

Towards the commercialization of hydrogen and fuel cell technologies: EU Policy

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Third Hydrogen Infrastructure Workshop
October 20, 2010, Brussels

Content



1. EHA in Brussels

2. EHA Energy Infrastructure 21

EHA in Brussels

EHA: What?



Mission: Foster the development of hydrogen technologies and their use in industrial, commercial and consumer applications.

Membership includes:

Industry: Shell, ENI, Statoil, Linde, Air Liquide, Air Products, Hydrogenics, McPhy, Renewable Energy Storage Ltd

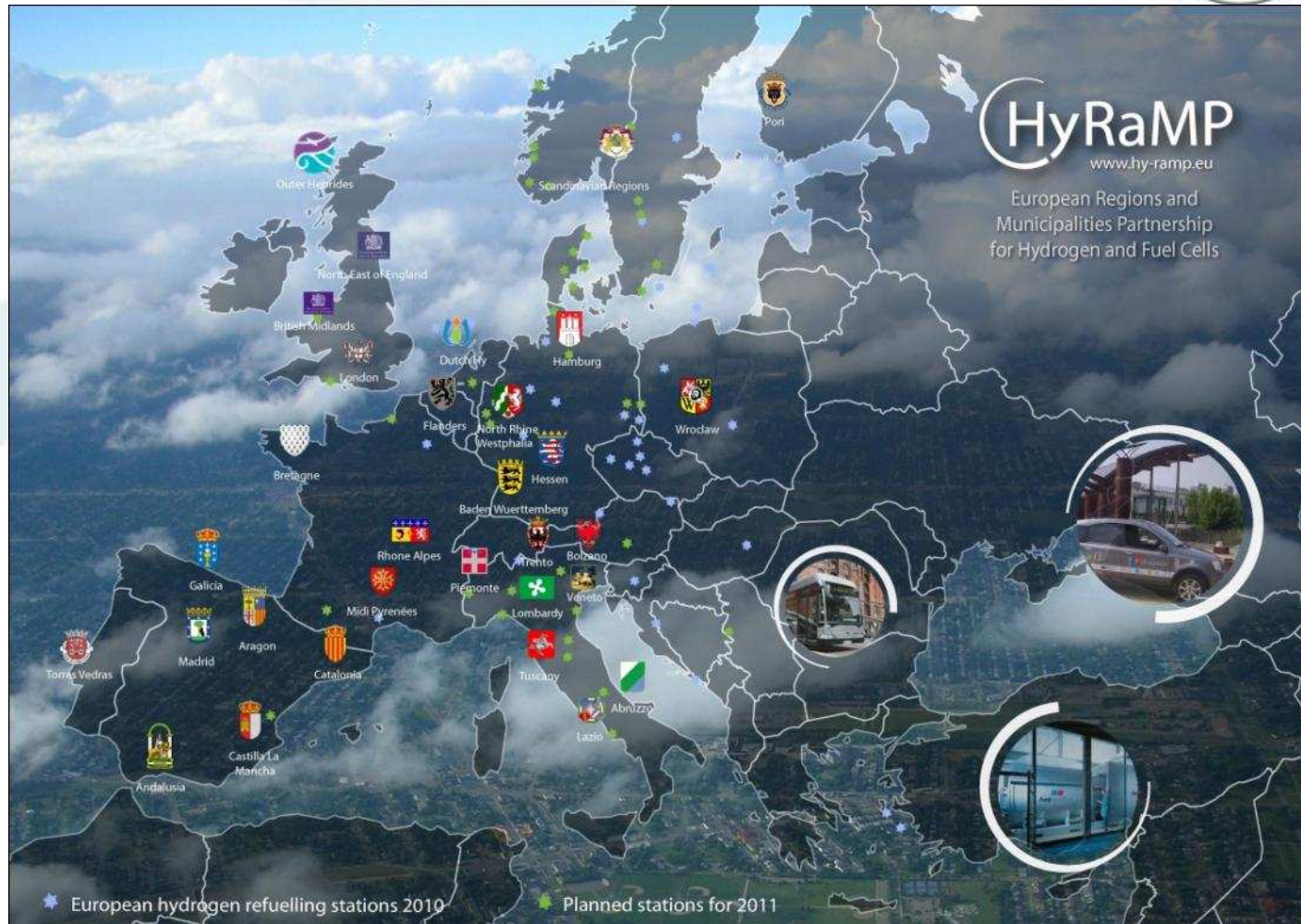
19 National Associations:

Belgium, Bulgaria, Czech Republic, Denmark, France, Germany, Hungary, Italy, Latvia, Netherlands, Macedonia, Norway, Poland, Portugal, Spain, Slovenia, Sweden, Switzerland, United Kingdom, representing 250 European companies, 30 regions and over a 100 research institutes.

