

# German Hydrogen & Fuel Cell Technology Update

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IPHE Implementation & Liaison Committee  
Seoul, 12 June 2007

## National Innovation Programme on H<sub>2</sub>/FC (NIP)

- Goal:** ⇒ Bridging the gap between **R&D** and **market** development  
⇒ Preparing hydrogen and fuel cell applications for **commercialisation**  
⇒ Maintenance and expansion of **Germany's good starting position**
- **Additional funding:** **500 million €** over the next 10 years
  - **Implementation:** through **PPP** with average public funding of **50 %**
  - **Focus:** demonstration and **lighthouse** projects, accompanied by **R&D** projects (basic and applied research)
  - **Link:** **close coordination** with **EU** / further **international** activities



8. May 2006

**National Hydrogen and Fuel Cell Technology  
Innovation Programme**

[www.nkj-ptj.de](http://www.nkj-ptj.de) and [www.iphe.net/germany.htm](http://www.iphe.net/germany.htm)

## Current Status of the Implementation of NIP

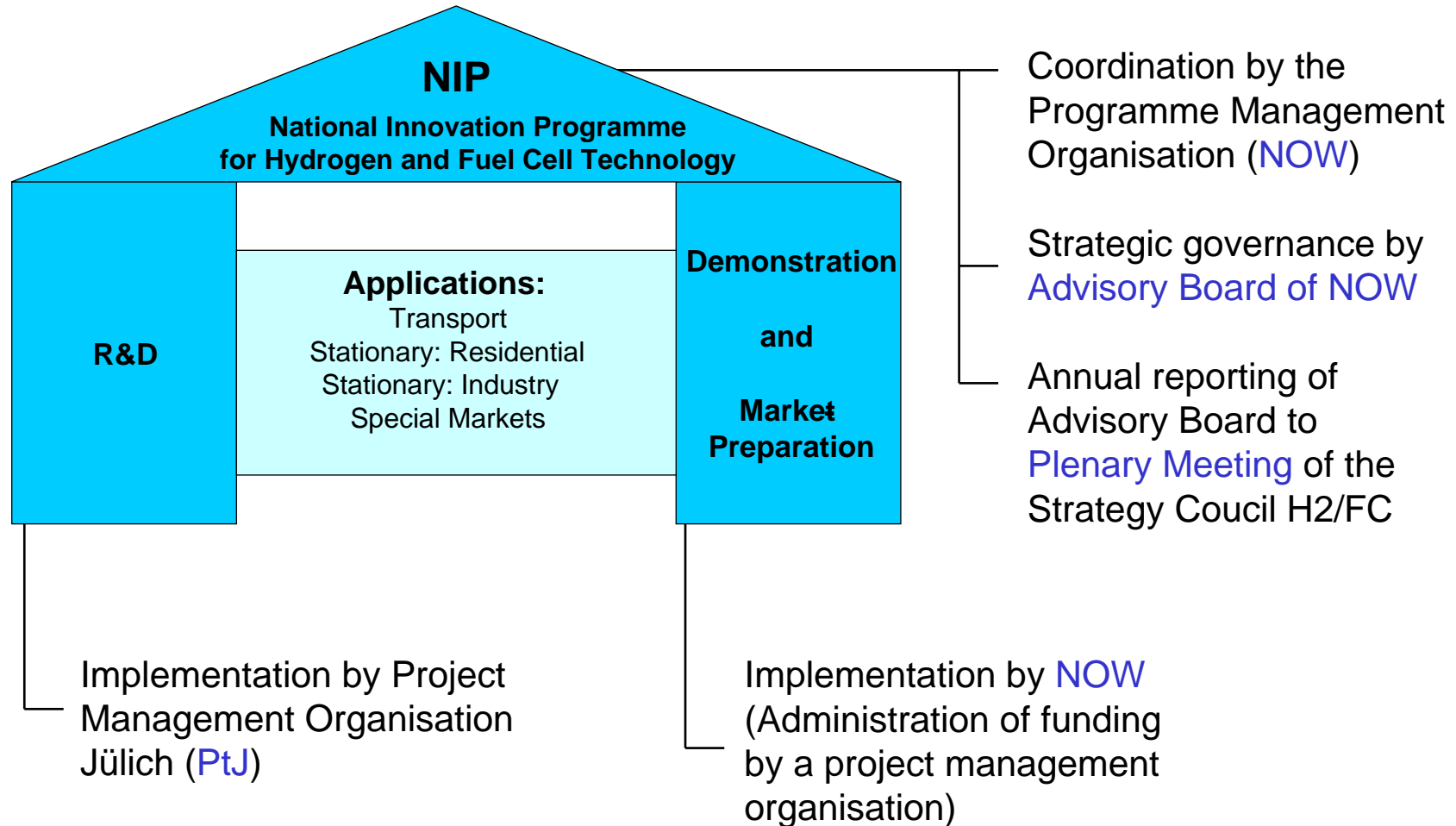
- **Commitments** of industry (Protocol declaration of **24 companies**) for matching the public funding (October 2006)
- Agreements with the **Federal States** concerning their participation (since September 2006)
- **Plenary meeting** (March 2007)
- Work programme (= **National Development Plan**) finalised by Strategy Council H2/FC (April 2007)
- **EU-Notification** of the NIP (May 2007)
- *Forming of **consortia** for demonstration projects in the **starter regions** (ongoing)*
- *Foundation of **Programme Management Association (NOW)** and begin of **operational activities** (expected **July 2007**)*



