



POTSDAM-INSTITUT FÜR
KLIMAFOLGENFORSCHUNG

Socio-economical and Ecological Impacts of Lignite Mining in Brandenburg and suggested Transformation Strategies

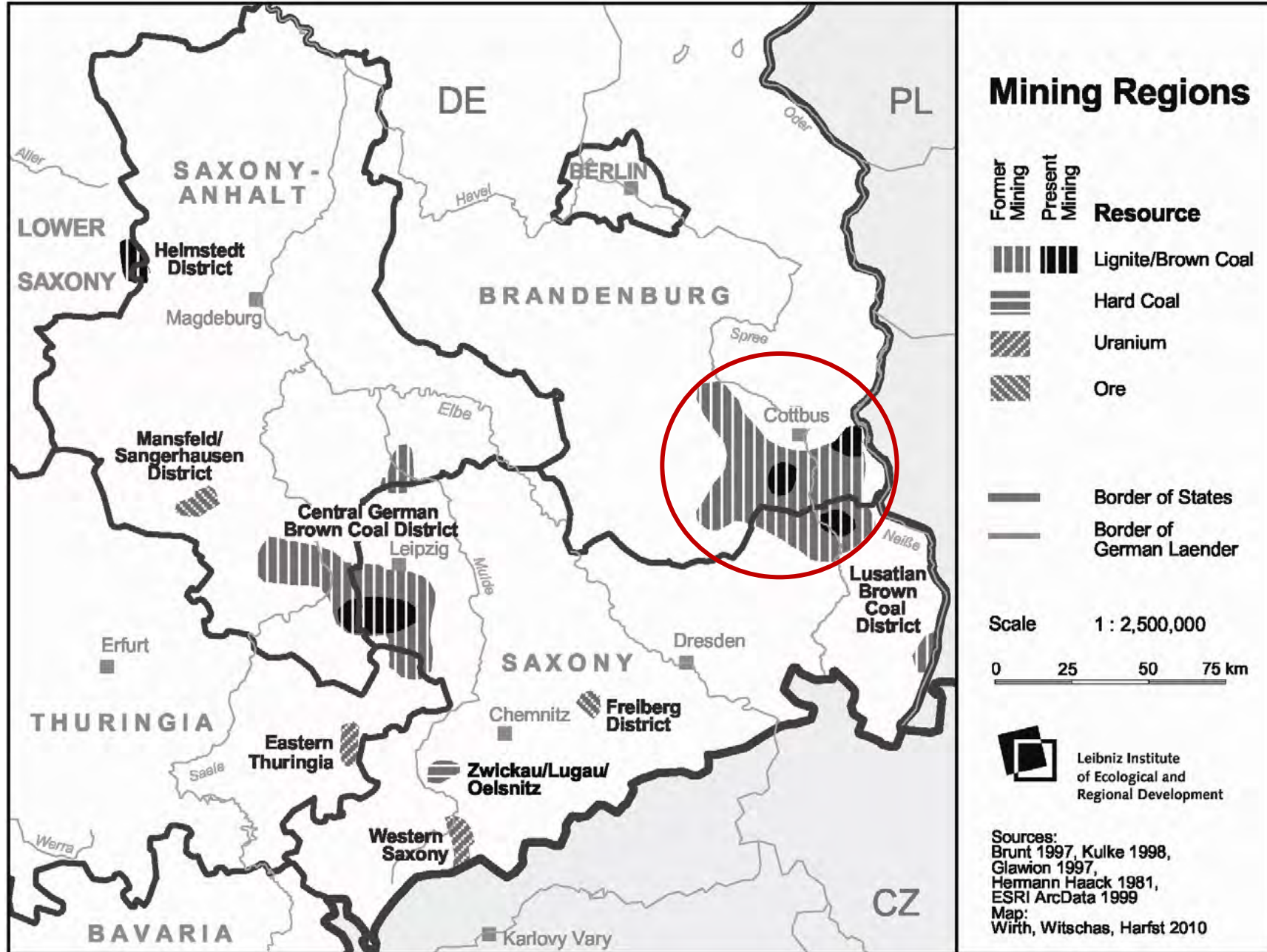
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Potsdam Institute for Climate Impact Research (PIK)
Advisory Board for Sustainable Development in Brandenburg, Chair

**European No Coal Network Meeting
Kerkwitz, 21. August 2014**

Impacts of Lignite Mining in Brandenburg and Suggested Transformation Strategies

1. Economic Impacts of Lignite Mining in Brandenburg
2. Socio-economical and Ecological Impacts
3. Indirect Climate Change Impacts
4. Suggested Transformation Strategies



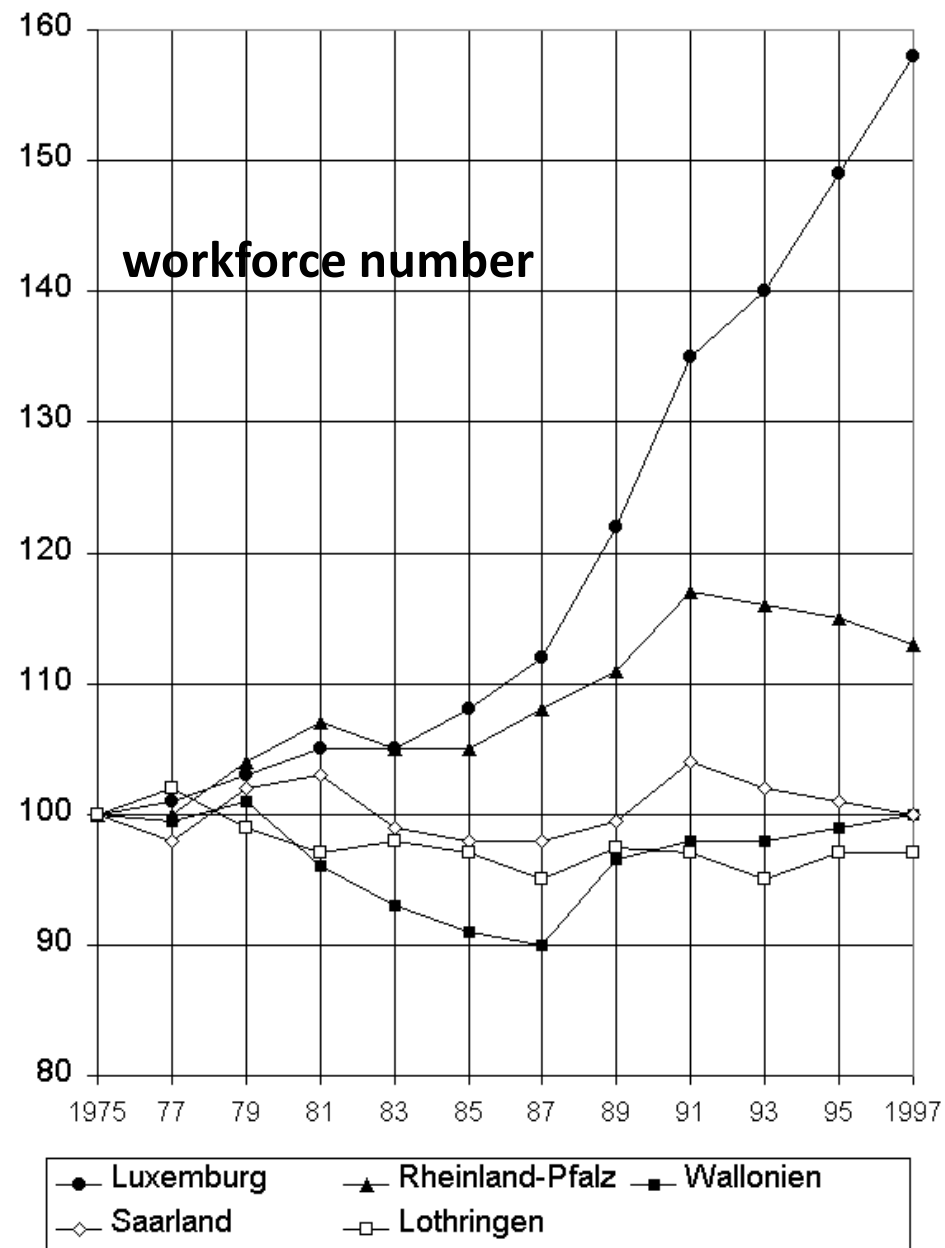
Source: Harfst, J., & Wirth, P. (2011)

