This note is prepared in response to the request to Task 18 Experts for support of the HIA Analysis Committee "Hydrogen Resource Study". The Committee asks for input on "qualitative analyses, evaluations or projections of future hydrogen supply for usage in transportation or power systems (of all sizes) in a hydrogen inclusive economy”.

**Bibliography: World Energy Technology Outlook 2050: WETO-H2**

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<th>Title</th>
<th>World Energy Technology Outlook – 2050: WETO-H2</th>
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**Is the supply projected in response to a projected demand?**

The study is a scenario study in which three different scenarios are considered: Reference projection; Carbon constraint energy system; Energy system in the H₂ case. The supply of hydrogen is not projected in response to a projected demand. Hydrogen demand and thus supply arises from a cost optimisation for the energy systems considered based on selected values for parameters like energy price, technology costs and efficiencies.

**From what sources is hydrogen produced?**

Hydrogen is produced from a variety of sources, basically all sources available.

**What is the time frame of the study or the projections?**

The timeframe of the projections is 2000 to 2050.

**What are the geographic boundaries of the study?**

The study considers the world energy system and the European energy system.

**What analytical tools or models are used to project supply?**

- Demographic forecasts from the UN
- Projections of the economic, physical and environmental performance from the TECHPOL database (database is developed in the framework of the FP6 SAPIENTIA and CASCADE-MINTS projects and also in the Centre National de la Recherche Scientifique (CNRS) Energy Programme)
- The POLES model (Prospective Outlook on Long-term Energy Systems) has been used for system analysis and optimisation.
List any key assumptions, such as the price of oil or the cost of carbon. A principal feature of the POLES model is that it estimates international prices for oil, gas and coal, based on an explicit description of the fundamentals of each international market and a detailed representation of the reserve and resource constraints.

International oil and gas prices in the H₂ case and the carbon constraint case are lower than in the Reference case because of the reduced demand. This development is driven by the increasing carbon values as shown in the figures below. The Figure on the left shows the carbon values considered for the Reference whereas the Figure on the right shows the carbon values for the two other cases.

What environmental considerations are included in the analysis? Only impact on energy use and CO₂ emissions are include in the analysis.

Any other useful components of the study?
- The POLES model accounts for oil and gas reserves and calculates production for every key producing country or region. The value of this feature depends of course very much on the input parameters, but offers the possibility to explore near-term "peak oil"-like scenarios.