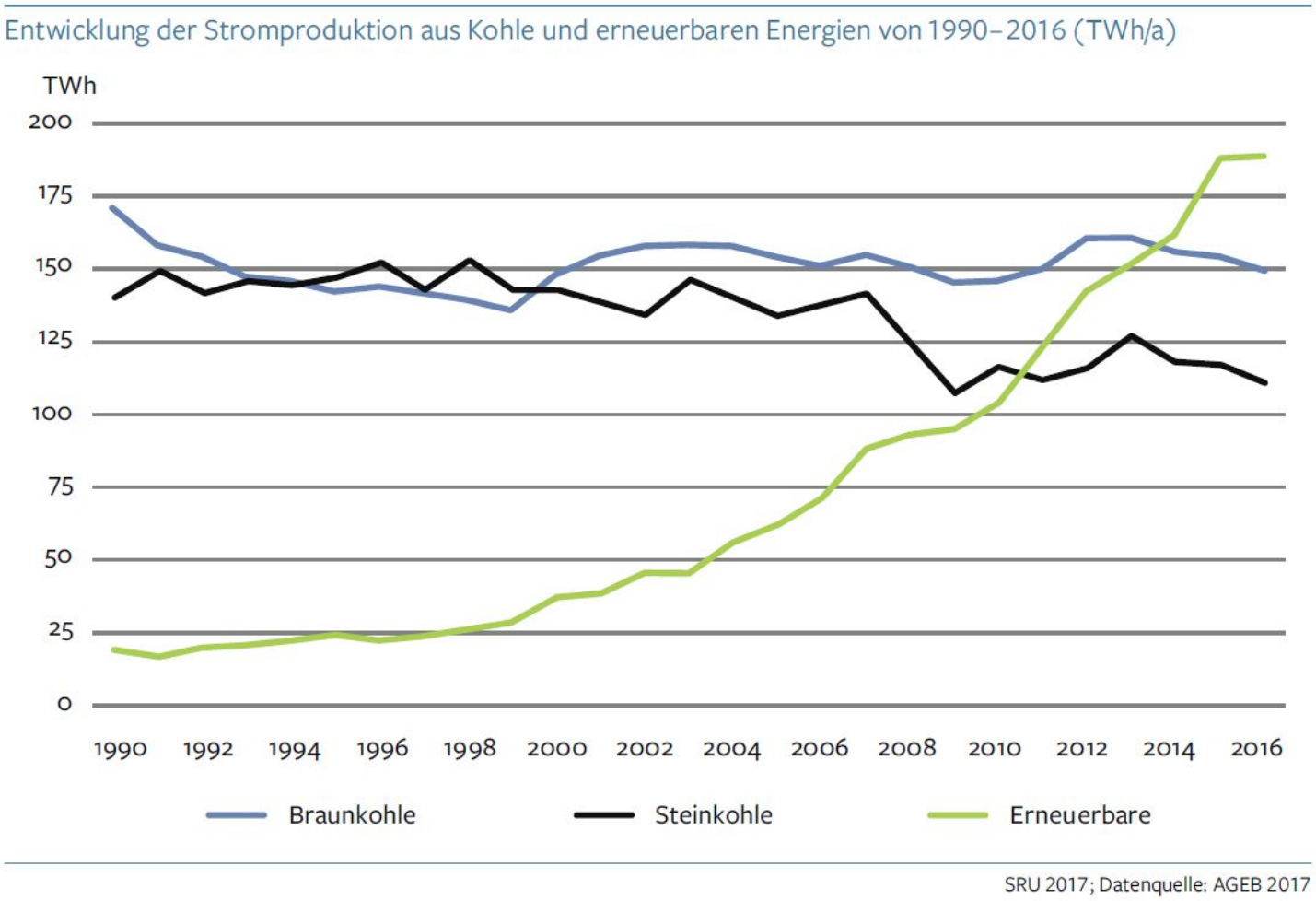
-NDCs … 40 % only

Missing

- city planning, buildings, building material/ urbanisation shift
- mobility systems
- carbon efficiency
- plans to phase out coal
- CCS

