

German transition towards a high renewable energy share - transferable challenges?

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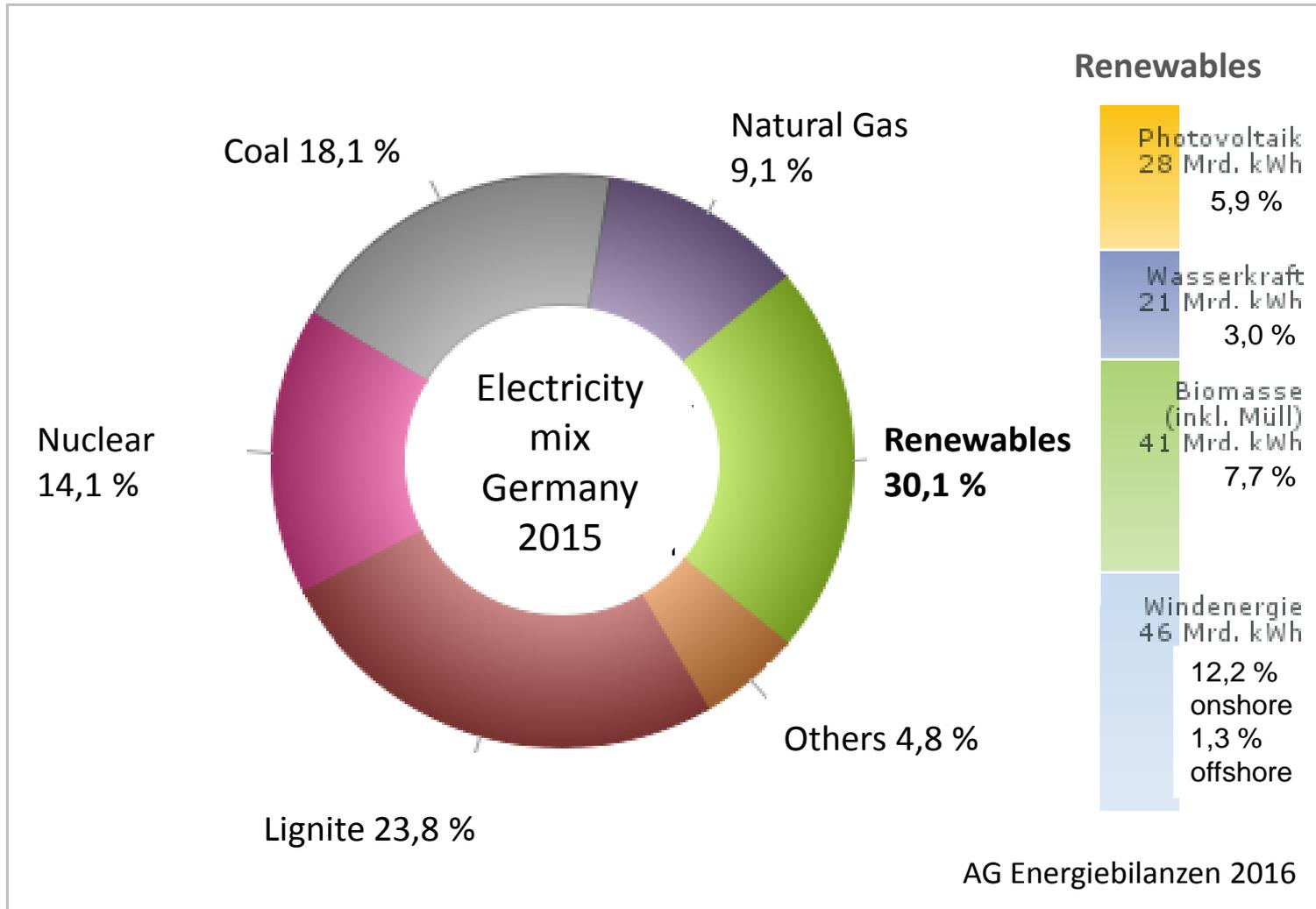
„Energiewende“ in Germany

