

„German Hydrogen and Fuel Cell Programmes and Activities“

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Federal Ministry of Economics and Labour (BMWA)

Hydrogen- and Fuel Cell based Energy Systems in a future sustainable Energy World

31. March / 1. April 2004
Wien

4. Programme Non Nuclear Energies

Objectives

- **Opening Options for new and sustainable Technologies to reduce energy related emissions**
- **Contribution to the modernisation of the German Economy and the increase of Competence in Industry, Research Institutions and Universities**

Performance

- **Start in 1996, prolonged till 2005**
- **Financial Support of Research, Development and Demonstration Projects (R,D&D)**

Results

... of a ten year demonstration period of the work supply chain of a solar based **Hydrogen Energy Economy** (HYSOLAR and BAYSOLAR) ended 1995/99

- all components are basically developed: electrolyser, storage systems, catalytic burners, fuel cells
- the functionality of the work supply chain has been proved
- no basic technological obstacles against the Hydrogen Energy Economy are observable
- Conclusion: public support of R,D&D with the exception of special technological questions is no longer necessary

Consequence

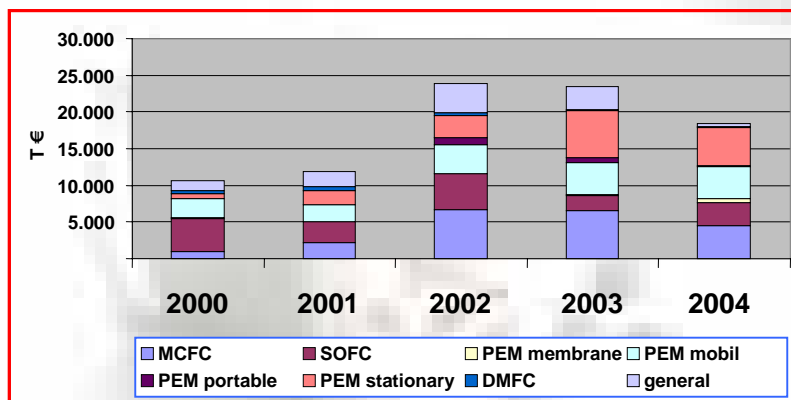
Competition of hydrogen economy based on renewable energy not yet given

Preference of direct use of Renewable Energies

Concentration of Research, Development & Demonstration to Fuel Cell Technologies

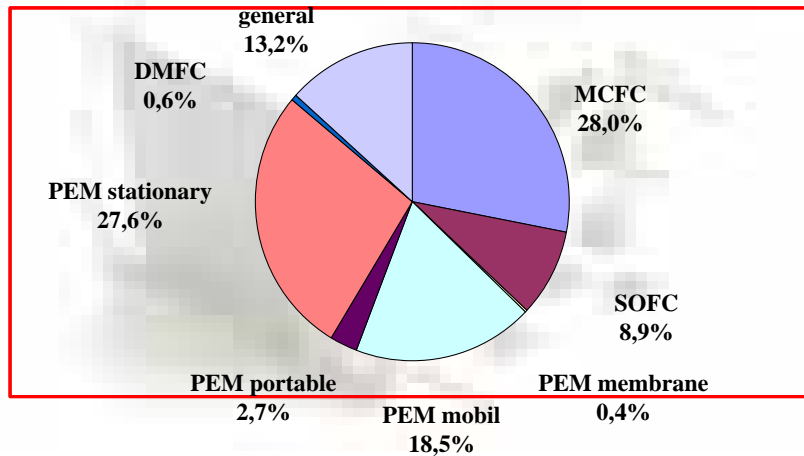
- **Hydrogen-Vehicles** prove since several years their functionality
- several **Hydrogen-Service Stations** have been erected in Germany (i.e. in Hamburg, Berlin, Stadt Barth, Stuttgart)
- all leading Car Manufacturer maintain **Development Centres** for Hydrogen and Fuel Cell Vehicles in Germany
- German Industry is highly competitive in **Traditional Hydrogen-Technology**
- in R, D & D of **Fuel-Cells** German Entities and Research Institutes have a leading position

Fuel Cell Development I



Fuel Cell Development II

Distribution BMWA fund in 2003, total 23,4 M. €



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Programme on Investment into the Future 2001 - 2005

Zukunfts-
investitions-
programm



Stationary Systems
10 Projects: ~ 16 M. Euro



Small systems for house holds and other Applications: 13 Projects : ~ 15 M. Euro

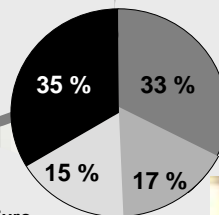


Mobile Applications: 6 Projects: ~ 7 M. Euro



Codes and standards, Test facilities, education

13 Projects: ~ 8 M. Euro



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BERTA - „Brennstoffzellen: Entwicklung und Erprobung für stationäre, mobile und portable Anwendungen“

Objective and task:

Coordination and support of Research and Development in fuel cell technologies

5 Working Groups (since January 2004):

1. PEM-FC, stationary
2. APU (Auxiliary Power Unit), mobile
3. Reforming technologies
4. Education, information
5. Codes and standards

- Actually R,D&D support by BMWA is **concentrated on fuel cell development**, only few R,D&D activities on hydrogen technology i.e. carbon nanotubes for hydrogen storage
- A new R&D concept **COORETEC** has been presented by BMWA to develop CO₂- reduced coal- and natural gas power systems **including coal gasification, CO₂- storage**
- ➔ • **Within a transition scenario the production of CO₂-free Hydrogen from fossil fuels could be possible**
- **But: the technology for CO₂-Storage can not be expected before the year 2020**

BMW-Advisory Council (Chair: Prof. U. Wagner TU München)
11 Entities and Associations, 6 Research Institutes, 3 Federal States,
DENA, 4 Federal Ministries and Project Management Organisation Jülich

Objective and task:

Elaboration of a strategy for Research and Development in the area
of hydrogen technologies

3 Working groups

1. Political and economical condition incl. codes and standards
2. Production of hydrogen, transport, Storage
3. Application technologies

Conditions for future R,D&D activities

- A new **Energy Research Programme** is in preparation
- Remaining objectives: **decrease of costs, increase of lifetime**
- All **three fuel cell technologies (PEM, SOFC, MCFC)** have to be taken into consideration for the future R,D&D activities
- **Increase of R&D activities of small and medium sized companies** as deliverers of fuel cell components (Reformers, inverters etc.)
- Development of **codes and standards, qualification** of staff of especially small and medium sized companies

Other activities

Federal Ministry for Education and Research (BMBF) Basic research in fuel cell technologies

www.bmbf.de

Competence-Network Nordrhein-Westfalen

www.brennstoffzelle-nrw.de



Fuel Cell Initiative Baden-Württemberg

www.brennstoffzellen-initiative.de



Hydrogen-Initiative Bayern

www.wiba.de



Rheinland-Pfalz

Competence-Network

"Future Technology Fuel Cell"

Hessen, Mecklenburg-Vorpommern und Niedersachsen

Hydrogen- and Fuel Cell Initiatives

Eastern Federal States

Working and Research Committee
Fuel Cells

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International Activities

European Union

BMWA is represented in the **Mirror Group of European Hydrogen
and Fuel Cell Technology Platform**

Internationale Energieagentur (IEA)

Participation in the **IEA Hydrogen Co-Ordination Group (HCG)**
established in June 2003

International Partnership for the Hydrogen Economy (IPHE)

Membership in the **Steering Committee**

Co Chair in the Implementation and Liaison Committee

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