… going for deep decarbonization … beyond the low hanging fruits (SDSN)

The German Challenge: moving out of coal

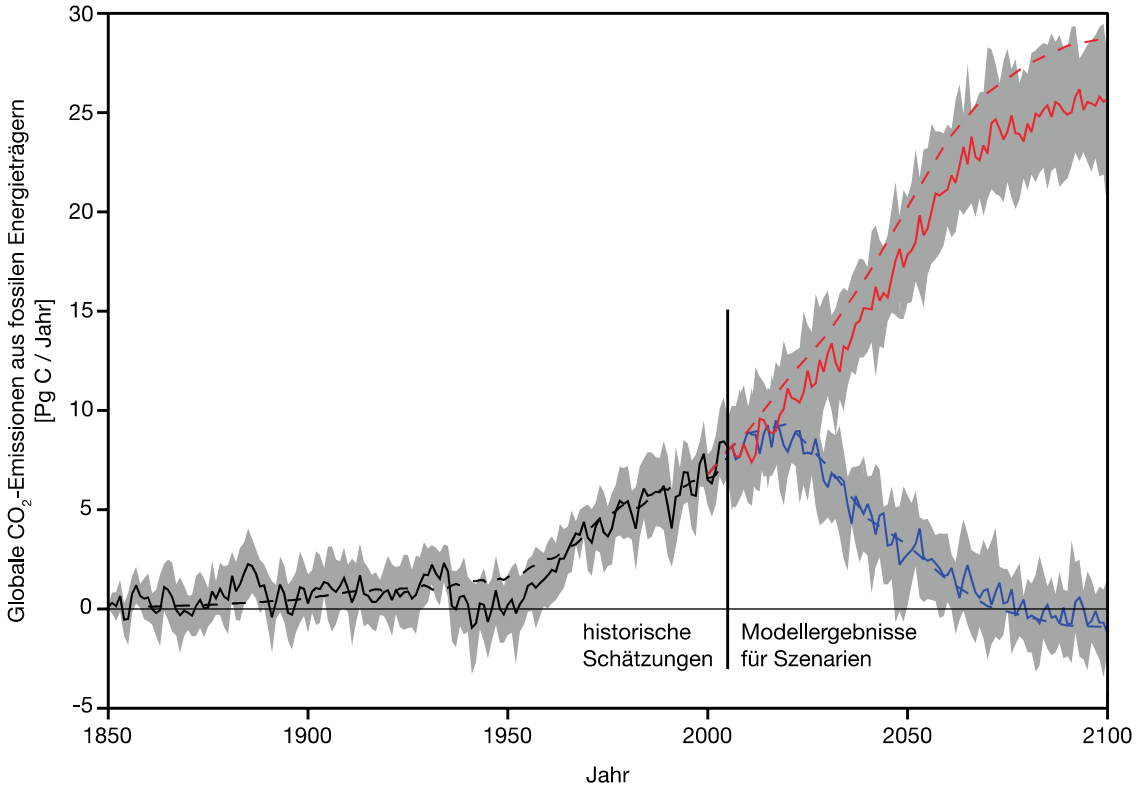


Source: Stefan Rahmstorf auf Spektrum.de

Report of the High-Level Commission on Carbon Prices

2020: 40 – 80 US $/ t
Instead of 150 US $/ t
Subsidies (5,3 Trillion US $ annually)

