

Clean Energy Partnership – a demonstration
project for a hydrogen based mobility

Conference “Hydrogen and Fuel Cells”
Vienna 01/04/2004

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Introduction to the German Energy Agency (dena)

- **First national Energy Agency in Germany**
- **Competence Centre for Energy Efficiency and Renewable Energy**
- **Founded in October 2000**
- **Based in Berlin**
- **60 employees with various educational and professional backgrounds**

Ownership Structure of the German Energy Agency

50 Percent

Federal Republic of Germany

represented by:

Federal Ministry for Economics and Labour

Federal Ministry for Environment, Nature

Conservancy and Nuclear Safety

Federal Ministry for Transport, Building and

Housing

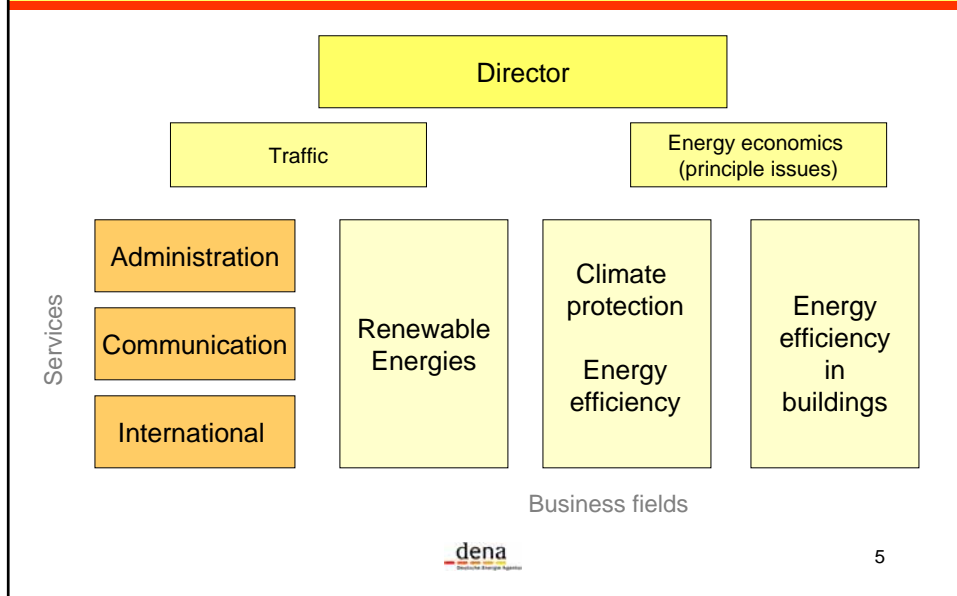
50 Percent

Kreditanstalt für Wiederaufbau (KfW-Group)

Managing Director

Stephan Kohler

Organisational Structure of dena



Clean Energy Partnership Berlin

- **German traffic-related energy strategy, Interim Report 2001:**
 - „.....Hydrogen is the most promising fuel for the mobility of the future....”
 - “..... but a lot of questions have to be solved regarding production, storage, security standards, regulations, set-up of infrastructure, utilisation in vehicles, costs, acceptance....”
- **Demonstration projects provide opportunities to gain experiences and to develop solutions regarding these questions**
- **Nine industry partners will realise the CEP demonstration project with support of the German government in the framework of a Public Private Partnership**

Clean Energy Partnership Berlin

Mobility Partners

Partners for Infrastructure



Promotion and Support by the
German Government

Public Relations, especially in
the Political Area by dena



Clean Energy Partnership Berlin

Project Aims:

- **Testing and demonstration of:**
 - Central production, transportation, distribution, storage and fuelling of LH₂
 - Local production, aggregation, storage and fuelling of CGH₂
 - Operation, service and maintenance of H₂-cars equipped with fuel cells or internal combustion engines and the filling station
- **Application of advanced technologies**
- **Verification of suitability for daily use and of clients' acceptance**
- **First time integration of H₂-technology in a standard filling station equipped with conventional fuel, shop and washing-bay**
- **Investment costs: 33 Mio. € (including cars), thereof 5 Mio. € subsidy**



