



# Hydrogen R&D in Norway

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The Research Council of Norway



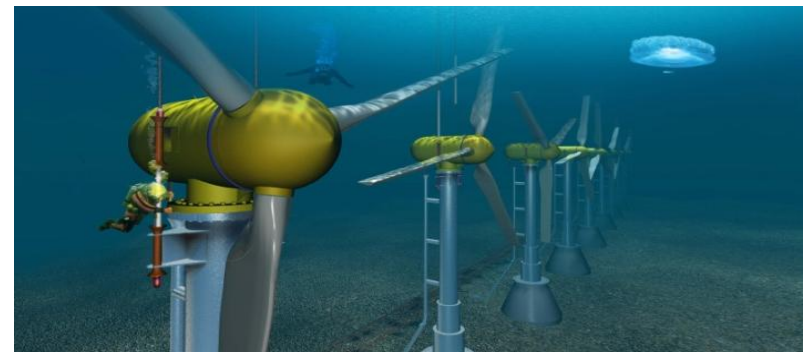
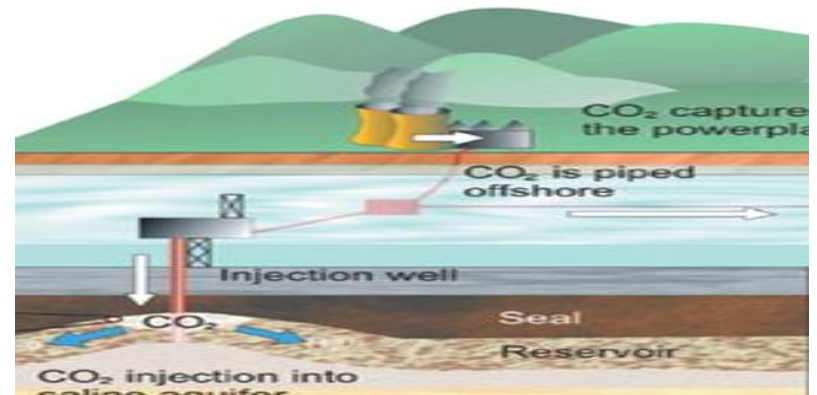
# Total expenditure on hydrogen 2009-11

RD&D Budgets						
Millions, national currency						
	2009		2010 Est.		2011 Est.	
	Total RD&D	<i>of which:</i> Demonstration	Total RD&D	<i>of which:</i> Demonstration	Total RD&D	<i>of which:</i> Demonstration
<b>HYDROGEN and FUEL CELLS</b> (sum of rows V.1 and V.2)	74,748	-	57,521	10,000	52,071	-
<b>V.1 Hydrogen</b>	62,226	-	37,797	10,000	29,641	-
V.1.1 Hydrogen production	17,989	-	13,900	-	13,762	-
V.1.2 Hydrogen storage	8,913	-	9,915	-	8,719	-
V.1.3 Hydrogen transport and distribution	27,800	-	11,732	10,000	4,900	-
V.1.4 Other infrastructure and systems R&D	6,000	-	0,700	-	0,700	-
V.1.5 Hydrogen end uses (incl. combustion; excl.fu	1,524	-	1,550	-	1,560	-
<b>V.2 Fuel Cells</b>	12,522	-	19,724	-	22,430	-
V.2.1 Stationary applications	12,522	-	19,724	-	18,674	-
V.2.2 Mobile applications	-	-	-	-	3,756	-
V.2.3 Other applications	-	-	-	-	-	-

Numbers in National currency:  
1 US \$= 5,4 NOK

# Research Council of Norway's main instruments for energy R&D

- **RENERGI** (2010:45 mill €)
- CLIMIT (2010:12 mill €)
- PETROMAKS (2010:30 mill €)
- DEMO2000 (2010: 12 mill €)
- Centres for Environmentally friendly Energy Research (2010:15 mill €)

