

Fuel Cell Center of Competence and Innovation of the Stuttgart Region



- **Foundation**
- **Definition**
- **Targets**
- **Members**
- **Activities and Performance**
- **Examples**
- **Partners and Cooperation**
- **Financing**

Foundation



Established :	March 21st,2001
Legal form:	non-profit association
Founding members:	15 partners (industrial, R + D)
Founding initiative:	Stuttgart and Kirchheim
Today:	46 members

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What is the Fuel Cell Center of Competence and Innovation?



- A network of professional competence in politics, economics, R & D - institutes, and associations
- Center and pivotal point for fuel cell technology
- Platform for communication
- Think tank
- Contact point
- Initiator and promoter

Objective of the „Fuel Cell Center of Competence and Innovation “



- **To utilize the innovative potential in the region by networking**
 - **Cooperation**
 - **Innovation - products, services, new enterprises**
 - **Transferring know-how through informal knowledge and communication structures**
 - **Integration of knowledge**
- **To assert a positive impact on investment**
- **To provide worldwide representation of the competence and innovative power of enterprises in our region**

Members (I)



DaimlerChrysler



Herning, March, 6th, 2006

Members (II)



HANDWERKSKAMMER
REGION STUTTGART



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Characterization of the Members



- **From SMEs to corporate companies**
- **International with regional roots**
- **Including the complete value added chain with:**
 - **Information services (FIZ Karlsruhe)**
 - **Producers of components and equipment**
 - **System integrators**
 - **Users**

Activities and Performance (I)



- **Information platform:**
 - Web site
 - News letter
 - News flashes, etc.
- **Communication Platform:**
 - f-cell event
 - Series “Concourse Fuel Cell“
 - Series „Who is who in Fuel Cells“
 - Panel discussions

Activities and Performance (II)



- **Consolidation of networking:**
 - **Contact point**
 - **Work base and information platform**
 - **Work shops: Market – Technical improvement – H₂-infrastructure**
 - **Initiating projects and cooperation:**
 - APU for caravans – FC-PV- combination for passenger ships – „Car(go)bike“, renewable feed for fuel cells**

Examples - Information Series "Concourse Fuel Cell"

Impressions



C U T E



The CUTE
hydrogen fuel
cell bus
demonstration
project

Examples - Information Series “Concourse Fuel Cell“



Producing hydrogen by reforming natural gas

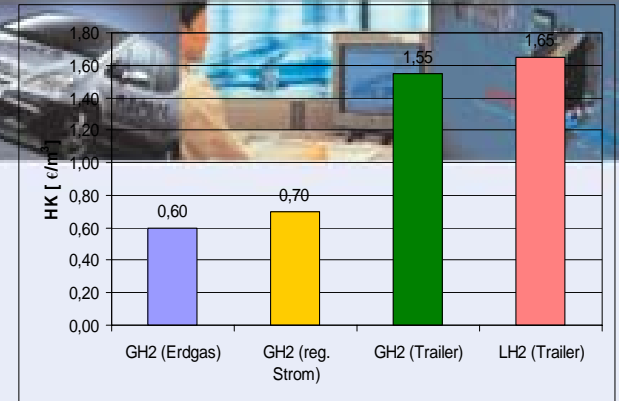
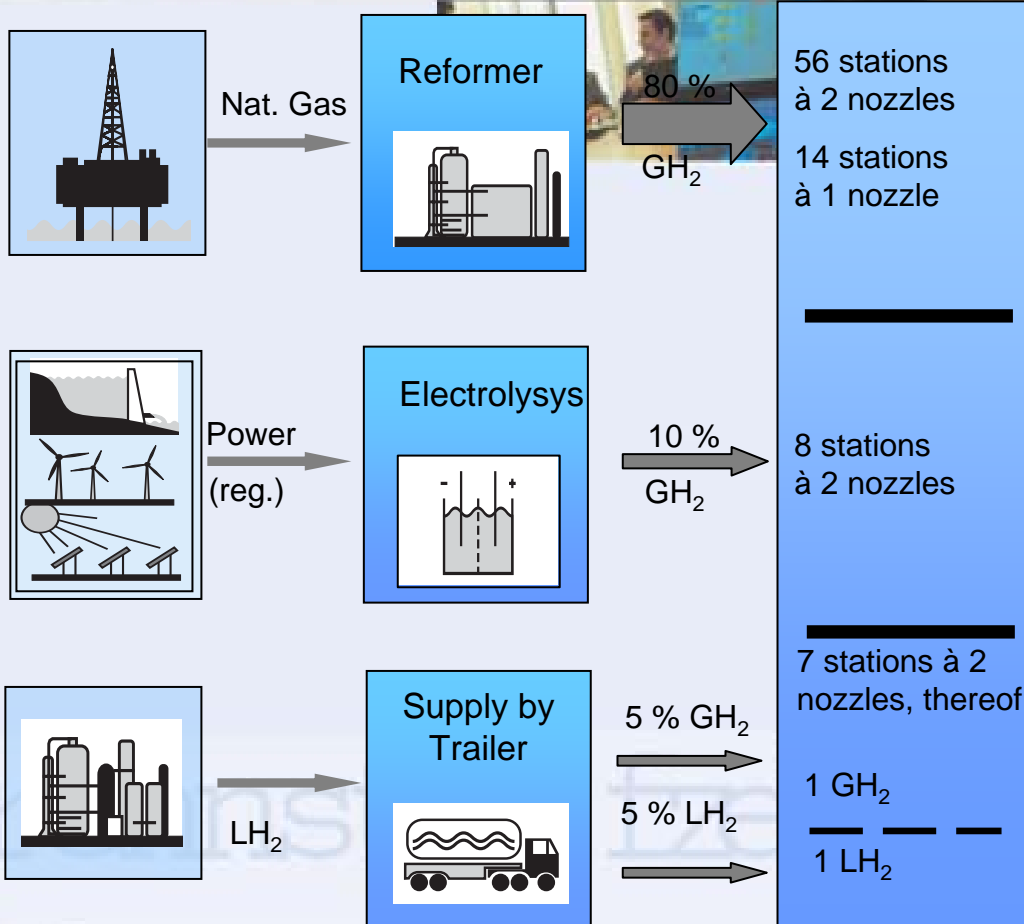
Examples - Workshops