Demonstrated Hydrogen Car Technologies

Partner	Car	Drive	Tank
BMW	2 BMW 7 LH series	H ₂ ICE	LH ₂
Daimler Chrysler	10 A-class F – Cell	Fuel Cell (Ballard)	CGH ₂
Ford	3 Ford Focus FCEV	Fuel Cell (Ballard)	CGH ₂
Opel	1 Opel HydroGen3	Fuel Cell (GM / Opel)	LH ₂

Additionally: Shop Floor for H₂-Busses and H₂-Cars provided by BVG and the Mobility Partners

Demonstrated Hydrogen Infrastructure Technologies

Partner	Task
Aral / BP	Planning and set-up of an integrated H ₂ -filling station
Hydro / GHW	On site GH ₂ production via electrolyses
Linde	Supply with centrally produced LH ₂ (reformer), LH ₂ fuelling
Vattenfall	Supply with electricity based on renewable energy

Advantages of H₂-Utilisation

- **Fuel Cell Cars**

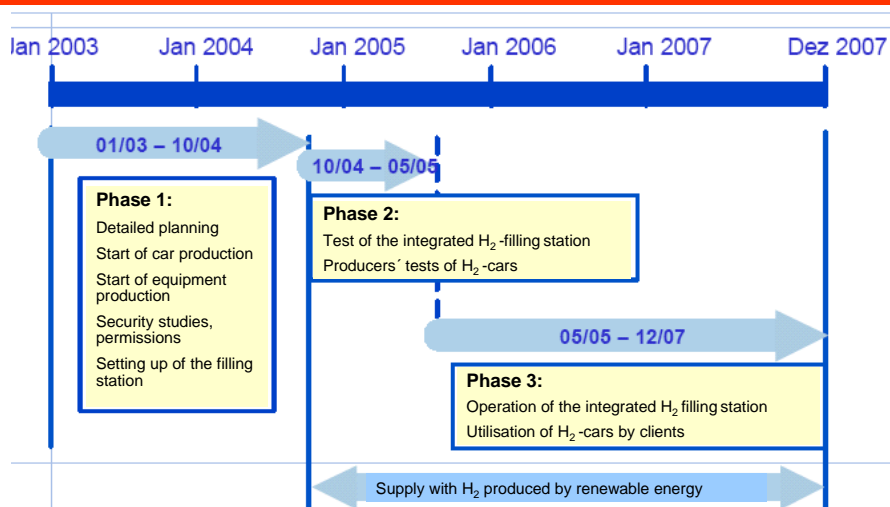
- Noticeable higher efficiency (state of the art: 37 %, potential > 45 %)
- No exhaust emissions
- Lower WTW CO₂- emissions
- Low noise, high elasticity of the electric drive
- Additional benefit: On board electricity



- **ICE Cars**

- Earlier market entry than for fuel cell cars expected
- Currently higher performance drives available

Time Schedule



Expected results

- **Comparison of different H₂- drives and H₂- fuelling concepts** (suitability for daily use, H₂- consumption, reliability, life time, maintenance)
- **Comparison of different production chains and supply concepts** (energy efficiency, costs, environmental compatibility, reliability)
- **Experiences with the planning and authorisation procedure**
- **Contribution to the harmonisation of standardisation and regulation processes**
- **Dialog with the public regarding the use of H₂ in every day life and experiences with the acceptance by clients**
- **Verification of H₂- technologies´ safe operation** (production, transport, storage, fuelling, usage of cars)

Summary

- **Hydrogen has the potential to fulfil the requirements of a sustainable mobility**
- **Decisions in industry and politics require further experiences stemming from studies on infrastructure and demonstration projects**
- **The CEP project will provide important results and answers for the decision making process related to technological, economic and political questions**