

Update on Hydrogen in Norway

EHA, 2010-06-22

National programs for hydrogen research and demonstration

- **The Research Council of Norway has had two big research programs which have supported hydrogen research.**
 - **RENERGI:** (Clean energy for the future) supports general research on hydrogen systems and technology development.
 - **NANOMAT:** (Nanotechnology and new materials) focuses on research on materials for hydrogen storage.
 - Total amount of money spent on hydrogen R&D in 2009 was 9 M€.
- **The Norwegian government established a new organization called Transnova in 2009.**
 - Its purpose is to support projects which can lead to lower emissions from the transport sector.
 - Yearly budget of 6 M€,
 - 40% of the available funds were allocated to 5 different hydrogen projects in 2009.

Demonstration projects

- **Utsira:**

- Demonstration project for wind- hydrogen system built in 2004.
- 10 households are supplied with electricity exclusively from wind generated electricity and hydrogen.
- More than 2 years of stand-alone operation has been proved.
- The project is now coming to its end after more than 4 year of successful testing.

- **FellowSHIP**

- Demonstration of fuel cell systems for auxiliary ship power.
- A 320 kW molten-carbonate fuel cell (MCFC) operating on LNG (<http://www.vikinglady.no>)



Demonstration projects

- **The HyNor project** (<http://www.hynor.no>): Joint public-private partnership initiated to demonstrate real life implementation of hydrogen energy infrastructure along a 580 kilometre road stretch from Oslo to Stavanger. Currently 4 hydrogen refuelling station are installed:
 - 1 in Stavanger, 2006
 - 1 in Porsgrunn in 2007.
 - 2 in Oslo in 2009
- Planned hydrogen stations:
 - 1 in Lillestrøm, just north of Oslo in 2010
 - 2 in Oslo in 2011.
- A fleet of 17 fuel cell vehicles will arrive with the new stations, making the total amount of hydrogen vehicles in Norway close to 40.
- Efforts are also being made for the procurement of 5 hydrogen fuel cell buses, resulting in a strong hydrogen cluster in the Oslo region.

Events

- **Nordic Hydrogen Conference:**
Oslo 24 – 26 November 2009,
(<http://www.hydrogen.no/h2conference2009>)
- **Renewable Energy Research Conference:**
Trondheim 7 – 8 June 2010 (<http://www.sffe.no/conference/>)
- **Viking Rally:**
A hydrogen- and battery-electric zero emission vehicle-rally was held in conjunction with the opening of HyNor and the 24th electric vehicle symposium. (<http://www.vikingrally.no/>)
- **ZeroRally:**
Due to Viking Rally's success a new rally will be held in 2010. Many international teams are expected to participate in the rally. (<http://www.zerorally.com>)



Other activities

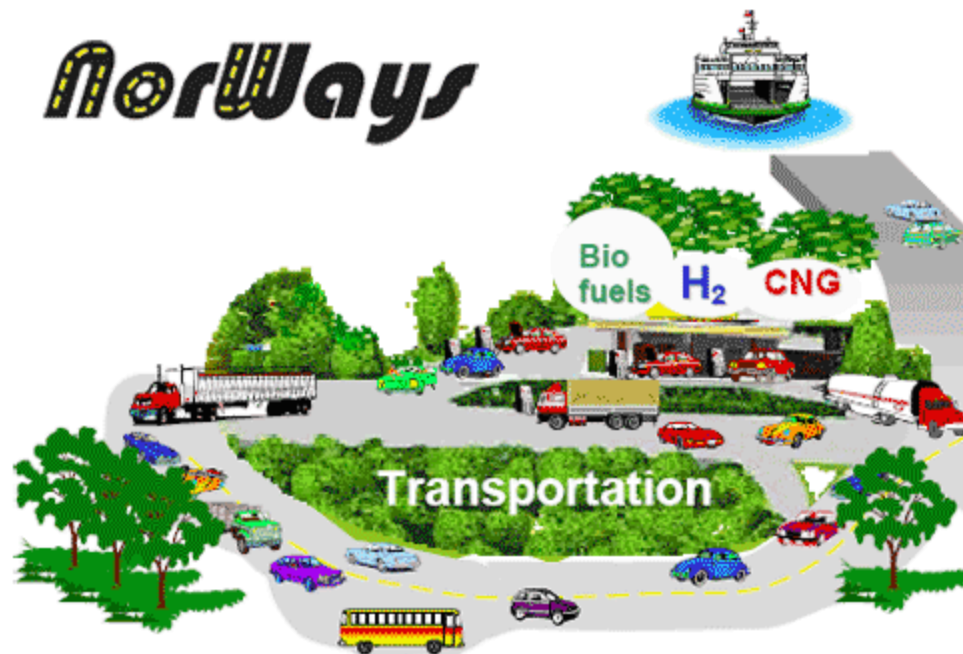
- **Secretary for Norwegian Hydrogen Forum and the Norwegian Hydrogen Council:**
From 2010 the Norwegian Hydrogen Forum and the Norwegian Hydrogen Council has engaged a full-time position to hold the secretary and coordinator for both actors
(<http://www.hydrogen.no>)
- **The Norwegian Hydrogen Guide:**
Comprehensive overview of Norwegian hydrogen activities from education to research and commercial development. (<http://www.hydrogenguiden.no>)



Other activities cont.

- **Norways:**

Analysis of infrastructure development (Norways, published 2009, <http://www.ntnu.no/norways>)



Commercial

- The two biggest companies in Norway with commercial products in the hydrogen business are:
 - **Hydrogen Technologies:** manufacturer of advanced alkaline electrolyzers and supplier of complete hydrogen filling station systems.
 - **Raufoss Fuel Systems:** composite storage tanks, both for cars and for stationary applications.
- There are also some new start-up companies related to hydrogen technologies:
 - **Hystorsys:** develops metal hydride compressors which use waste heat as compression driver.
 - **Nordic Power Systems:** developer of APU fuel cell systems which incorporate a diesel reformer and a high temperature fuel cell.
 - **GasPlas:** developer of a plasma cracking technology for small scale production of hydrogen from natural gas for on-site use at hydrogen stations.