



Hydrogen: Realistic Game Changer?

Background

The idea of a “Hydrogen Economy” is hardly new. In 1870 writer J. Verne famously proclaimed that “water is the coal of the future”. Elon Musk (the CEO of Tesla Motors, a battery electric car producer) has famously described fuel cells as “fool cells” outlining some of the possible challenges with the implementation of hydrogen use in road vehicles.

The Hydrogen Council however, consisting of some of the world’s leading energy producers, engineering companies, technology providers and car manufacturers has been formed to promote and support hydrogen technologies in the global energy transition.

“New” hydrogen applications range from fuel cells in road, industrial and military vehicles, rail (trains and trams) and marine to back-up and remote power generation, energy storage and grid balancing applications.

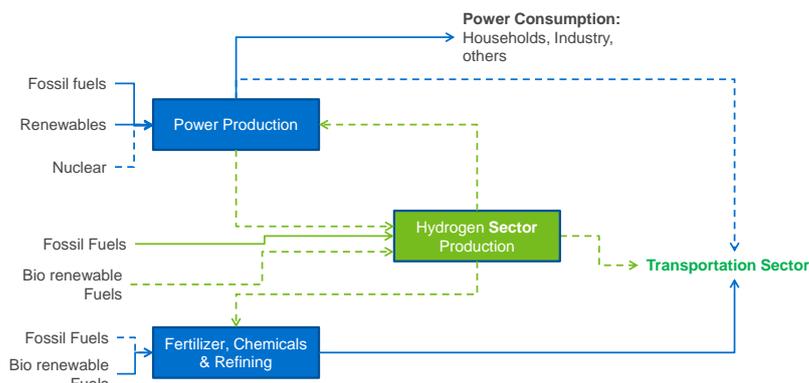
Hence, there are various potential applications for hydrogen ... but can hydrogen be economically and sustainably produced, stored and transported safely to consumers?

This report will look at the current state of the hydrogen industry which is largely dominated by captive consumption of hydrogen in fertilizer, chemical and refining applications as well as possible future scenarios of hydrogen used in the transport and power sectors.

Objective

Hydrogen is the most abundant element on earth (and the universe)! However – hydrogen in its pure form does not exist in nature and needs to be extracted from different (often very strong) molecules (e.g. water or hydrocarbons). This usually results in expensive (energy intensive) production economics. This report will focus on possible demand scenarios where hydrogen is adopted as an energy carrier in various “new” applications and what it will take to actually produce this amount of hydrogen from an economic and market perspective. Conclusions will be drawn on the realistic implementation of hydrogen as an energy carrier, especially in the transport sector.

Hydrogen integration into the wider transport, power, refining, chemicals and fertilizer industries



What will be Included in the Report?

- Description and status of old and new H₂ applications including ammonia, methanol, refining, as well as in fuel cells for road, rail and shipping. Commentary will also be provided on stationary fuel cell applications.
- Description and status of old and new H₂ supply sources including from natural gas, coal and liquid hydrocarbons as well as electrolysis, photosynthesis and biomass gasification. Distribution and storage will also be discussed.
- Historic market analysis by global region, demand application and supply source from 2000 until 2017.
- Delivered cost analysis for various H₂ production methods and delivery to consumer in the US including from domestic and international (e.g. Middle East, Asia) hydrocarbon based and other sources and transportation to the United States.
- Forecasts of H₂ consumption and production under different scenarios (high, medium and low) with all assumptions clearly stated
- Summary and conclusions on the realistic implementation of H₂ as an energy carrier from a cost and market perspective

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Table of Contents (Proposed)

- Executive Summary
- Introduction
- Old & New Demand Applications
- Old & New Supply Sources
- Historic Market Dynamics
- Cost Analysis for Producing and Delivering H2 to Consumers at the Filling Station
- Future Demand & Supply Scenarios
- Summary & Conclusions

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