Where: H2 stations in Europe by night



Where: hosting 30 regions in Europe by day

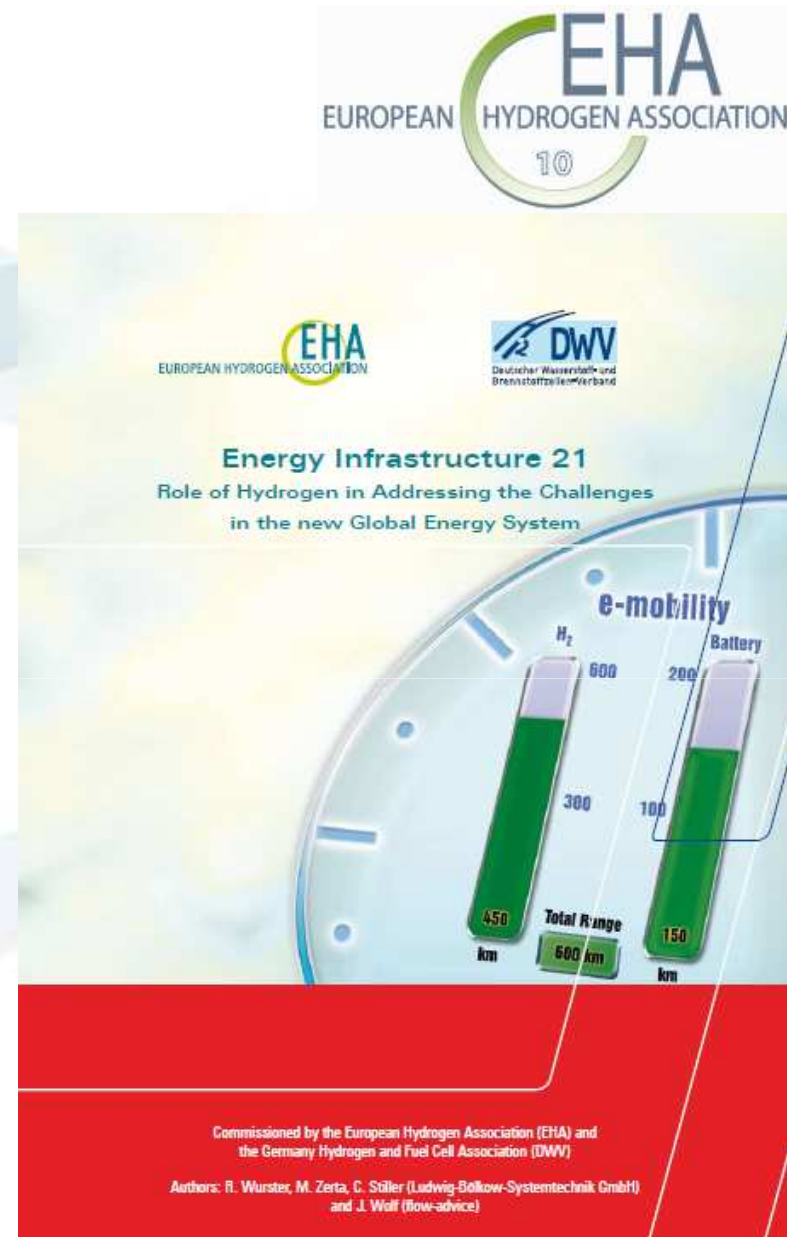


EHA: Why? answering the FAQ

2008: Where does the energy for hydrogen production come from?

