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Deutsches Institut für  
Entwicklungspolitik

WBGU

Wissenschaftlicher Beirat der Bundesregierung  
Globale Umweltveränderungen

# Great Transformation 2.0: A Social Contract for Sustainability

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**Visions and Strategies for Long Term Transformative Change to  
Sustainable Development in the 21st Century**

Yautepec, Morelos, Mexico, 10–13 September 2012

## **Karl Polanyi (1944): Modern industrial society**

- Stabilization and acceptance of „industrial revolution“
- Embedding of market forces
  - Rule of law
  - Democratic participation
  - Welfare policies

## **WBGU (2011): Sustainable world society**

- Overcoming fossil-nuclear metabolism
  - New „Contrat Social“ that reflects and consolidates
    - Culture of attentiveness (ecological responsibility)
    - Culture of participation (democratic responsibility)
    - Culture of obligation for future generations (future responsibility)
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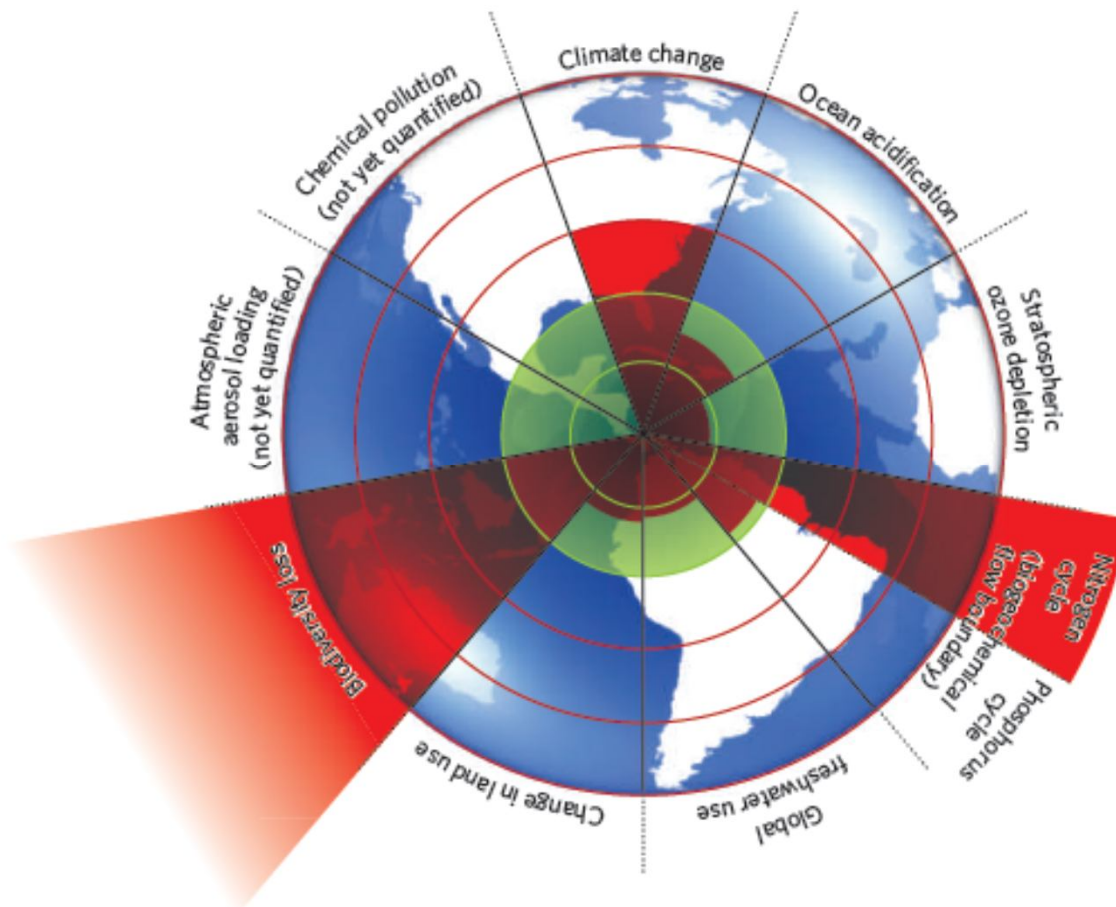
## Contents

1. Why another „Great Transformation“?
  2. Is a global transformation towards sustainability feasible?
  3. Key transformation areas: energy, urbanization, land use
  4. Recommendations: Ten arenas for action!
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- **unmitigated climate change**
    - growing demand for fossil energy
    - more greenhouse gas emissions
  - **continuous environmental degradation**
    - loss of biodiversity, degradation of land and soil, deforestation
    - warming and acidification of oceans
  - **scarcity of arable land vs increasing demand for agriculture**
  - **growing world population (ca. 9 billion / 2050)**
    - rapid urbanisation, growing global middle classes
    - 2010: > 1 billion people without access to safe drinking water
  - + measurable progress in human development, declining poverty
  - + spread and consolidation of democratic governance
-

# „Planetary Boundaries“

prohibitive for „business as usual“ approach to sustainable global development



Source: Rockström et al. in *Nature* 461, 24 September 2009



„We simply can't scale up existing growth patterns!“  
(Michael Spencer)

## Focus on global low carbon development

- avoiding dangerous climate change is not the only challenge, but a *conditio sine qua non* for sustainable global development
- „two centigrade - guardrail“
  - max. 750 billion t CO<sub>2</sub> from fossil sources by 2050
  - global CO<sub>2</sub>-Budget without transformation est. 20 years