Goals in German climate and energy policy

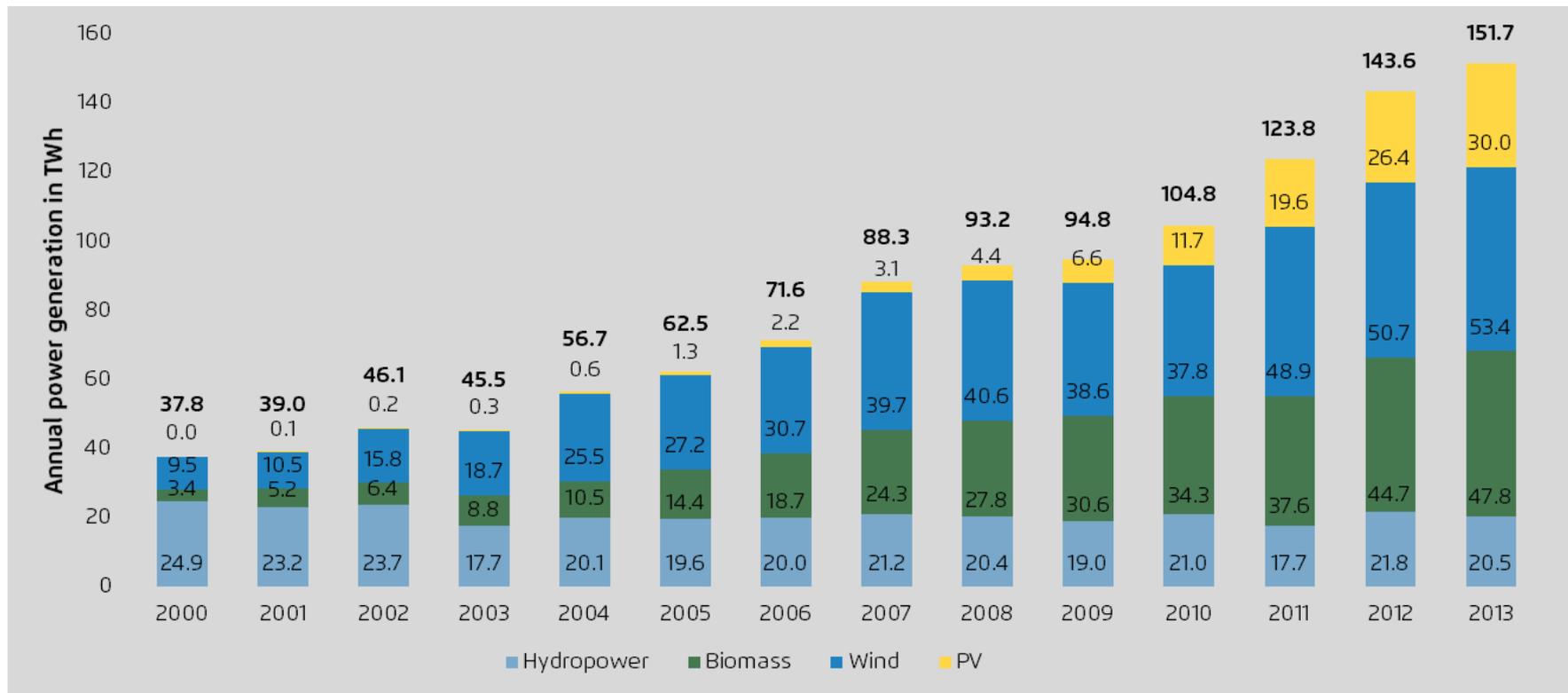
- nuclear phase out by 2022
- 80 - 95% reduction of CO₂ emissions by 2050 (compared to 1990)
- 80% renewable energy share in gross electricity consumption by 2050
[50% by 2030; 65% by 2040]
- improve of energy efficiency:
Reduction of primary energy consumption of 20% by 2020
and of 50% by 2050 (compared to 2008; NEEAP)