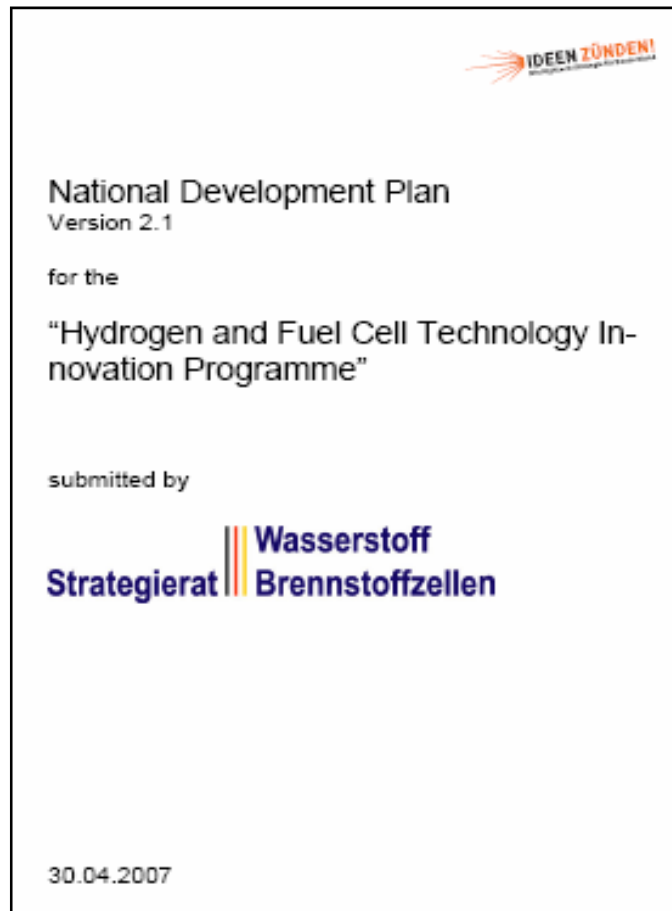
8. May 2006

**National Hydrogen and Fuel Cell Technology  
Innovation Programme**

## Structure for the Implementation of NIP



## National Development Plan



The present work programme is divided into four development plans which are designated according to the different areas of operation:

- **Transport** including hydrogen **infrastructure** (production, distribution, storage and refuelling)
- **Residential** energy application
- **Industrial** applications
- **Early markets** for fuel cells