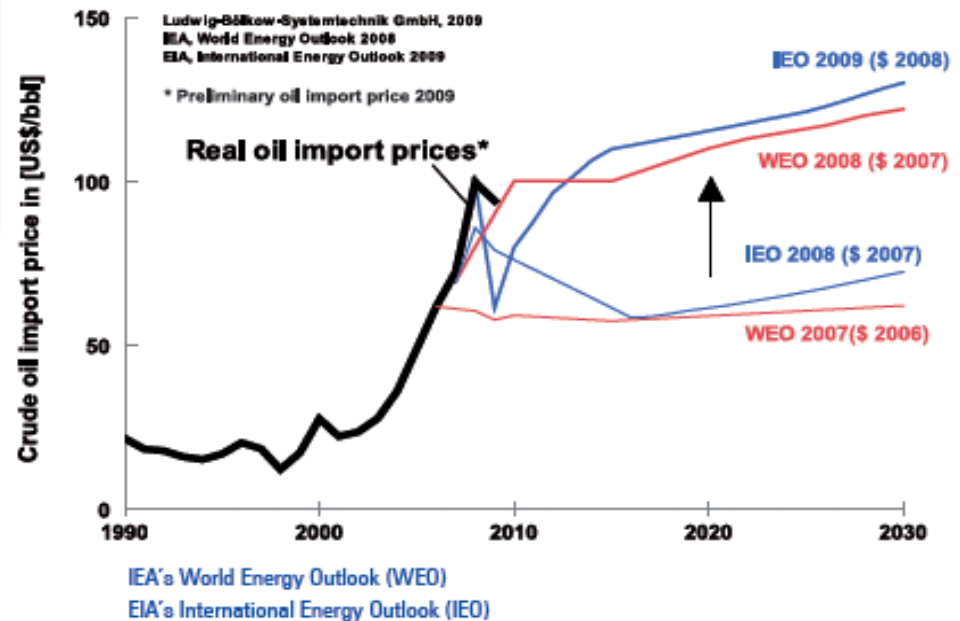
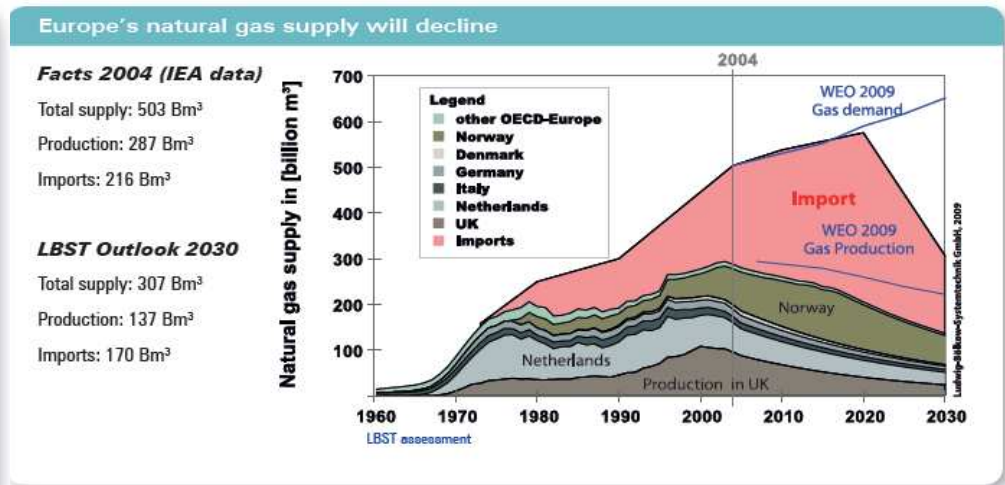
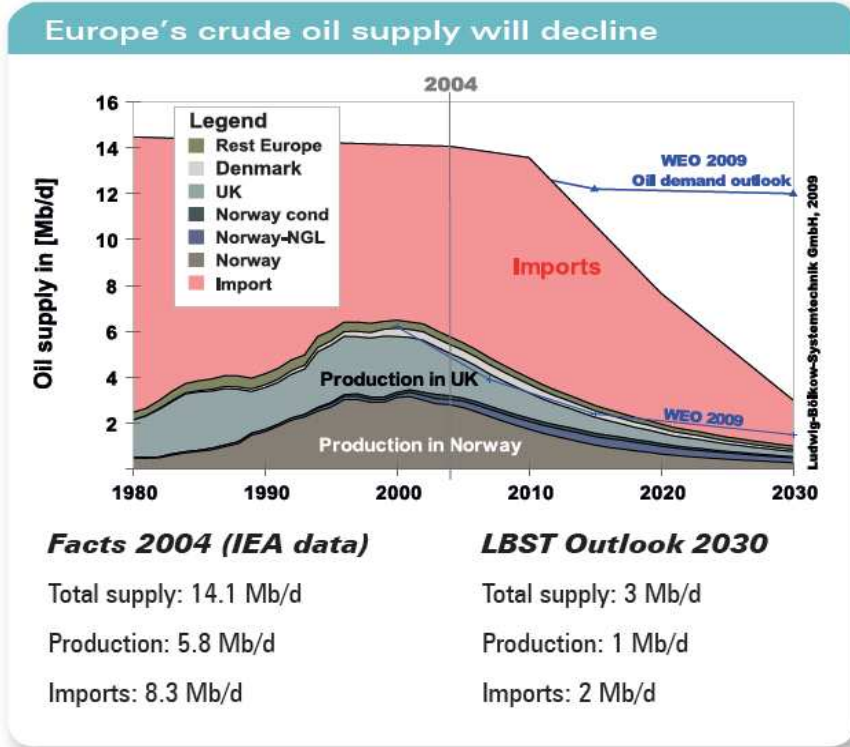
2009 : Hydrogen and fuel cells as strong partners of renewable energy systems.