Achievements:

Power mix in Germany 2015 (power generation)



Wind and solar as main pillars of the future renewable electricity supply



Power generation from renewables 2000-2013 (AGEB 2014)

Achievement until now:

- One third of the German electricity supply comes from renewables (gross electricity generation)

Challenge:

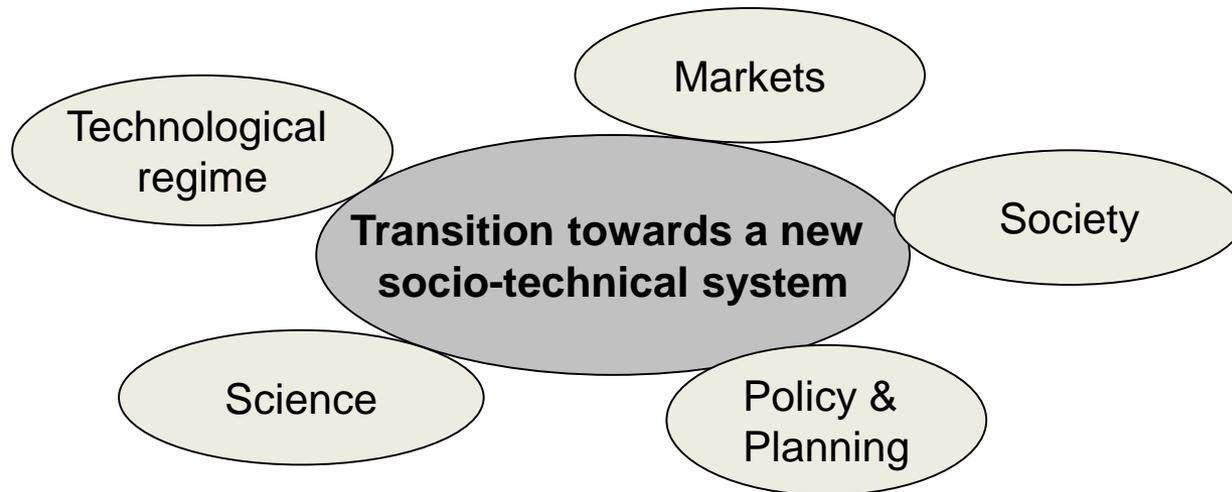
- 50% renewable energy share by 2030
- 80-95% renewable energy share by 2050

Which factors have influenced the innovation and policy process?

- Technology and society are shaped in parallel
- Effects of governance unfolds in the interaction of heterogeneous factors and contextual conditions

Transition towards a new socio-technical system...

- ...needs innovation - niches that allow experimentation with new technologies and ideas (laboratories)
- ...involves co-evolution of several inter-connected sub-systems
- ...involves interaction of a broad range of societal actors
- ...involves all levels of governance



Masterplan?

...no, but the German transition towards a high renewable share in the electricity sector meets multiple challenges, implementation gaps and open questions.

-> which of them are transferable to other countries?

Thesis 1:

Bottom-up engagement is a prerequisite for transformation

„Energiewende“ in Germany

Nuclear Phase Out Influenced by Many Factors

- Anti-nuclear and peace movements of the 1970s
- Electoral success of the anti-nuclear Green Party
- Chernobyl (1986) and Fukushima (2011) as important contextual factors for societal opposition against nuclear energy