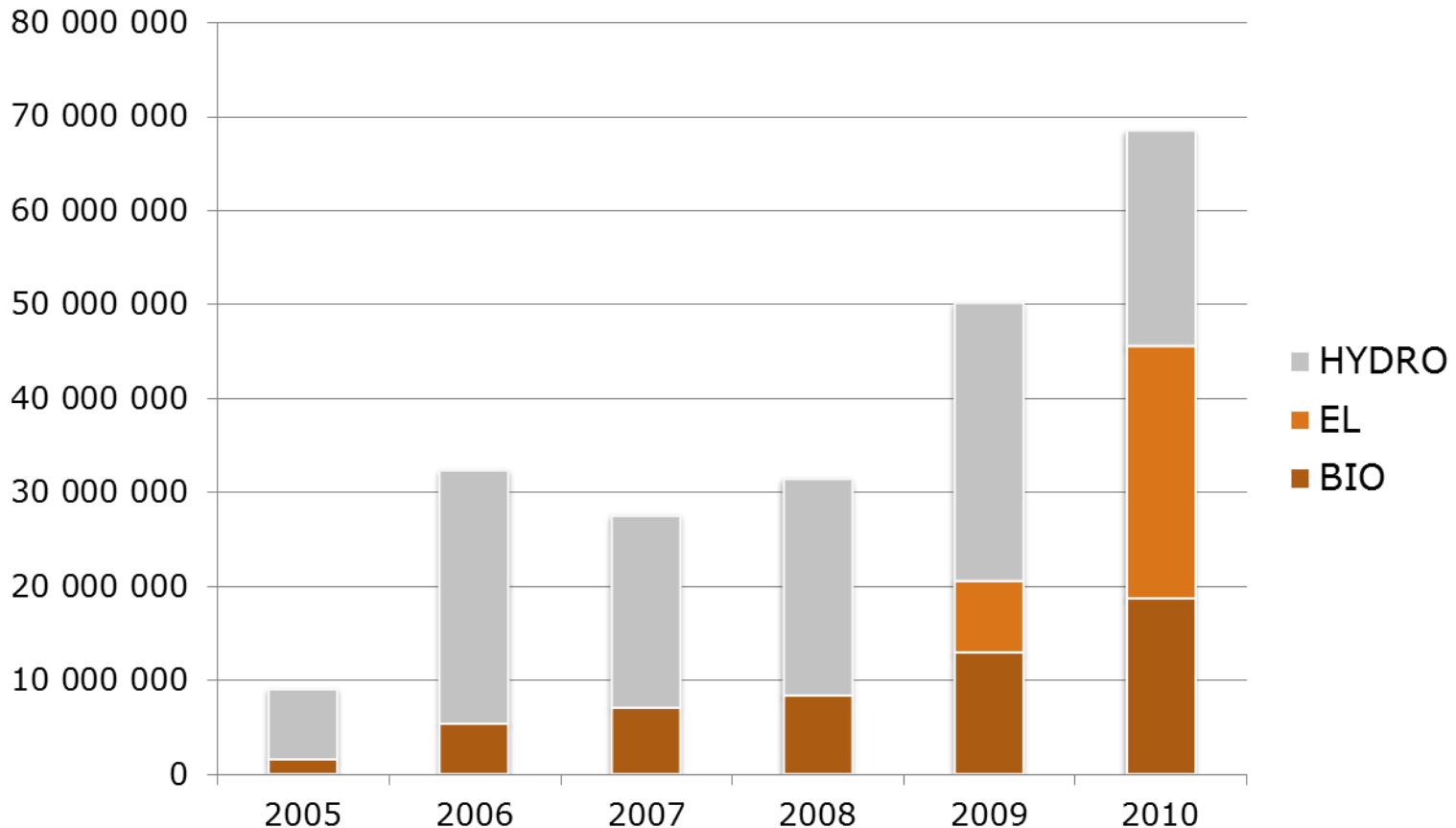


# Thematic priority areas for RENERGI

## 2009-2013:

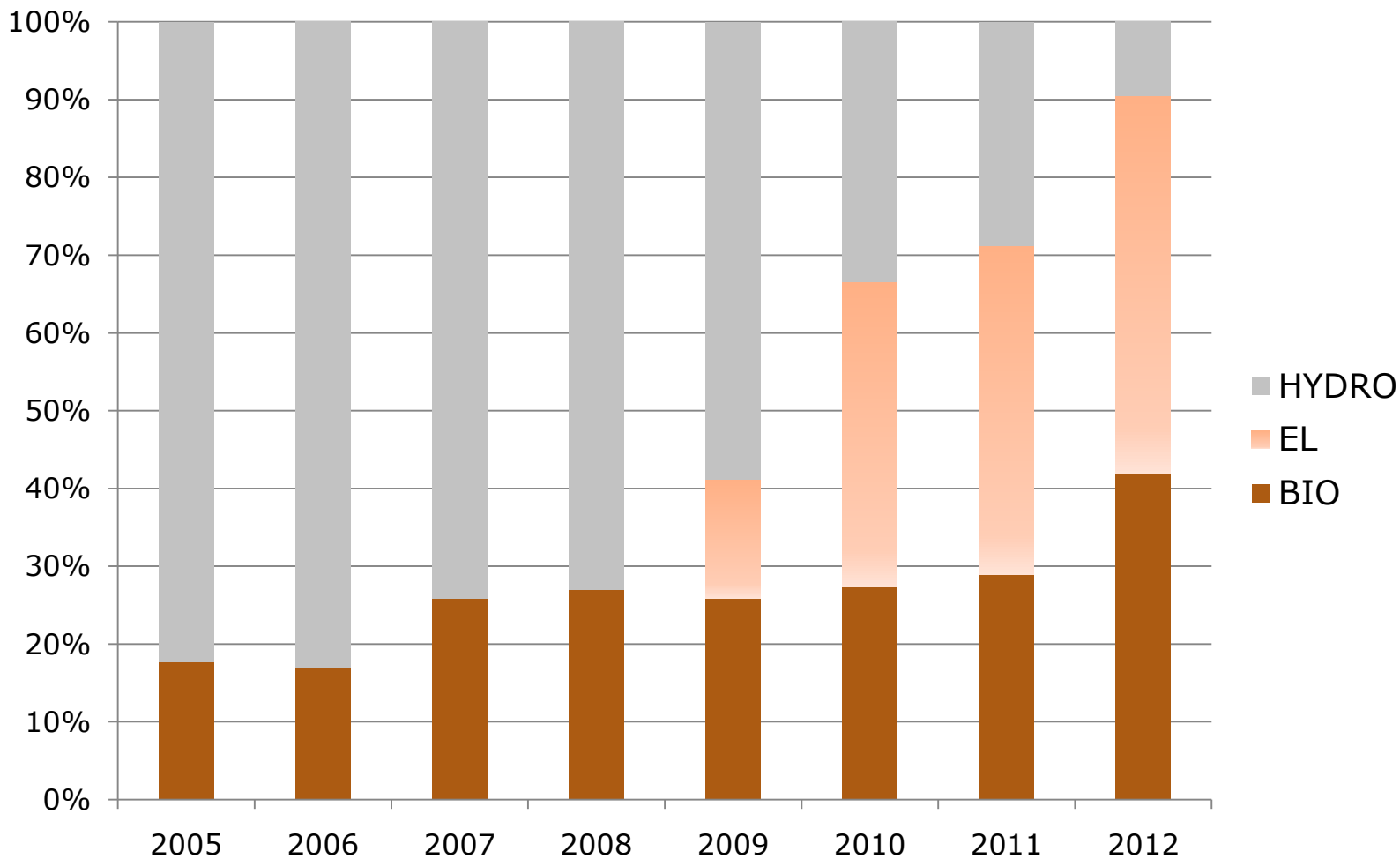
- **Energy efficiency**
- **Energy systems**
- **Renewable power, wind, solar, bio, ocean, hydro**
- **CO<sub>2</sub>-neutral heating/cooling**
- **Social science research**
- **Alternative energy carriers (Stationary use of H<sub>2</sub>, biogas, fuel cells)**
- **Transportation (H<sub>2</sub>, biofuels, electromobility)**

