



Federal Ministry
of Economics
and Technology



Federal Ministry
of Transport, Building
and Urban Affairs

German Hydrogen & Fuel Cell Technology Update

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IPHE Steering Committee
Reykjavik, 26 September 2006

Relevant Programmes

5th Federal Energy Research Programme (July 2005)

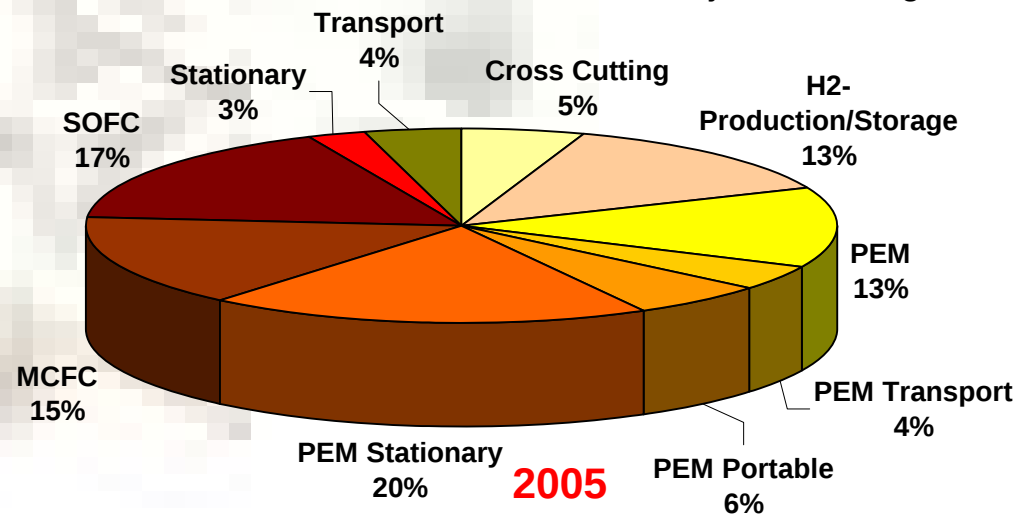
Hydrogen & Fuel Cell Technology Innovation Programme (May 2006)

Total amounts:

2004	2005	2006	2007
87.5 M. USD	87.5 M. USD	100 M. USD *	145 M. USD *

* Subject to change

Breakdown of Funding
of Federal Ministries in the
past (2005) – new issues
needed to be addressed





The new Hydrogen and Fuel Cell Technology Innovation Programme: 3 Partners – 1 Aim

- **Additional funding:** 625 M. USD (**500 million €**) over the next 10 years, i.e. nearly a **doubling** of the actual public funding
 - **Implementation:** through public-private-partnerships with average public funding of 50 %, i.e. 1,25 B. USD (**1 billion €**) over next 10 years
 - **Goals:** maintenance and expansion of **Germany's good starting position**
 - **Focus:** **market preparation** with demonstration and **lighthouse** projects, accompanied by targeted **R&D** projects (basic and applied research)



Bundesministerium
für Verkehr, Bau
und Stadtentwicklung



Bundesministerium
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8. May 2006

National Hydrogen and Fuel Cell Technology
Innovation Programme

- **build on two pillars: existing R&D and – new – Public-Private-Industry-Programme** to foster market development/ strengthening excellencies
- **Objective now:** bridging the gap between R&D and market development
- **The aim of the new Programme pillar** is targeted support and promotion of the emerging Hydrogen and Fuel Cell sectors to accelerate the market development, e.g.:
 - Demonstration of efficient conversion technology in Lighthouse Projects
 - Optimising prototype engineering
 - To optimise H&FC system integration into existing infrastructure