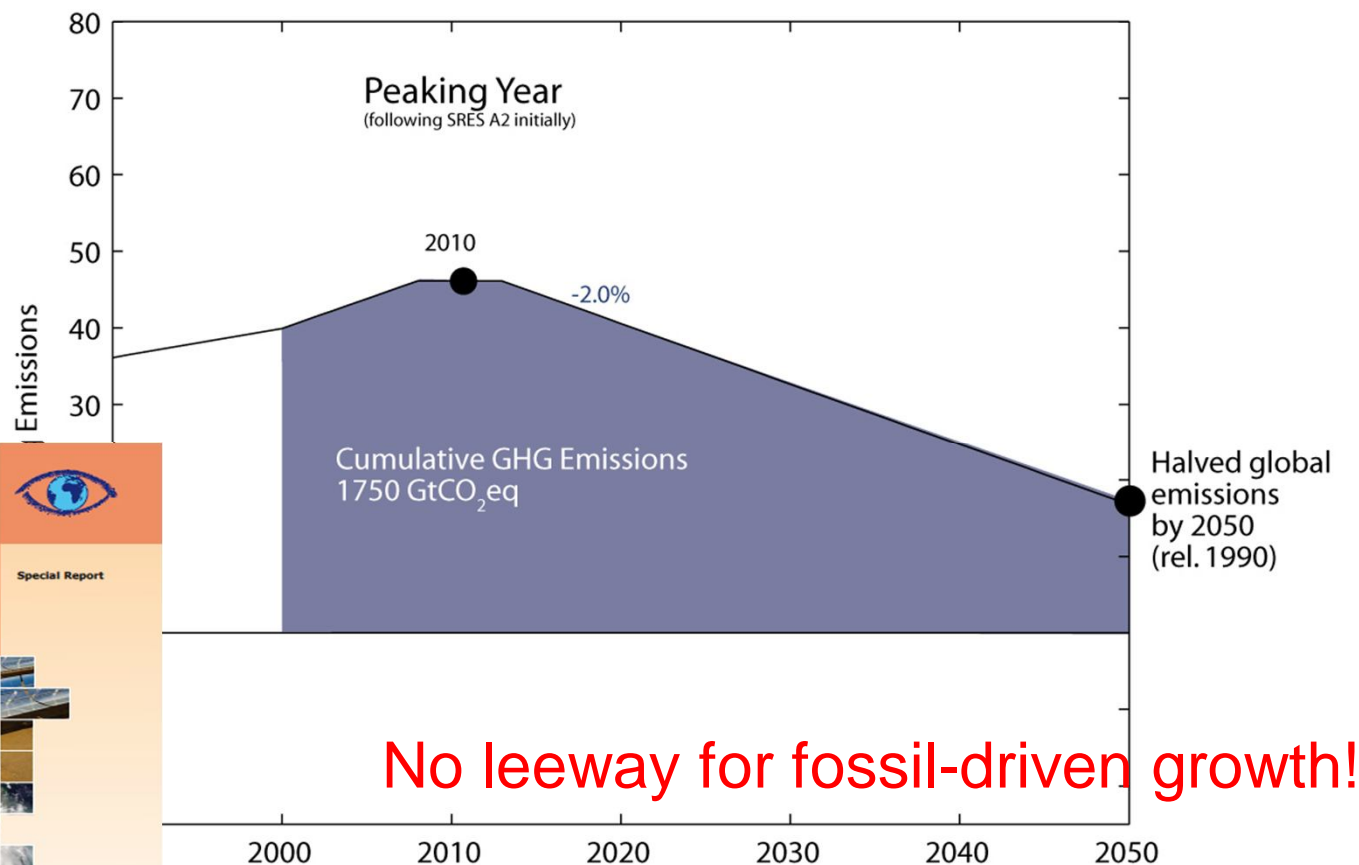
## Key messages

- No future for fossil-nuclear driven economy!
  - Transformation is already under way, yet its outcome remains to be seen!
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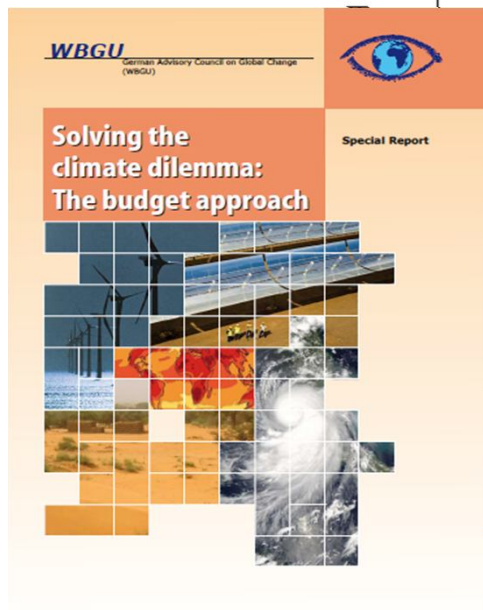
Global greenhouse gas budget: 750 Gt (2° C, 67 %)



