



Kompetenz-Netzwerk Brennstoffzelle NRW.

The Fuel Cell Network NRW – A Model for the Co-operation Between Science and Business

Frank Koch

Gelsenkirchen, April 3rd 2003



Ministerium für
Verkehr,
Energie und
Landesplanung
des Landes
Nordrhein-Westfalen



Ministerium für
Wissenschaft und
Forschung
des Landes
Nordrhein-Westfalen

Why Fuel Cell Technology in NRW ?



Economical Reasons

- Technology with a high potential in various applications
- Commercial competitiveness possible
- Proficiency and skills available in NRW, applicable for fuel cell technology
- New options for the industry, new employment possibilities

Ecological Reasons

Why Fuel Cell Technology in NRW ?



Economical Reasons

Ecological Reasons

- Hydrogen and Fuel technology cells fits very well to NRW Climate Protection Programme
- High potential to decrease emissions caused by energy utilisation for stationary as well as transport applications
- Key technology on the way to a renewables based hydrogen economy

Why Fuel Cell Technology in NRW ?

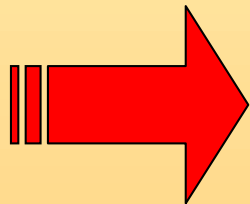


NRW Energy Policy Statement

Agreement to support Hydrogen and Fuel Cells in NRW

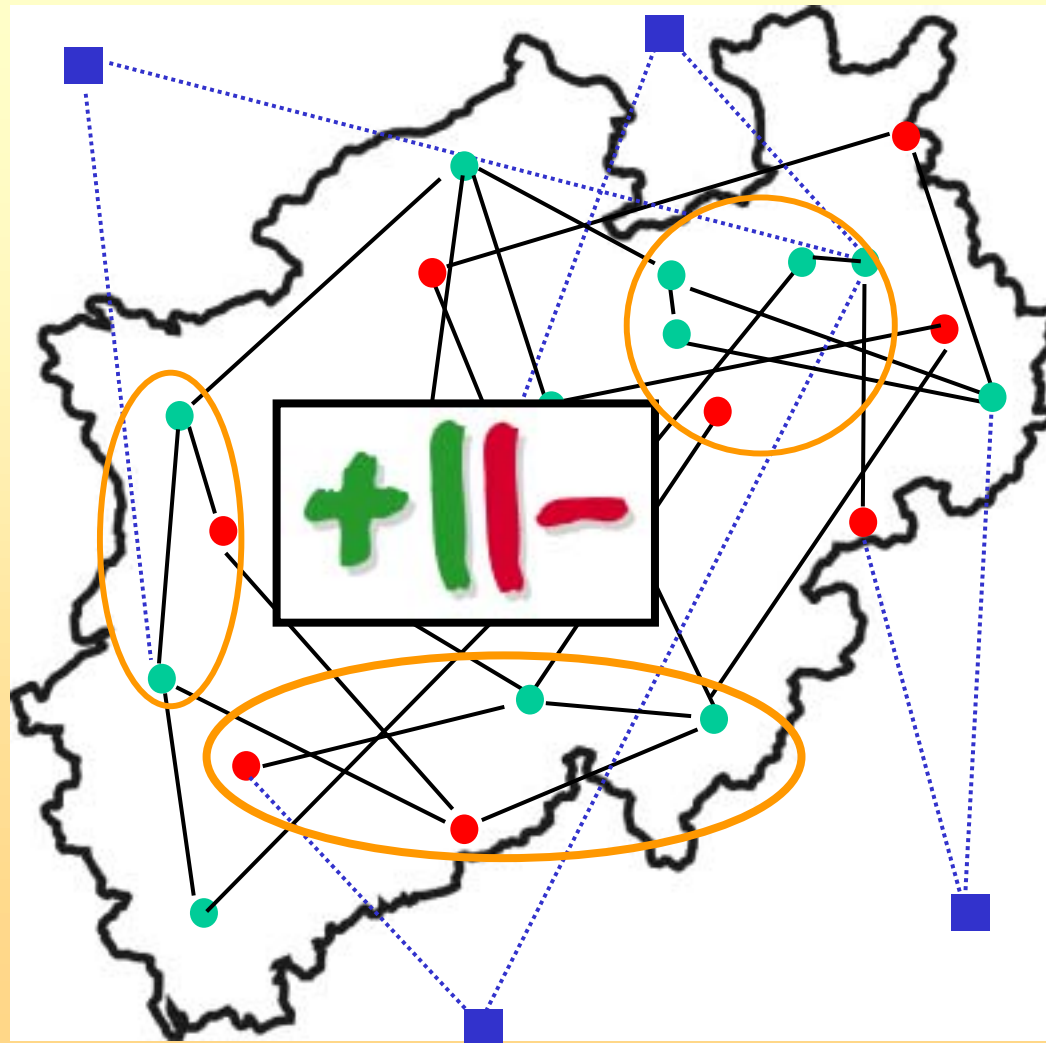
by the Fuel Cell Network NRW

Strengthening of the industry and science in NRW in the field of fuel cell technology in order to



- develop NRW towards an international attractive location for fuel cell technology
- promote the introduction of fuel cell technology and establish a fuel cell industry
- improve the international competitiveness of NRW companies

Strategy

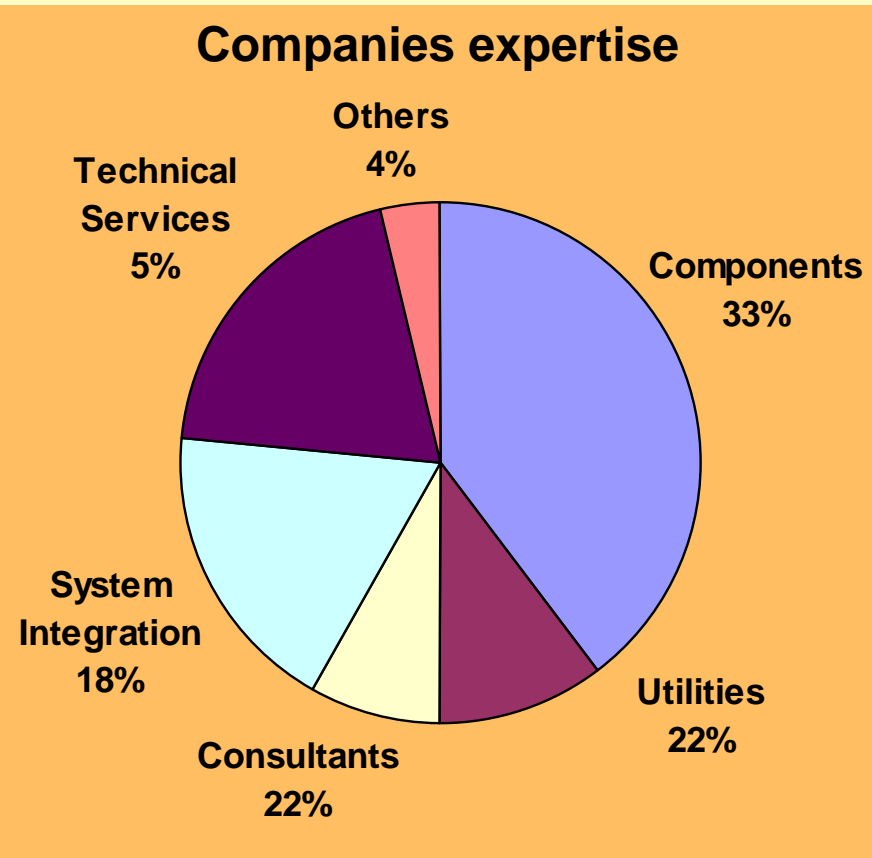
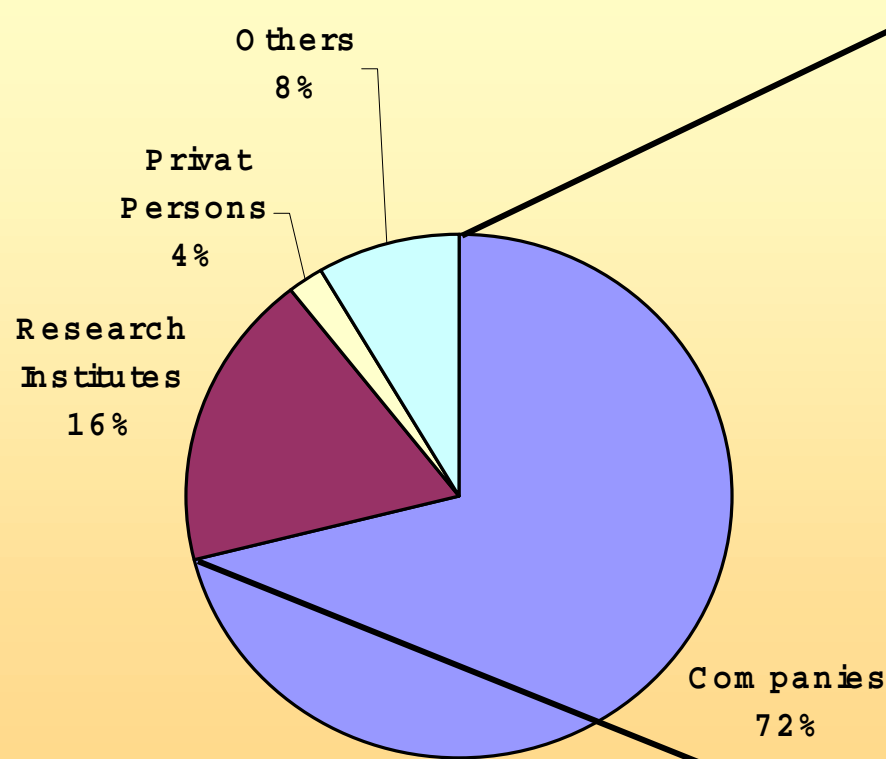