Accelerating the transformation

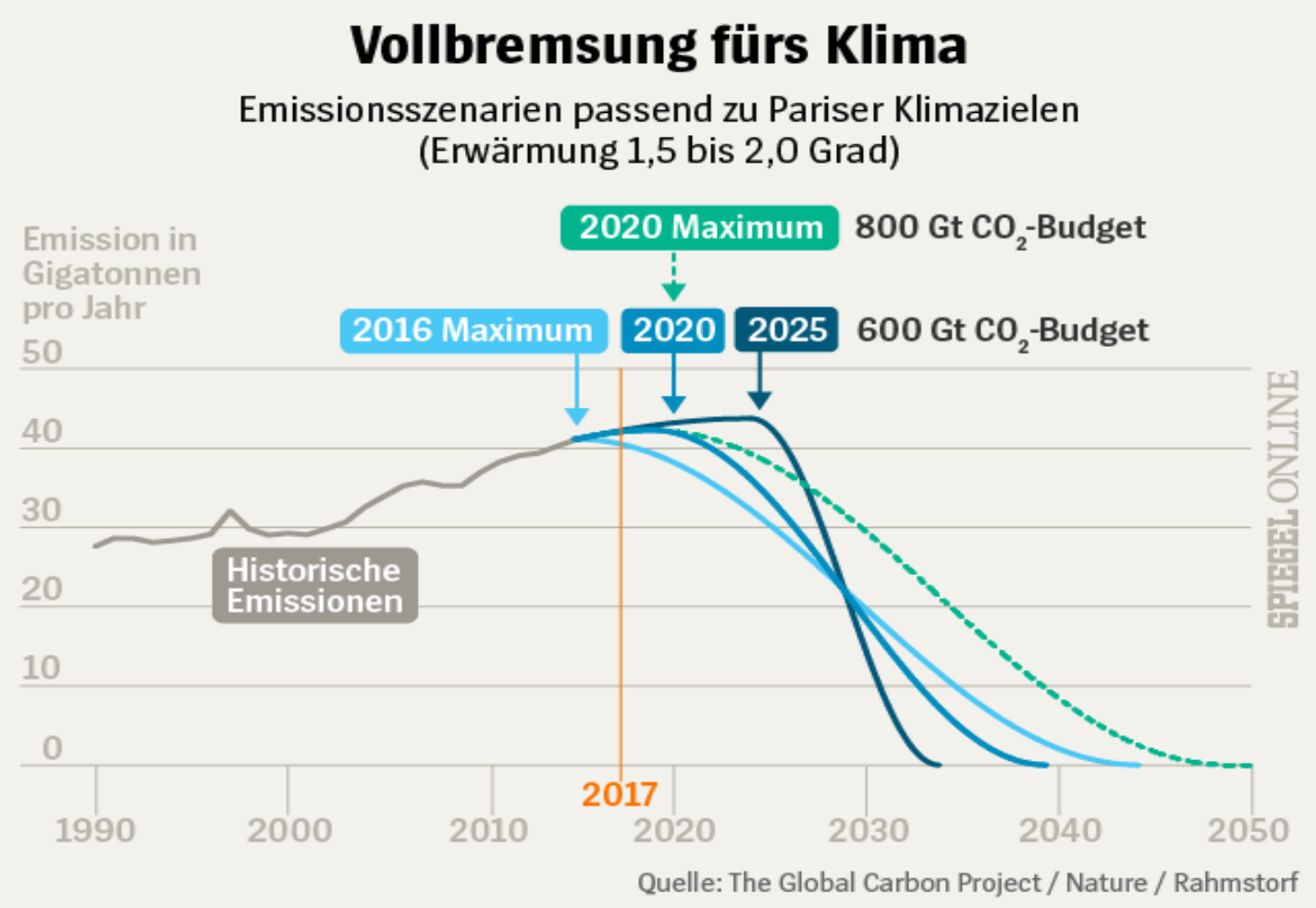


Der WBGU empfiehlt:

Bis Mitte des Jahrhunderts sollten die CO_2-Emissionen aus fossilen Energieträgern weltweit auf Null abgesenkt werden.