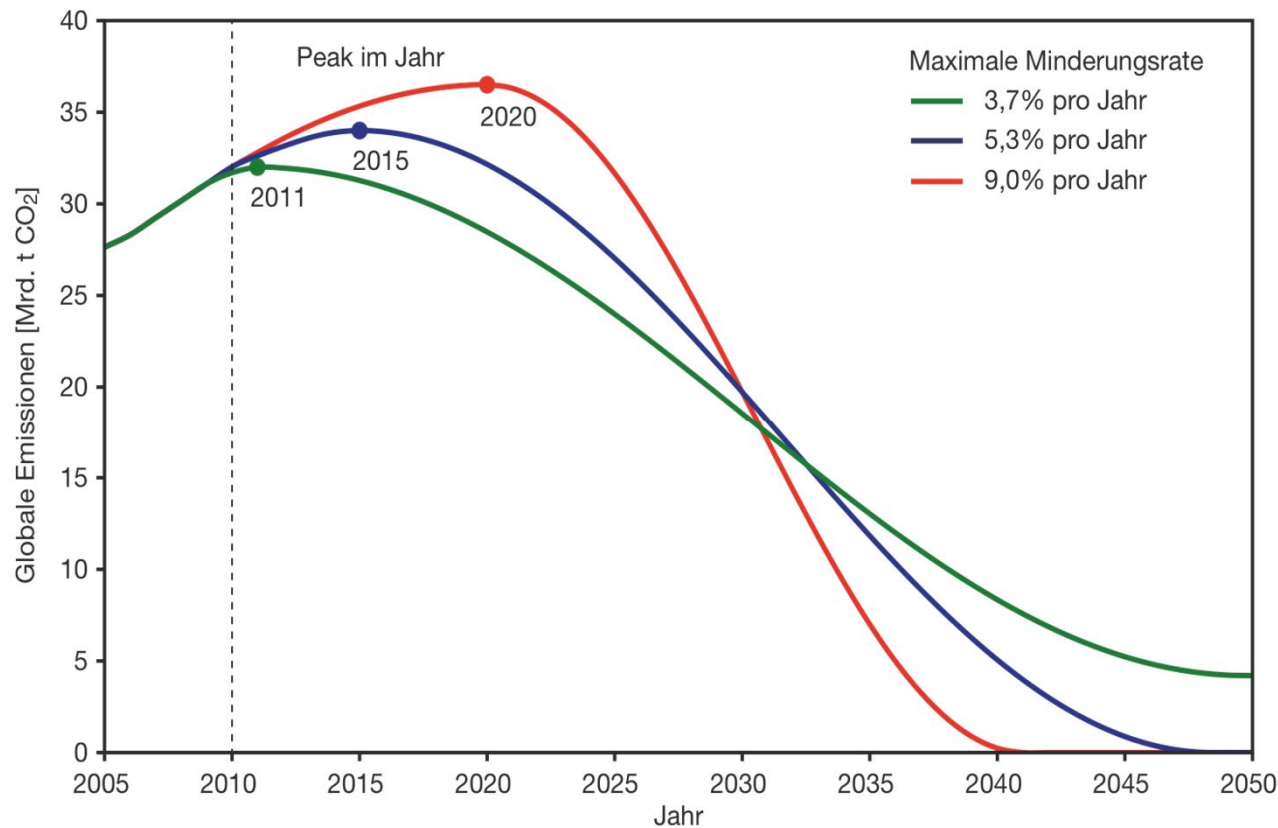
... exhausted in 20 years (emissions at current levels)



No leeway for fossil-driven growth!



## Time is tight!



*Transformation needs to be global:*

- 2,5 t per capita 2010-50
- already 110 countries above 2 tons per capita

# Great transformations: past and present

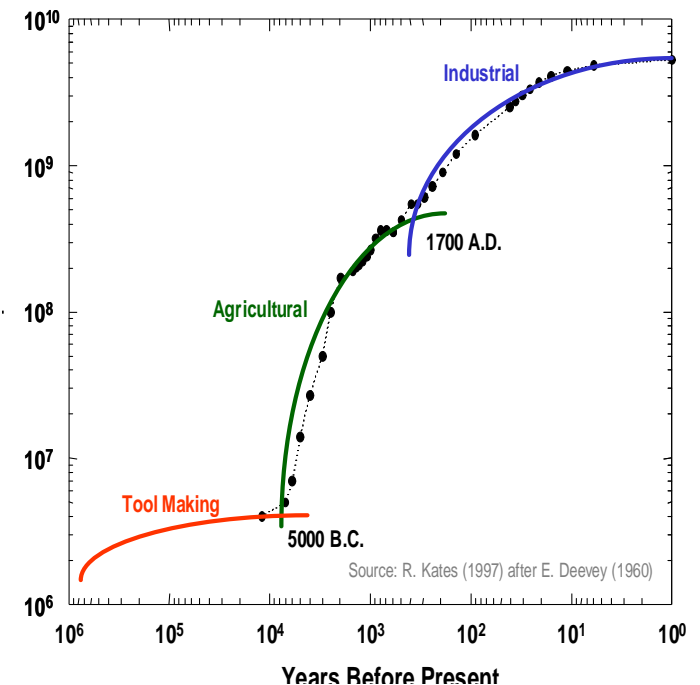
## Historical transformations

- Neolithic revolution: emergence of agriculture
- Industrial revolution: emergence of fossil energy

## Sustainability transformation

- Respect planetary boundaries
- Decarbonization
- Global scope

... needs to be actively managed!



## Some medium-range lessons from history

### **Vision:** normative drivers

- Abolition of slavery
- European integration

### **Crisis:** responsive drivers

- Hunger crisis: „Green Revolution“ in agricultural production
- Debt crisis: structural adjustment programmes