H₂-Infrastructure for Stuttgart

Production

Filling Stations

Comparison of Production Costs *without tax*:



Demand:

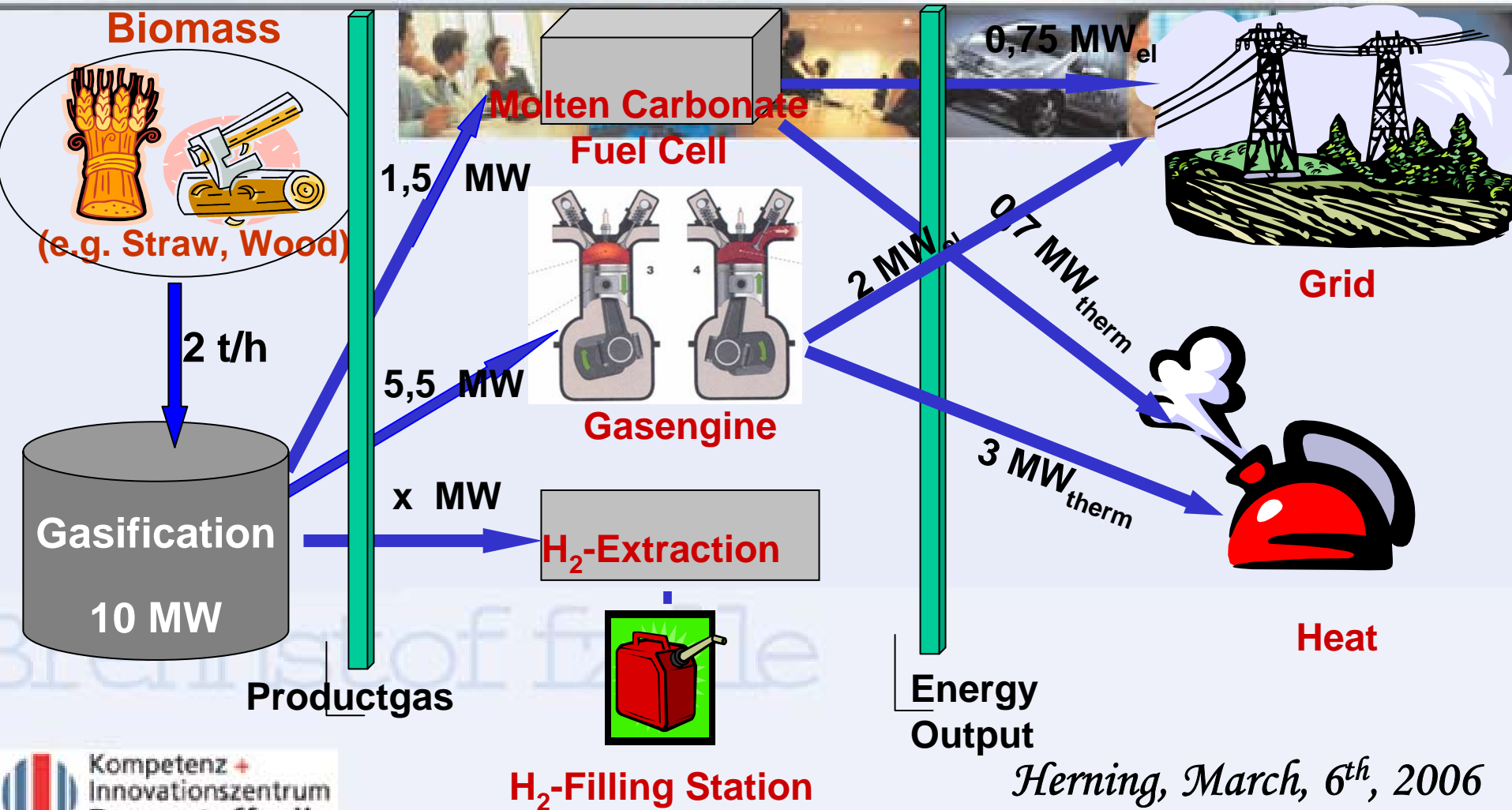
15 % of the inventory = 50.100 cars
 „Mileage“ ca. 1kg H₂/100km
 Annual Mileage 12.000 km