„Energiewende“ in Germany

driven from the bottom up

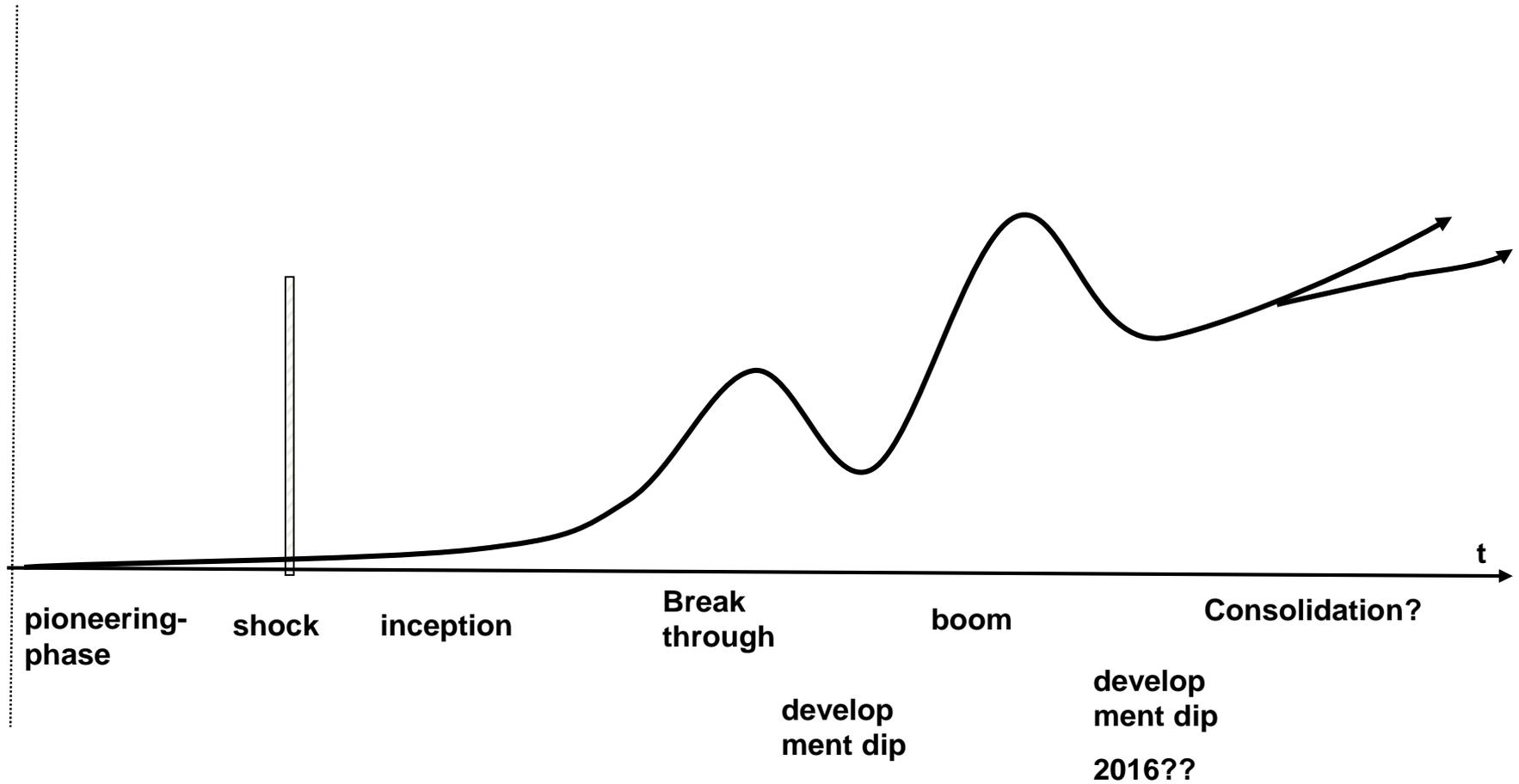
- Active communities and regions
- citizen initiatives, cooperatives
- private owners of
wind & solar plants (prosumers)



