Karlsruher Institut für Technologie

Die Energiewende jenseits der technisch-ökonomischen Herausforderungen

La transition ènergètique au-delà du défi technico-économique

Witold-Roger Poganietz, Martin Knapp

VDI & ARISAL, Obernai, 21. März 2014

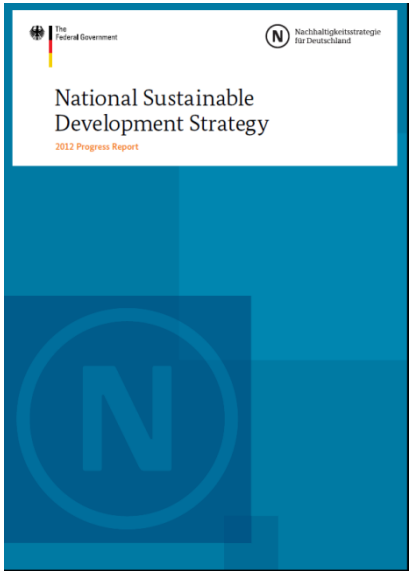
Institute for Technology Assessment and Systems Analysis (ITAS)

Source: http://andysrant.typepad.com/.a/6a01538f1adeb1970b017c370046b797 0b-800wi; 28.05.2013

Germany's Energiewende – overarching aims

"[… T]o make Germany one of the **most energy-efficient** and **eco-friendly economies** in the world while **maintaining affordable energy prices** and **a high level of prosperity**. **High security of supply**, **effective climate and environmental protection**, and an **economically viable energy supply** are also vital if Germany is to remain an internationally competitive industrial location in the long term."

Source: The Federal Government (of Germany) – National Sustainable Development Strategy – 2012 Progress Report, p. 148



Germany's Energiewende – selected targets

Year	GHG (compared to 1990)	Share of renewables in FEC	Share of renewables in elec.	Energy efficiency (compared to 2008)
2030	-55%	30%	≥ 50%	n.a.
2050	-80 to -95%	60%	≥ 80%	PEC: -50% Electricity: -25% FEC transport: -40% PEC of buildings: -80%

Notes:

- Adopted on September 28 2010
- GHG: Greenhouse gas emissions
- FEC: Final energy consumption
- PEC: Primary energy consumption
- elec.: Electricity

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Energiewende seems to be a reconstruction of the German energy system under the supervision of the society
⇒A societal driven transformation of a system?

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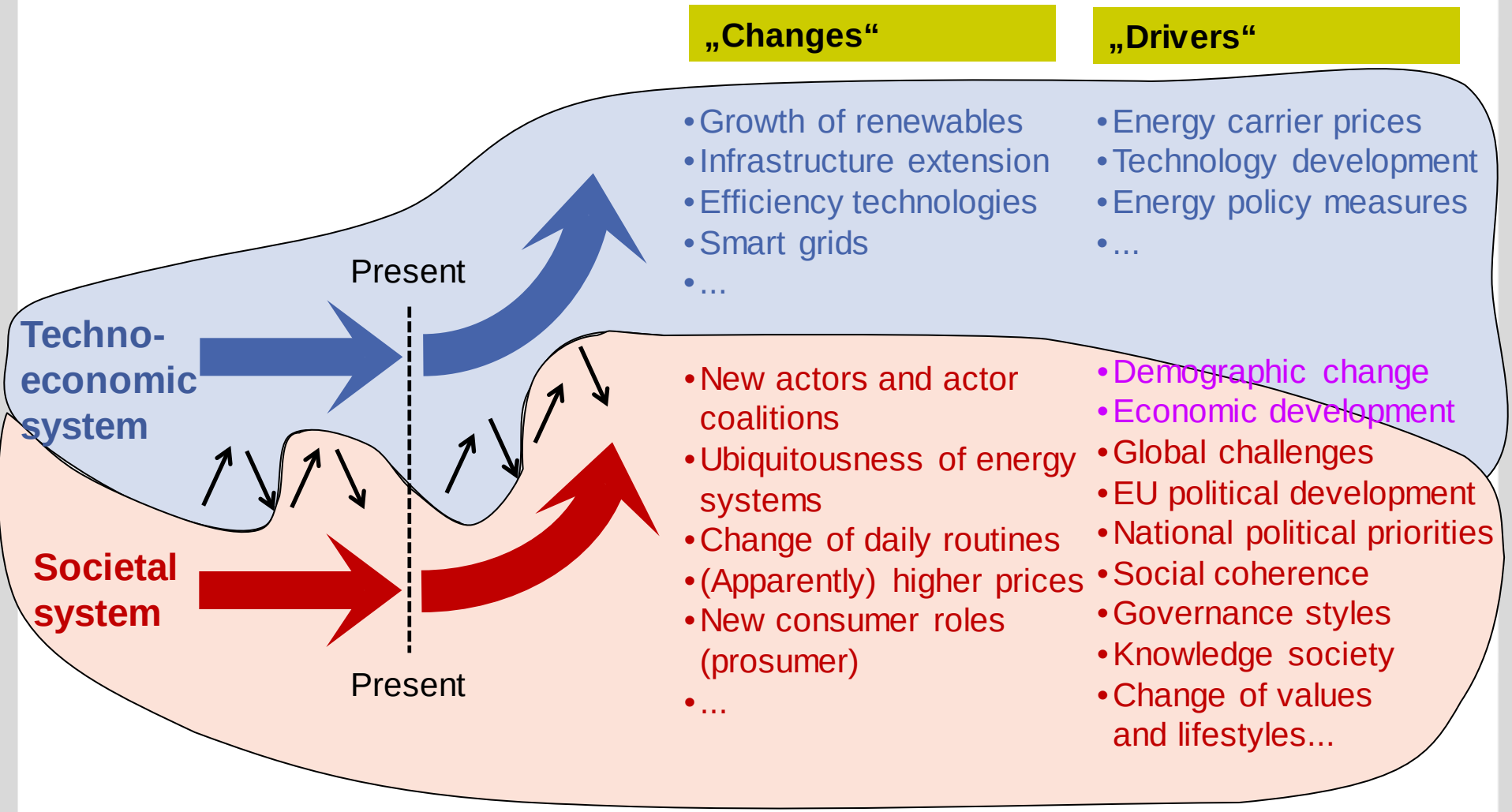
But, something seems to go wrong