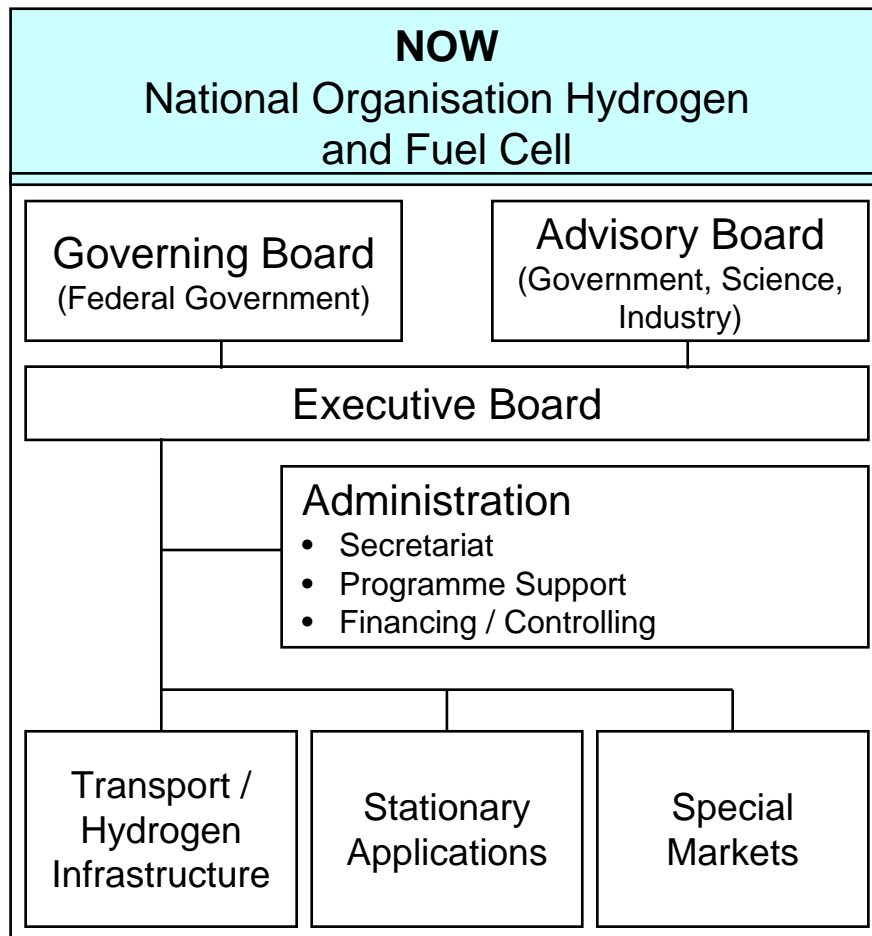
# New Programme NIP

Application		Million € (2007 – 2015)	%	%
Transport	R&D	658	57	<u>54</u>
	Demonstration	478	42	
	Cross-section	8	1	
	<b>Transport total</b>	<b>1,144</b>	100	
Domestic energy	R&D	361	72	<u>24</u>
	Demonstration	141	28	
	<b>Domestic energy total</b>	<b>502</b>	100	
Industry	R&D	80	32	<u>12</u>
	Demonstration	170	68	
	<b>Industry total</b>	<b>250</b>	100	
Special markets	R&D	69	31	<u>10</u>
	Demonstration	152	69	
	<b>Special markets total</b>	<b>221</b>	100	
Total	R&D	1,168	55	100
	Demonstration	949	45	
	<b>Grand total</b>	<b><u>2,117</u></b>	100	

⇒ The given numbers in the **National Development Plan** represent bottom-up calculated (target) figures not real budgets

⇒ They provide orientation for the distribution of the funding and include public (EC, federal ministries, state ministries) and private funds

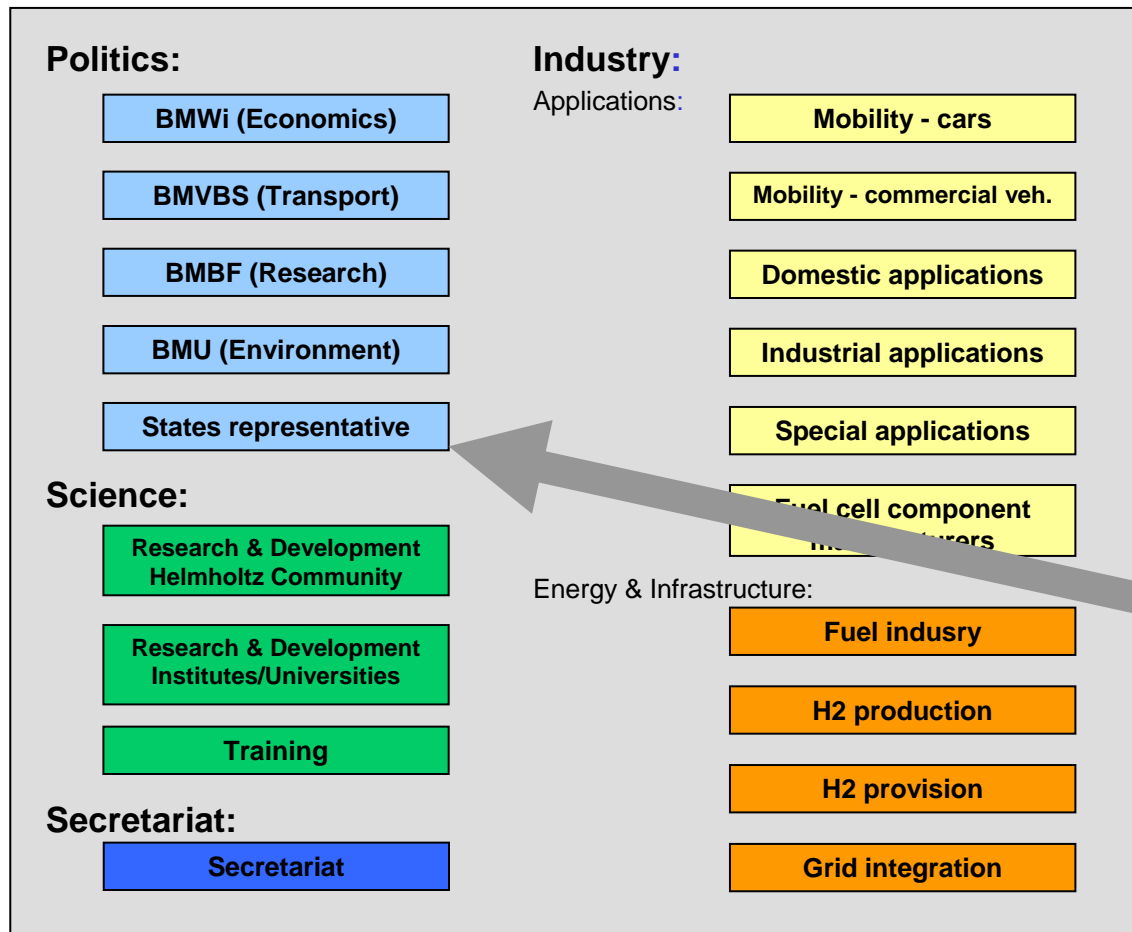
## Structure of new Programme Association NOW



### Tasks of NOW

- Coordination and **supervision of the programme implementation** on the basis of the development plan
- Identification and **utilisation of synergies** between the applications (e.g. materials sciences, production technologies)
- Acting as an **interface with European and international** initiatives
- **Central point of contact** for H2/FC community
- Conception and initiation of **lighthouse projects**
- **Evaluation** and **monitoring** of projects
- **Interface** between R&D and demonstration activities