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National Development Plan

Version 1.1

for the

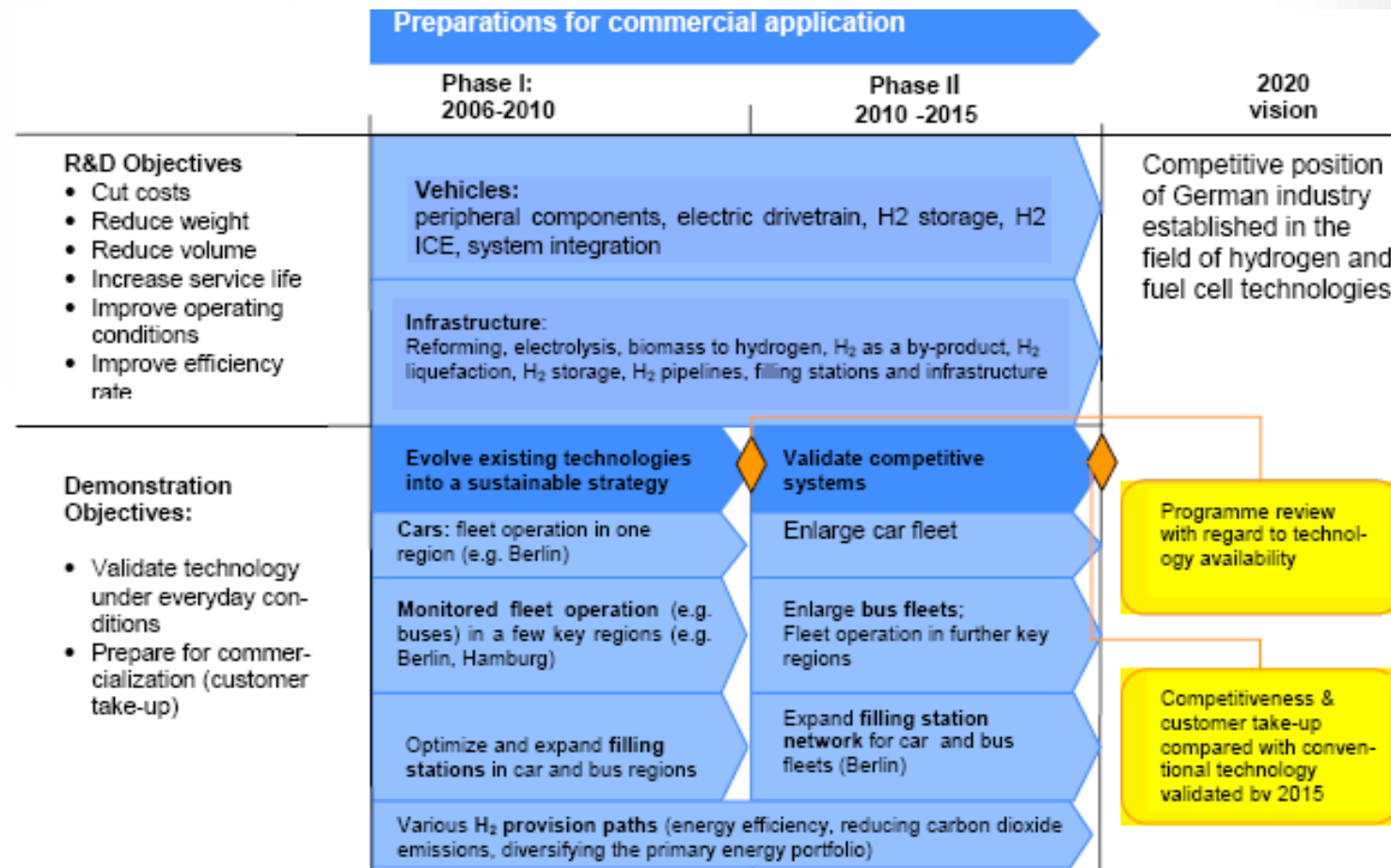
“Hydrogen and Fuel Cell Technology Innovation Programme”

