HyNør and the Scandinavian Hydrogen Highway Partnership
Brussels, June 25, 2008

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Chairman SHHP, Board member HyNør
Agenda

- StatoilHydro and Hydrogen
- HyNor – The Hydrogen Road of Norway
- Scandinavian Hydrogen Highway Partnership (SHHP)
StatoilHydro Hydrogen
New energy portfolio

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Developing Hydrogen as an energy carrier

- Participating in market preparation activities
- Developing Hydrogen as a vehicle fuel
- Developing Renewable Hydrogen Systems
- Developing technology for Hydrogen production and supply
StatoilHydro delivers hydrogen solutions for Europe

• ECTOS/HyFLEET:CUTE – Hydrogen station Reykjavik

• CUTE/HyFLEET:CUTE – Hydrogen station Hamburg

• CEP Berlin
  Hydrogen production Messedam

• Utsira Wind-Hydrogen plant

• HyNør – Grenland Hydrogen station
  Oslo, Drammen, Stavanger II
HyNor Objective

• The HyNor project was established in 2003 with the objective of a broad market demonstration of hydrogen for transportation in Norway, described by the following vision:

“**In 2009 it shall be possible to drive hydrogen fuelled vehicles between Stavanger and Oslo**”

• This is to be achieved by establishing local nodes along the 580 km long road – ”The hydrogen road of Norway”
HyNor: Public Private Partnership at work

• Introducing a new fuel requires a major co-operation effort
  – HyNor has more than 50 partners organised in the various nodes

• PPPs are needed in the early development phase
  – HyNor is a good example of successful implementation of PPPs

• Example Grenland:

  – Partners in HyNor Grenland are: Høgskolen i Telemark, Zero, TelTek, Miljøbil Grenland, Ineos (Hydro Polymers), Telemark Fylkeskommune and StatoilHydro

  with car partners: Quantum Technologies, Porsgrunn Kommune, Vekst i Grenland, Skagerak Energi, HiT, Choice Hotels, Hydro and StatoilHydro

  and funding from Department of Transport via Norwegian Research Council
The HyNor nodes

Bergen
- Plans for station in phase II (2010)
- H₂ from refinery by-product

Stavanger
- 2006: trucked-in 2. station (3Q09)
- H₂ from biogas reforming (3Q09)

Kristiansand
- Trucked in hydrogen (09)
- By-product or electrolysis

Grenland
- 2007: Pipeline supply
- H₂ from by-product

Drammen
- Trucked-in hydrogen (2Q09)
- H₂ reformed from local landfill

Oslo
- Car station (2Q09)
- Bus station (4Q09)
- H₂ from electrolysis

Romerike
- Plans for station in phase II (2010)
- H₂ from electrolysis

H₂ from biogas reforming (3Q09)

H₂ from refinery by-product

H₂ from electrolysis

Trucked-in hydrogen (2Q09)

H₂ reformed from local landfill
HyNor Stavanger – Norway’s 1st Hydrogen Station

- Opened August 2006 as an integrated part of a petrol station
- Hydrogen, NaturalHy (8% H₂ in Natural Gas) and Natural Gas
- Start-up with trucked in hydrogen, dispensers for 350 and 700 bar hydrogen
- Stage II with production of H₂ from Natural gas with CO₂ handling or from biogas + second filling station
HyNør Grenland – A World class hydrogen station

• Several technology innovations
• Directly linked to large scale hydrogen production, scalable solution
• Possibility for supply and back-up for other HyNør stations
• 10 hydrogen cars in operation at the station
• Upgrading to 700 bar technology
HyNor Oslo – Hydrogen in Public Transport

- Plan for 4 buses, 5 taxis and 15 cars
- Production of hydrogen from water with electrolysis
  - demonstrating new world-class electrolyser technology
- Car station will be in operation in 2009 (350/700 bar), bus station in 2009/2010
Vehicle fleet in HyNor

**Hydrogen Prius:**
converted to hydrogen operation by Quantum US, 15 cars in Norway

**Think Hydrogen:**
A hydrogen/electric hybrid, 5 cars to HyNor in 2008/2009

**Mazda RX8:**
Hydrogen/petrol, dual fuel, 30-40 cars to HyNor/SHHP in 2008/2009

**Buses:**
Plans for 8 buses in HyNor 2009-2010

**More cars:**
Dialogue ongoing with several car manufacturers for larger series of cars to HyNor and SHHP
The Scandinavian Hydrogen Highway Partnership
Joining forces

Making the Scandinavian Region one of the first regions in Europe where hydrogen is commercially available and used in a network of refuelling stations.
Building a network of hydrogen stations

- 3 stations are opened
- 2 will open in 2008
- 9 planned for 2009
- 8 sites under evaluation
Raising our ambitions

• We are looking at the next level of development for 2008 – 2015
  – SHHP aims to become a Lighthouse Project in EU

• A network of Hydrogen stations
  – 20 stations
  – 15 satellite stations

• A large fleet of vehicles
  – 100 buses
  – 500 cars
  – 500 speciality vehicles
EU and the JTI

• 5 Nordic members in the industry grouping
  – *Iceland*: Icelandic New Energy
  – *Norway*: StatoilHydro
  – *Sweden*: E.ON, Volvo
  – *Denmark*: H2Logic (DK)

• 1. call from JTI planned for September -08:
  – “Large-scale demonstration of road vehicles and refuelling infrastructure, *study and preparation activities*”
  – SHHP are building a consortium with interest to apply for above, and move further to become a large scale demonstration project
Nordic collaboration in the transport sector

• SHHP links with Iceland and Finland in network project funded by NIC

• “Hydrogen bonds” formed between Iceland, Norway and Denmark
  – StatoilHydro (NO) technology in Electrolyser based hydrogen station in Reykjavik (IS)
  – H2Logic (DK) partner in the Fuel cell ship project in Iceland and Think (NO)
  – Close cooperation on the fleet of Hydrogen Prius (NO+IS) and other cars

• The Nordic countries are playing an important role in hydrogen development
  • Today there are 4 hydrogen stations in operation, 5 by summer this year, by end of 2009 the plan is to have 13 stations in operation
  • Current car fleet counts 28 hydrogen cars, concrete plans for 70 – 80 vehicles by end 2009