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C2: Governance of Electricity System Restructuring

Helmholtz Allianz Statuskolloquium, Karlsruhe
30. November bis 2. Dezember 2011

PROPOSAL, C2

- Governance of the energy system transformation through vertical and horizontal integration in Germany
- Comparative perspective tied to the governance of renewable energy and related infrastructure development in Germany's immediate neighbor countries and good practice transfer
- Policy measures and strategies for electricity efficiency addressing the barriers to tap efficiency potentials in Germany (including best practice transfers)

Core question

How can multi-level policy with regard to certain transformation issues be successfully optimized and coordinated? (actors, instruments)?

- Which problem/ issue should be addressed at which policy level?
- Which competencies and potentials to act different actors have and exist (or lack) at which policy level?

Vertical integration as the specific challenge at the local, the federal-state and the federal level

- energy policy governance framework
- options, capacity for action
- interplay or inconsistency of different levels, bottom-up and top-down processes
- identification of change agents and restrictions

Horizontal integration of departmental policy

- interplay or inconsistency in targets
- disparity between departmental policies; options to handle these disparities

Problem analysis: identification of governance requirements for the energy system transition

Current situation and background

- national targets: energy strategy, offshore strategy
- european targets

Components of the energy transition

- renewables extension (e.g. regional optimization strategies)
- Transmission grid (e.g. grid development planning, acceptance)
- distribution grid
- energy efficiency
- warranty of grid stability (flexible energy generation, storage, smart grids)

Uncertainty in energy demand

- centralized/decentralized energy generation; import/ autarky = different believe systems?
- efficiency? required grid and storage extension?
- acceptance? conflict of aims? spatial conflicts?
- future energy mix? (technical developments? policy developments?)



uncertainty about target state, no masterplan

Our research interests

- Example I: Management of centralized renewable power generation and transmission (Offshore windparks)
- Example II: Municipalities and regions as key actors of a decentrally driven energy system transformation (e.g. 100% renewable supply regions)
- Example III: distribution grid operators/public utilities as key actors of electricity system transformation

STRUCTURE of ENERGY SUPPLY

CENTRALIZED

DECENTRALIZED

Issue areas of our interest

- Governance of renewable power generation in Offshore windparks and transmission (example I)

- decentral management of *generation, distribution and conservation (efficiency)* of electricity (*ffu focus*)
- decentral sustainable mobility structures and heating systems (building sector) (= both are interests of our Dutch partners) (example II and III)

Key actors we will focus on

Multiple levels:

- European Commission
- national governments
- North Sea Countries Offshore Grid Initiative
- regional planning authorities
- transmission grid operators

- municipalities/regions and
- distribution grid operators/public utilities as *change agents and laboratories of innovation*
- Consumer and Prosumer
- Superior policy level actors (*as creators of framework conditions*)

Our leading questions

How the risk of „lock in“ on suboptimal paths in infrastructure development can be avoided?

What kind of complementary governing mechanisms are needed to exploit the potentials to act at decentral level?

Our research methods

- policy analysis (interplay of actors, interests, strategies)/Conflict analysis (winner/loser)
- national case studies and international comparison (e.g. Netherlands, Germany, UK/Norway)
- Policy-transfer analysis (options for good practice transfer)

- Issue specific policy analysis by comparative case studies of decentral initiatives (potential and barriers to act)
- analysis of diffusion mechanism and good practice transfer strategies
- International comparison (e.g. Netherlands, Germany)

I: Management of centralized renewable power generation and transmission (offshore windparks)

- European climate protection goals, national offshore strategy
- high time pressure – long realisation phase, time lag costs
- target conflicts: climate protection, nature conservation, economic goals

Challenges

- Multiple levels: international coordination required, administrative actors on national and federal state level, planning and permission competencies and procedures, local authorities and their interests (harbors, marine technology, jobs, vs. tourism)
- distributional conflicts: financing of grid connections
- Overload of onshore grids
- Integration of European markets, balancing wind with hydro
- Conflict management (winners *and* losers, national interests)

Leading questions

- Determinants of actor strategies
- coordination of multiple key actors and interests: governance approaches, instruments
- how can the risk of „lock in“ on suboptimal paths be avoided?
- comparison of good practice: UK, NL, DK