Comparative Analysis of Structural Change in Regions depending on Steel and Coal

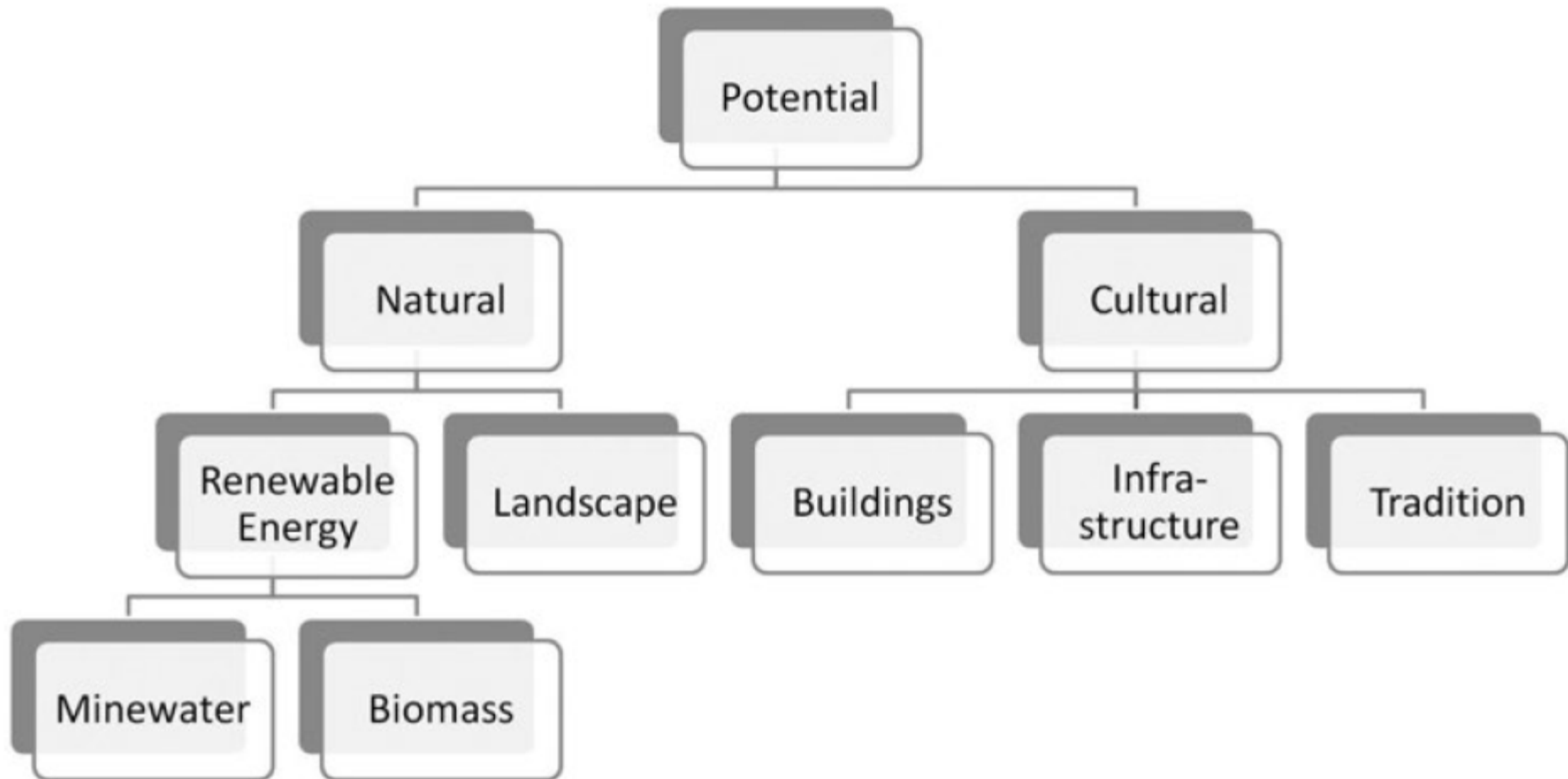
Example Regions

1. Ruhr, Germany
2. Pittsburgh, USA
3. Luxemburg
4. Lille and Surroundings, France/Belgium/Germany

The transformation from an industrial to a tertiary sector society can fail or has long times of poverty due to persistence of outdated structures and strong barriers against innovative projects.



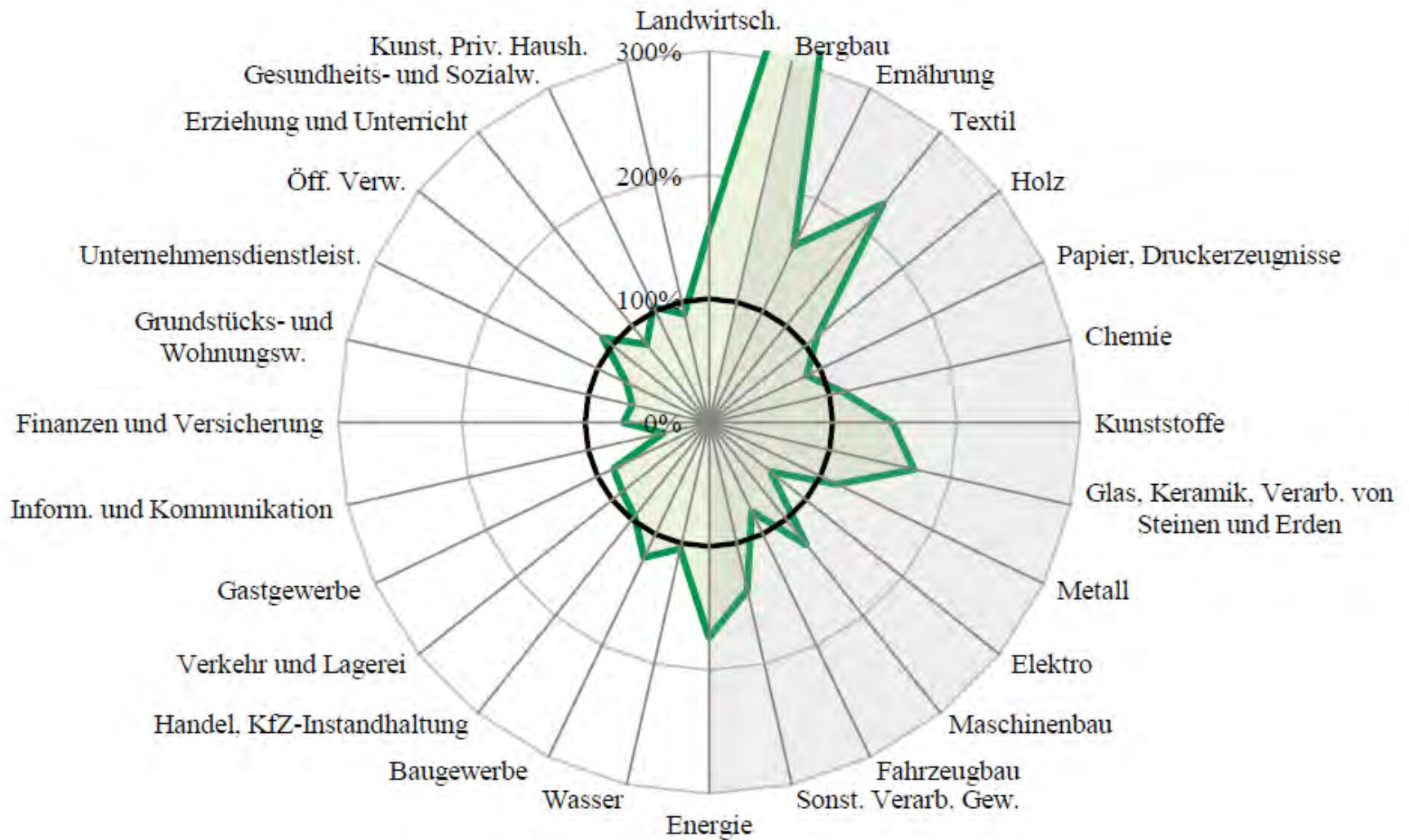
Natural and Cultural Potential of Mining Regions



