

“ZERO REGIO“



**Development and Demonstration of Infrastructure Systems
for Hydrogen as an Alternative Motor Fuel
Lombardia & Rhein-Main towards a
'Zero-Emission-Region'**

EU FP6 Integrated Project 2003

**Presentation at the Hynet meeting, Brüssel, 8.June 2004
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Presentation Outline



- **Overall & specific objectives**
- **Consortium**
- **Activities (RTD, Demonstration, Training)**
- **Dissemination**
- **Schedule**
- **Budget**
- **Expected results**



Overall Objective



Developing low emission transport systems For European Cities

**Goal of the European Commission:
5% H2-driven cars in the year 2020**



Specific Goals Of Zero Regio



- **Use of Hydrogen as an alternative motor fuel**
- **Development of infrastructure systems for Hydrogen as an alternative motor fuel and their integration into conventional refuelling stations**
- **Adaption & demonstration of Hydrogen refuelling technology (700 bar)**
- **Demonstration of alternative fuels via automobile-fleet field tests at two different urban locations (Rhein Main and Lombardia)**
- **Development of tools for faster penetration of Hydrogen in the market**



Strategy



- **Use of Hydrogen as an alternative motor fuel from existing Hydrogen sources in Europe**
(Infraserv Höchst, D; Sapio, I)
- **Employing European technological and development capabilities** (Uni Lund, S; JRC-Ispra, I; Roskilde Univ., DK)
- **Collaborating with key players in hydrogen powered vehicle development** (Daimler-Chrysler, Fiat)
- **Collaborating with universities, research institutes, SME's and other projects developing a European hydrogen economy**
(CRF, I; Becker Technologies, D; Eni-Technologies, I)



Project Consortium



Adam Opel / Daimler Chrysler
Agip Deutschland GmbH
Centro Recerche Fiat
City of Mantova
JRC, Ispra
Eni Technologie
Fraport AG
IEFE, Bocconi University
Infraseriv GmbH & Co. Hoechst KG
Linde AG
Lund University
Regione Lombardia
Roskilde University
Sapio
Saviko Consultants
TÜV Hessen GmbH

Germany
Germany
Italy
Italy
EC
Italy
Germany
Italy
Germany
Germany
Sweden
Italy
Denmark
Italy
Denmark
Germany

Industrie
Universität, RC
Public Admin.
KMU

16 Partners, further
SME,s are planned to
be engaged as
subcontractors



Research- and Development Activities

Rhein-Main & Lombardia



- **Adaptation & integration of 700 bar refuelling technology in conv. refuelling stations**
- **Integration of 350 bar dispenser**
- **Integration of liquid hydrogen tank and dispenser**
- **Optimised H₂-infrastructure from source to refuelling station**
- **Assessment of pollutant emissions**
- **Development of inovative testing procedures**
- **Development & implementation of data acquisition systems**
- **Innovative strategies to simulate demand of hydrogen**
- **Economic aspects & public acceptance of Hydrogen as a car fuel**



Planned refuelling station in Rhein-Main, D





Demonstration-activities



- Safe and reliable operation of dispensing Hydrogen integrated in a conventional refuelling station
- Field tests with a car fleet of 5 FC-vehicles in Rhein-Main
- Field tests with a car fleet of 3 FC-vehicles in Lombardia
- Operation of a reforming technology for onsite production of hydrogen
- Experience with vehicles in customer's hands
- Evaluation of customer's experience with FC-vehicles
- Gaining experience with different application profiles, e.g. Taxi, Post, etc..
- Data on customer acceptance



Airport Frankfurt and industrial site Höchst





Training activities



- **Operation of hydrogen filler equipment in a public refuelling station**
- **Operation of onsite hydrogen production facility**
- **Driver training for fleet operation**
- **Basic education and background on new propulsion systems and safety aspects**



Cooperation



- **European scale via. 4 EU partners in the consortium**
- **Cooperation with the european Hydrogen Technology platform espec. with the following projects:**
 - **CUTE** (focus on public busses)
 - **CH₂IP** (700 bar)
 - **Hyways** (Development of a european hydrogen roadmap)
 - **DWV-Roadmap** (Project of german hydrogen association)
- **Hynet**



