



# H2 Logic presentation

June 2010

# About H2 Logic A/S

- Developer of hydrogen and fuel cell technology for electric transport
- Developer of hydrogen refueling stations
- Established 2003
- 26 employees



## Board of directors

### **Svend Sigaard**

Former CEO & CFO  
Vestas Wind Systems A/S

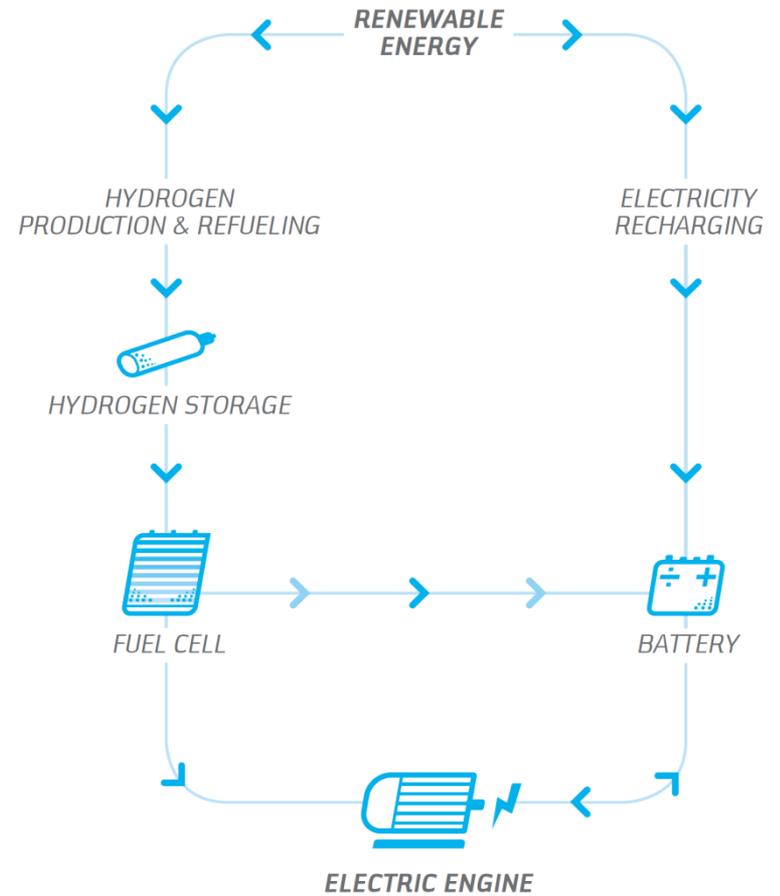
### **Mogens Filtenborg**

Former CTO & CPO  
Vestas Wind Systems A/S

### **Flemming Hansen**

Former Danish Minister for  
Transport & Energy

# The vision of sustainable electric transport



# About H2 Logic A/S

- Hydrogen and fuel cell technology for zero emission electric transport
- Development & manufacturing company since 2003

## HYDROGEN REFUELLING INFRASTRUCTURE

  
Energy



  
Hydrogen

## FUEL CELL POWER SYSTEMS



  
Electricity



# H2 Logic Fuel Cell Systems



# Fuel cell electric forklifts

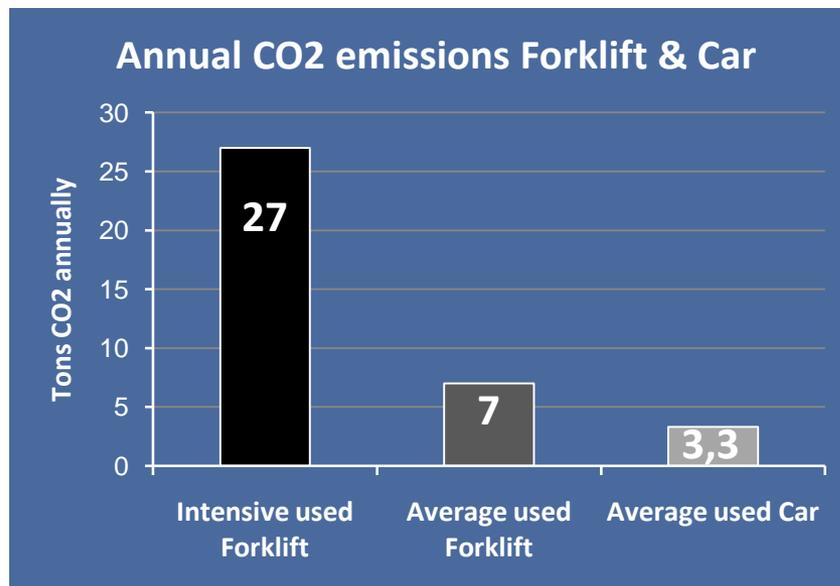
- Fast refuelling & consistent power like diesel/LPG forklifts
- Zero emission & high fuel efficiency like battery electric forklifts
- Fuel cost competitive with LPG
- Hardware cost competitive with batteries