Wirth, P., Mali, B. Č., & Fischer, W. (2012)

Problems and Potentials of Post-Mining Regions in Central Europe

Compass of economical sectors of Lusatia



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Financial Privileges of Lignite Mining Industry (competitive advantage)

- Explicit and implicit privileges of investments (grants and taxation) ≥ 602 Mio. €/a
 - Extra privileges in East Germany ≥ 150 Mio. €/a
 - Privileged use of natural resources ≥ 202 Mio. €/a
-
- **Sum (without external effects) ca. ≥ 960 Mio. €/a**

Source: Wuppertal Institute 2004

Follow-up Costs of Mining

Constitutionally **covered costs** by causer

- relocation of population and infrastructure (transport & supply)
- land restoration and renaturation at the mining site

Only **partly covered costs** by causer

- disturbance of natural water balance
- mining subsidence damages to private and public property
- long-lasting measures for hazard prevention (e.g. draining)
- unforeseen damaging events

Constitutionally **not covered costs** by causer

- psychosocial disturbances because of relocation
- health impacts due to noise and fine dust (from mining and burn-up)
- limitations of use due to soil instabilities and movements
- loss of natural soil fertility and biodiversity

Financially **not provided costs** by causer

- limited or vanished financial reserves (e.g. insolvency)
- underestimation of follow-up costs and risks
- disregarded “eternally” costs over very long periods

Soil Instability: Structural Damage of Buildings and Landslides



Nachterstedt, 18. July 2009: deadly landslide from former mine area (Photo: DPA)

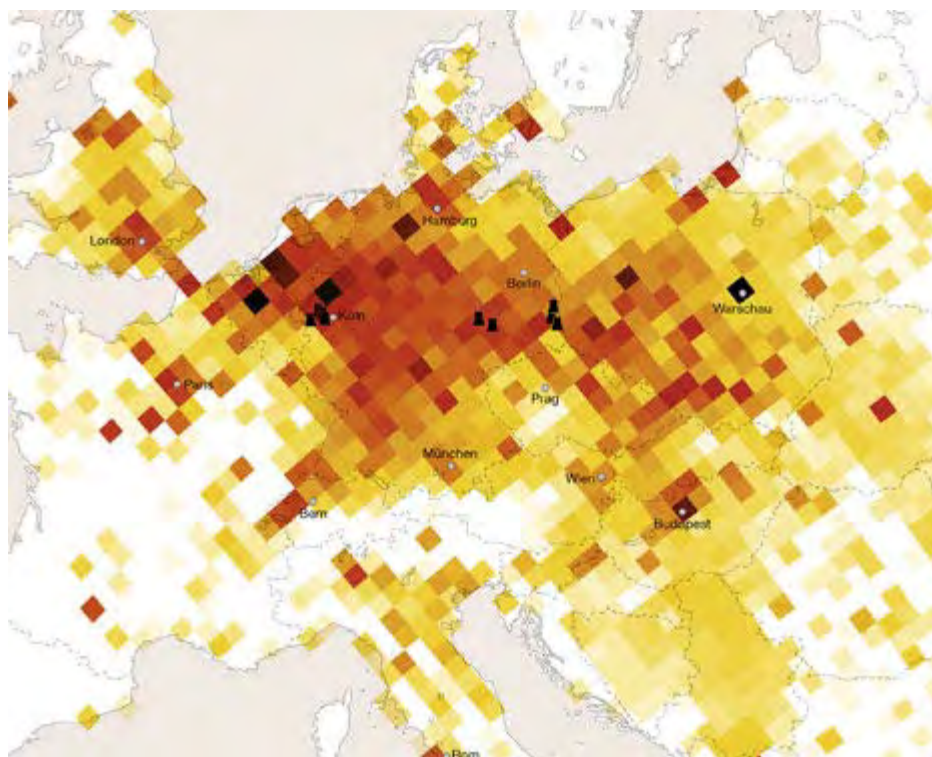
Water Quality Degradation

- Acidification
- Iron ochre sedimentation



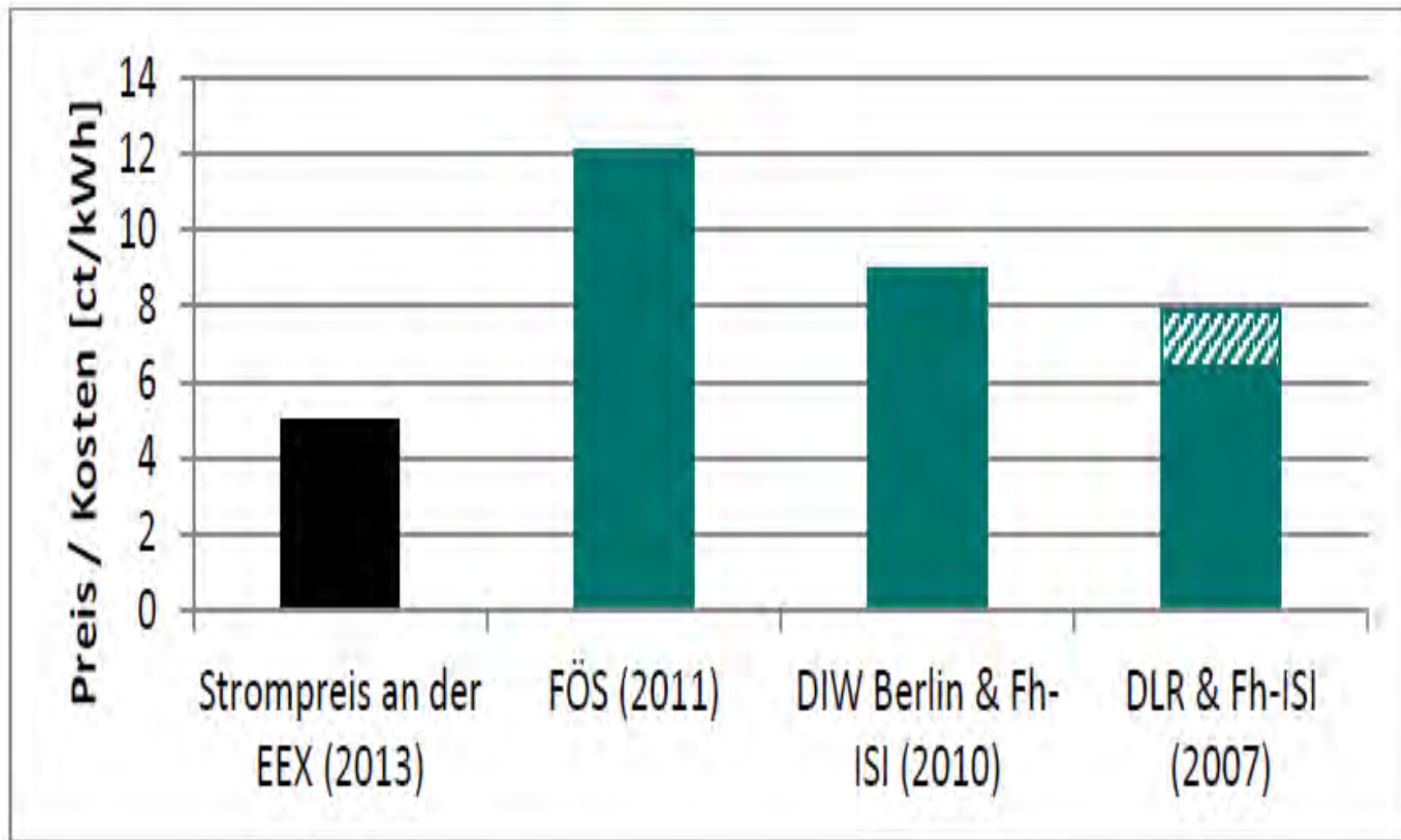
Brawn Spree and Waterway at Ragow/Lübbenau
(Photos dapd)