### **Knowledge:** cognitive drivers

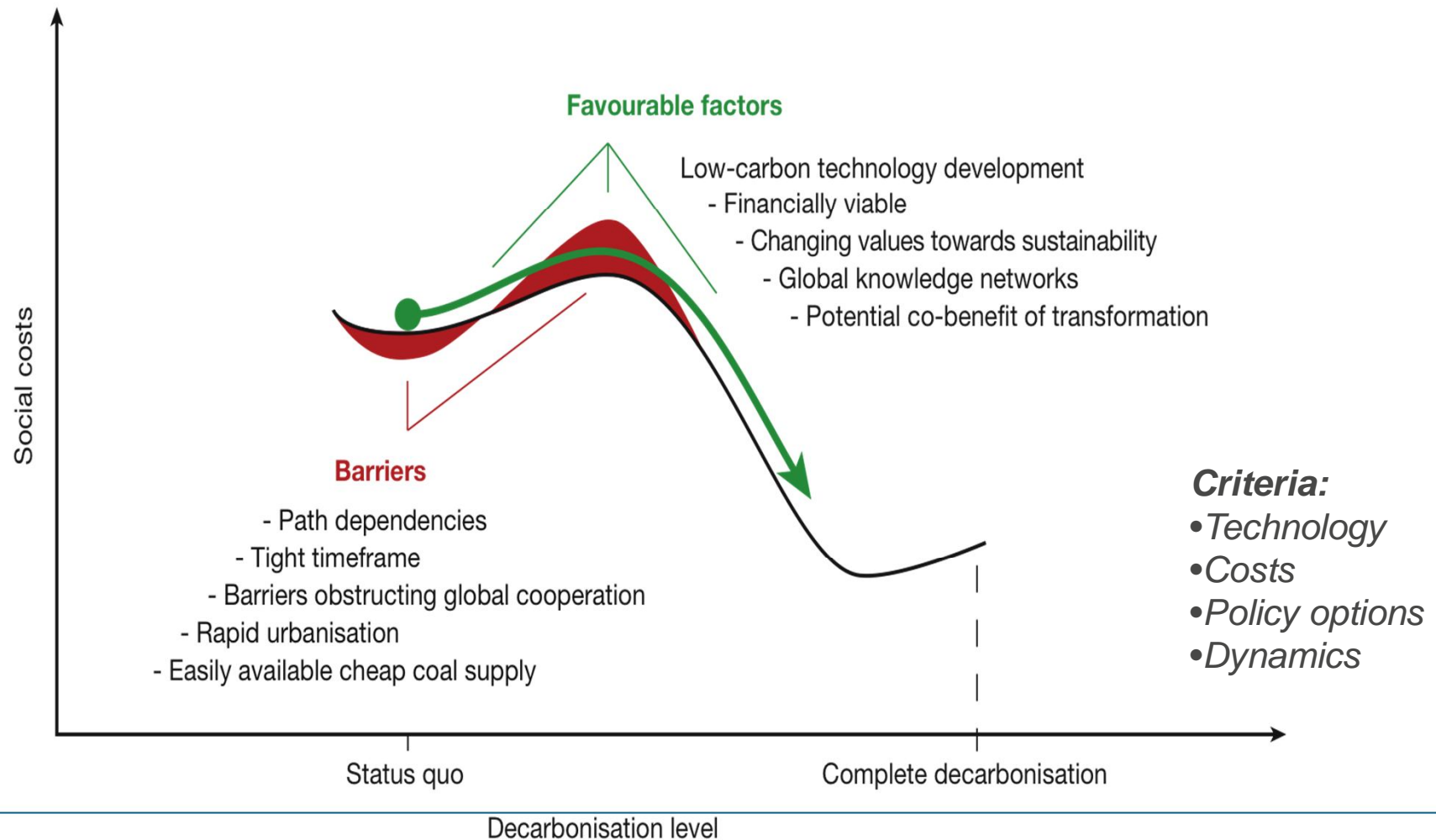
- Protection of the stratospheric ozone layer

### **Technology:** innovative drivers

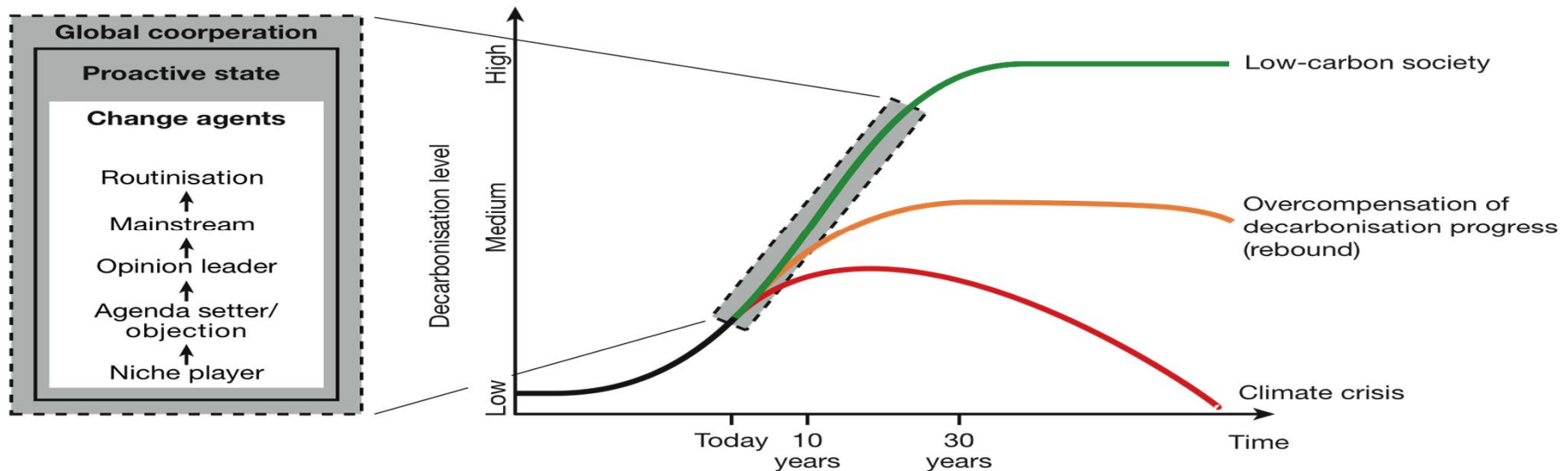
- IT-Revolution & World Wide Web
-

# Where do we stand?

*Five good news ... five major challenges*



# Ideal-typical transformation trajectories



WBGU 2011, adapted from Grin et al. 2010

## ***Transformation is already under way!***

- Challenges of the „fossil regime“ at least since „Limits to Growth“ and awareness for „peak oil“ (1970s)
- Trajectory is not predetermined, but we are now facing critical junctures (2010-2020)