# Distribution 2005-10 for Transportation R&D in RENERGI



(Numbers in National currency: 1 US \$= 5,4 NOK)

# H2, Biofuels and Electromobility: Distribution in RENERGI 2005-2012 (%)





# Transnova and hydrogen

Konrad Pütz  
Vancouver May 13th

# About Transnova

- We are a government funded trial project. The government has announced that it aims at continuing Transnova beyond 2011. A decision is expected this autumn
- Main goal is to contribute to reduce national CO<sub>2</sub>- emissions from the transport sector (land, sea and air)
- To achieve this we support a large variety of projects with participants from research, business, NGOs and local authorities.





# Our role

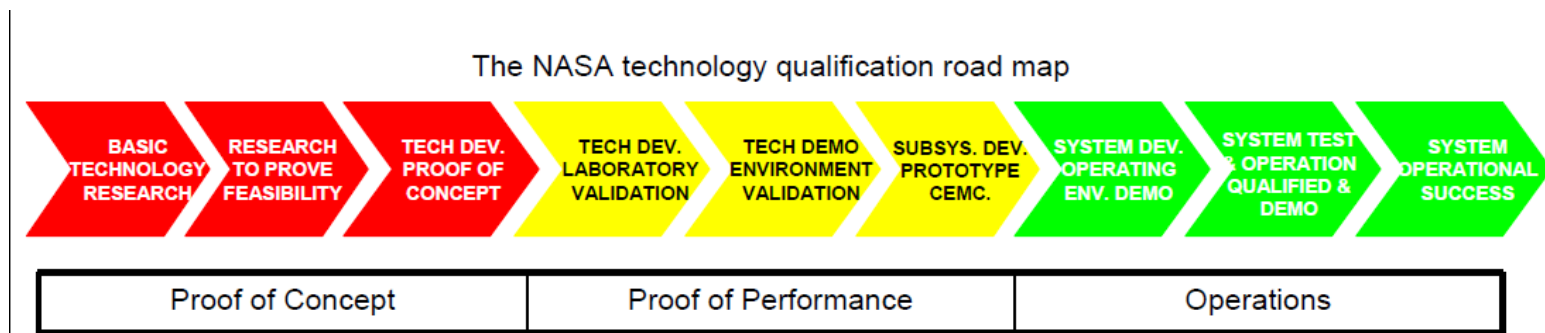
- Transnova was established out of a need to supplement established government policies to reduce GHG emissions from transport and established research programs
- We are contributing towards reducing institutional, economical and technical barriers to stimulate widespread use of clean and renewable fuels and improved technologies and transport solutions.
- Typical effects of projects we support can be reduced cost, improved knowledge, new standards, improved economics of scale, new fuel or charging infrastructure, cluster – and learning effects etc.

Transnova solving the chicken and egg problem  
(photo: Wiki Commons)



# What we support

- We engage in projects after proof of concept and are mainly operating at the pilot and demonstration stages of R&D.



- We are mainly supporting projects that are:
  - Replacing fossil fuel with renewable or clean fuels
  - Improving transport systems:
    - Public transport in stead of private cars
    - Energy efficient modes of transport (sea and rail) in stead of lorries
  - Reducing transport and travel volumes

