

# HyNor

- the Norwegian Hydrogen Highway

Bjørn Simonsen  
HyNor Chairman



# HyNor – short history

- Initiative started in 2003
- Objective: broad market demonstration of hydrogen for transportation in Norway
- Vision:

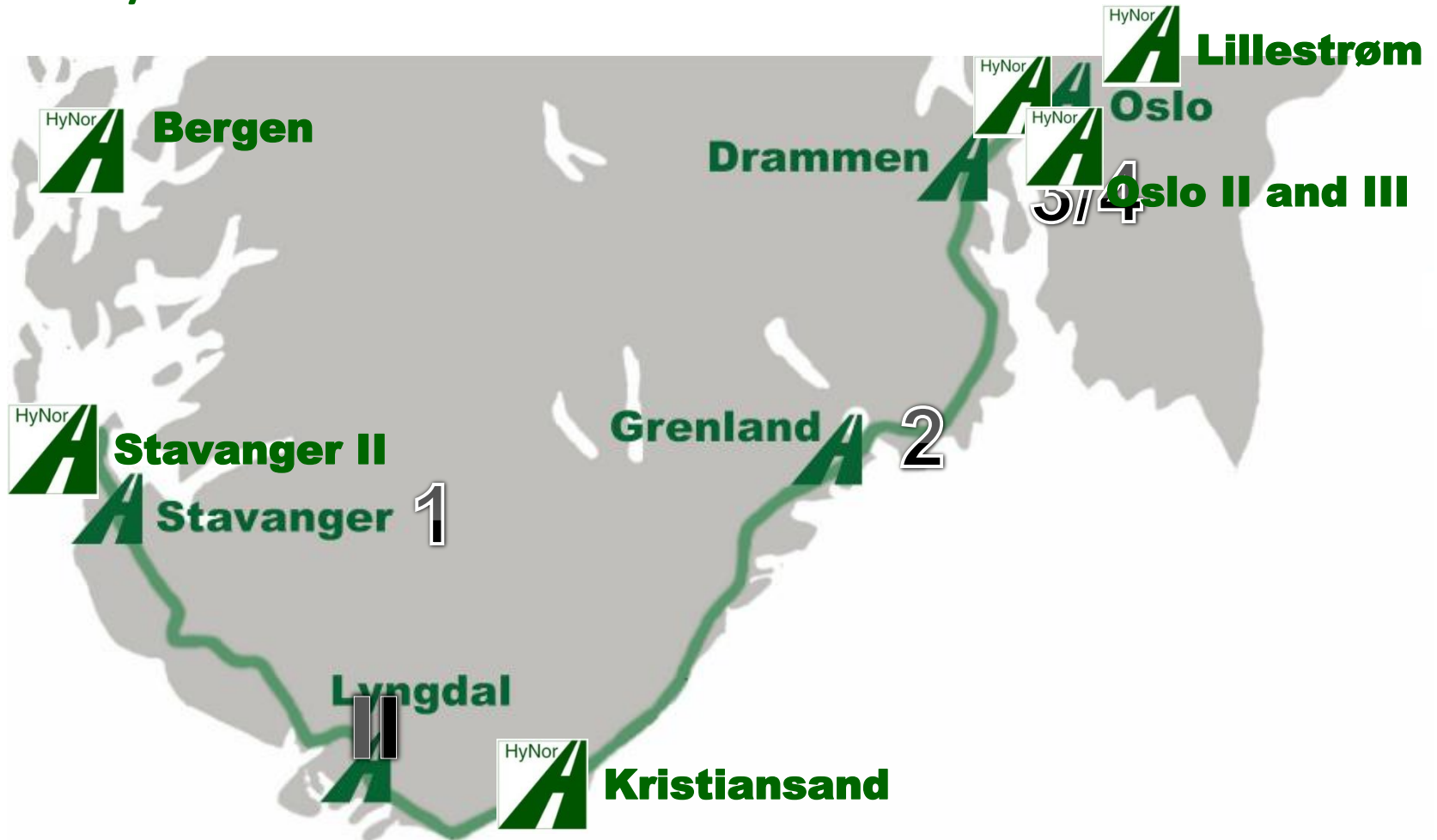
***“In 2009 it shall be possible to drive hydrogen fuelled vehicles between Stavanger and Oslo ”***

- A number of nodes along the road identified as locations for filling stations
- Public-private partnerships formed
- Statoil and Hydro strong drivers for hydrogen implementation



The Hydrogen Road of Norway

# The HyNor nodes



# Opening of HyNor Oslo + Drammen, May 11<sup>th</sup> 2009



# HyNor Oslo and HyNor Drammen concept

- Filling station concept developed by Statoil
- Credit card terminal for filling of hydrogen
- Moveable solution
- 350 and 700 bar fillings, 2-nozzle dispenser
- Storage: 46 kg @ 900 bar, 34 kg @ 200 bar
- Room for electrolyser at station



# Viking Rally



## Special stages

Special stage	Criteria	Remarks
Autoslalom	Time	
Ecodriving	Fuel consumption	The teams must follow ordinary traffic flow
Hillclimb	Time	
Accelration	Time	From standstill to 201 meter
Regularity	Regularity	



# Viking Rally – highlights



# ZeroRally 2010



23-26.august 2010

Info and registration at: [www.zerorally.com](http://www.zerorally.com)

# Vehicle fleet in the HyNor project

Now:



**15 Toyota Prius**  
Converted to ICE Hydrogen  
by Quantum (US)  
Range: 170 km



**4 Mazda RX-8**  
Flexifuel wankel engine  
Range: 100 km H<sub>2</sub>,  
50 km gasoline

Additional vehicles in 2011:



**10 Mercedes B-class**  
Range: ~400 km



**5 Think Hydrogen**  
10kW FC (range extender)  
Total range: 250 km



**2 Alfa Romeo MiTo**  
Range: ~300 km



**5+ utility vehicles**  
Forklifts, etc

**5 buses**  
Type: TBD

# HyNor – test sites for Norwegian technology

## •HyNor Stavanger II (2010)

- Location: Risavika harbour, Norway's biggest harbour
- On-site natural gas reforming
- Hydrogen utility vehicles



## • HyNor Lillestrøm (2011)

- 20km north of central Oslo
- Hydrogen from two production lines:
  - Bio-hydrogen from local land fill gas via Sorption Enhanced-SMR process.
  - Electrolysis (PV-power)
- Thermal Sorption Metal Hydride Compression



## •H2-moves Oslo + HyNor Oslo Bus (2011)

## •HyNor Bergen (2012)

- ZEGPower concept
  - Solid oxide fuel cell coupled with SE-SMR



# Oslo, site for hydrogen **lighthouse project**

- **H2-moves Scandinavia**

- *Oslo chosen as main city for the EU-project H2-moves Scandinavia → H2-moves Oslo*
- *16 M€ project*
- *350/700 bar filling station in central Oslo*
- *17 FC vehicles*
- *Chosen as city for deployment of new Mercedes B-class fuel cell vehicles*
- *Station opening in March 2011*

H2moves.eu



# Oslo as **Scandinavian hub for buses**

- **HyNor Oslo Bus**

- *Oslo will be part of a new European bus project*

- *Building on the HyFleet-CUTE project*

- *5 regions/cities in Europe*

- *18 M€ project*

- *5.5 M€ from FCH JU*

- *350 bar filling station in central Oslo*

- *On-site production of hydrogen*

- *5 FC buses operating for 5 years*

- *Opening in October 2011*

## Ruter#



# Thank you for listening!

[bjorn@kunnskapsbyen.no](mailto:bjorn@kunnskapsbyen.no)