## Structure of the Advisory Board of NOW



### Tasks of the Advisory Board

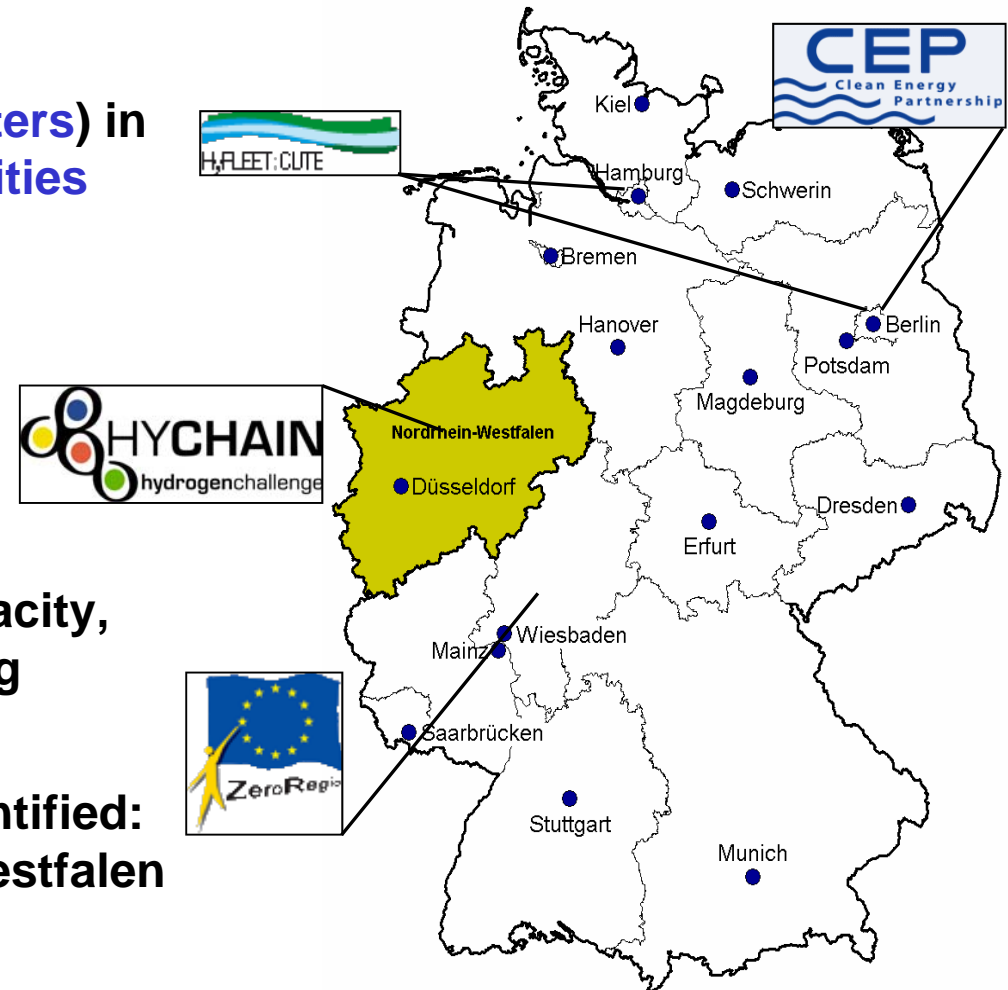
- Continuous **monitoring** and **updating** of the **strategy**
- Securing an **exchange of information**
- Creating of **consensus and reconciliation** of the interests involved
- Communication to **regional, European and international bodies** and to the public

**Nordrhein-Westfalen represents the Federal States in the Advisory Board (together with deputy representative Hamburg)**



## Lighthouse Projects in NIP

- Concentration on a few sites (**clusters**) in the beginning, **broadening of activities** and linking up with those in other **European regions**
  - Advancement of **existing** R&D and demonstration **projects**
- and
- Use of extensive experiences, capacity, financial commitments and existing infrastructure in **individual regions**
- ⇒ 3 “Starter Regions” have been identified: Berlin, Hamburg and Nordrhein-Westfalen