Health Impacts of Emissions (Fine Dust, Hg,)



Source: aerzteblatt.de 24. April 2013
HEAL-Studie

External Costs of Electric Power in ct/kWh



Source: C. Hirschhausen et al., DIW 2013

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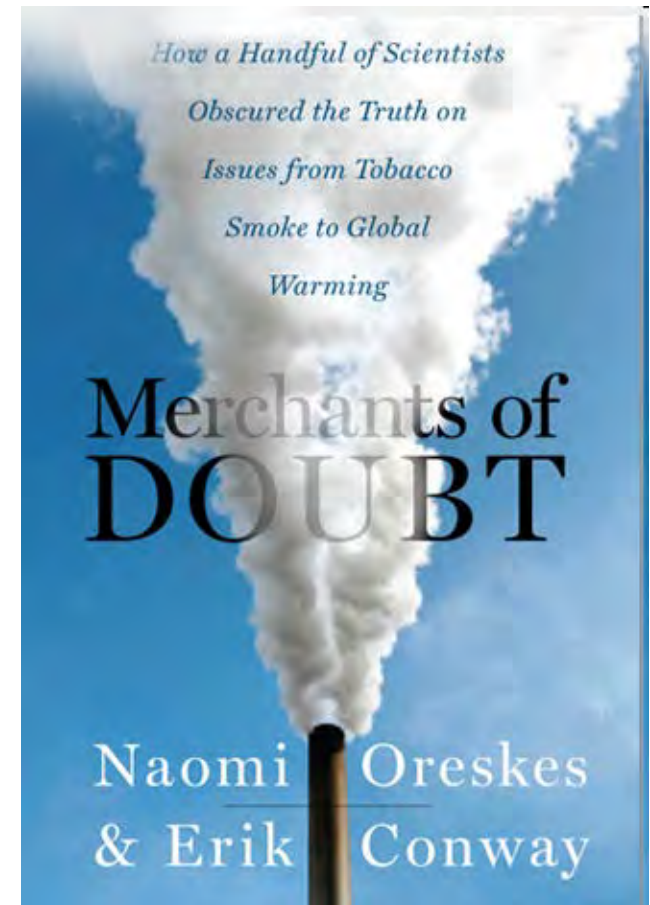
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Book Recommendation: Merchants of Doubt

The troubling story of how a cadre of influential scientists have clouded public understanding of scientific facts to advance a political and economic agenda.

Examples:

- Tobacco Smoking
- DDT / Revisionist Attack (“Silent Spring”)
- Strategic Defense Initiative (Nuclear Winter)
- Acid Rain
- Ozone Hole
- Global Warming



What does the new IPCC Report (AR5-WG1) say about Climate Change?

- 1. The warming is unequivocal.**
- 2. Humans caused the majority of it.**
- 3. The warming is largely irreversible.**
- 4. Most of the heat is going into the oceans.**
- 5. Current rates of ocean acidification are unprecedented.**
- 6. We have to choose which future we want very soon.**
- 7. To stay below 2°C of warming, the world must become carbon negative.**
- 8. To stay below 2°C of warming, most fossil fuels must stay buried in the ground.**



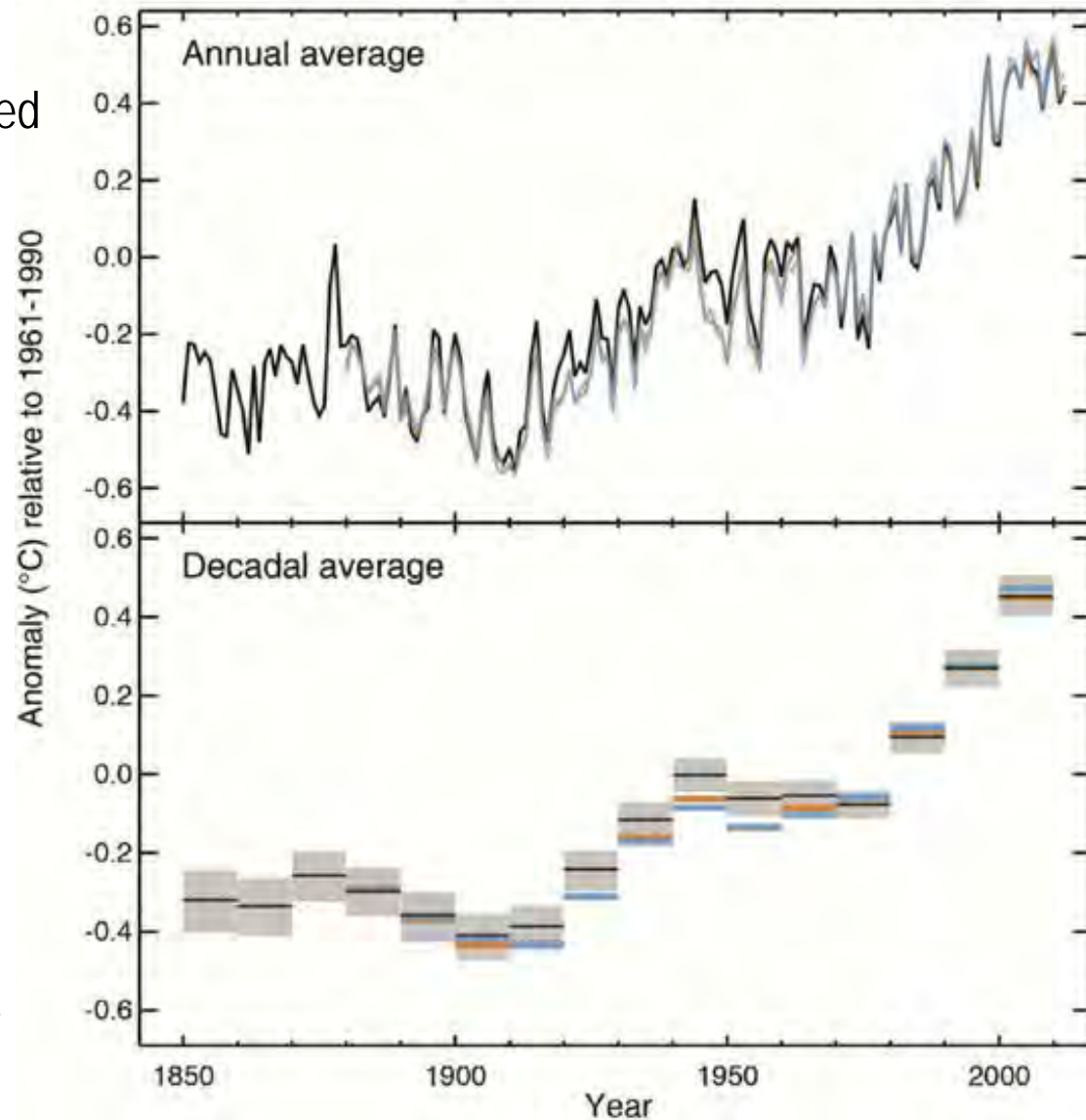
(1) The warming is unequivocal

Fig. SPM.1:

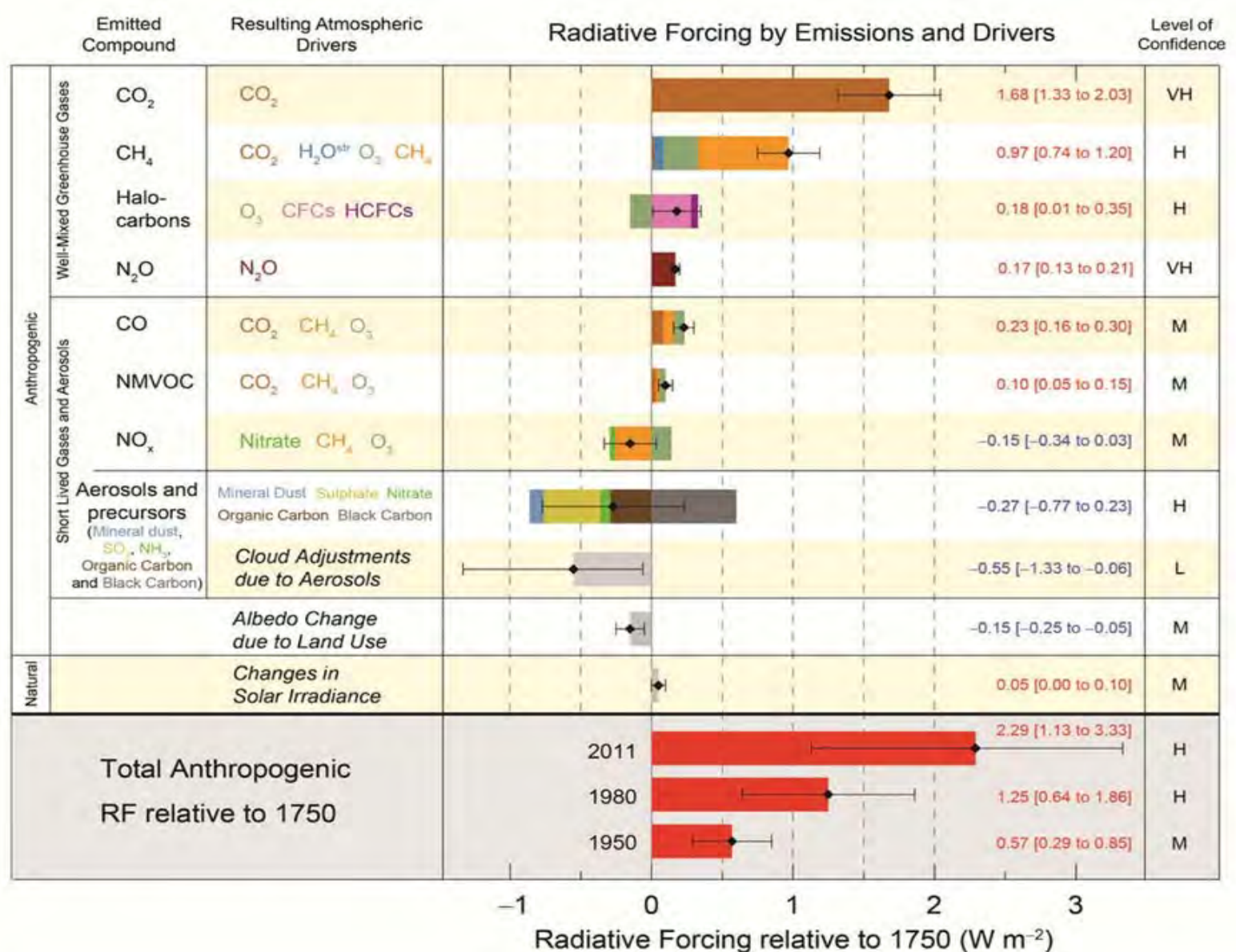
Observed globally averaged combined land and ocean surface temperature anomaly 1850-2012.

SPM:

"Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased."



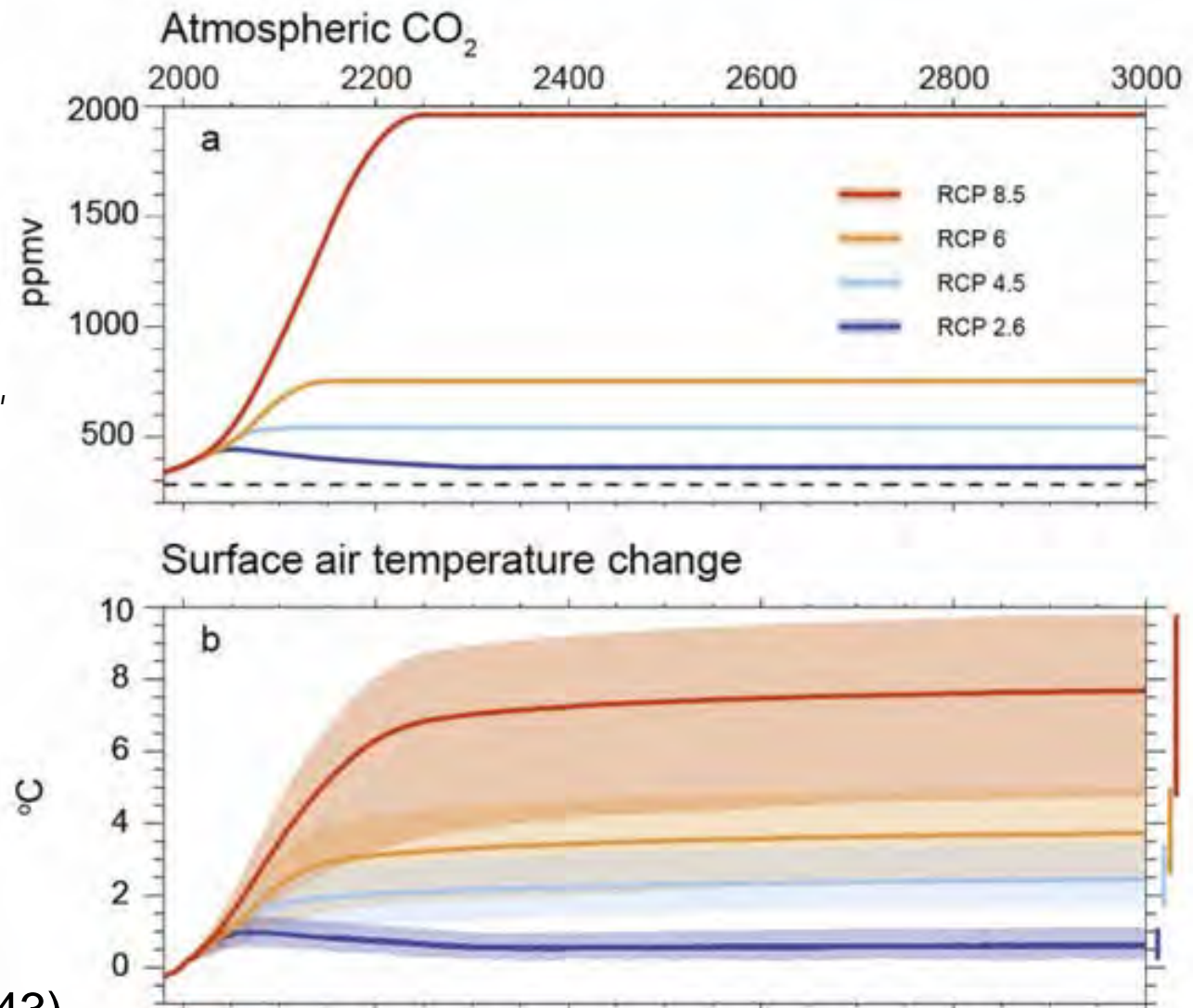
(2) Humans caused the majority of the warming