Carbon Law:
Halving emissions every decade

Peaking of emission in 2020



Source: S. Rahmstorf auf Spektrum.de

Fighting inequalities – precondition for ambitious climate protection

IMF @IMFNews

.@lagarde at #FII2017 in Riyadh: We must address climate & inequality for a future that is utopian, not dystopian

24/10/2017, 10:45

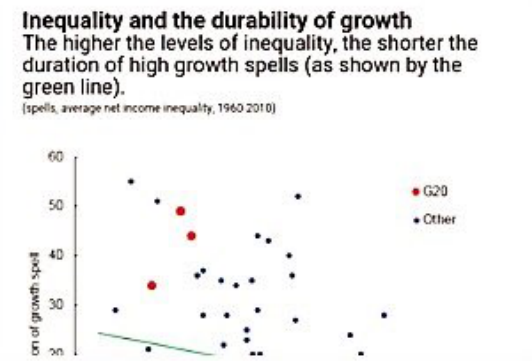
The Economist @TheEconomist

Higher taxes can lower inequality without denting economic growth

23/10/2017, 23:44

World Economic Forum @wef

Inequality is getting so bad it's threatening the very foundation of economic growth

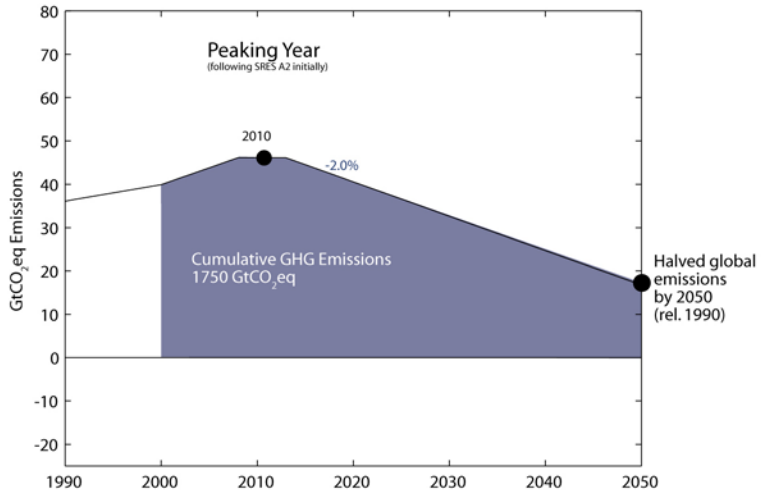


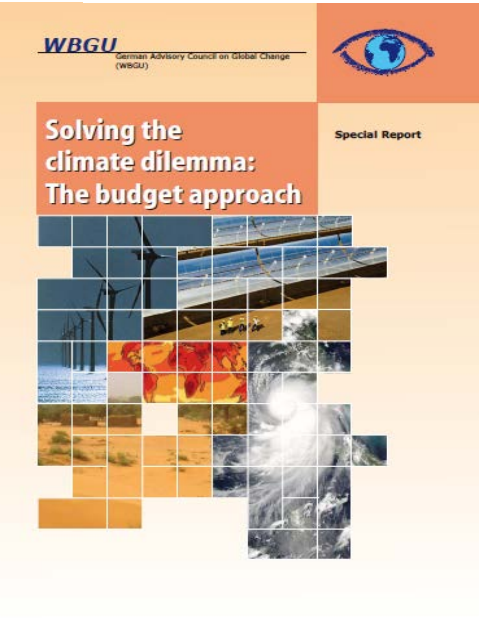
The New York Times @nytimes

The end of apartheid was supposed be a beginning. Two decades later, "you still are living in apartheid."