submitted by

Strategierat  **Wasserstoff
Brennstoffzellen**

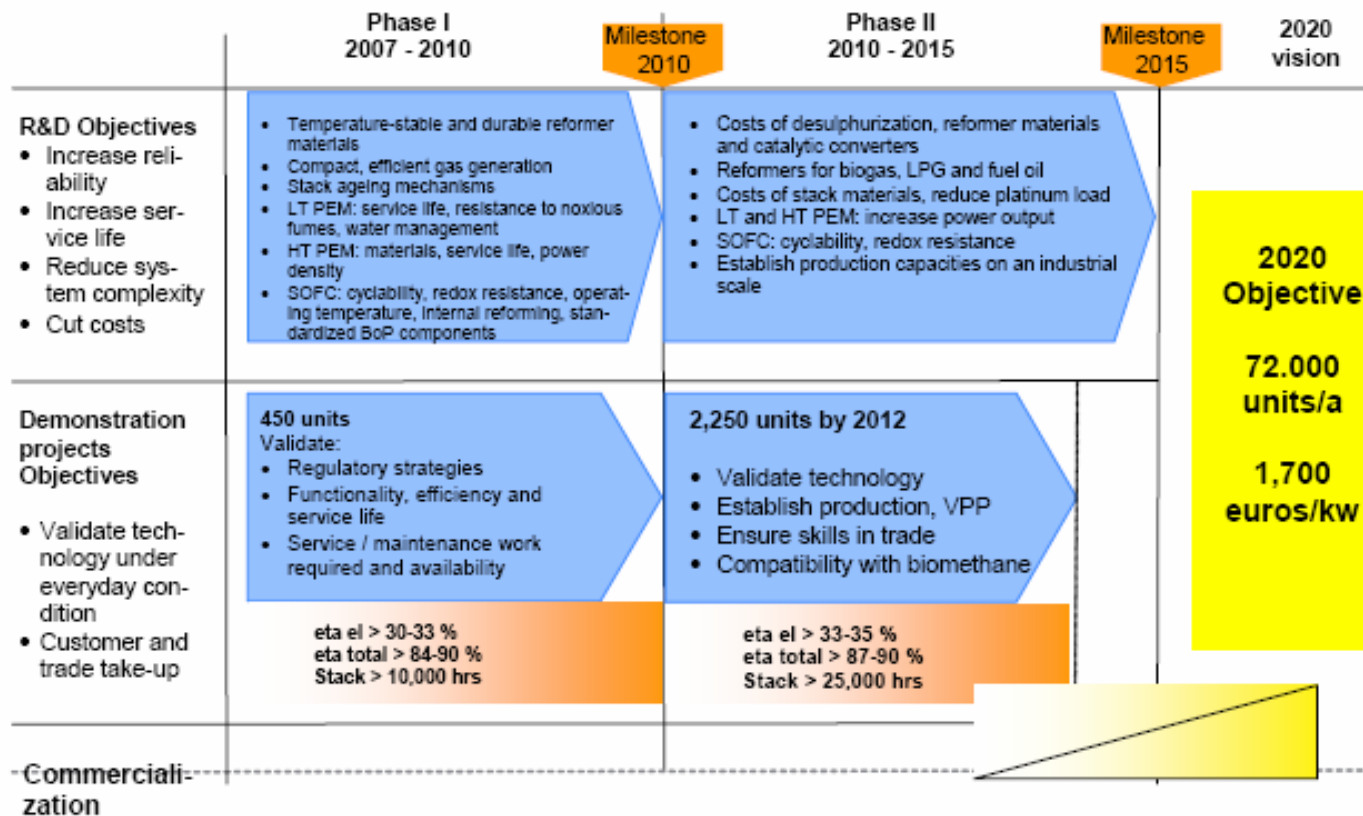
Berlin, 25 July 2006

National Development Plan - Transport