(3) The warming is largely irreversible

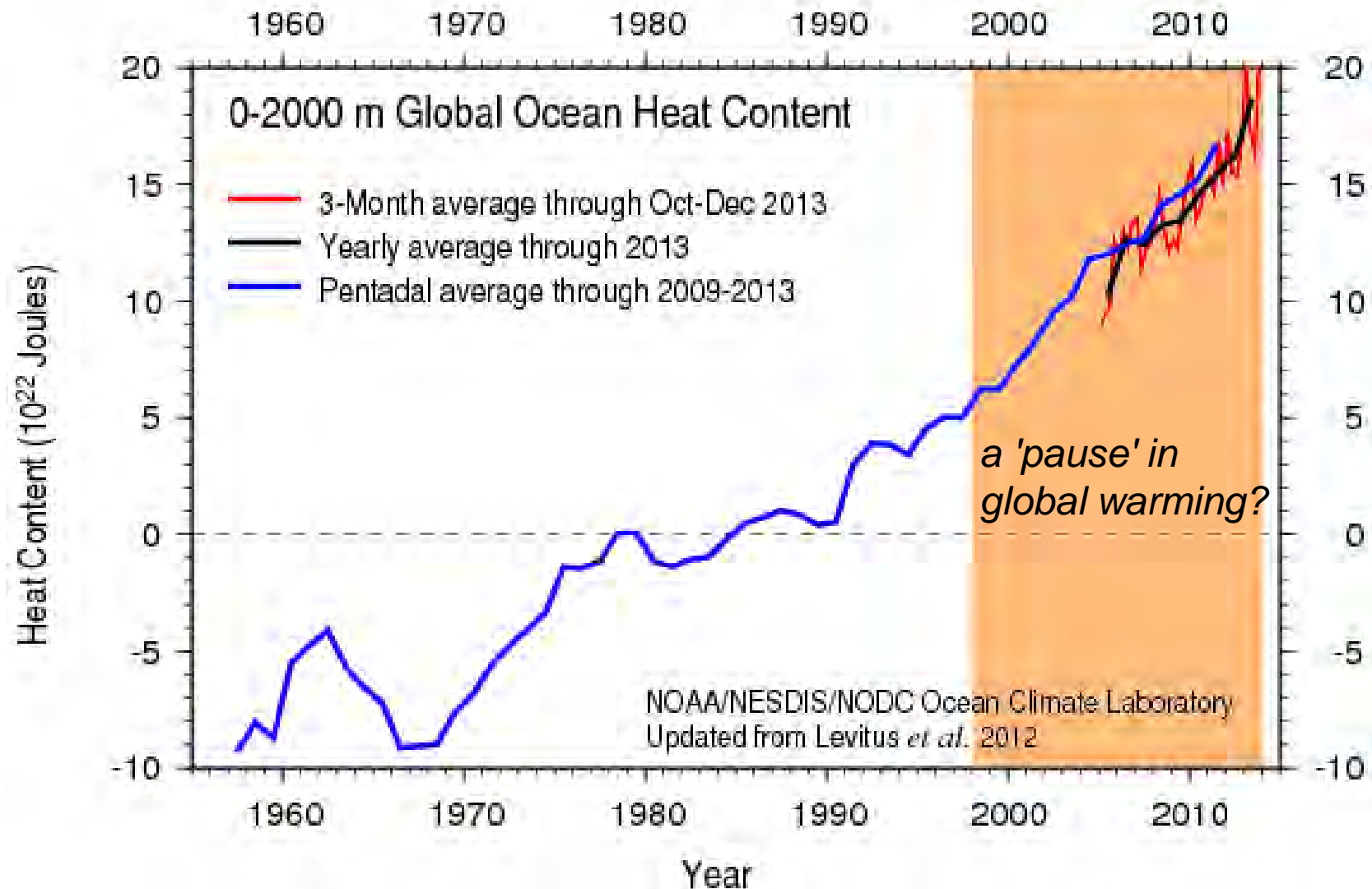
SPM:

"A large fraction of anthropogenic climate change resulting from CO₂ emissions is irreversible on a multi-century to millennial time scale, except in the case of a large net removal of CO₂ from the atmosphere over a sustained period. Surface temperatures will remain approximately constant at elevated levels for many centuries after a complete cessation of net anthropogenic CO₂ emissions."

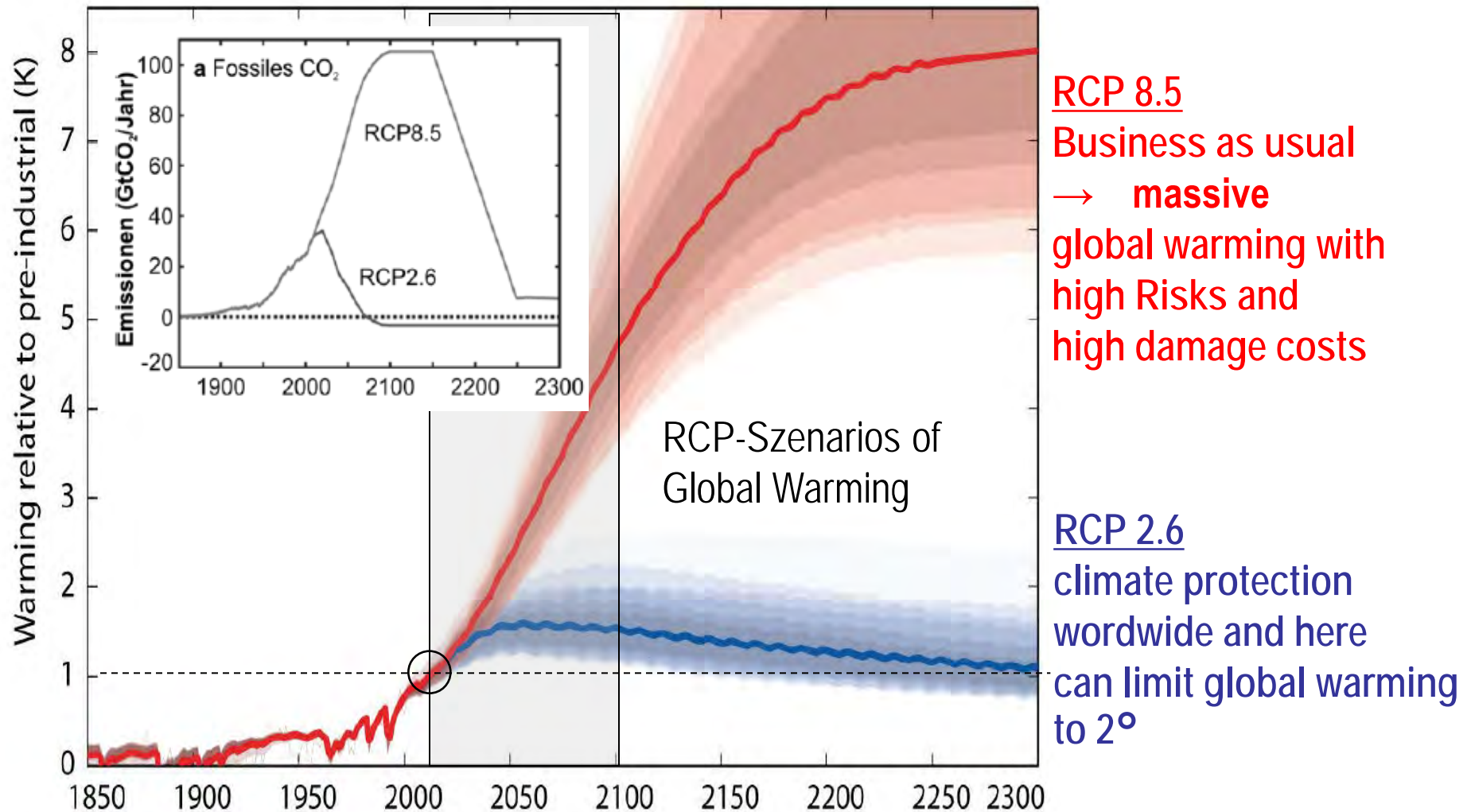


(Fig 12.43)