Tools:

- Project initiation
- Procurement of partners
- Advice on fundings
- Company visits
- Workshops
- Working groups
- Internet
- Newsletter
- Industry Atlas
- Publications
- ...

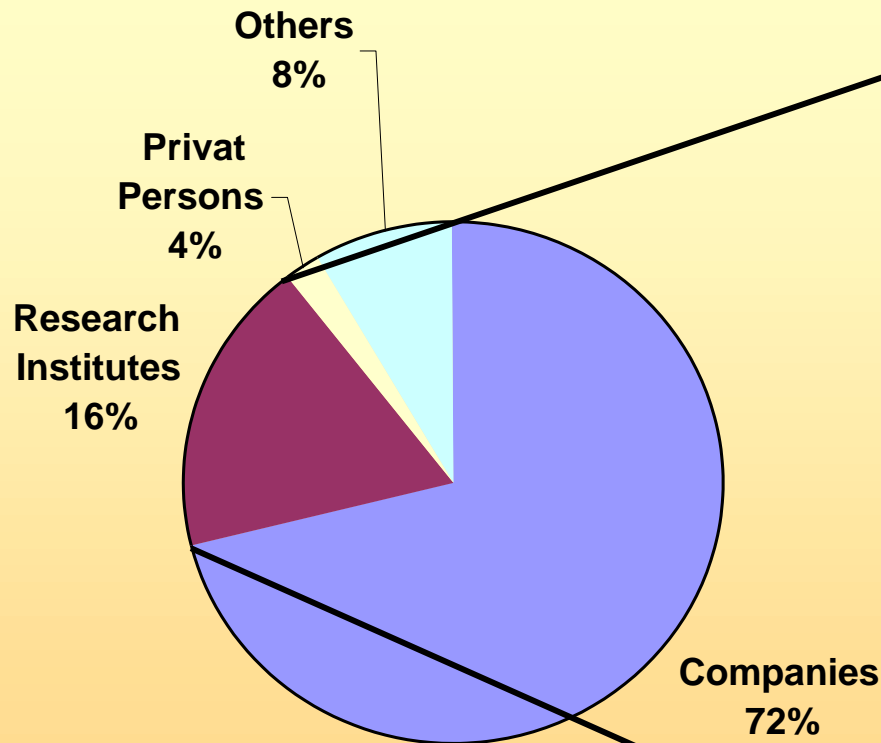
Network Status

230 companies, research institutes and institutions

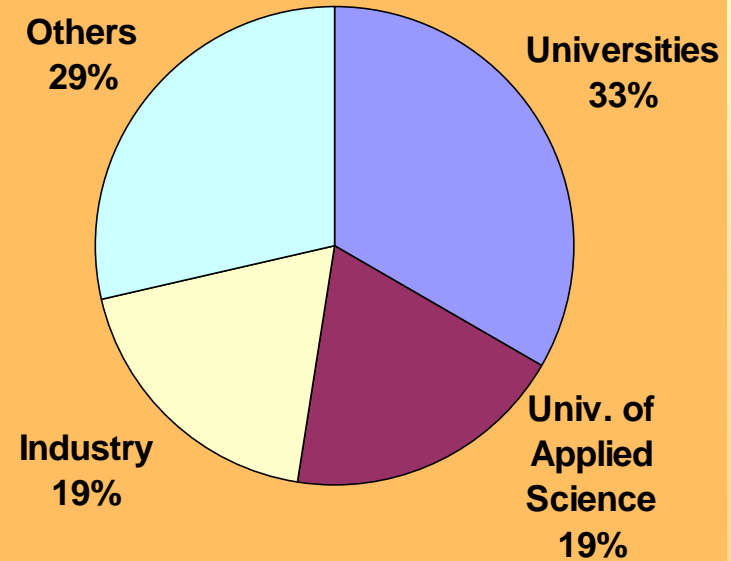