# Significant emission reduction

- 1 average used forklift emits CO2 annually for 2 cars
- 1 intensive used forklift emits CO2 annually for 8 cars
- Using hydrogen in fuel cell powered forklifts can eliminated CO2 emissions
- Further local/indoor particle emission is eliminated & noise level reduced

*Numbers based on comparison with diesel/LPG powered forklifts*



# Fuel cell systems for forklifts

- Targeted R&D and testing towards a range of vehicles
- Collaboration with forklift OEMs and early adopter end-users



# Fuel cell system demonstration

- Targeted R&D and testing towards a range of vehicles
- Collaboration with forklift OEMs and early adopter end-users

**2006 DK**  
7 units



**2008 DK**  
5 units



**2010-2011 DK**  
10 + 30 units



**2011-2012**  
Deployment



**2008 DK**  
4 units



**2009 DK**  
8 units



**2010 DK**  
3 units



**2011 Oslo**  
5 units

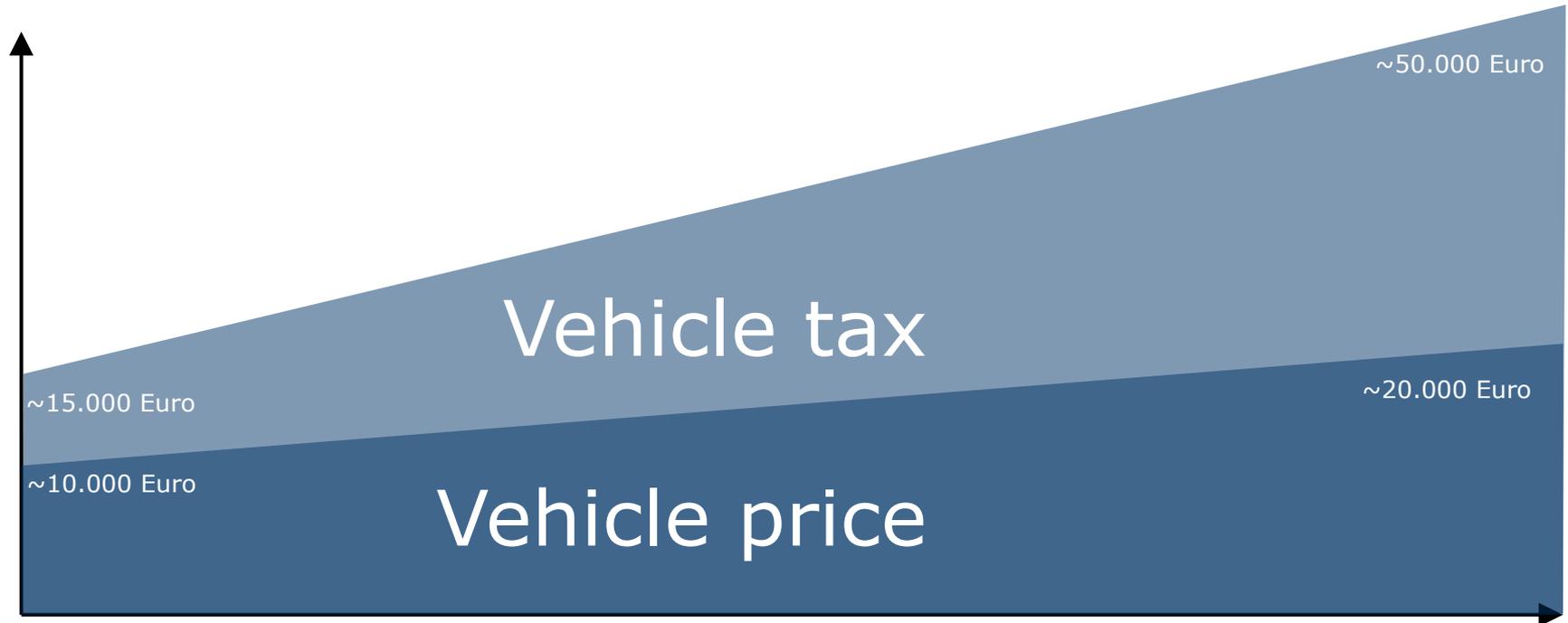
# THINK Hydrogen



Specification	
Top speed	115 km/h
Range	250 km
Fuel	H2 / electricity
Fuel consumption	0,9kg H2/100km
Refueling time	3 min / 8 hours
Fuel cell system	10kW