## Early Market Applications – Some Examples from NRW

**Masterflex**  
Brennstoffzellentechnik

**HYDROGENICS**  
CORPORATION

**FCEV**

**HOPPECKE**  
POWER FROM INNOVATION

**STILL**

**Focus: Fuel Cell / Hybrid up to 30 kW**

**ZBT**

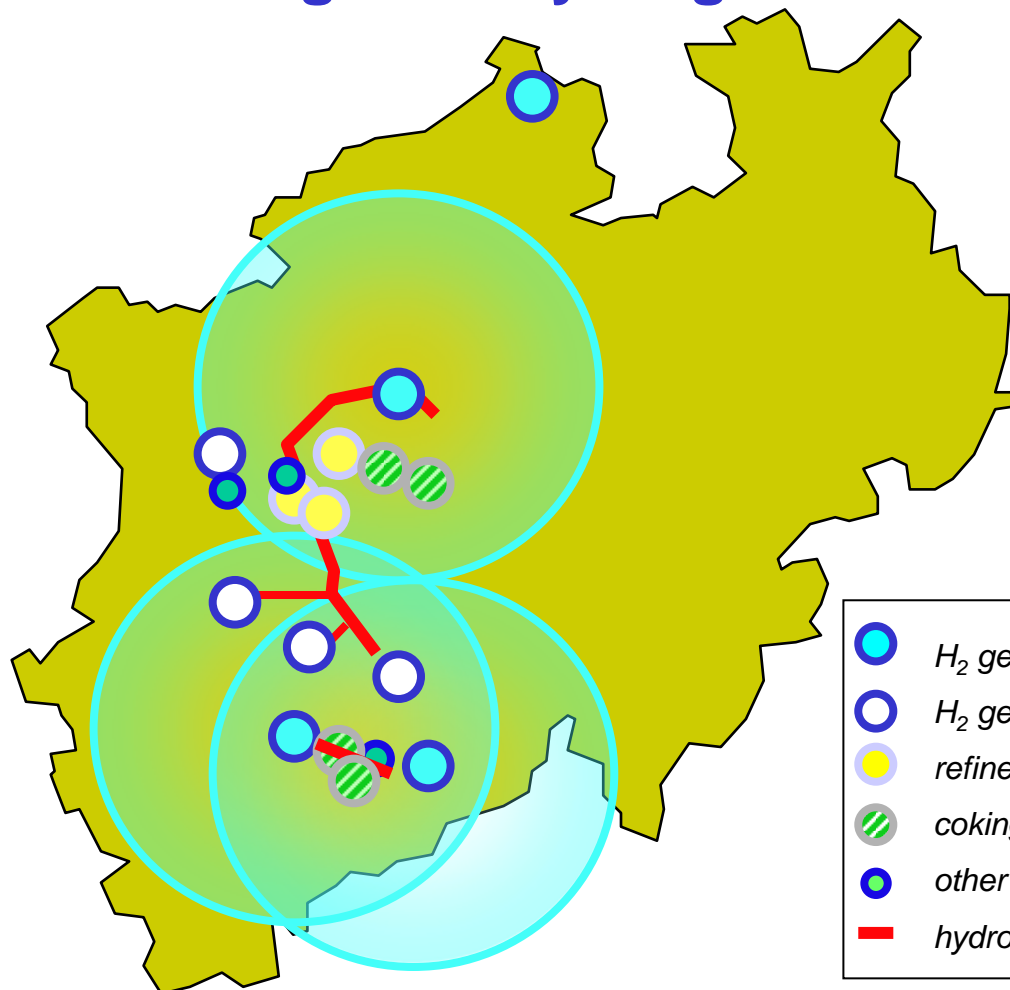
**LIETEC**  
FUEL CELL TECHNOLOGIES

**RITTAL**

**IdaTech**







[www.fuelcell-nrw.de](http://www.fuelcell-nrw.de)

## Advantageous Hydrogen Availability



### NRW:

- A unique cluster of by-product H<sub>2</sub> sources in Europe (> 35,000 tons/year, sufficient to operate approx. 150,000 cars\*)
- Link of locations by hydrogen pipeline (230 km length)
  - ⇒ Advantageous preconditions to reduce costs of early infrastructure set-up
  - ⇒ **NRW** will be an **infrastructure nucleus** in Europe (result of HyWays project)

-  H<sub>2</sub> generation/filling station
-  H<sub>2</sub> generation chemical electrolysis
-  refinery
-  coking plant
-  other H<sub>2</sub> source
-  hydrogen pipeline