Appr. annual demand. 6.000 t
 H₂

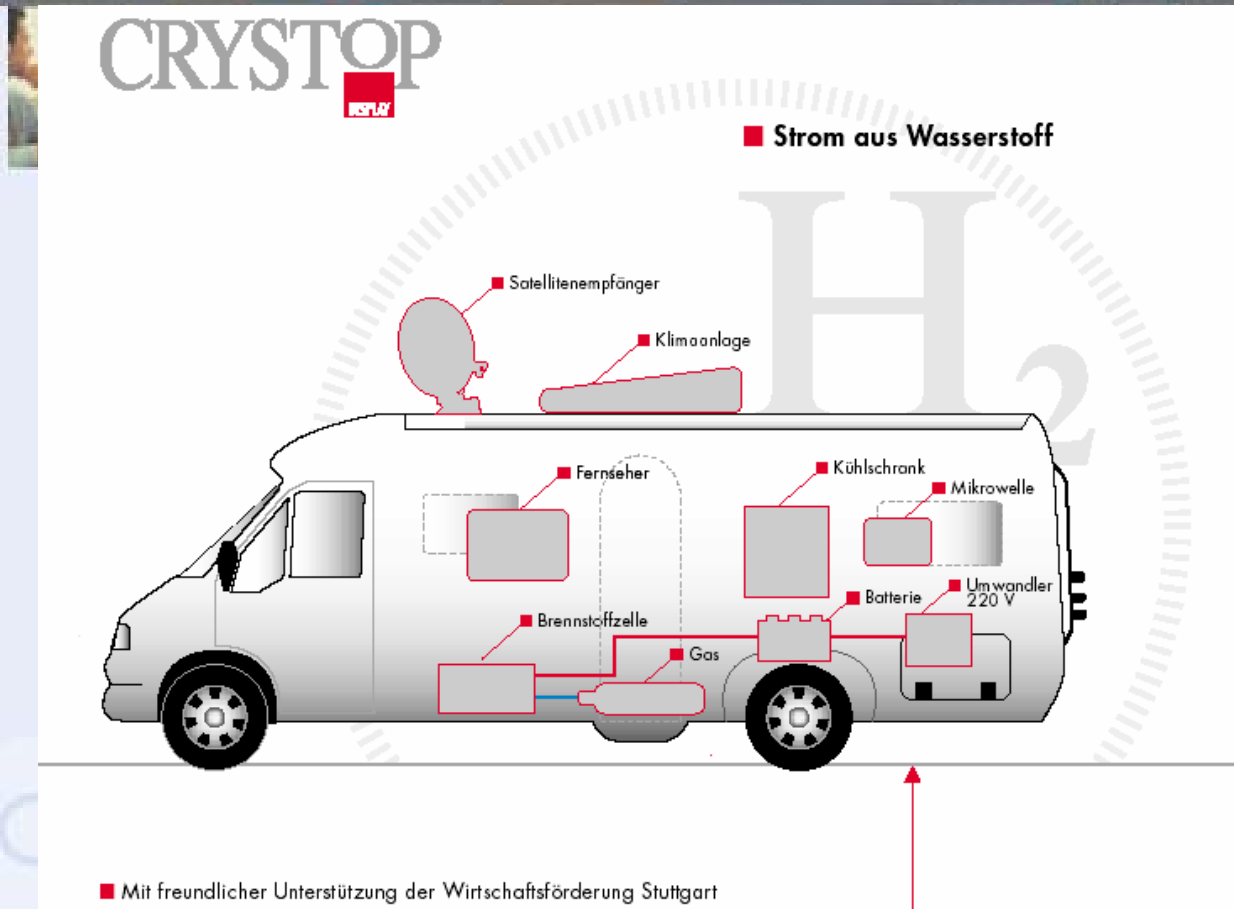
Examples - Concepts

Renewable feed for fuel cells



Examples - Initiating projects

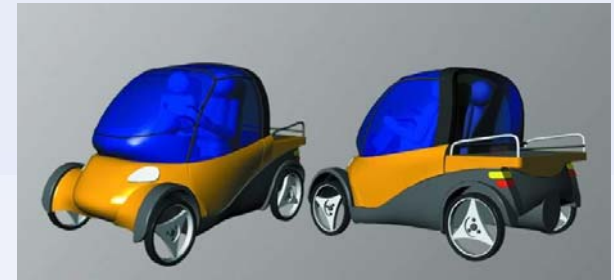
APU for caravans



Examples - Initiating projects FC-PV- combination for ships



Examples - Initiating projects „Car(go)bike“



Examples - Initiating projects

Leonberg – Biogas and MCFC



MCFC:

240 kW_{el.}

2 Gas engines:

$\Sigma = 1,4 \text{ MW}_{el.}$

Biomass:

30.000 tons p. a.

Partners and Cooperation



Platform for cooperation with:

- **Other fuel cell-activities in our state**
FABZ - WBzU
- **Other centers in our region**
kisem – KURS etc.
- **Networks in other states**

Austria – Italy – Spain - Hestia - NRW

Partners and Cooperation State Activities

Fuel Cell Initiative Baden-Württemberg (FCI)



Fuel Cell Research Alliance
Baden-Württemberg



Fuel Cell Center of
Competence and Innovation
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Fuel Cell Education Centre in Ulm



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Cooperation within the Fuel Cell Initiative Baden-Württemberg

New approaches:

Materials

Diagnostic methods

Modelling, Systems

Hydrogen storage

Market:

Demonstration

Market introduction

Mass production

Product integration



Training and further education



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Financing



- **Member fees**
- **Project funding**
- **Donations**

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Fuel Cell Center of Competence and Innovation of the Stuttgart Region



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Thank you for your attention!

Contribution of KIBZ with Experience of Leonberg Project



MCFC:

240 kW_{el.}

2 Gas engines:

$\Sigma = 1,4 \text{ MW}_{el.}$

Biomass:

30.000 tons p. a.

Recommended enlargement of the frame of objectives