2010: Energy Infrastructure 21, the role of hydrogen in addressing the challenges in the new Global Energy System.

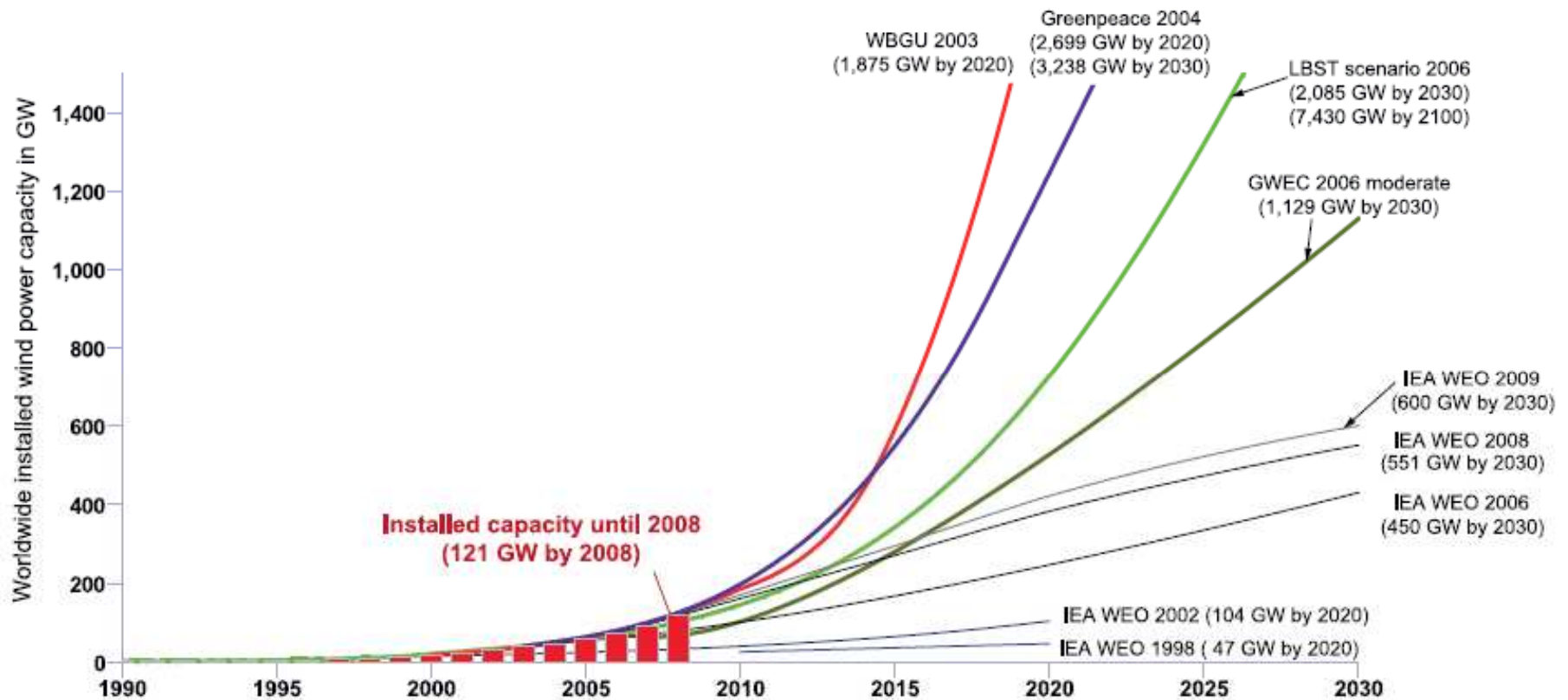


Energy Infrastructure 21

Motivation ... with significant consequences for Europe -



Motivation - Example wind power: History and growth -



Ludwig-Bölkow-Systemtechnik GmbH, 2009

Sources: GWEC 2008 Report: Worldwide wind capacity 1997-2008, Report, 2009

International Energy Agency: World Energy Outlook (WEO) 1998, 2002, 2004, 2006, 2008