### \*Assumptions:

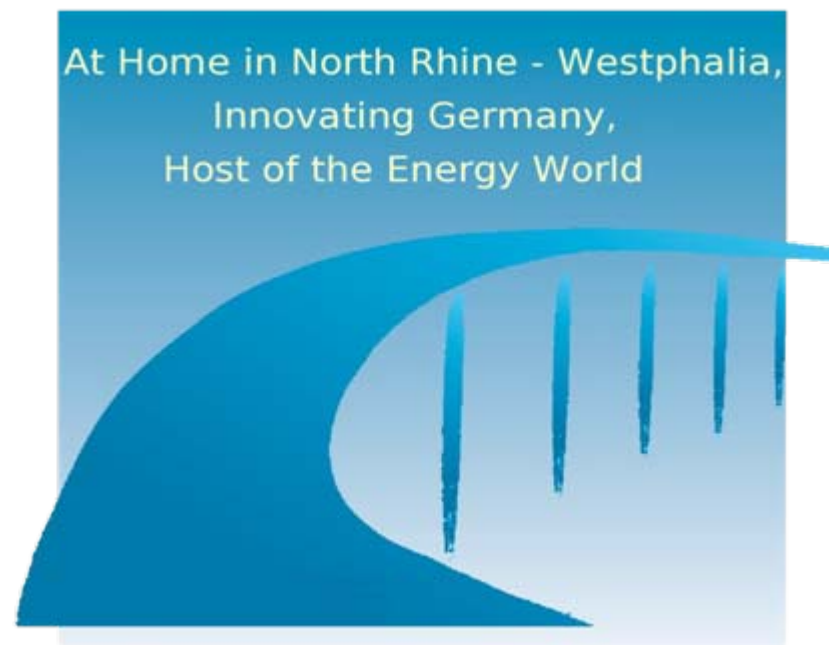
15,000 km/a

1.5 kg H<sub>2</sub>/100 km

### The Concept of Nordrhein-Westfalen

- Securing market entrance for **early applications**
- Organising **large-scale deployment projects**
- Implementing **R&D activities** for further applications
- Participating in **national (and international)** programs and partnerships
  - Partners in NRW have developed about 40 projects and already proposed more than 20 projects for the new National Programme NIP
  - Co-financing by industry and NRW agreed
  - Strategic partnership with other German regions under development
  - NRW intends to become a key location for NIP projects (focus: industrial hydrogen, fuel cells, UPS, light utility vehicles)

## The next long-term milestone ...

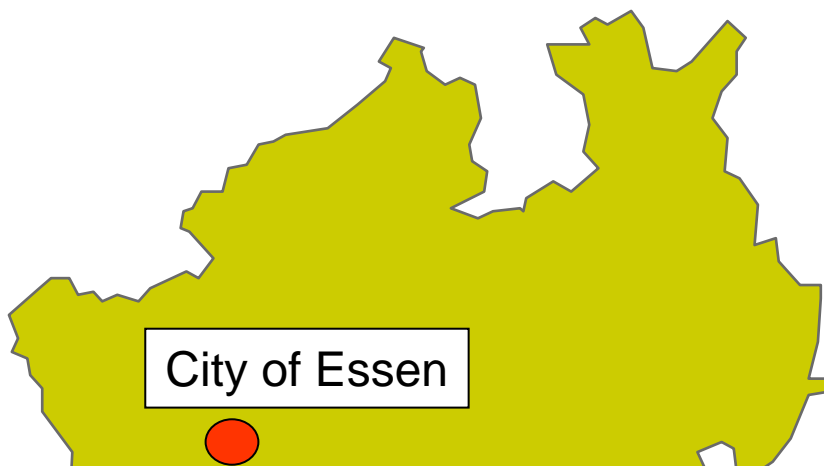