End of Apartheid in South Africa? Not in Economic Terms

Global Justice –A carbon budget perspective



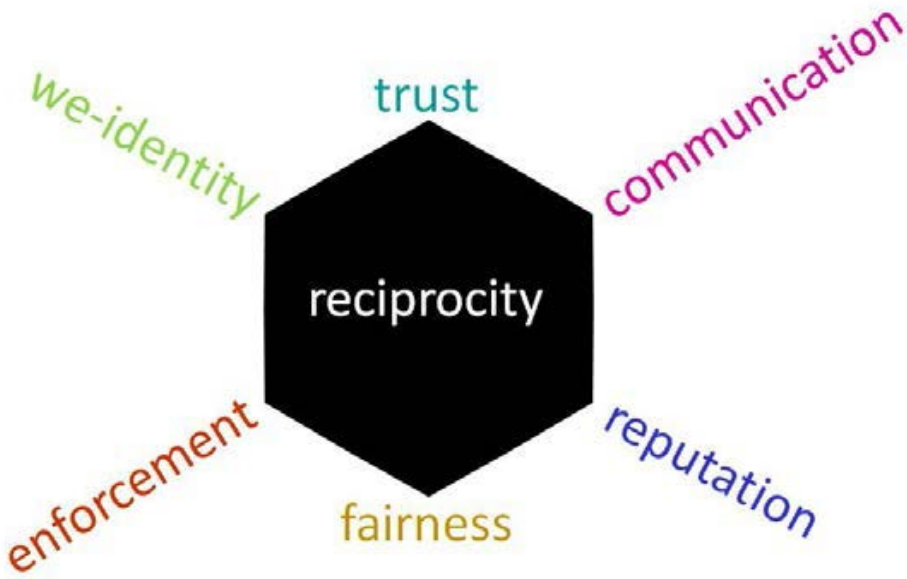


Option II „Zukunftsverantwortung“: Zeitraum 2010–2050; 67 % Wahrscheinlichkeit, die 2°C-Leitplanke einzuhalten; 2010 als Referenzjahr für Bevölkerungsdaten. Berücksichtigt sind ausschließlich die CO_2-Emissionen aus fossilen Quellen. Die CO_2-Emissionen sind Schätzungen für das Jahr 2008, die Bevölkerungszahlen Schätzungen für das Jahr 2010.
Quellen: WBGU unter Verwendung von Daten aus: Meinshausen et al., 2009; WRI-CAIT, 2009; U.S. Census Bureau, 2009

	Anteil an Weltbevölkerung im Jahr 2010 (Schätzung) [%]	Budget 2010–2050 [Mrd. t CO_2]		Emissionen im Jahr 2008 (Schätzung) [Mrd. t CO_2]	Reichweite des Budgets bei jährlichen Emissionen wie 2008 [Jahre]
		Gesamter Zeitraum	Pro Jahr		
Deutschland	1,2	9,0	0,22	0,91	10
USA	4,6	35	0,85	6,1	6
China	20	148	3,6	6,2	24
Brasilien	2,8	21	0,52	0,46	46
Burkina Faso	0,24	1,8	0,043	0,00062	2.892
Japan	1,8	14	0,34	1,3	11
Russland	2,0	15	0,37	1,6	9
Mexiko	1,6	12	0,29	0,46	26
Indonesien	3,4	25	0,62	0,38	67
Indien	18	133	3,2	1,5	88
Malediven	0,0058	0,043	0,0011	0,00071	61
EU	7,2	54	1,3	4,5	12
Welt	100	750	18	30	25

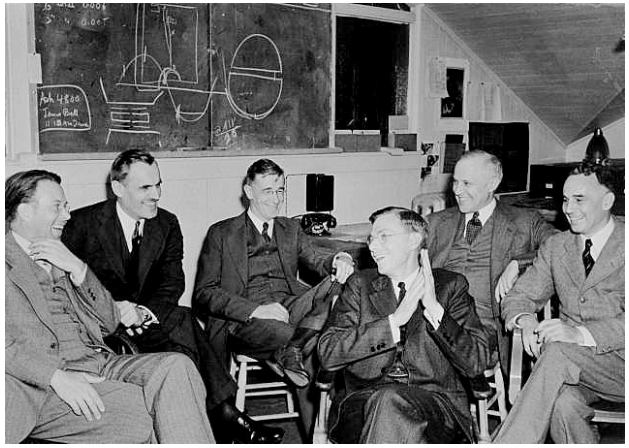
Global alliances to avoid “Our country first backlashes”