# Vehicle taxation in Denmark

*...180% tax on purchase of cars in Denmark, less tax in small cars*



# To vigtige begivenheder i 2009

## 8. Sep. indgik bilproducenterne en hensigtserklæring om:

- Udvikling og markedsintroduktion af brintbiler frem mod 2015
- At nå et produktionsvolumen på et par hundrede tusinde biler



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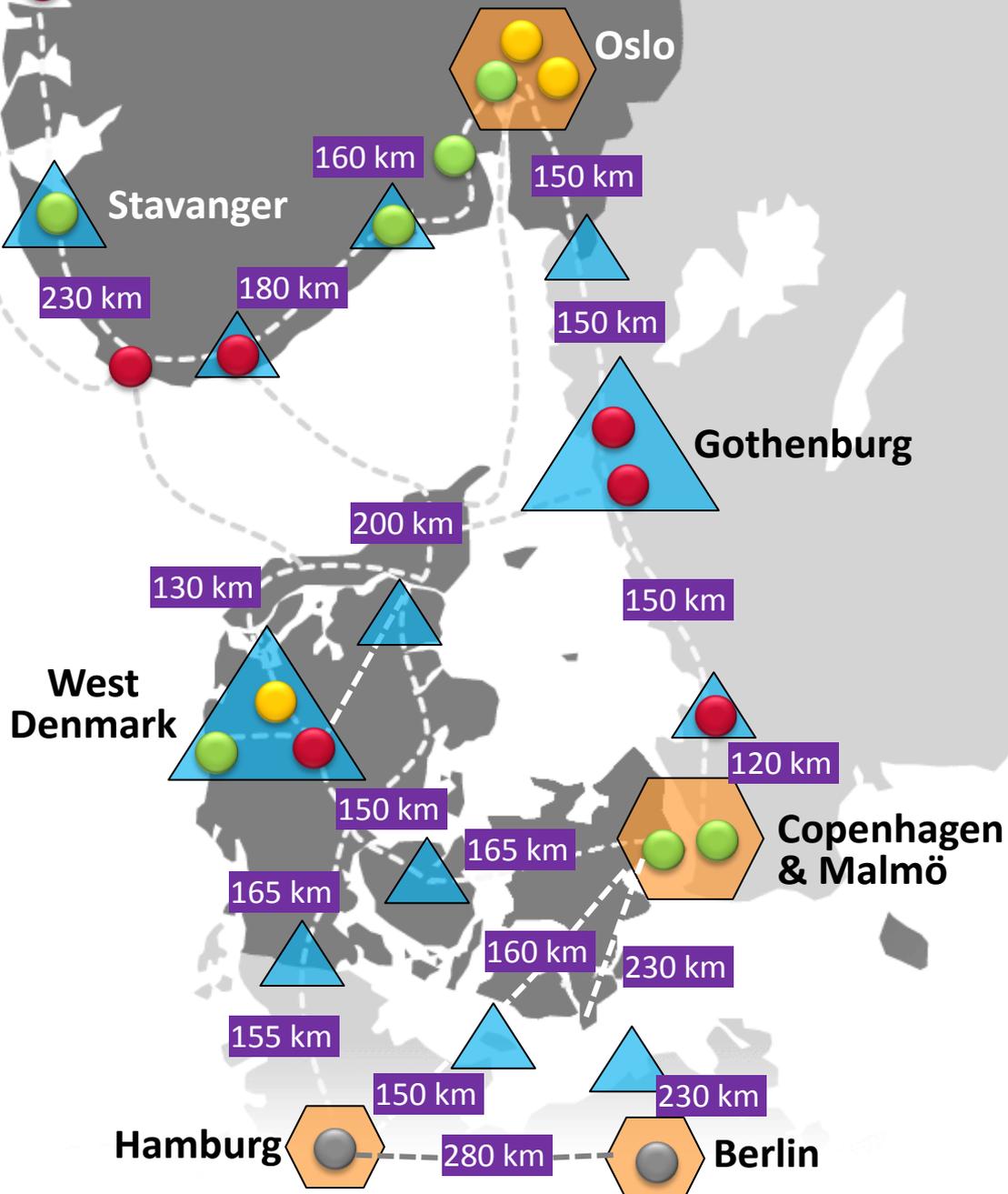
## 9. Sep. indgik energiselskaberne en hensigtserklæring om:

- Etablering af en infrastruktur af brint tankstationer i Tyskland
- Perspektiv om op mod 1.000 brint stationer i Tyskland i 2017



**I Tyskland planlægges investeret 17 mia. kr. frem mod 2015**

**Initial layout only!**



**Clustering stations in Metropolitan Regions**

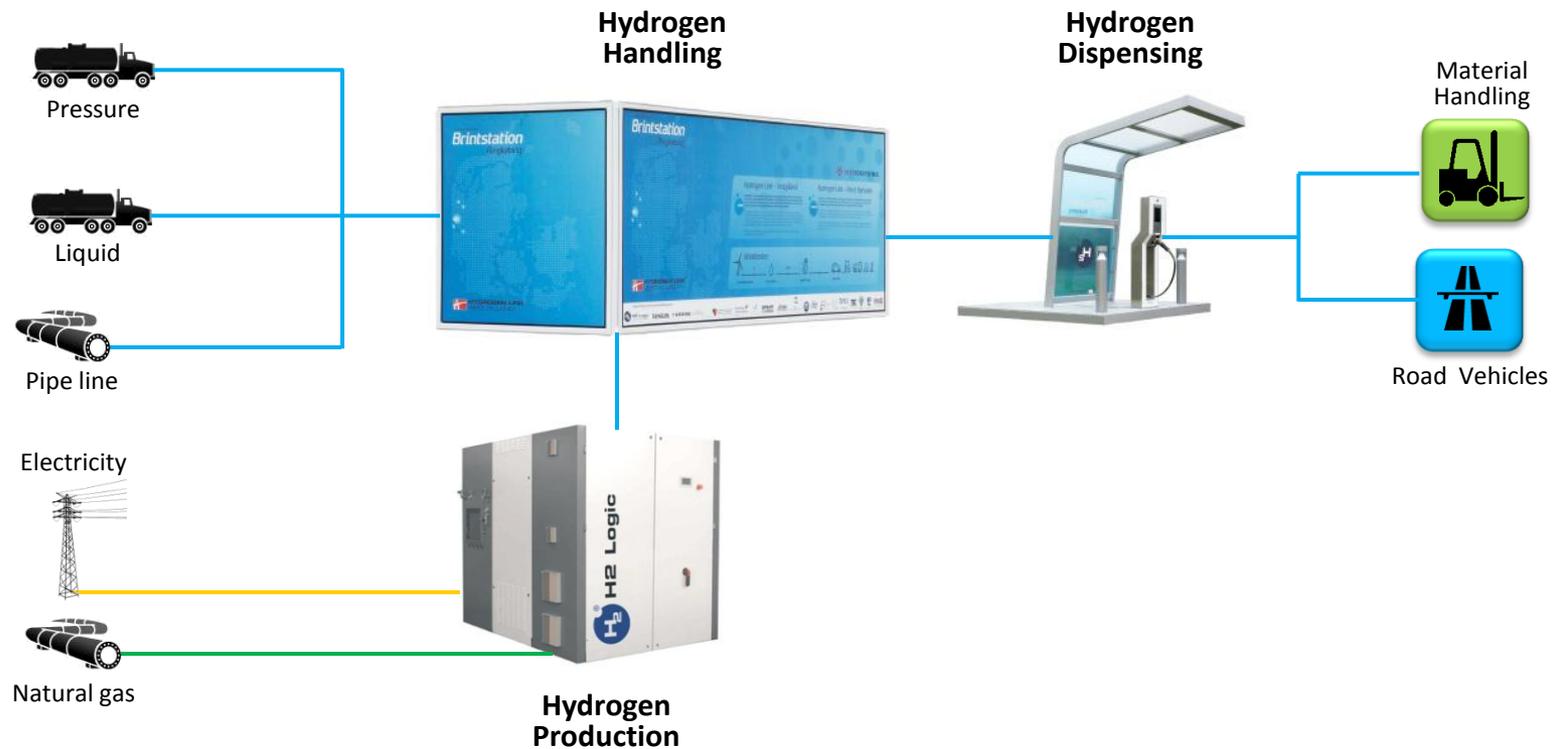
**Few/small stations in Corridor Regions, closing the corridor**

-  In operation (7)
-  Under construction (3)
-  Under planning (7)
-  Clean Energy Partnership
-  Metropolitan Region
-  Corridor Region
-  X km Road distance between Regions



# Hydrogen Stations

- **Various hydrogen supply options** (trucked liquid/pressure, pipe & onsite)
- **Various dispensing pressures** (350/700bar)
- **Modular & scalable in capacity** (kg day/instant)



# Thank you for your attention

## Questions and input

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