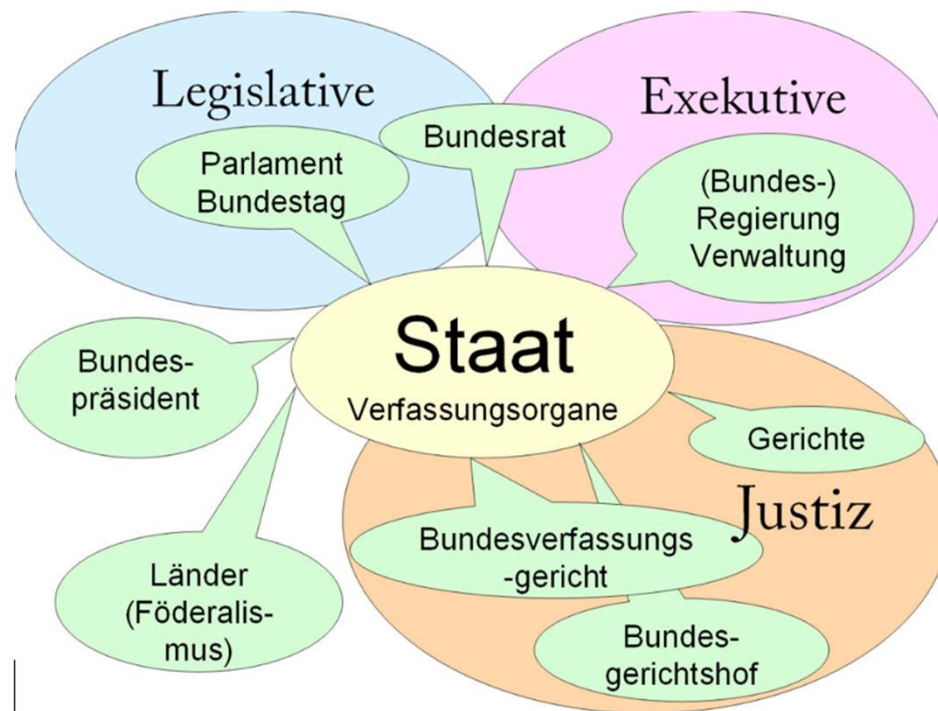
## Obstacles in the way of transformation

- institutional „short-termism“ & dilatoric decisionmaking
    - electoral cycles, quartely business statements etc.
    - comissions instead of decisions
  - powerful veto-players, driven by interests or ideology
    - behavioural path dependencies, knowledge-action-gaps
    - resourceful economic interest groups, corruption
  - political fragmentation & lack of coherence
    - tenacity of established policies impedes innovation
    - turf battles, consensualism, capacities
  - lack of representation undermines acceptance
    - „Input-Legitimacy“ vs. „Output-Efficiency“
-

# Need for proactive & enabling states!

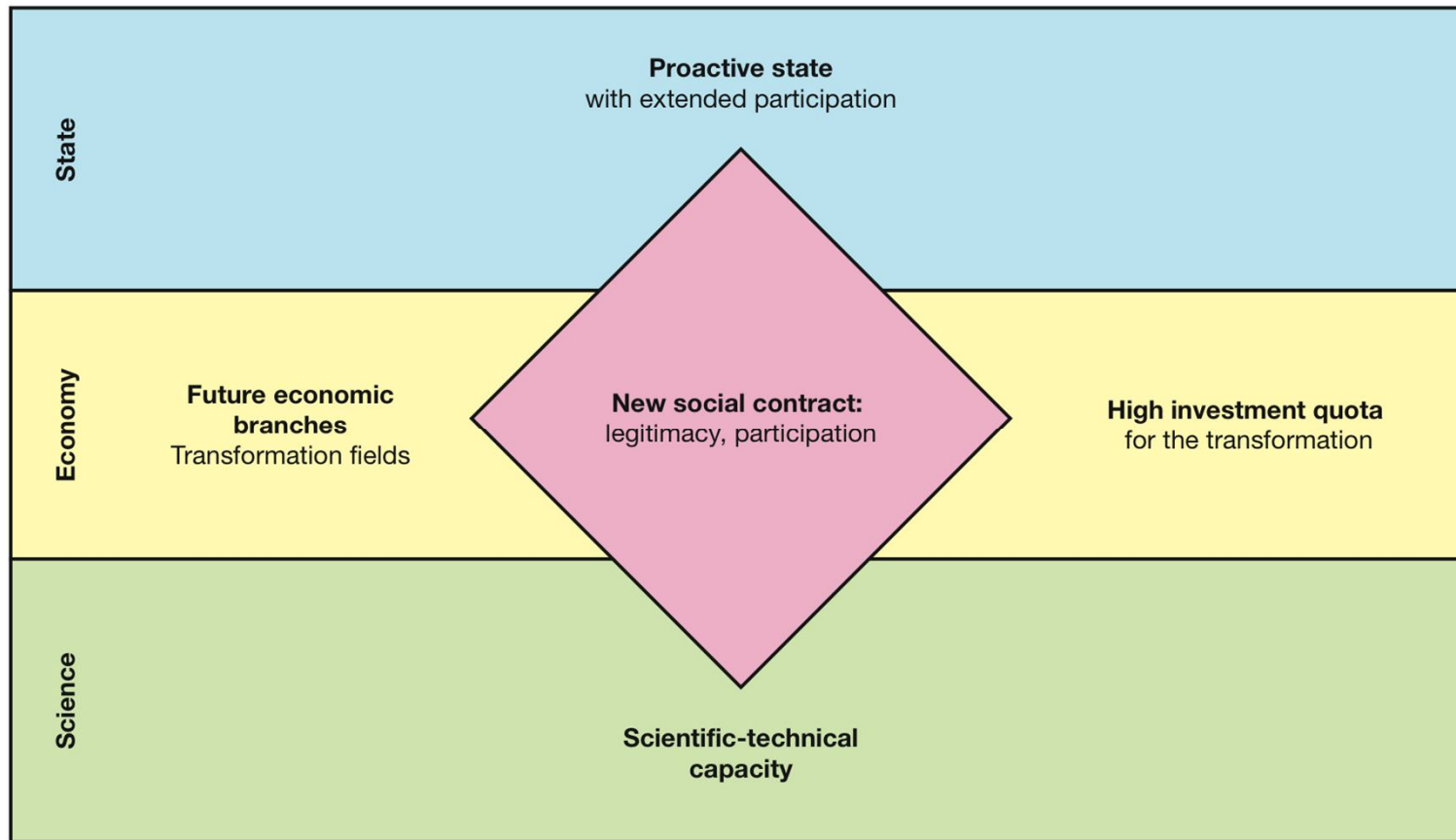
(Arena #1 of WBGU Recommendations)

