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EUROPEAN HYDROGEN ENERGY ROADMAP (HYWAYS)

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Overview

HyWays aims to develop a validated and well-accepted roadmap for the introduction of hydrogen in the European energy system until 2030 and provides an outlook to 2050. The Roadmap will reflect real life conditions by considering technological as well as institutional, geographic and socio/economic barriers and opportunities at country specific level. Mobile and stationary applications are addressed, including possible synergies between the two. HyWays comprises two phases of 18 months each. In the first phase, an analysis of the introduction of hydrogen was performed for six countries (France, Germany, Greece, Italy, the Netherlands, and Norway). In the second phase, the analysis will be carried out for another 4 countries, Finland, Poland, Spain and the UK. The results produced in HyWays Phase I are of preliminary nature and subject to changes. Therefore no validated roadmap can be presented at this time. Nevertheless some robust conclusions can be drawn at this stage of the project.

Methods

The socio-economic assessment is based on a hybrid approach that combines quantitative and qualitative elements. The quantitative analysis of impacts is tackled by using computational energy system and economic models. Carried out in conjunction with the modelling work is a qualitative study based on past research in the field of transition analysis. The HyWays transition analysis is composed of two sections conducted in parallel: the infrastructure analysis and the actor analysis. The conceptual links between the components of the transition analysis and the computer modelling activities are shown in Figure 1, as well as the cross-cutting "reality check" in terms of MS workshops and partner workshops that take place at various points throughout the study.

HyWays is characterised by the novelty of using extensive modelling as support for strategic discussions between large groups of stakeholders from the member states, industry and institutes, applying interdisciplinary models and tools.

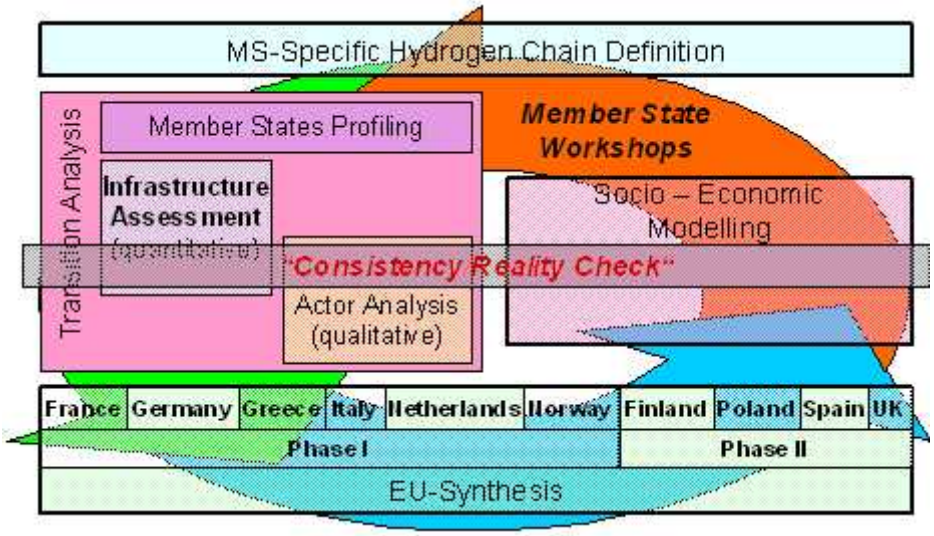

Fig. 1: Conceptual information flows between transition analysis, modelling, and the EU-synthesis.

Conclusions

The results produced in HyWays Phase I are of preliminary nature and subject to changes. Therefore no validated roadmap can be presented at this time. Nevertheless some robust conclusions can be drawn at this stage of the project.

1. Until 2030, hydrogen production from fossil fuels with carbon capture and sequestration (CCS) is expected to be the dominant production source in Europe, given it proves to become a viable option, with renewable hydrogen slowly being phased in.
2. Hydrogen infrastructure build-up will likely comprise both central and on-site hydrogen provision.
3. Fuel cell vehicles (FCVS) will need to show cost competitiveness in the marketplace. Four major drivers will influence this:

i. The crude oil price
ii. The price of hydrogen (infrastructure costs)
iii. Internalization of CO_2 emissions
iv. Costs of hydrogen drive systems.

The cost assumptions for the hydrogen drive system have the biggest impact on the cost-competitiveness, followed by the variation of crude oil price.

These drivers determine both the pace in which the cost-competitive level is reached and also the total investments needed to achieve market entry.

4. Impacts on employment have been assessed for a number of scenarios, each tells a story of a possible future for the competitiveness of hydrogen technologies produced within the EU:

i. The replacement of conventional vehicles by FCVs induces a sectoral employment shift away from the traditional car manufacturing industry.
ii. The preparation for expected mass production by 2015 will require a build-up of manufacturing capacities and a skilled labor force. Early political action will be needed to support this.
iii. First calculations show that the impacts of the transition to a hydrogen based energy system on overall welfare are likely to be relatively small. Whether the impact on welfare is positive or negative depends strongly on the cost reduction potential of FCVs

References

www.HyWays.de