Network Status

230 companies, research institutes and institutions



Research Institutes *



* Members only

Fuel Cell R&D in NRW



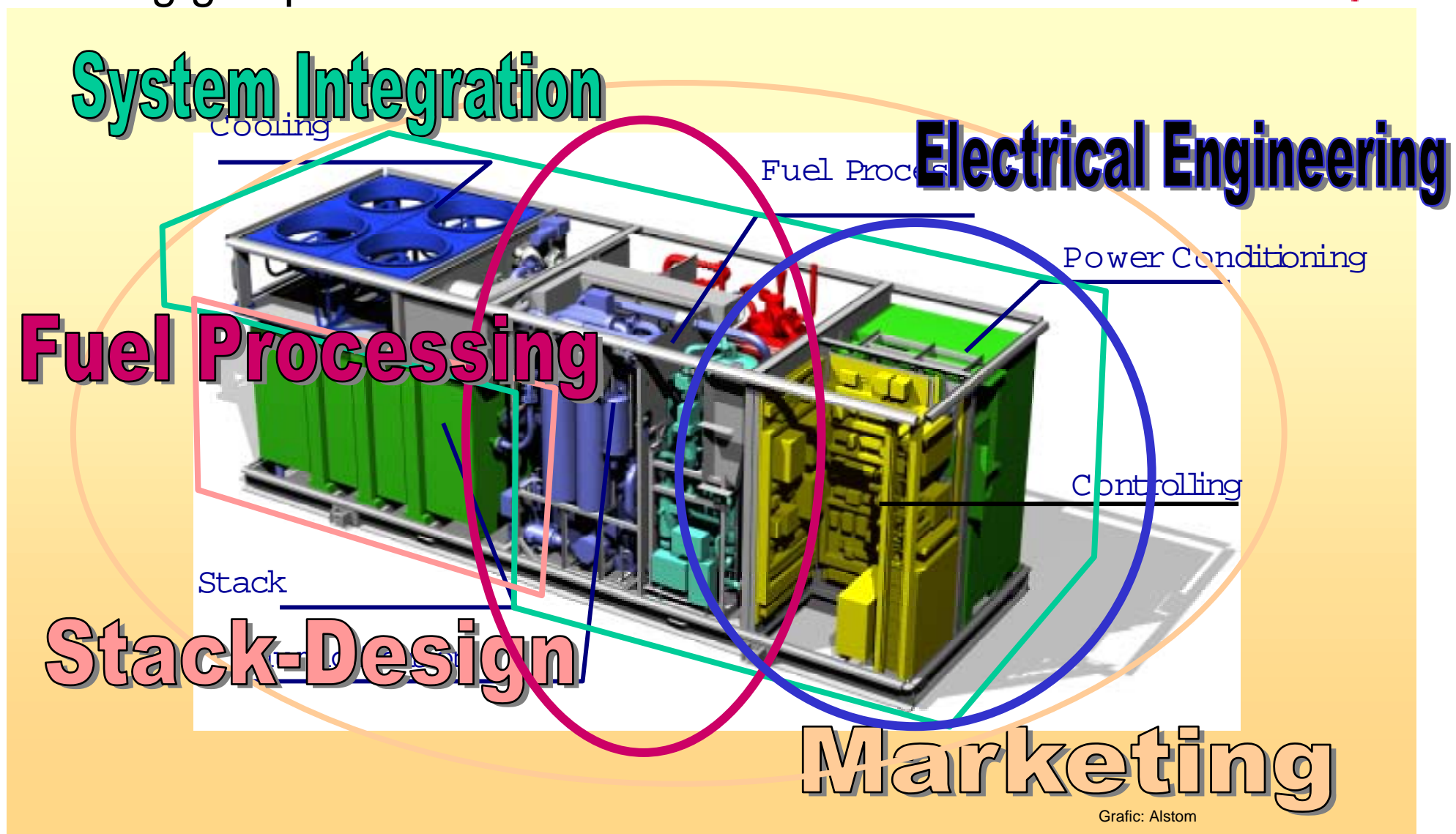
- Approx. 140 relevant Departments in the fields of
 - ✓ Mechanical Engineering
 - ✓ Electrical Engineering
 - ✓ Chemistry
 - ✓ Physics
 - ✓ Economy