**18th World Hydrogen Energy Conference 2010**  
**Essen, Germany, May 16 - 21, 2010**

[www.18whec2010.de](http://www.18whec2010.de)   [info@18whec2010.de](mailto:info@18whec2010.de)



## The next short-term milestone ...



**9<sup>th</sup> Implementation-Liaison Committee**  
**Essen, Germany, February 18 - 20, 2008**

**4<sup>th</sup> German Hydrogen Congress**  
**Essen, Germany, February 20 - 21, 2008**



[www.H2CONGRESS.de](http://www.H2CONGRESS.de)



Deutscher Wasserstoff- und  
Brennstoffzellen-Verband

Forschungszentrum Jülich  
in der Helmholtz-Gemeinschaft



E-world  
energy & water



EnergieAgentur.NRW



Europäischer Fonds  
für Regionale Entwicklung

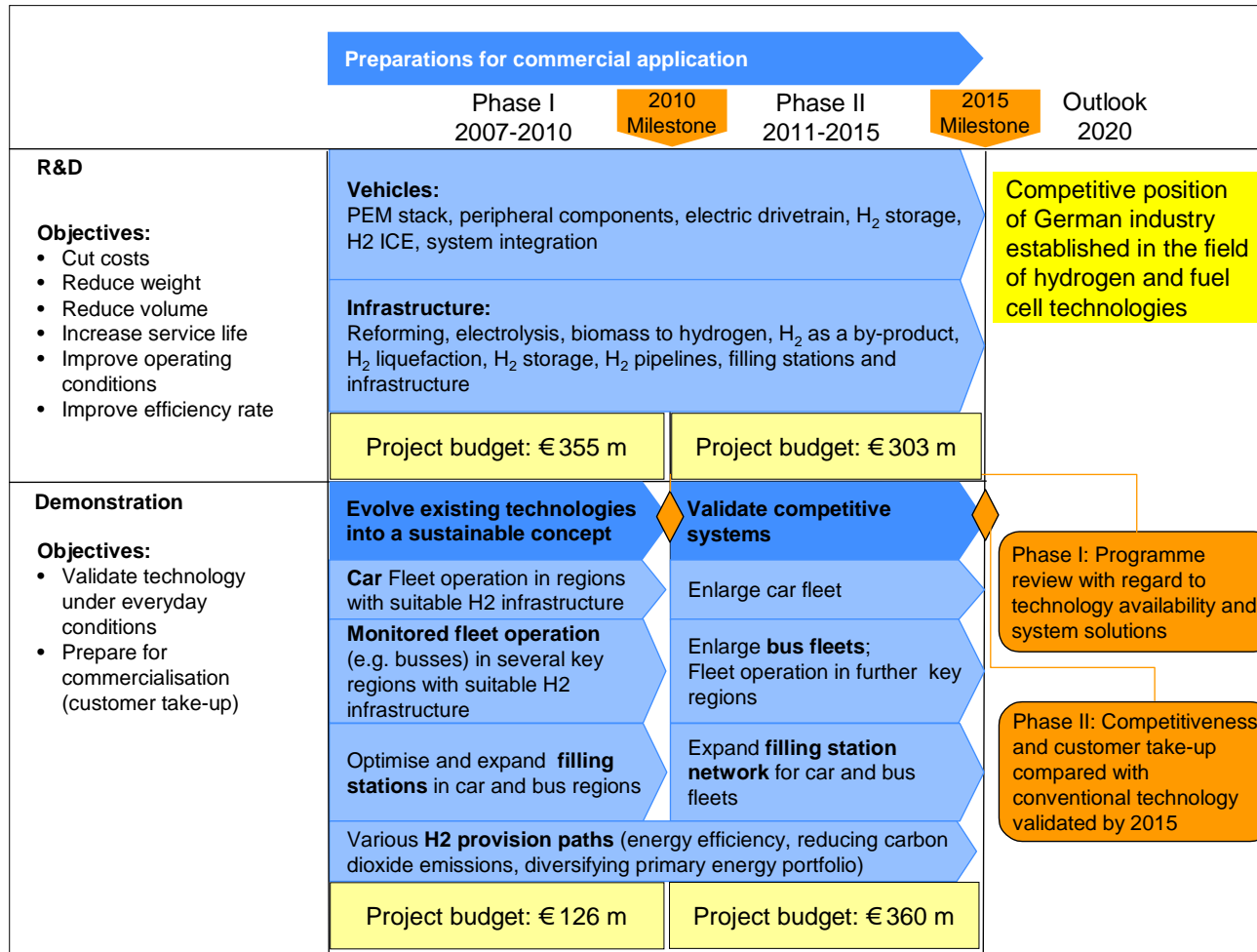
[www.h2congress.de](http://www.h2congress.de)    [contact@h2congress.de](mailto:contact@h2congress.de)