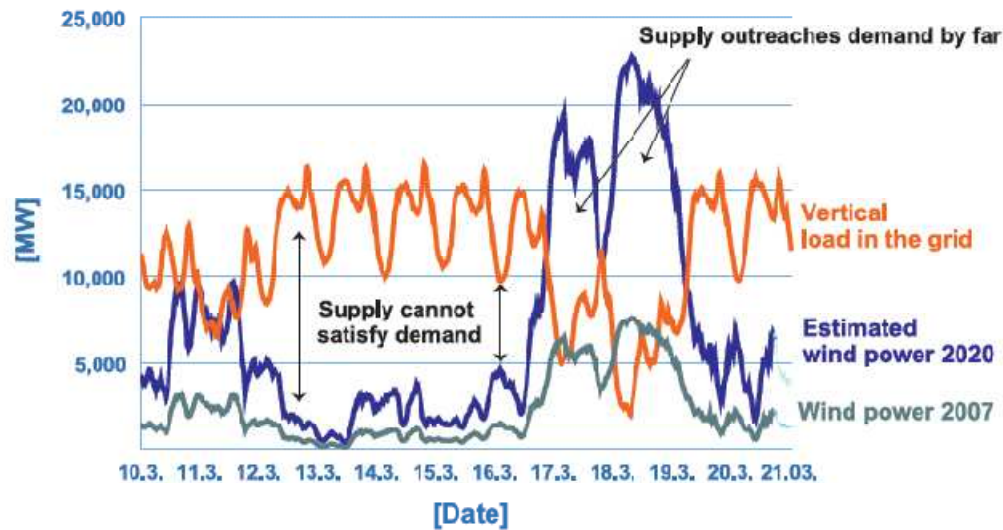
Greenpeace: Windstaerke 12 (Windforce 12), May 2004

WBGU 2003: German Advisory Council on Global Change (WBGU), World in Transition – Towards Sustainable Energy Systems, Report 2003

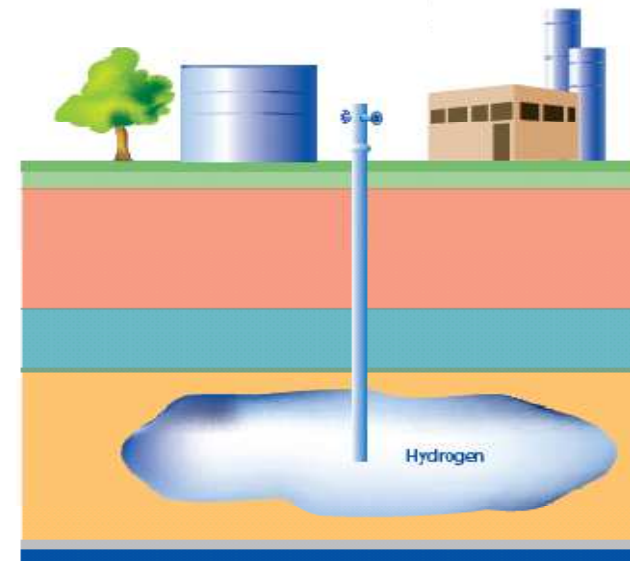
Motivation - utilisation of available intermittent renewable energies -

Need for energy storage

Vertical load curve and feed-in of wind power in the E.ON grid



Ludwig-Falkow-Systemtechnik GmbH, 2008
Source: E.ON Netze, February 2008, www.eon-netz.com