# Funding

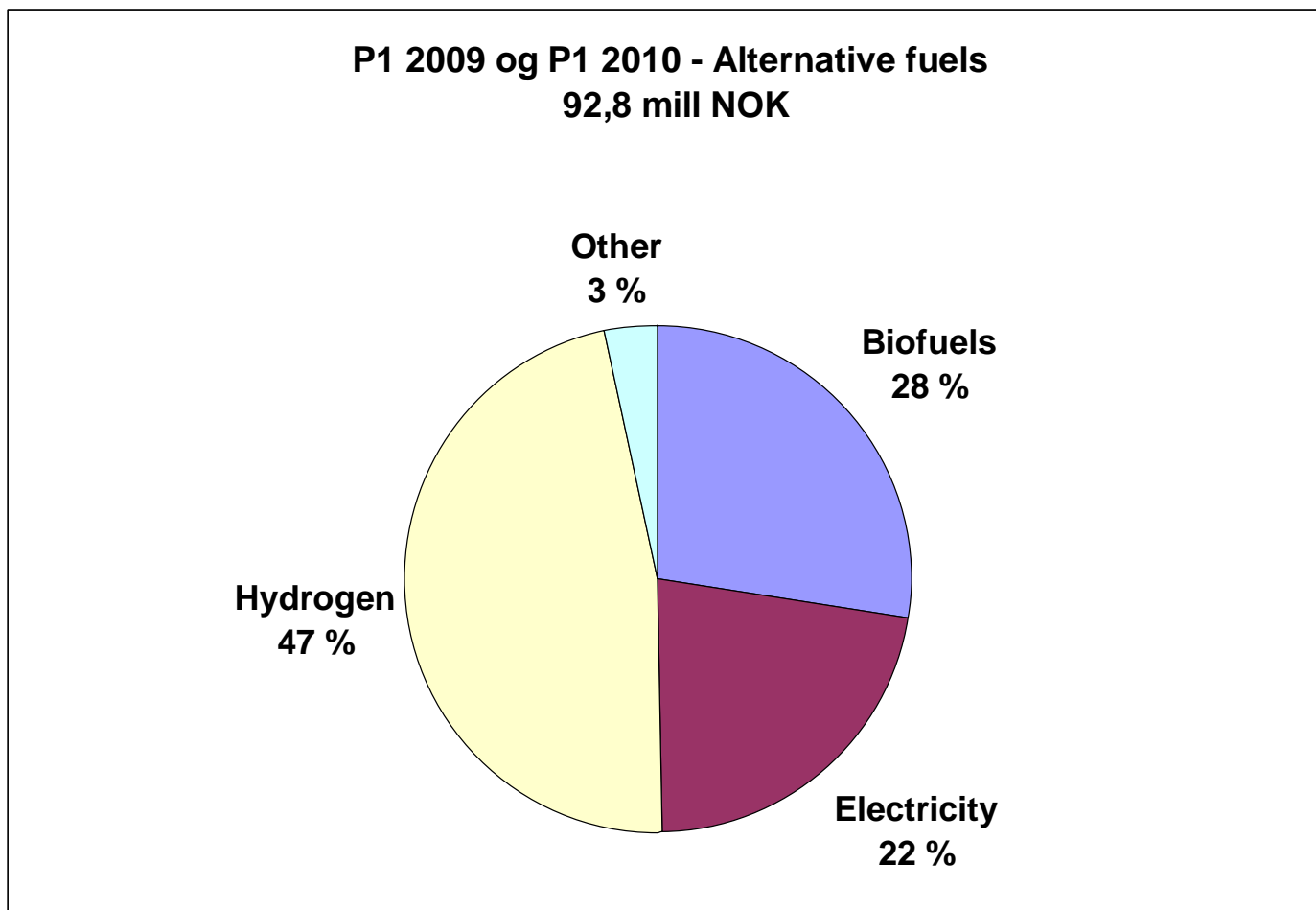
- 2009-2011: 50 mill NOK/year ~approx 10 mill USD
- 2009: additional 50 mill NOK for public electrical charging stations
- 2011: additional 20 mill NOK as part a programme to develop improved environmental technologies strengthening Norwegian industry *and* reducing emissions



# Hydrogen projects we support

- H2 Moves Oslo (filling station+cars) 12 mill NOK. Part of EU-project
- Mobile H2 Plasma Reactor (GasPlas AS) 9 mill NOK
- HyNor 3,6 mill NOK
- HyNor Oslo Buss (5 hydrogen buses+filling station) 12 mill NOK. Part of EU project
- HyNor Lillestrøm (production, storage, filling station) 4,9 mill NOK
- Prototech (small hydrogen passenger ferry) 1,2 mill NOK
- Nextmove 0,9 mill NOK (part of EU-Interreg project)

# Fuel related projects in 2009 and 2010



Thank you for your attention!

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