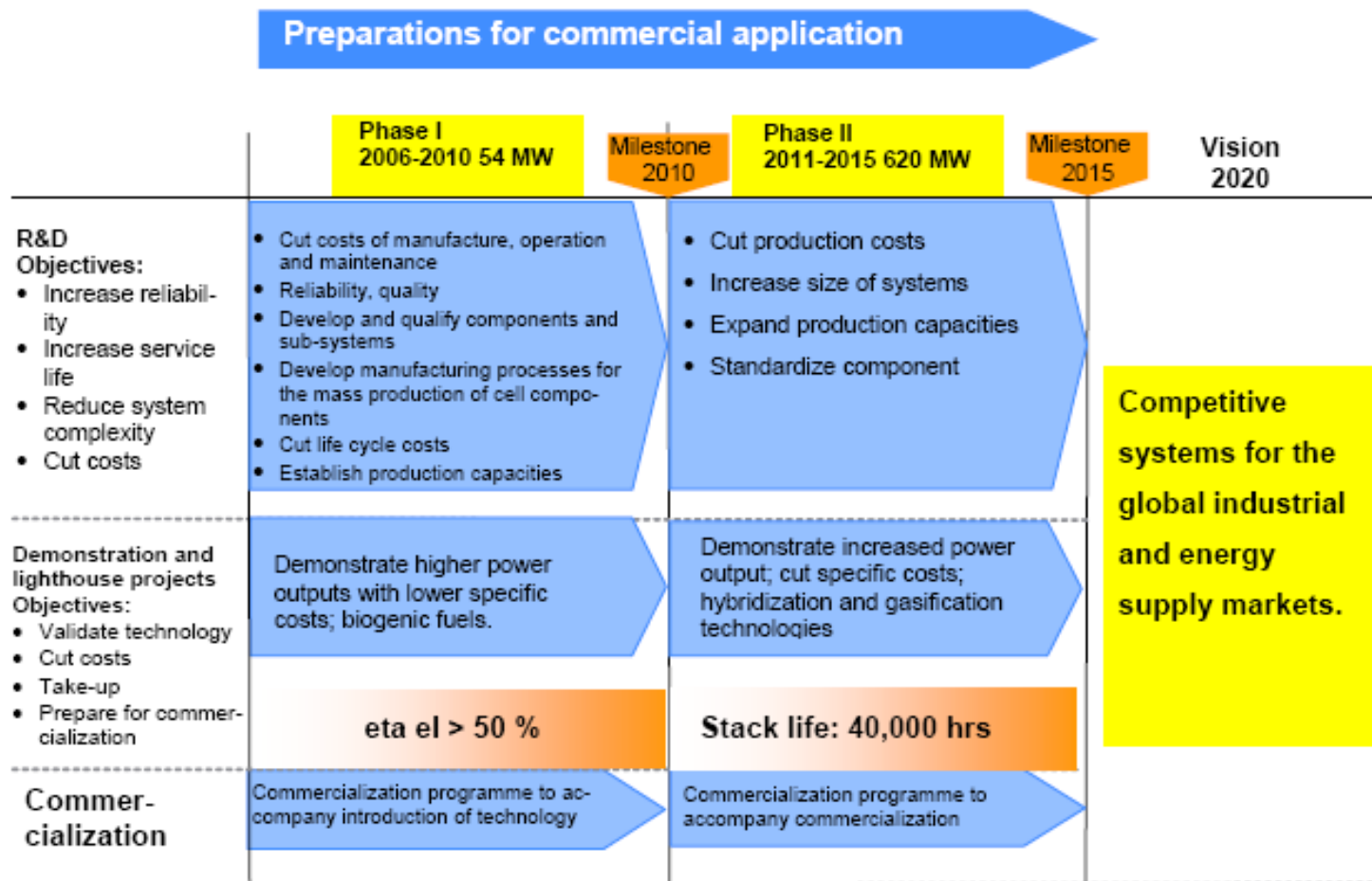


National Development Plan – Stationary (domestic)

Preparations for commercial application



National Development Plan – Stationary (industrial)