- Current: 45 Institutes are members of the Fuel Cell Network
 - Great potential to increase the competence of the network!

Network Status

- 230 members
- Internet-Homepage German/English: www.fuelcell-nrw.de
www.brennstoffzelle-nrw.de
- Industry Atlas
- 5 symposia about general topics
- 4 target workshops on technical fuel cell topics
- 5 standing working groups

Working groups





(Spring 2003):

About 41 NRW-funded fuel cell projects

- Total volume of 75 Mio. €
- 40 Mio. € public funding on the fields of
 - ✓ Stack Components
 - ✓ System Components
 - ✓ Materials
 - ✓ Fuel Processing
 - ✓ Testing, Application and Demonstration



Project Overview I

Stack Components

- Development of production plants for MEAs
- Development of a new technology for the production of bipolar plates
- NaKaB – Nano Catalysts for Fuel Cells
- ...

Fuel Processing

- Natural gas reformer in the range of 10-50 kW
- Developing a prototype „natural gas processor for stationary PEFCs“
- Compact reformer for liquide hydrocarbons
- ...

Project Overview II



Systems Components

- **Developing SOFC of various output classes, examining joining techniques and operation of individual cells and stacks of up to 100 watts, work on long-term stability, cell efficiency level**
- **Development of a power inverter for network feed for fuel cell heating units**
- **Pressurized 320 kWel – SOFC/gas turbine**
- **New recuperator system for high temperature fuel cells**
- **Development of gas sensors and compressors for mobile fuel cell systems**
- **Development of a humidification system for a PEFC**
- **Compressor/expander systems with highest efficiency**
- **Development of a bi-directional power inverter for stationary systems**
- **Development of a Control-Management-System for Fuel Cell Systems**

Project Overview III



Testing/ Application/ Demonstration

- Examining the long-term behaviour of SOFC at fluctuating gas qualities, field trials of SULZER-HEXIS SOFCs for use in home technology
- Erecting, operating and optimizing the thermal recovery based on a MCFC in the so called „hot-module“-design
- Erection of a sewage digester gas purification module and analysis of digester gas composition in conjunction with the operation of a 200 kWel-PAFC
- PEFC-based co-generating plant in Oberhausen based on coal mine gas
- Power supply of electrical wheel-chair by fuel cells
- 50 W power supply for mobile office systems
- ...

The Network Team



Detlef Stolten



Frank Koch



Andreas Ziolek



Ernst Kugeler

Coming together is the beginning.

Working together is the success.

Henry Ford

Thank you for your kind attention.