- Governments should prioritize, promote & mainstream decarbonisation
- on the basis of liberal democracy and rule of law
- accompanied by extended participation of civil society



- avoiding dangerous climate change as a constitutional objective
- advance and implement commensurate legislation
- institutions to integrate interests of future generations
- compulsory staff exchange with partner countries in ministries and administration

# Action Levels of Transformation



# Key areas of decarbonization:

Energy – Urbanization – Land Use



- Brown coal mining, Germany
- Megacity Lagos, Nigeria
- Soy crop expansion in the Amazon

*(Sources: Express, ORF, SPON)*

## Trends

- „Fossil growth“ is still on the rise
  - global energy supply > 80% fossil
  - yet 3 billion people without access to modern energy („energy poverty“)

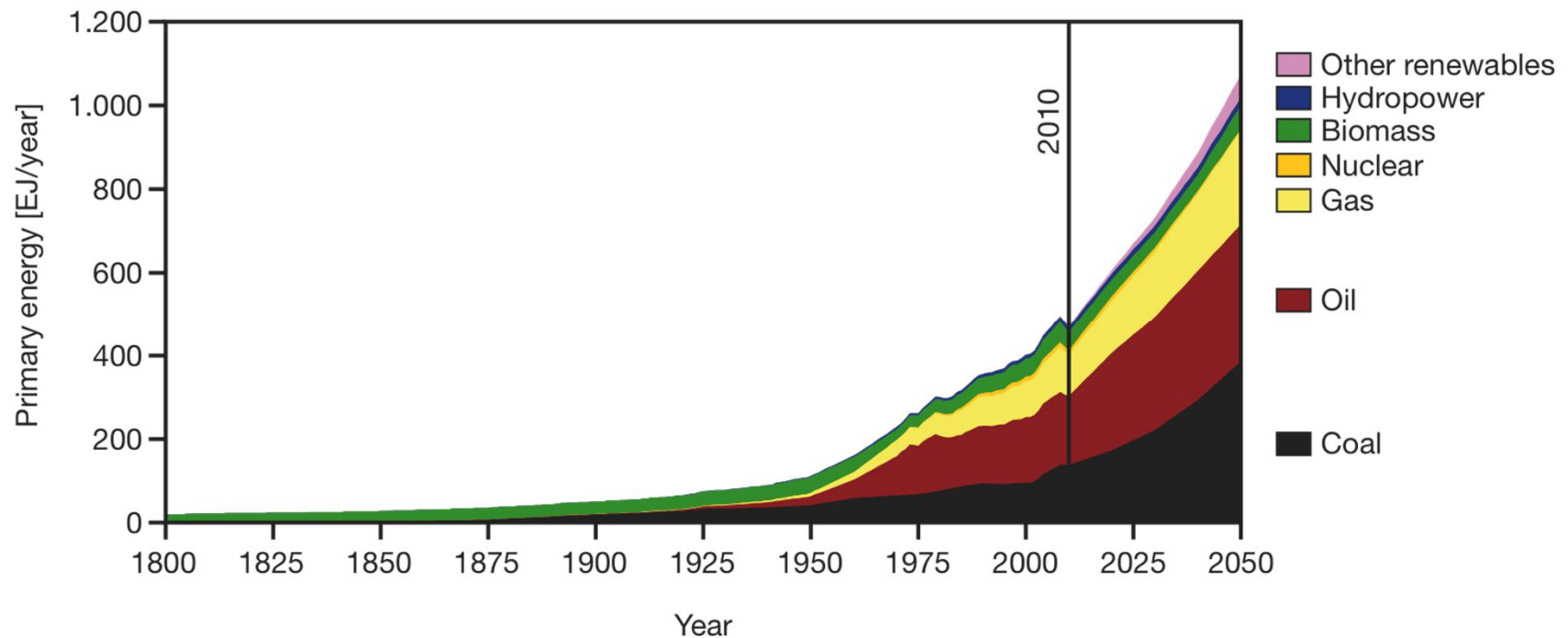
## Challenges

- access to modern energy services for all, world wide
- decarbonization of energy systems by 2050

## Preconditions

- stabilize global demand for primary energy: today 350 EJ; 2050 < 500 EJ
  - massive improvements in energy efficiency
  - changes in lifestyles
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## BAU Projection of Primary Energy Demand = Highway to Dangerous Climate Change