National Development Plan – Special Markets

	Phase I 2007 - 2010	Phase II 2010 - 2015	Vision 2020
Micro fuel cell	BMBF-Programme Phase I: Technology demonstration	BMBF-Programme Phase II: Field test	Market penetration with stronger positioning of German industry
Portable / stand- alone power generators	Develop innovative projects Pilot projects	Accompanied by R&D for optimization Large-scale demonstration and applica- tion; Commercialization instruments	Increasing wide-scale commercialization out of niches as of 2010
Light vehicles, materials han- dling equipment, boats, etc.	Develop innovative projects Pilot projects	Accompanied by R&D for optimization Large-scale demonstration and applica- tion; Commercialization instruments	Increasing wide-scale commercialization out of niches as of 2010
Auxiliary power units (APUs) and off highway	Link to R&D for stationary applications – adaptation development Initial field tests	Accompanied by R&D for optimization Extensive field trials	Commercial use in certain market seg- ments
Emergency power / UPS	Innovative products and accompanying R&D for next generation Extensive field trials	Accompanied by R&D for optimization Large-scale demonstration and applica- tion; Commercialization instruments	Wide-scale commercial use starting in regions with unstable power supply as of 2010

Hydrogen and Fuel Cell Technology Innovation Programme

- Next Steps for Implementation (by End of 2006)
 - Overall **programme of work** (roadmap, proposals for lighthouse and R&D projects) **by Strategy Council Hydrogen and Fuel Cells** differentiated for **transport, stationary** (domestic and industrial) and **early market** applications
 - **Commitments of industry** (Letters of Intent) for a principle participation (binding financial contributions later within concrete projects)
 - Discussions and agreements with the **Federal States** concerning their participation
 - Constitution of a professional **programme management**



8. May 2006

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

www.nkj-ptj.de



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Thank you for your attention!



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Examples of existing activities

Stationary (Industrial) – MCFC

Development and demonstration of MCFC plants (250 kW) of MTU CFC

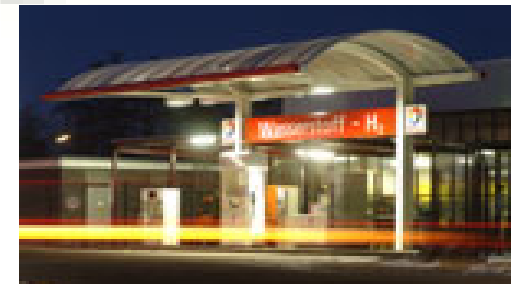
- Applications: hospitals, telecommunication, industry and utilities
- Fuel: natural gas and biogas
- Efficiency: 47 % (el.), 90 % (overall)
- Max. operating time: 30,000 h (goal: 40,000 h)
- Costs: 8,750 USD/kW
(goal: 1,250 - 2,500 USD/kW)
- Supported by Federal Ministry of Economics and by Federal States



Transport – Clean Energy Partnership (CEP) www.cep-berlin.de

**Hydrogen demonstration project in Berlin
to demonstrate the reliability of hydrogen in
everyday motor vehicle operation**

- Duration 2004-2007
- Two public filling stations
- Hydrogen: gaseous and liquid
- 17 passenger cars from BMW, DaimlerChrysler, Ford, GM/Opel and – new - Volkswagen
- Total cost: 40 M. USD, funding of 6.25 M. USD by Federal Government
- 14 busses from MAN with ICE projected (within EU-project HyFleet:CUTE)



Early Markets – Applications developed and demonstrated in Nordrhein-Westfalen



**250 W Cargobike
(Masterflex)**



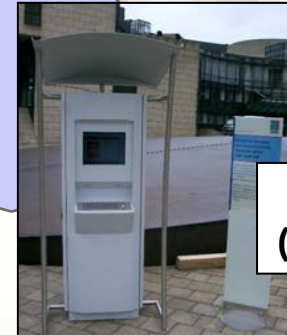
**10 kW Fuel Cell Shuttle
(Hydrogenics)**



**H2Trail Mobile Filling Station
(Linde Gas)**



**5 kW UPS System
(Rittal, AEG)**



**250 W Web Terminal
(IdaTech GmbH)**



**250 W Phone
(IdaTech GmbH)**