II: Municipalities and regions as key actors of a decentrally driven energy transformation

- Raising number of 100%-renewable supply regions in Germany (72 regions in 2010 which are in a process to become 100%-Regions) – a diffusion dynamic (acceleration) is expected
- Raising awareness and willingness at the superior policy levels to assist local level approaches as a key approach in the energy system transformation

Challenges

- Regions are in different stages of the progress, most of them at the very beginning
- Variety of paths and approaches due to distinct local and regional circumstances
- Development of suitable framework conditions to support these approaches, which ensure both regional flexibility and the necessary coordination to contribute to the national energy system transformation

Aims of Research

- Identification of typical barriers in *different issue* areas (renewable energy generation, heat, mobility, efficiency) – relevant for regions; define the need for superior level coordination and support
- Identification of system innovations and good practice strategies (pioneers) and their diffusion potentials to other regions/countries (case studies in NL and Germany)

Leading questions

- How much local or regional governance is possible?
- How much supra-regional or national governance is necessary?
- Interrelation between issues and policy mix (Which issues are related to which mix of governance levels and instruments?)

III: Distribution grid operators/public utilities as key actors of electricity system transformation

- 3/4 of renewables is fed into the distribution grid - extensive need for optimization (smart grid); *increasing importance* of distribution network operators (supply-side perspective)
- “market for energy efficiency services” remains niche market: distribution network operators *might* become key efficiency actors (demand-side perspective)

Challenges

- To strengthen and to integrate both roles of this local actors (infrastructure developer and efficiency actors (e.g. by integration of efficiency factors in the revenue cap regulation vs. saving obligations)
- coordination of high number of distribution grid operators (more than 800)
- re-municipalisation of distribution grids: network optimization with small and fragmented units, grid maintenance and extension of grid capacity

Leading question

- What kind of new policy instruments and complementary governing mechanisms are needed to exploit the potentials to act at this key (decentral) interface level between the demand for electricity and the supply of renewable electricity?
- Can we learn from other countries experiences (comparison with NL, UK?)

- **with research field A: Technical-Societal-Development**
 - Input needs from A 1: regional conditions for implementation of key technology concepts/technology concepts for decentralised/centralised energy systems (regions)
 - output C2 for A3: test case for necessary policy coordination both horizontally between regions and vertically
- **with research field B: Innovation processes and the transformation of the energy system (especially with projects B1,3)**
 - direct linkage to our core interests (framework conditions of policy innovation at decentral level - implementation and diffusion ; governance of offshore windparks) - coordination with regard to issue selection, research questions and methods is necessary (to secure added value)
- **with research field D: user behavior**
 - Input from D: relevant for evaluation the effectiveness and the choice of DSM-measures of efficiency actors at different levels (question of appropriateness/fit of interventions with regard to the interplay of instruments, actors and policy levels)
- **with research field E: Planning Governance**
 - Input from E: relevant relevant issue for offshore windfarms, 100%EE-regions

What else?

- Clarification of input needs from and cooperation opportunities with our Dutch partner (Dutch interest in steering consumer behavior and facilitate creativity in issue areas: efficiency, innovation in heating/building sector, sustainable mobility structures)

Our Expertise

- [Transpose-Project](#) (BMBF): policy options to tap electricity saving potentials in the German household sector (including lesson drawing from abroad)
- [Evaluation of the National Climate Initiative](#) (BMU): impact-evaluation of interventions, policy instruments and programs addressing different sectors (consumers, small and medium enterprises, municipalities)
- [Windenergie in Deutschland - Absichten und Wirkungen von Steuerungsimpulsen](#) (VW-Stiftung): Study of wind energy development in Germany through different phases
- [Innovationsbiographien erneuerbarer Energien im Stromsektor](#) (BMU): Study of the renewable energy innovation processes, constellation analysis
- [Restriktionen für die Integration hoher Anteile erneuerbarer Energien in die leitungsgebundene Energieversorgung](#) (BMU): Analysis of grid related restrictions for a high share of renewables in electricity, heating and gas supply
- [Pathways towards a 100 % renewable electricity system](#) (2011), special report of the German Advisory Council on the Environment