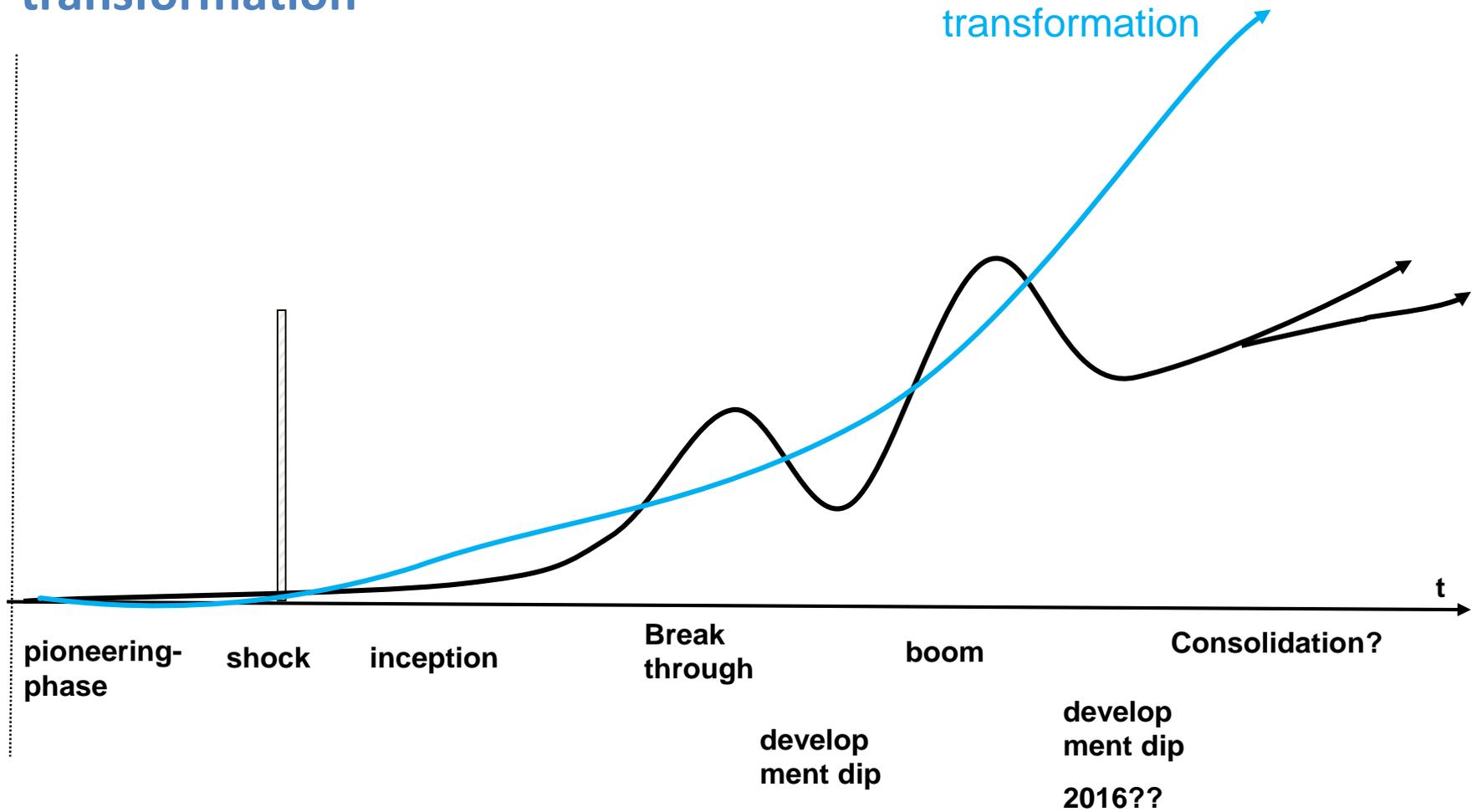
“Bürgerenergie” - driven from the bottom up

- almost half of Germany's installed eco-power is owned by citizens
- high private investments strengthen regional added value
 - investments remain largely in the local economic cycle, rather than run into global financial flows
 - municipal budgets benefit from tax revenues
 - economic and social effects are important especially for rural and structurally weak regions
- democratization and diversification
 - many people can share the value added
 - influence in the energy market is more broadly diversified
 - broken oligopoly of large corporations in the energy market
- lower costs: some of the costs are avoided through voluntary work
- ca. 113,600 full-time jobs preserved or created
- social acceptance of the transformation of energy grows

