S3-3 Low Carbon Scenario for Germany

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As in many countries also in Germany low carbon society (LCS) research has not yet been established very well as working field. Furthermore there is no clear definition of what LCS means. So far rather terms like sustainable energy systems or decarbonised energy systems are more common. But, even focussing on the climate context there is no single definition of what is the appropriate long term target and what is really sustainable.

On the other hand the development of long term energy scenarios has more or less a long tradition. Although most of the scenarios which have been developed for Germany have a mid term focus (2020 or 2030) there is a significant number of scenarios based on long term projections from different research institutes. Though there is no specific scientific network dealing with this kind of issue and organizing a knowledge exchange long term energy scenarios have been used and are part of several policy contexts. Already in 1990 long term energy scenarios provided valuable scientific input for the debate within the Enquête Commission of the German Parliament "Protection the Earth". Afterwards they have been used to feed further energy dialogues on national and regional level. For policy makers the main value of scenarios was to get a feeling of the remaining scope of action having a specific long term goal in mind, an impression of the "must's" and "can' s". That's why comparative scenario analysis is crucial. Nevertheless, although having been used for more than 20 years in the policy context there is still a partly misunderstanding of scenarios as many policy makers do not distinguish between scenarios and projections (Business as Usual scenarios).

Existing long-term scenario tools in Germany are based on different methodological approaches(simulation, liner optimisation, macro-economic modelling). In the Wuppertal institute which is one of the German research institutes with a long modelling tradition a bottom-up oriented modelling methodology is used. The specific approach is characterized on one hand by a disaggregated modelling of the technology-interaction (even on the supply side). On the other hand it is a simulation model which requires at every node to determine the market share of each technology. Within the Wuppertal Institutes model this decisions are made on the basis of expert knowledge considering cost and technological aspects as well as market barriers and suitable policy options (including a discussion of the respective implementation probability of these policies).

In that context among others the Wuppertal Institute for example outlined different development paths for Germany all of them leading to a 80% reduction of energy related greenhouse gas emissions by 2050 (compared to 1990) focussing on specific strategies (e.g. significant extension of renewable energies and improved energy efficiency, implementation of carbon capture and storage as significant new technology, renaissance of nuclear power). For Munich, on of the biggest cities in Germany, the institute came out with an analysis how a sustainable urban infrastructure could be shaped resulting in a 90% decrease of CO_2-emissions (compared to 1990 level). Long term energy scenarios are not only worthwhile for policy makers, but for industrial companies as well. A systematic and comparative analysis of long term demands (derived from long term scenarios) for instance can lead in the identification of robust technologies requirements.

Although long term energy scenarios are already part of the policy decision making process in Germany there is still the option to use these instruments more sufficiently. Following questions are the core of the added value for the policy making process:

- How can sustainable energy and mobility structures be shaped in the future?
- How can the transition to such structures take place?
- What are the implications connected to the transformation process?

- How can the process be guided?
- What can companies and policy makers learn from different future views?
- Which challenges emerge for future technologies (additional demands, system solution challenge)?
- How can or should future knowledge influence the product portfolio?