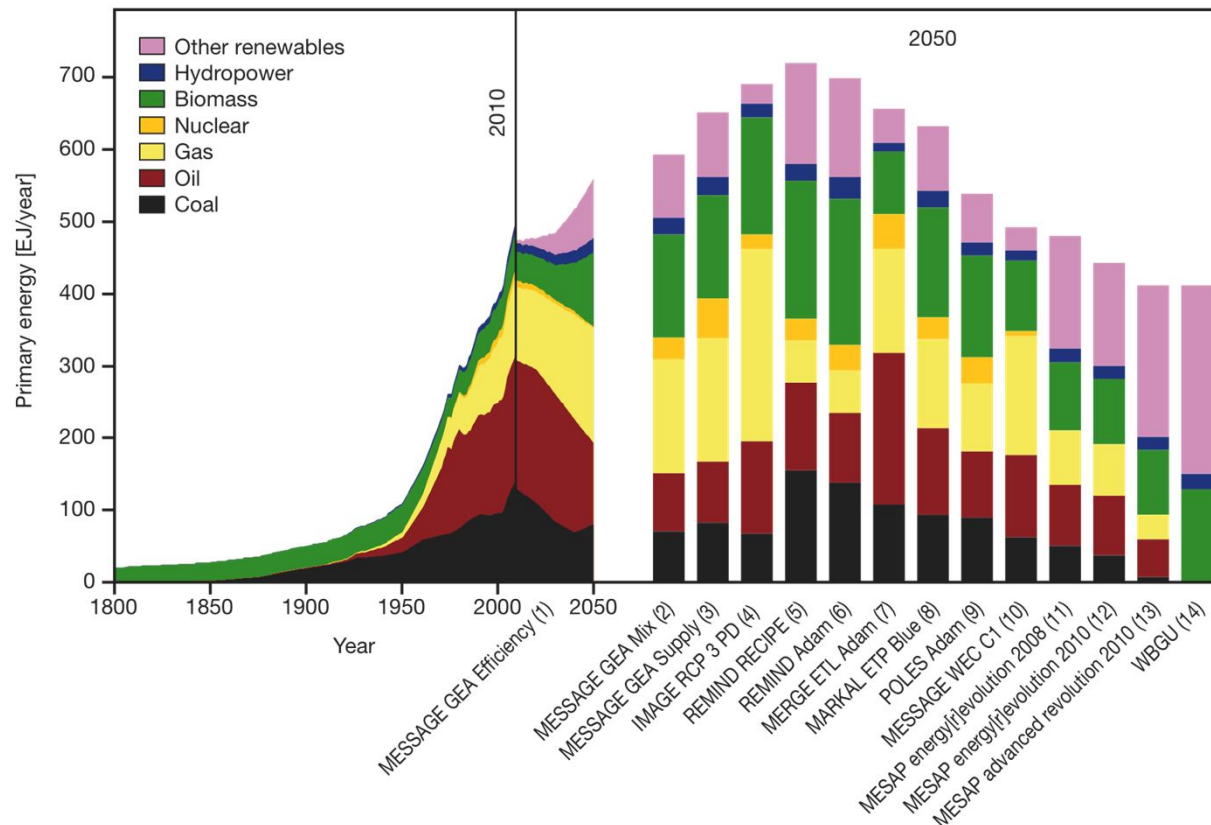


Source: WBGU based on data from GEA, 2011

# Global Primary Energy Demand: Transformative Scenarios

## Requirements:

- 80/20 → 20/80  
large-scale investments in renewables
- energy/carbon efficiency  
needs to improve drastically
- stabilization of global energy  
consumption at 450-500 EJ
- change of lifestyles
- realize regional solutions  
(cheaper than national!)



Sources: WBGU, based Nakicenovic, 1998; EREC and Greenpeace, 2008, 2010; IEA, 2008b; Edenhofer et al., 2009a, 2010; IIASA, 2009; GEA, 2011

### Arena #3: Common European Energy Policy

• By 2050 at the latest the EU should implement a low-carbon and nuclear free energy system.



- Realization of cost reduction from transition to low-carbon energy supply
- Development of transeuropean grid
- Creation of European domestic energy market
- Support energy partnerships with Northern African states

## Arena #5: Fight Energy Poverty

- Facilitate access to safe and sustainable energy for 3 billion people who lack access to modern energy services



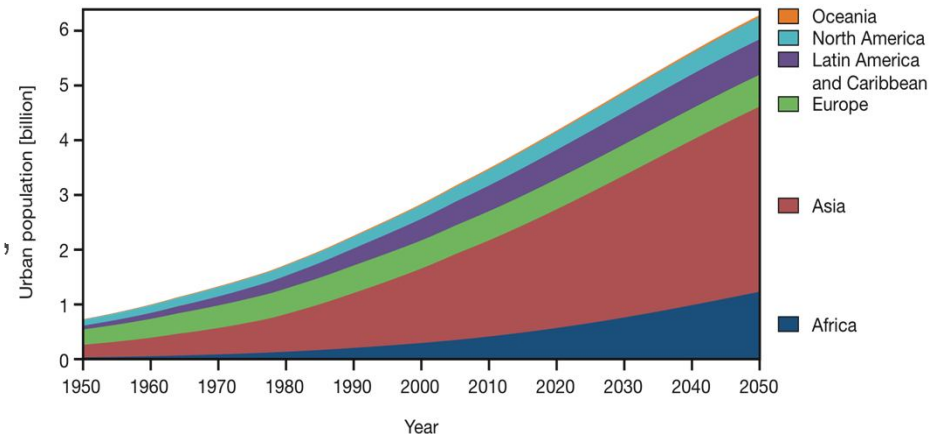
- Modern rural energy systems, notably in Sub-Saharan Africa
- Extend DESERTEC towards the South

## Trends:

- $\frac{3}{4}$  of global energy is used in cities, rising trend
- urban growth creates new long-term infrastructures and thereby creates path dependencies (energy demand, mobility)
- today half of world population lives in cities; approx. 6 billion in 2050!
- Asian urban population to double to 3 billion by 2030