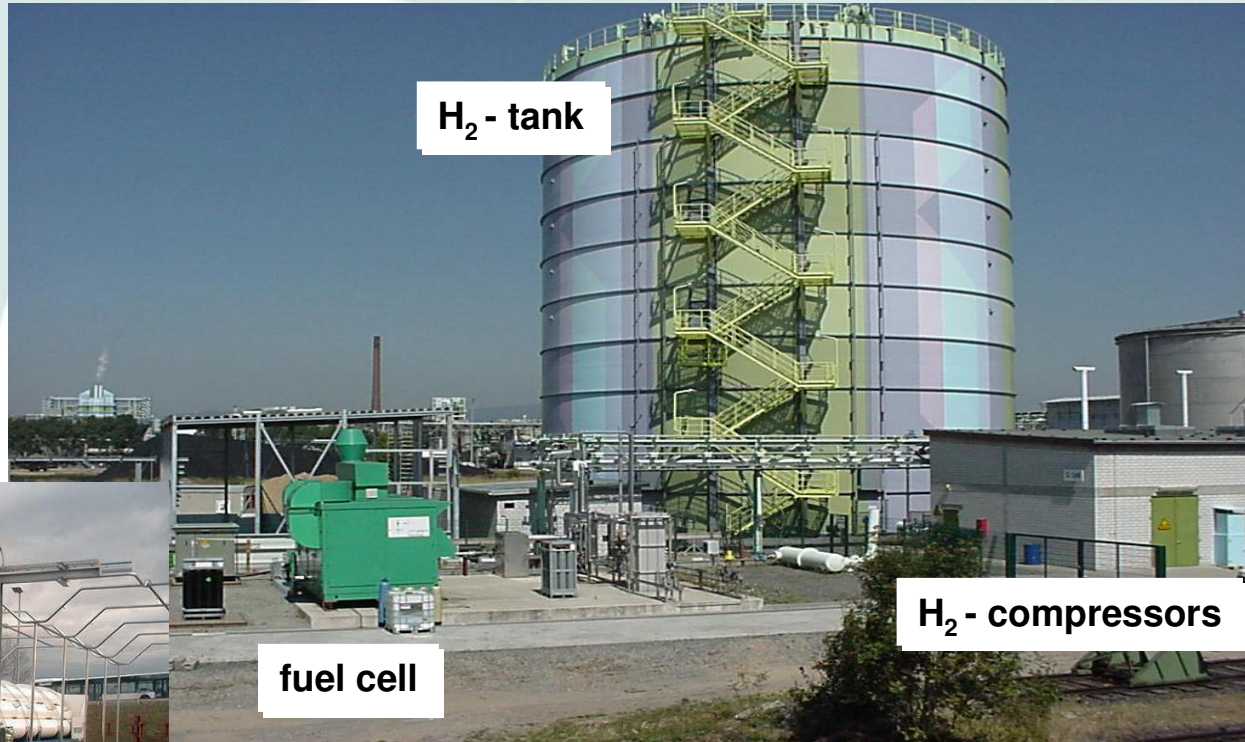
Zero Regio

Rhein-Main & Lombardia

Hydrogen-center of Infraseriv Höchst



infraseriv
höchst



H₂ - tank

H₂ - compressors

fuel cell

H₂ – trailer filling station





project schedule phase I



phase I (2004 – 2005):

- **Development & construction of H2-infrastructure in Rhein-Main**
- **Construction of onsite H2-production and H2-transportation (Mantova)**
- **Development and construction of 700 bar refuelling technology (Frankfurt)**
- **Development of safety standards for public integrated refuelling stations**
- **Development of car fleet**



project schedule phase II



phase II (2006 – 2008):

- **Field tests with vehicle fleets (Frankfurt and Mantova)**
- **Data acquisition and integrated data evaluation**
- **Assessment of the economic competitiveness, identification and analysis of interested parties**
- **Development of a strategy for policy makers to support and stimulate demand of H2 in the transport sector**

Total project duration

5 years

Daimler-Chrysler-A-class in Rhein-Main



Fiat-Panda in Lombardia



ZERO REGIO – the demonstration project of the EU for private cars



project budget total



Activities	Costs	EU- grant
RTD and innovation related activities	3.974 M€	2.161 M€
Demonstration activities	15.409 M€	4.688 M€
training activities	79.63 T€	79.63 T€
consortium management	531 T€	531 T€
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total	19.995 M€	7.461 M€



expected results



- ✓ **Building up safe & functional infrastructure for Hydrogen to serve future road traffic in urban areas**
- ✓ **Promoting public acceptance for Hydrogen**
- ✓ **Developing suggestions and models for faster penetration of Hydrogen over larger urban areas in the EU**
- ✓ **Promoting the development of FC-driven cars**
- ✓ **Contributing to the EC's political objective of 5% fuel substitution through Hydrogen in the road transport sector by the year 2020**