The G-Zero world from the Hexagon-perspective



… it`s not only power, stupid.
… the underprovision of the basic elements of cooperation

6 Humans are good at cooperating/ in changing directions under high problem pressure – Needs to be avoided this time: TIPPING Points in the Earth System



Manhattan Project … fierce competition/ conflict (Robert Oppenheimer)

Apollo program

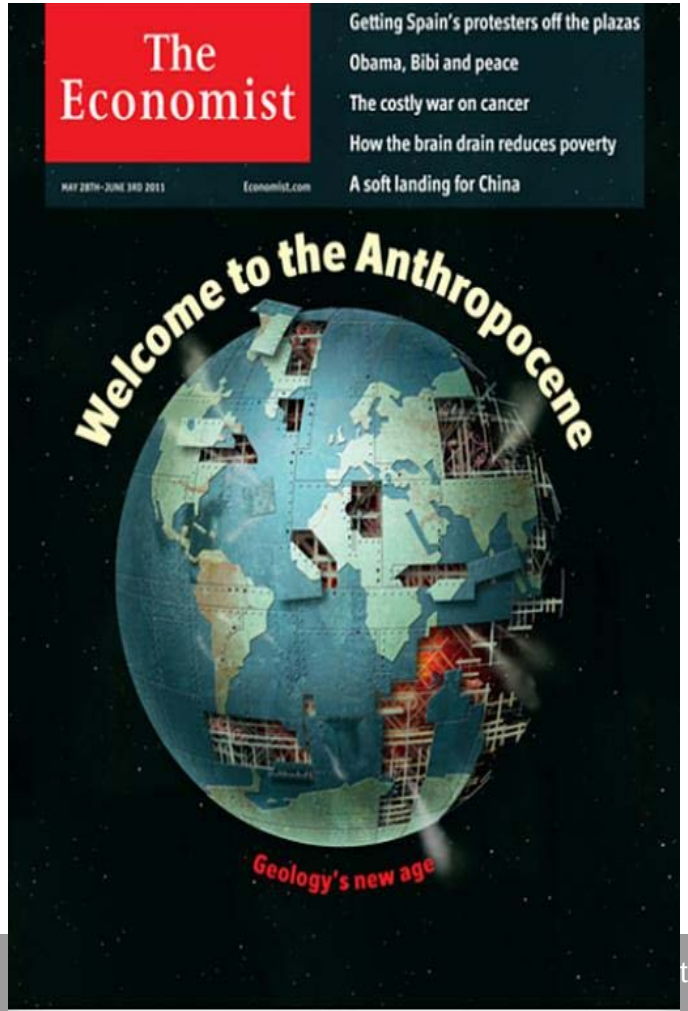
Fukushima: … external shock provoking a political shift: Energiewende

Evolution taught us to cooperate in groups … confronted with other groups.

Cooperation and conflicts are Intimately connected

The transformation towards sustainability: a civilisational challenge

1- End of the 20th century/beginning of the 21st century: Humans being as the most/ a dominant force in the Earth system (Paul Crutzen) – New era for humans/ the planet