## Challenges:

- Decarbonizing urbanization quickly
- Low-carbon conversion of existing cities
- ... buildings, mobility, consumption patterns, life styles



**Time pressure! No evidence for a „Low Carbon City“ yet**

## Arena #6: Managing Urbanisation

- Accelerated management of sustainable urbanisation: urgent need for conversion as well as new development



- Global Commission for standards and guardrails to guide low carbon urbanization
  - Prioritize the challenge on G-20 agenda
  - Commensurate action programmes by World Bank & regional development banks
  - Creation of „Low-Carbon City Faculties“
-

## Trends:

- Continuous conversion of forests, grass- and wetlands into agricultural land
- Large-scale foreign direct investment („land grabbing“)

## Challenges:

- Reduce deforestation and forest degradation
- Sustainable increase of global food production until 2050 by up to 70 %
  - yet, no progress in agricultural GHG efficiency since the 1990s
  - changing global eating habits
  - increasing demand for bioenergy and biomass

**No consensus on low carbon agriculture!**

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## Arena #7: Advance climate-friendly land use

- Stop deforestation
- Support low-carbon agriculture
- Promote sustainable eating habits



- strategic alliances with „forest countries“
- increasing investments in climate-friendly agriculture (including from ODA)

## Overview: Ten arenas for action

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- 1 Proactive & enabling state
- 2 Global carbon pricing
- 3 Regional energy cooperation
- 4 Accelerate promotion of renewables through feed-in tariffs
- 5 Fight energy poverty with sustainable means
- 6 Steer urbanization to low carbon
- 7 Advance climate-friendly land use
- 8 Encourage commensurate finance mechanisms and new business models
- 9 Advance international climate and energy governance
- 10 Pursue ambitious international cooperation for global governance

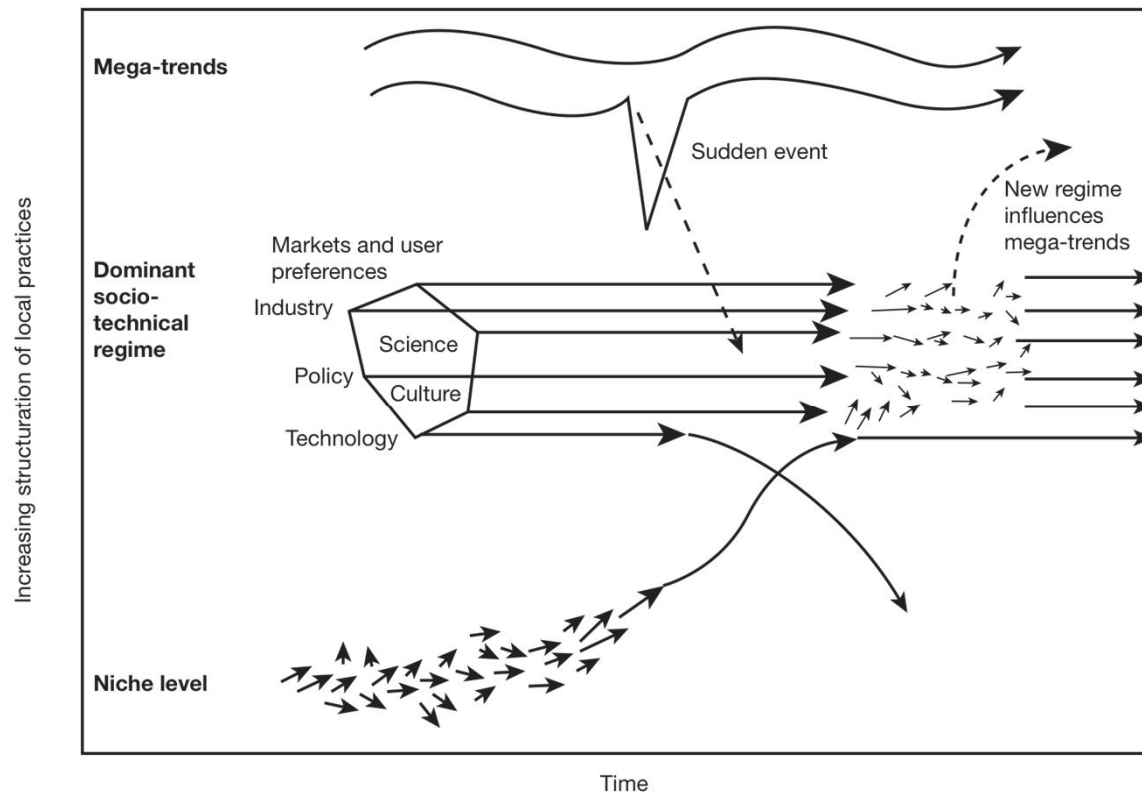
polycentric strategy



focused strategy



# Against All Odds: 7 reasons for optimism! WBGU



Source: Grin et al., 2010

**High carbon regime is eroding!**

**Co-evolution of critical tipping elements:**

1. Consensus: BAU a no-go!
2. *New narratives are emerging*
3. Growing groups of change agents (NGOs, business, science, cities ...) indicate power shifts
4. *Changing policy regimes (feed-in tariffs, emissions trade etc.)*
5. Actual success stories (e.g. technologies, green jobs etc.)
6. *Awareness for & salience of what's at stake (climate change impacts, peak oil etc.)*
7. International competition & cooperation between low carbon pioneers (e.g. EU/China)

### Flagship Report

### World in Transition A Social Contract for Sustainability



**Full Report** freely available

[www.wbgu.de](http://www.wbgu.de)

- Download & Hardcopy
- German & English

Also concise ***Factsheets*** on

- Social Contract for Sustainability
- Transforming Energy Systems
- Global Megatrends
- Transformation towards Sustainability
- Research & Education: Drivers of Transformation