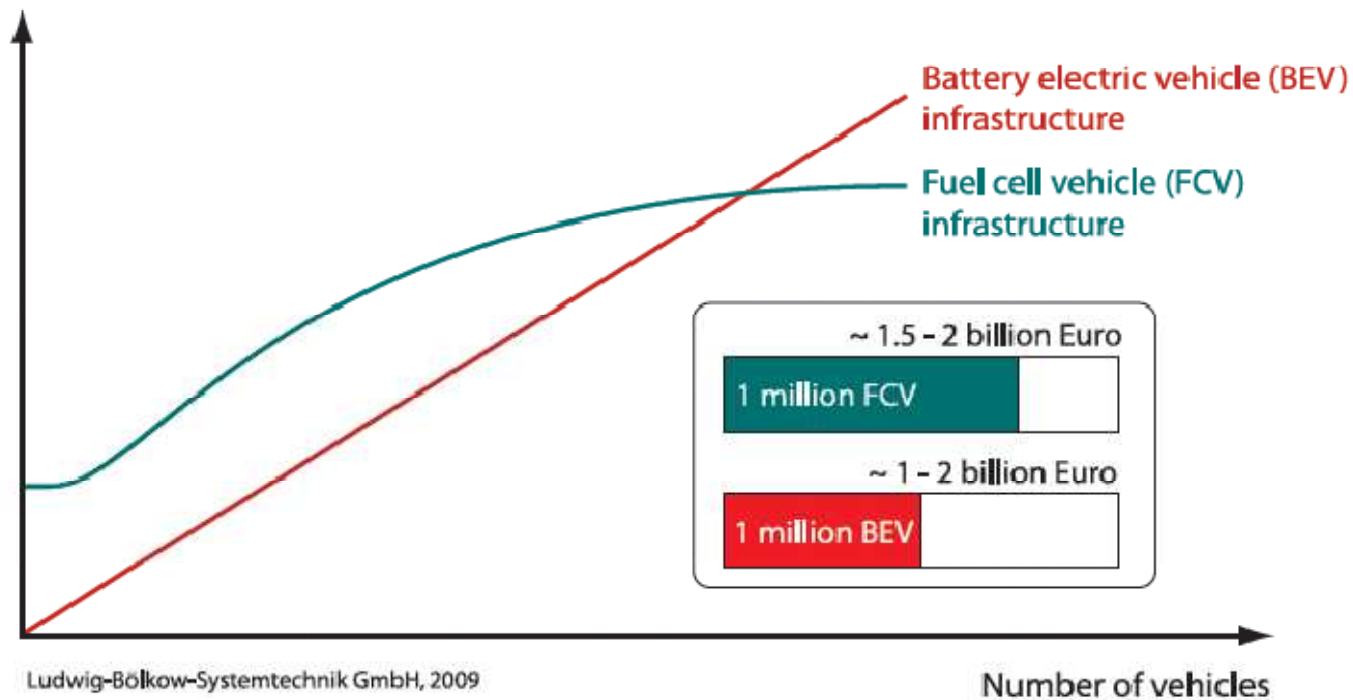
Hydrogen storage in underground salt caverns

Long-term view - Refueling and Infrastructure Implications -

	Charging / refuelling points	Charging / refuelling time
Battery vehicle	Private charging points (at home, company)	8-10 hours – regular charging
	Public charging (e.g. parking lots)	0.5-4 hours – fast charge
	Battery swapping station	3 – 15 minutes – battery swapping
Fuel cell vehicle	Hydrogen refuelling station (public)	< 3-5 minutes



Investments



Ludwig-Bölkow-Systemtechnik GmbH, 2009

Energy Infrastructure 21 Conclusions

- The upcoming decline of fossil fuel availability, and unsustainable rise of CO₂ emissions is a fact. Development and investment cycles in energy and infrastructure are long. **Action needs to be taken now to prepare for the changes to come.**
- **Renewable electricity will take over a dominating role in the energy sector** and in transportation, whereas biofuels will only have a limited role.
- **Actions include adapting the electricity network and management system** as well as preparing for the introduction of new transportation fuels.
- Electricity needs to be complemented by a more densely storable energy carrier. Hydrogen is an ideal energy carrier given its established and efficient conversion path to and from electricity. **Hydrogen is storable electricity.**



Energy Infrastructure 21 Conclusions (2)

- **Hydrogen will pave the way to new harmonised and economical structures** and markets. New and more diverse players will appear.
- **Electricity and hydrogen as leading new fuels in transport will force the electrification of the powertrain** and the gradual replacement of the international combustion engine and conventional fuels.
- A strategic synergy exists between the need of heavily increasing the role of renewable energy sources in the primary energy mix and the goal to introduce clean climate neutral energy carriers in the transport sector: both require the storage of “clean energy”. **This storage capability from several days onward can be best achieved through hydrogen storage and use.**



Energy Infrastructure 21 Conclusions (3)

- **EU, national and local energy development needs a coordinated approach**, i. e. clean urban mobility can only be created by taking into consideration the efficient use of primary energy sources as well as their delivery to the point of use. This implies that transport and energy policies needs to be closely coordinated to ensure a positive effect of incentives, fiscal, and financial measures.
- **The politically monitored and coordinated integration of different clean energy technologies is crucial** to avoid inefficient solutions and not to miss industrial development opportunities.





Ready to Team up:

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