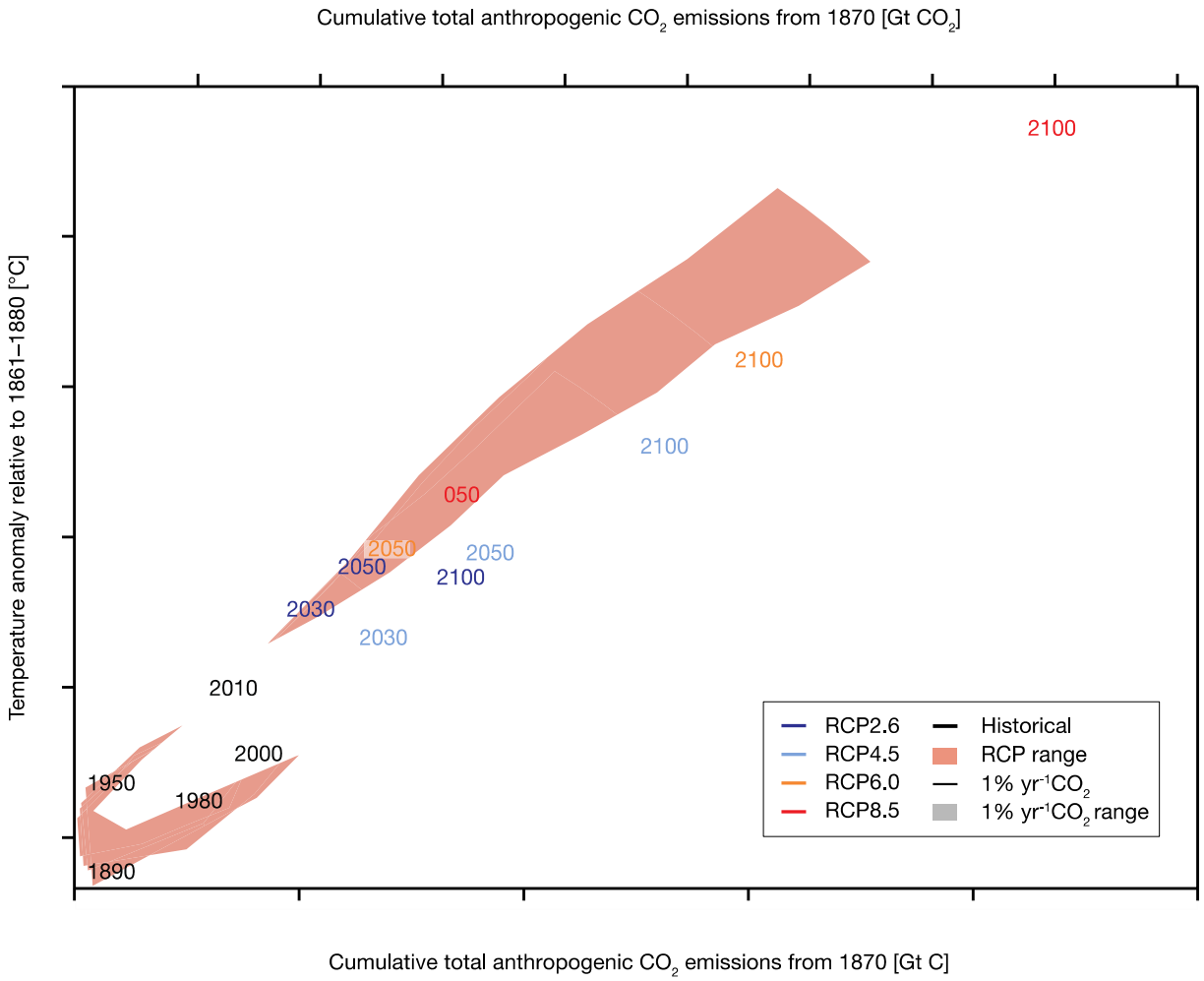
Challenges:

- Stewardship for the Earth system:
- Factor X … shaping globalisation

- Timescales
  - current generations
  - future generations
  - timescales of the Earth system

