German Hydrogen Technology Update

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German Hydrogen Technology Update

Summary 2004

- Continuation of R&D and demonstration programmes on Federal and Federal States Level
- Preparation of newly structured co-ordination through HYBERT Advisory Council and NKJ National Co-ordination Office Jülich
- Involvement in European and international activities
- Numerous Conferences and Other Events

Hydrogen and Fuel Cell R&D Programmes

- **Hydrogen Strategy Group (mid-2003 to end-2004)**
  - Goal: Defining a common Strategy for national R&D activities
  - Experts from industry, science and government
  - Results will be presented to the IPHE SC on 28 January
- **HYBERT Advisory Council**
  - Merger of Hydrogen Strategy Group and Fuel Cell Strategy Group:
    A strategy group for hydrogen and fuel cells (inauguration Feb. 05)
  - Consulting of ministries, defining R,D&D requirements, Information Exchange
- **National Co-ordination Office Jülich (NKJ)**
  - Established in late 2004 at Project Management Organisation Jülich (PtJ)
  - Interface between national, European and international activities

Hydrogen and Fuel Cell Demonstration Programmes (1)

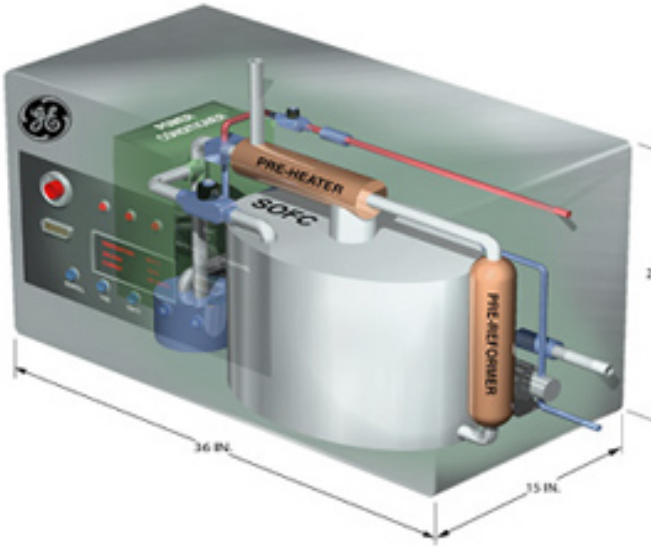
❖ Clean Energy Partnership (CEP): Hydrogen demonstration project in Berlin

- To demonstrate the reliability of hydrogen in everyday motor vehicle operation
- Start: Nov. 2004, duration: 5 years
- Hydrogen: gaseous and liquid
- 16 vehicles from BMW, Daimler-Chrysler, Ford and Opel with ICE and FC
- Total cost: 33 million €
- Supported by Federal Ministries of Transportation, Economy and Environment
- More information: www.cep.de

Hydrogen and Fuel Cell Demonstration Programmes (2)

❖ Lightweight Solid Oxide Fuel Cell Project: Development of SOFC in the range of 2,5 to 5 kW

- Goal: Bundling of know how, technical realisation by 2008
- Main application: APU for cars, alternative applicatior
- Main focus: cost reduction, durability (goal: 5,000 h), degradation (goal: 0.2 % / 1,000 h)
- BMW and 7 partners from industry and science
- Start: January 2004, duration: 3 years
- Total Cost: 12 million €
- Supported by Federal Ministry of Economics and Labour



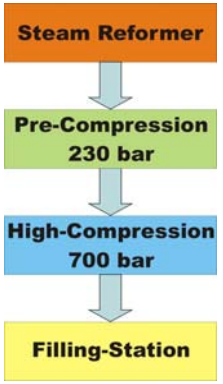
Hydrogen and Fuel Cell Demonstration Programmes (3)

- **Gaining practical experience with 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: 20,000 h (goal: 40,000 h)
  - Operating time accumulated: 100,000 h
  - Costs: 8,000 €/kW (goal: 1,500 - 2,000 €/kW)
  - Supported by Federal Ministry of Economics and Labour

Hydrogen and Fuel Cell Demonstration Programmes (4)

❖ Establishment of a hydrogen infrastructure for portable and small mobile fuel cell applications

- Exchangeable and portable hydrogen cartridge
  - Storage: 2 litres, 700 bar
  - Prototype expected for May 2005
  - Partners: Operathing, Dynatek Germany



- 700 bar re-filling station in NRW
  - Final capacity: 800 bottles per day
  - Start-up: before summer 2005
  - Filling, distribution and logistics: Air Liquide Germany
- Supported by the Federal State of Nordrhein-Westfalen
- More information: www.fuelcell-nrw.de

Involvement in European and international co-operation

- **European Hydrogen and Fuel Cell Technology Platform**
  - German industry, science and government are actively involved in all Platform activities

- **European Research Area (ERA-net) Project HY-CO: co-ordination of R&D for fuel cells and hydrogen in Europe**
  - Co-ordination by Project Management Organisation Jülich (PtJ), (01.10. 2004 – 30.09.2008)

- **International Energy Agency**
  - Participation in the Hydrogen Co-ordination Group and the Advanced Fuel Cell Implementing Agreement

- **International Partnership for the Hydrogen Economy**
  - Co-chair of the Implementation – Liaison Committee (together with Iceland)

Conference: The Investment into Future Programme (ZIP)

Zukunfts-
investitions-
programm
zip

- **ZIP was initiated in 2001 with the aim**
  - to support technical development of fuel cells
  - to strengthen the German position on the international market and
  - to stimulate the market
- **The following projects have been funded**
  - Mobile applications: 10 projects with 12 million €
  - 250 kW-block power plants: 10 projects with 17 million €
  - CHP for residential buildings: 9 projects with 18 million €
  - Standardisation, education, safety: 13 projects with 8 million €
- **The promising results have been presented in November 2004 and will be published at www.bmwa.bund.de**

Inauguration of the Fuel Cell Education and Training Centre Ulm (WBZU)

- **Provided services**
  - Education and training (workshops etc.)
  - Information, Demonstration, Consulting

- **The courses are adopted for**
  - Technicians and engineers
  - Scientists and students

- **Fuel cell testing systems available**
  - PEMFC and DMFC, MCFC and SOFC

- **Supported by the Federal State Baden Württemberg and the Federal Ministry of Economics and Labour (total 5 million €)**