(4) Most of the heat is going into the oceans



(6) We have to choose which future we want



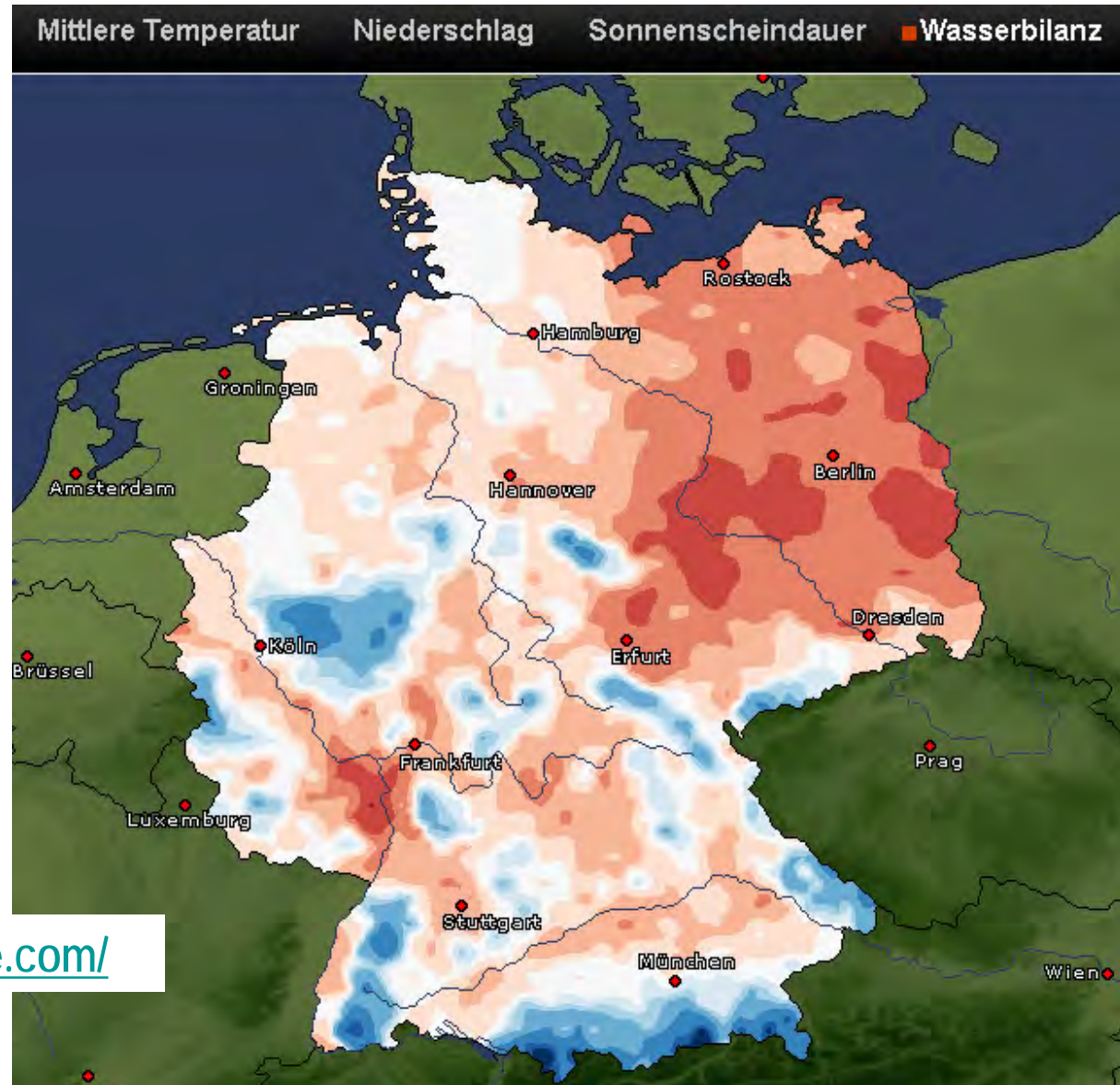
Climate Impacts

Water balance 2021 to 2030 in Germany

Climate Impacts

Water balance 2021 to 2030 Germany

<http://www.klimafolgenonline.com/>



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Regional Cores of Growth and Areas of Competence in Brandenburg and Lusatia



Automotive

Biotechnologie/Life Sciences

Energiewirtschaft/-technologie

Ernährungswirtschaft

Geoinformationswirtschaft

Holzverarbeitende Wirtschaft

Kunststoffe/Chemie

Logistik

Luftfahrttechnik

**Metallerzeugung, -be- und
-verarbeitung/Mechatronik**

Medien/IKT

Mineralölwirtschaft/Biokraftstoffe

Optik

Papier

Schienenverkehrstechnik

Tourismus

Mikroelektronik

(Querschnittsbranche)