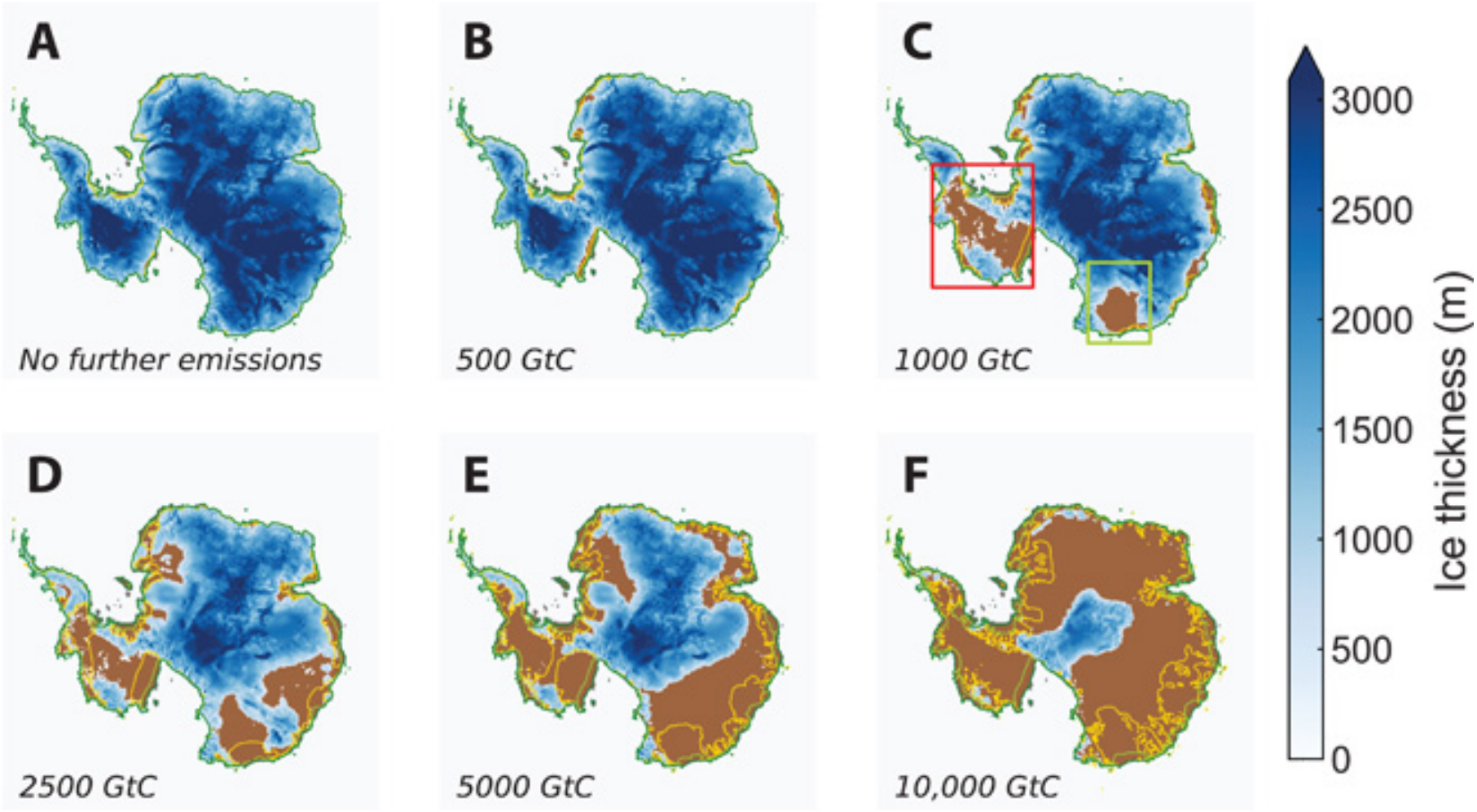
- Global Society
  - 9 billion people
  - World civil society
  - Mutual vulnerability
  - Wealth in the Anthropocene

2 New time dimensions



Source: IPCC, 2013

States of the Antarctic Ice Sheet after 10,000 years



Ricarda Winkelmann et al. Sci Adv 2015;1:e1500589

Published by AAAS

Science Advances

Vielen Dank für Ihre Aufmerksamkeit!

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