# Thank you for your kind attention!

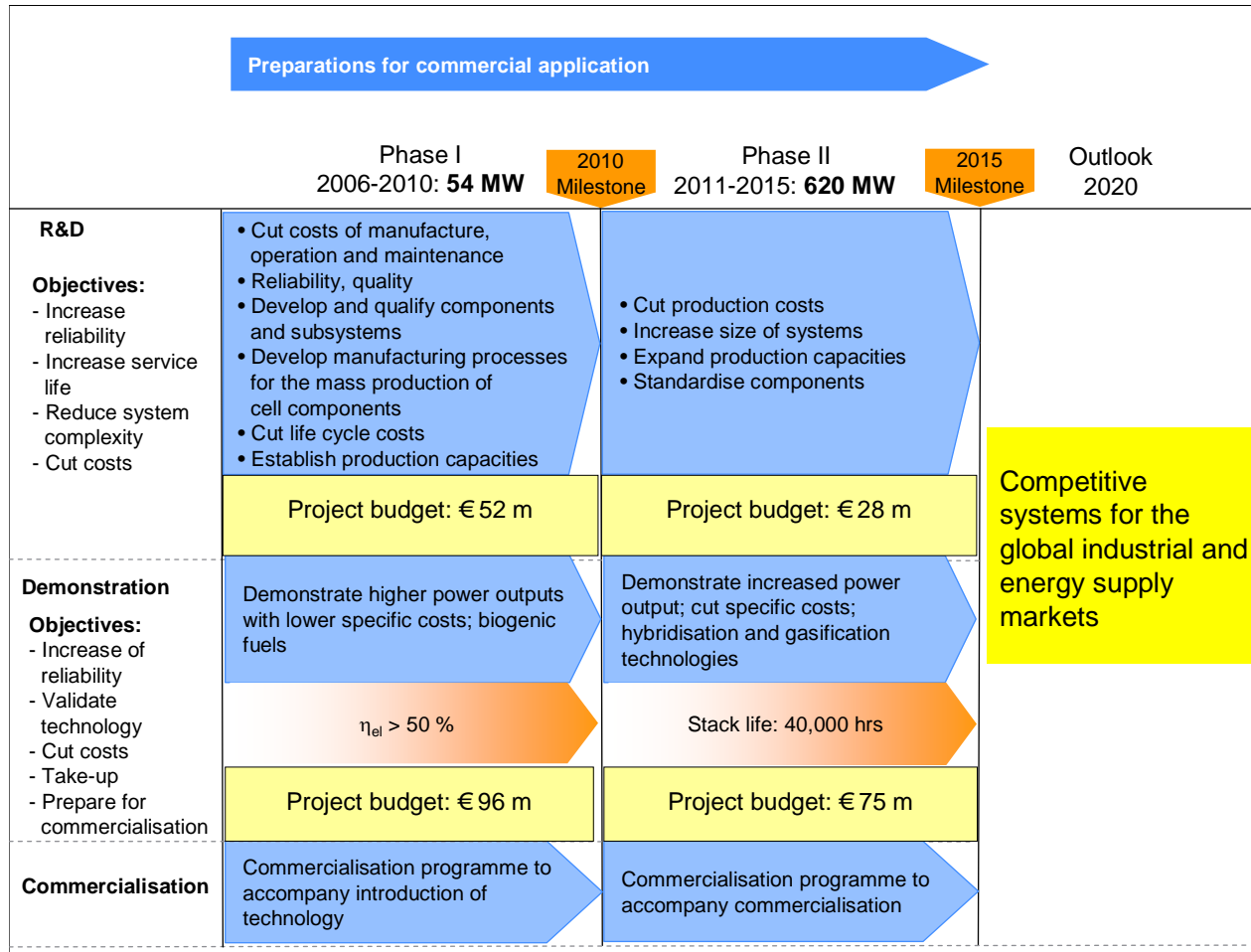
# Backup slides



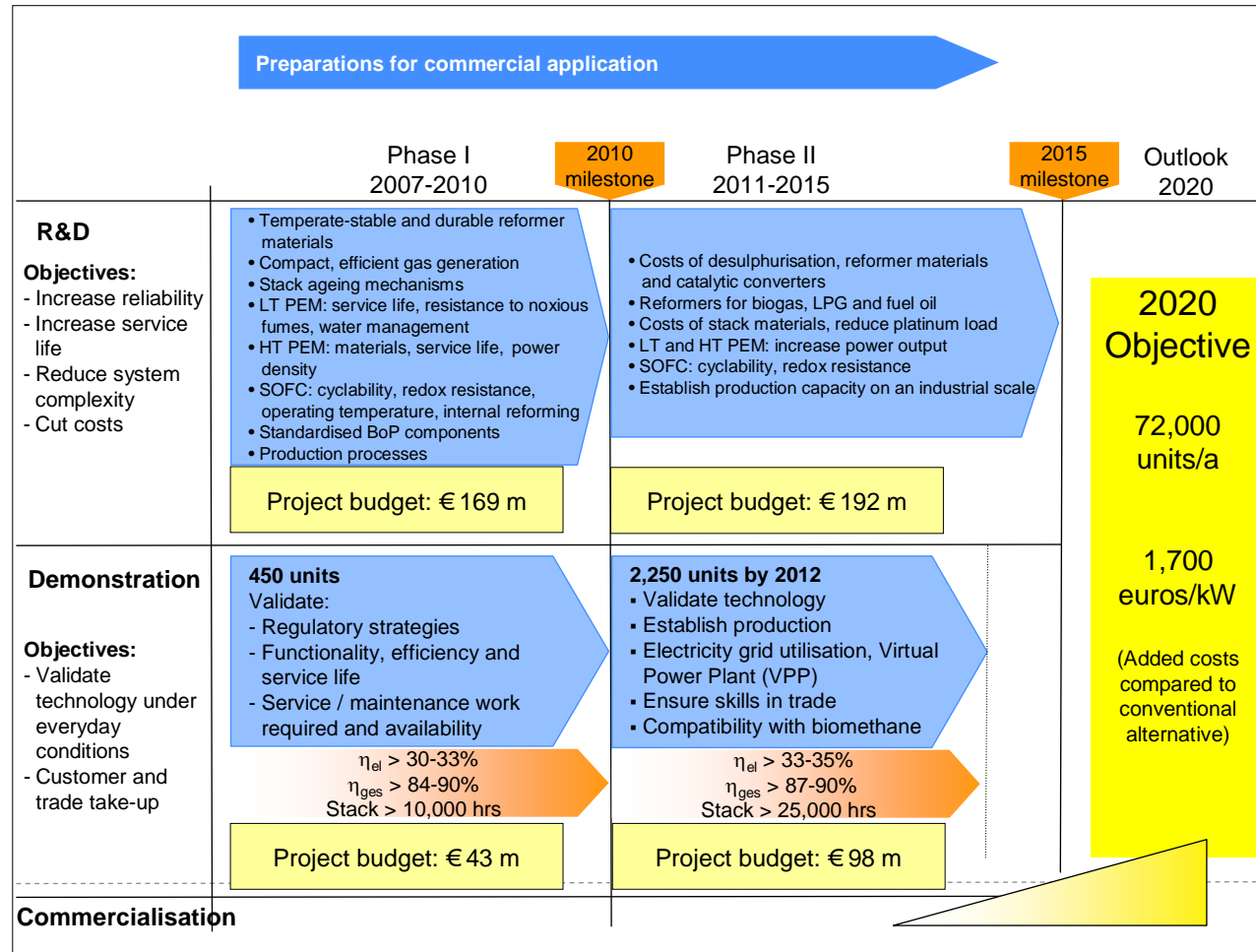
## Development Plan “Transport”



## Development Plan “Industrial Application”



## Development Plan “Residential Application”



## Development Plan “Special Markets”

**The common feature of fuel cell applications in the “special markets” is a more advanced marketability in comparison to other applications, with prototypes being ready for use in many cases. These are in particular:**

- **Emergency power supplies / UPS**
- **Material handling vehicles (fork-lift trucks, airport tractors etc.)**
- **Light electric vehicles and boats**
- **Onboard power supplies for the leisure market (boats, mobile homes)**
- **Miniature applications (4-C applications) based on micro fuel cells**