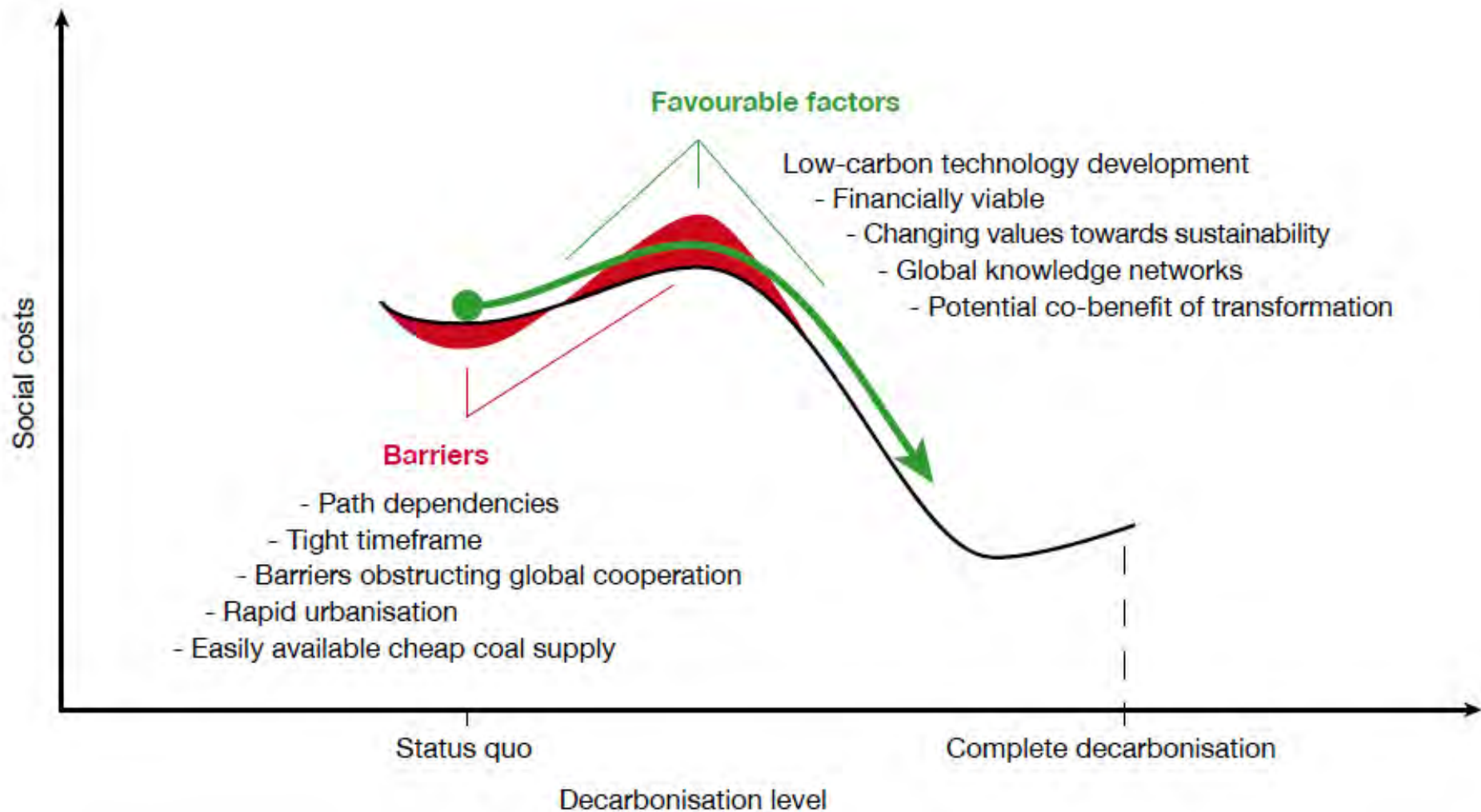


Ten Transformative Measure Bundles

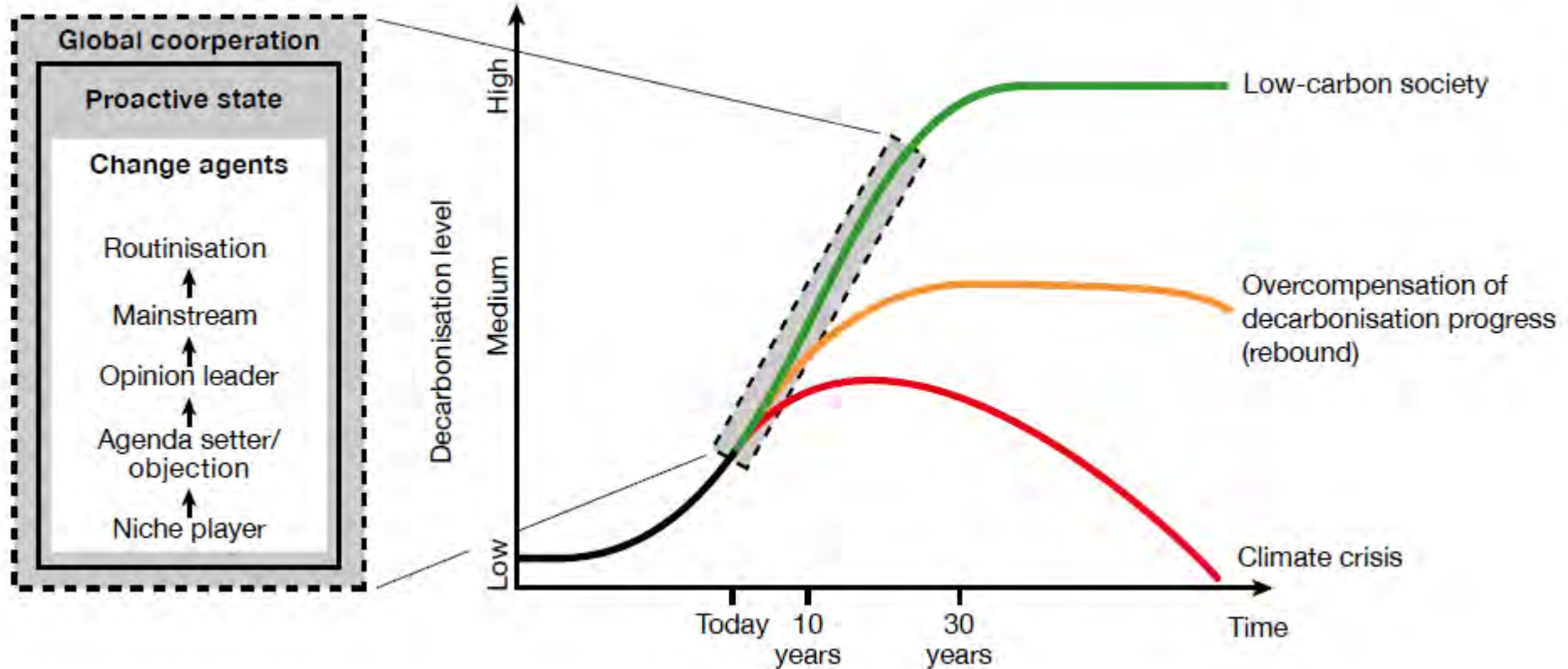
1. Improve the Proactive State with Extended Participation Opportunities
2. Advance Carbon Pricing Globally
3. Promote a Common European Energy Policy
4. Accelerate Promotion of Renewable Energies on a Global Level through Feed-In Tariffs
5. Promote Sustainable Energy Supply Services in Developing and Newly Industrialising Countries
6. Steering the World's Rapid Urbanisation towards Sustainability
7. Advance Climate-Friendly Land-Use
8. Encourage and Accelerate Investments into a Low-Carbon Future
9. Improve International Climate and Energy Policy
10. Pursue a Revolution in International Cooperation



Topography of the Transformation Process

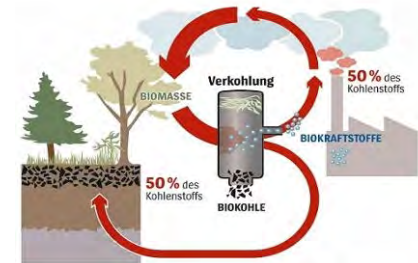
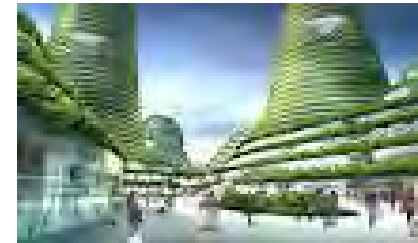
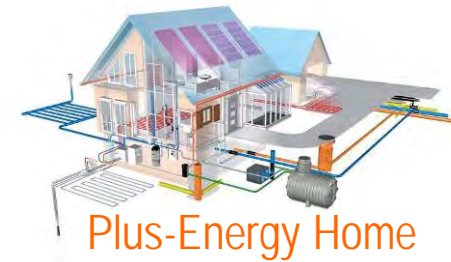


Temporal dynamics and action levels of transformation



Seven Cardinal Innovations for the Transition to Sustainable Development

1. Integration of decentralised renewable energy sources in intelligent networks ("Supersmart Grids")
2. From energetic restoration of buildings to plus-energy homes (domestic power plants)
3. Modular e-mobility (apart from storage)
4. Systemic optimised industrial production („Cradle to Cradle")
5. Holistic regional planning and innovative types of urban and rural land use
6. Sustainable biomass management, soil melioration ("de- & anti-Carbonising")
7. Regenerative water supply systems (e.g. "solar desalting ")



Life is mainly a matter of deciding what's important.

Thank you for your kind attention!