Challenges


„Changes“
„Drivers“
Techno-economic system
Present
Societal system
Present
•Growth of renewables
•Infrastructure extension
•Efficiency technologies
•Smart grids
•...
•Energy carrier prices
•Technology development
•Energy policy measures
•...
•New actors and actor coalitions
•Ubiquitousness of energy systems
•Change of daily routines
•(Apparently) higher prices
•New consumer roles (prosumer)
•...
•Demographic change
•Economic development
•Global challenges
•EU political development
•National political priorities
•Social coherence
•Governance styles
•Knowledge society
•Change of values and lifestyles...

Example I:
Changing market and economic relations

- New energy conversion technologies allow to establish a small scale production of electricity and heat,
  - e.g. photovoltaic => private households
  - e.g. wind power plants => land owner
  - e.g. biogas => farmers
- Regulations and subsidies promote the market entry of small-scale suppliers,
  - e.g. 1000-Dächer-Programm (1000 roofs program)
  - e.g. Renewable Energy Sources Act (EEG)

- “Prosumer”: new consumer roles
- “Self consumption regulation”: Fragmentation of the electricity market

Example II:
Changing public awareness (I)

- Public awareness has changed, since the 1970s: the individual valuing of personal advantages and disadvantages increases
- Characteristics of saturated societies, i.e. enhanced importance of non-income factors for the individual welfare, like no interference in the current environment
- Not actually a consequence of the energy transformation, but the Energiewende has to deal with it

- NIMBY (Not in my backyard)
  - Grid extension
  - Wind power plants ("Stop Verspargelung")
  - Biogas ("Vermaisung stoppen")