Typical Phases of the Innovation Process



consolidation (stability) or transformation ? bottom-up engagement as prerequisite for transformation



Central instrument: Renewable Energy Act (EEG)

- priority feed-in for RES, differentiated feed-in-tariff
- guaranteed access to the grid
- grid operators are required by law to purchase renewable power
- investors in renewables receive sufficient compensation to provide a return on investment - irrespective of electricity prices
-> high level of investment security
- every three to four years, feed-in tariffs are reviewed and the law is amended
- degression brought down costs of RES
- copied worldwide

last major revision August 2014: Shift in support system

- auction system
- quotas (limited expansion): share of RES should not exceed 35 to 40% by 2020
- drastic reductions of feed-in tariffs (aiming at lower costs)
- mandatory direct marketing

-> risk of a backlash (instable phase) of the development

Thesis 2:

Highlighting co-benefits of greenhouse gas mitigation strengthens renewable energy policy

Reframing greenhouse gas mitigation

Primary/ dominant justification:

- Reducing climate change risks (= preventing tragedy of the commons)

Co-benefits (“win-win”)

- economic benefits: lead markets, added value, trade tax revenues, structural change, lowers risk of economic losses caused by price volatility etc.
- driving innovation
- more security of energy supply/ reduced dependence on fossil fuels/resource efficiency/ less risks of disruption
- resilience
- motor for green jobs
- clean air and health benefits
- sustainability of ecosystems/ protection of biodiversity
- participation/ democratization of energy production and consumption
diversification of energy supplies
- disruption of traditional energy cycles
- etc.

Reframing greenhouse gas mitigation

Why highlighting co-benefits from greenhouse gas mitigation?

- synergies through overlap of goals
- motivating factors for states, regions and municipalities to set ambitious targets for RES expansion
- facilitates political feasibility and stability of decisions, strengthens positive policy feedback
- supportive stakeholders can be addressed
- facilitates the formation of actor coalitions
- more personal relevance/ more appealing to citizens/ more emotionally engaging
- strengthens public support for RES expansion

Thesis 3:

It is important to overcome a simple dichotomy of incumbent-challenger dynamics.

Incumbents and challengers

Incumbents

- established actors that dominate current understanding of issues
- have a strong interest in maintaining the existing rules and infrastructures
- incumbent regime cannot always be considered as a homogeneous block
- access to knowledge in combination with economic power - strong lobby and better ability to influence decision-making
- interests and practices are creating path dependencies

Challengers

- New actors in the field
- challenge the incumbents positions
- question the existing rules and infrastructures

Actors/ actor groups cannot always be clearly delineated as challengers or incumbents

Example: municipal utilities

- with the trend of re-municipalisation and energy transition, many municipal utilities changed into a challenging position

Example: distributive conflicts within the incumbent companies in Germany

- Incumbent-challenger-dynamic within companies and branches

Example of E.ON and EnBW

- gradual shift towards adaptivity because renewable entrepreneurs within the companies came into better power positions
- engagement in niches and sub-fields as an incumbent strategy

What drives actors to change their position (from incumbent to challenger)?

- national and international policies are important institutional factors shaping opportunities for challengers and incumbents pursuing their strategies
 - Germany: The instrumental shift to an auction scheme will influence the actor-constellation in the renewable electricity market: it will diminish the chances for those actors who cannot diversify risks
 - reform will generate higher transaction costs for investors; challengers need low cost options and access to finance
- governmental strategy of confrontation will not always work
 - strong local cultural embeddedness of coal mining explains the persistence of the incumbent mining industry (e.g. Brandenburg, where Vattenfall foundation runs kindergardens)
- participatory approaches to understand and integrate regional interests and cultures
- electoral systems can determine sudden political shifts towards or against incumbents interests (UK)
- public demand, expressed by a fast rising Green party, can be a strong driver for strategies that support challenger positions (Norway)

Thank you

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