Quantified Back Casting: Methodological design of transition strategies in the area of sustainable transportation chains

Coordinator:
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Involved organisations:
Universiteit Utrecht (various groups)

Program term:
2003-2009

Summary of problem definition:
A transition of the current energy system is necessary in order to reach a significant reduction in greenhouse gas emissions. The back-casting methodology (Waever, 2000) offers an approach to define future images of clean and efficient energy systems. In the COOL project (Hischemoller, 2001), backcasting was also applied as a tool for formulating long term (climate & energy) policies. The use of back-casting approaches to design transition trajectories, necessary to reach one or more of these desired future images, is still in it's starting phase. Most exercises, although being most useful, have a qualitative character. The desire to have more detailed output and insights, e.g. covering costs, RD&D planning and timing of activities from back-casting exercises is apparent.The central question of this project is to investigate how insights from innovation – and energy studies combined can help to improve and develop back-casting further by means of quantifying the influence of key technologies and by incorporating the concept of innovation systems. The main goal of the project is to develop and apply an improved methodology well suited for the design and implementation of complex technological systems with a long planning horizon (i.e. 2050). In this project, the methodology will be applied on a complex and actual case: 'reduction of GHG gases in the transportation sector through GHG neutral energy carriers'. This case involves many new technologies, from production of fuels to end-use technologies, as well as the involvement of a wide diversity of different key actors. This case is directly linked to real policy programmes in practice (such as the GAVE programme and the new EC directive on biofuels) aimed for demonstration and further market introduction of complete chains. This obvious link with ongoing activities in society makes the area of transport and alternative transport fuels a logical and urgent one. Furthermore, transport is one of the prime areas in society were GHG control measures are most desired (due to the growing share in total e missions) but also most difficult to introduce.
The method consists of three pillars: (1)detailed technological systems analysis to study the influence of key-technologies on the transition trajectories and future images, (2) analysis of innovation systems to determine weak and strong points in the technology production and diffusion system that is related to the transition trajectories and (3) development of policy strategies. Effective transition management should comprise both the specific technologies that are crucial for specific transition processes as well as a functional and effective innovation system in order to stimulate effective production and diffusion of a broad range and coherent set of new technologies which combined result in the desired systems. By combining beta-gamma methods in an integrated way a comprehensive approach, a much improved basis for transition management processes will de developed.

Subprojects:
- Quantitative analysis of the development of techno-economic performance of sustainable well-to-wheel systems over time, O. van Vliet.
- Determining the feasibility of transition trajectories using technology specific innovation systems approach, R. Suurs.
- Long term strategies for realising transition trajectories resulting from back casting scenarios, S. Breukers

Results:
- See the NWO-website for a full list op publications, www.nwo.nl/energieonderzoek