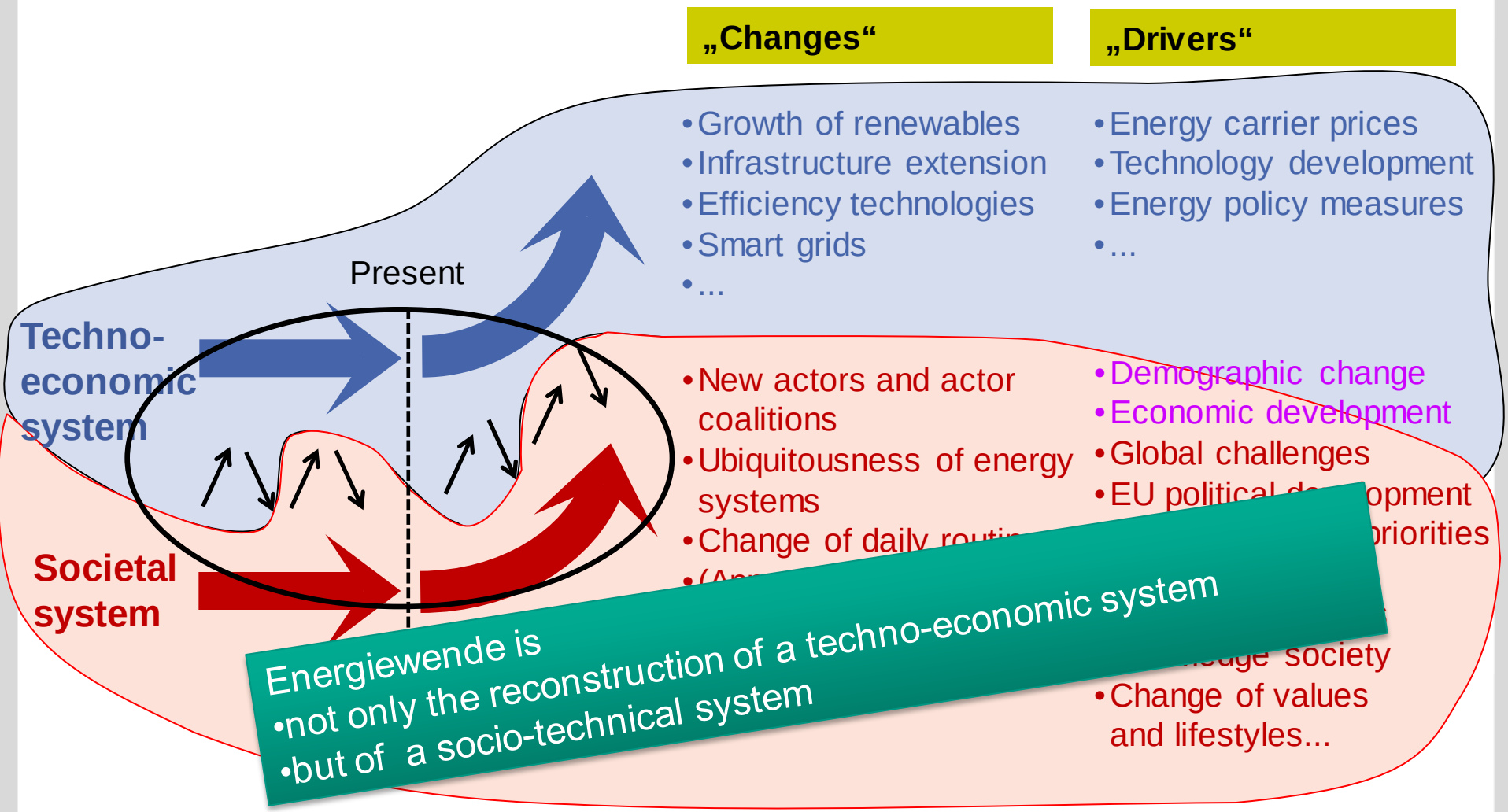
Source: http://www.thehindu.com/multimedia/dynamic/00003/INDIA_GREENPEACE_3890f.jpg; 28.05.2013

Example III:
Changing public awareness (II)

- Smart grid implies
  - collecting, storing and analyzing of mass data
  - to identify amongst others consumption patterns
  - to enhance the provision of energy
  - to reduce required resources and emissions

- But, “who cares for my data?”
  - hardly comprehensible willingness to provide private information to social media (e.g. Facebook; WhatsApp)
  - But, on the contrary: great reluctance to provide information to non-social media
    - “Who deals with my data?”
    - “What will be done with my data?”
    - “Do I lose my private autonomy?”

And now?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Energiewende is
•not only the reconstruction of a techno-economic system
•but of a socio-technical system

Challenges ahead

- To understand the interdependencies between
  - politicians
  - civil society agents and stakeholders
  - economic agents

  and in respect to technology,
- To understand ways and means capacitating to coordinate diverging interests beyond democratic procedures,
- To learn the required regulations for achieving the aims of the Energiewende

considering

- the time scale (until 2050)
- the technological challenges
- the unknown future economic and societal conditions,

i.e. high uncertainty regarding the precise shape of future energy system

In the meantime?

- Involvement of civil society will increase, at least in cases of large-scale investments
- (Taylor-made!) Participation of concerned stakeholders and individuals

- Participation
  - Method: analytical-deliberative discourses
    - scientific-based analyses combined with joint discussions with all involved individuals and groups
    - honest brokerage situation
    - transparent procedures
    - actual decision to be made
    - Various shapes of participations, like surveys, round tables, hearings
- Other ways: shareholder principle; co-operatives

But, success cannot be taken for granted

In the meantime?

- Demands of consumer regarding the demanded product will change:
  - Taylor-made services will outmatch mere products
  - Simultaneously, to stay “non-transparent” may still be eminent

➡ To overcome this “consumer conundrum” will be crucial for designing any successful smart grid system

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http://www.presseurop.eu/files/images/article/CHAPPATTE-nuclear-490.gif?1381824695

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