There exists a relatively well based knowledge about the use of solar energy for hydrogen production via solar cells:
e.g. Hysolar project of DLR

Similar to solar radiation wind represents also a non- continuously available energy source and requires adapted electrolysers suited for intermittend operation without the necessity of potential keeping at shut-off

Therefore solar radiation shall also be considered as energy sources together with wind and bio material

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Background of KIBZ contributions Involvement in Leonberg plant



MCFC:

240 kW_{el.}

2 Gas engines:

$\Sigma = 1,4 \text{ MW}_{\text{el.}}$

Biomass:

30.000 tons p. a.

Background of KIBZ contributions: Tight connection with the DLR research center



The Institute for Technical Thermodynamics in Stuttgart of the German Aerospace Center (DLR) hosts the KIBZ in its site

The present head of the KIBZ, Dr. Henne, was heading the Electrochemical Energy Department of this institute till his retirement two years ago

Main fields of activity of this department have been:

- **Low (PEFC, DMFC, AFC) and high temperature fuel cells (SOFC),**
- **FC systems operated with hydrogen, gasoline, biogas etc.**
- **Alkaline water electrolysis, hydrogen technology, catalysers, reforming,**
- **Surface physics, surface and plasma technology**

Relevant DLR Projects in the Past



- **Hysolar Project with Saudi-Arabia (10 years):**
300 kW photovoltaik + alkaline water elektrolyser for hydrogen production in Saudi-Arabia
- **Hycos Project: Development of high performance electrodes for alkaline water electrolysers by plasma deposition suited for intermittend operation without potential keeping**
- **Field study about the use of wind (Scotland) for operating of the improved alkaline water elektrolysers for hydrogen production**