Nationale Organisation Wasserstoff- und Brennstoffzellentechnologie

Global Research, Development, and Demonstration Environment

The German National Innovation Program for Hydrogen and Fuel Cell Technologies (NIP)

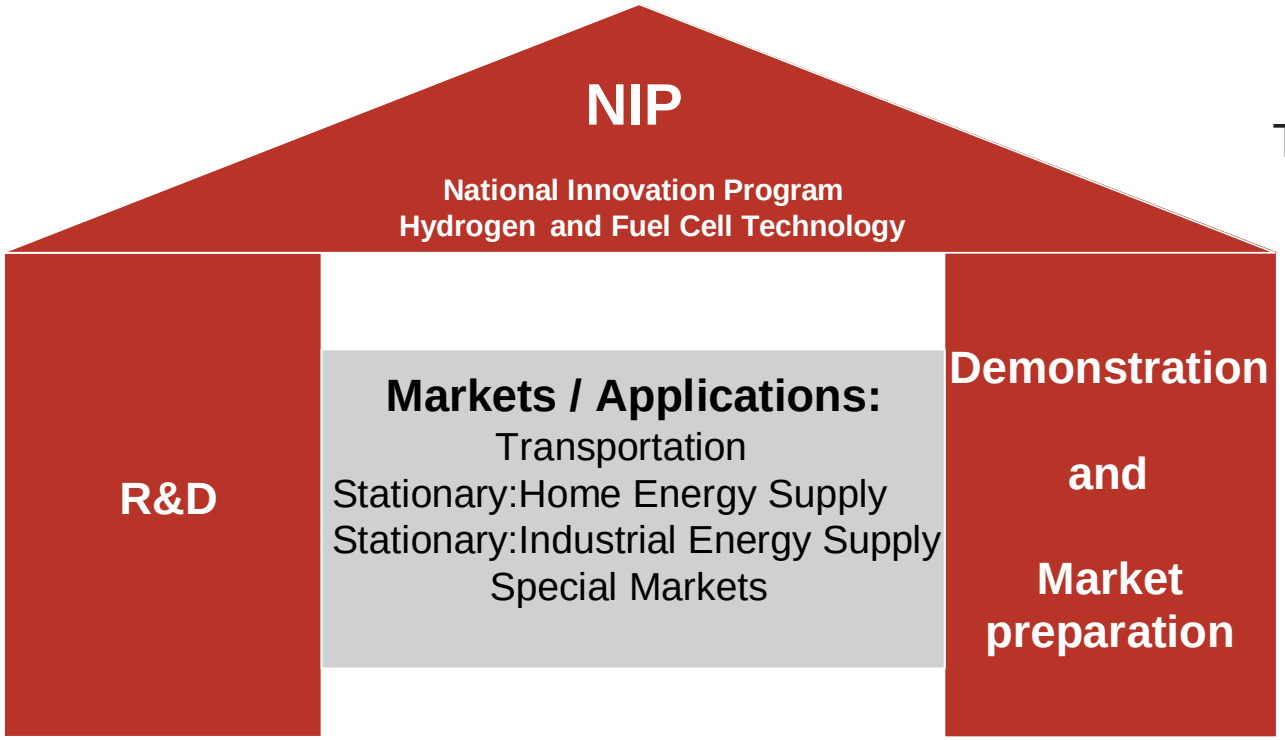
and

the European Joint Technology Initiative (JTI)

HTAC | Washington, USA

Dr. Klaus Bonhoff | July 22, 2008

German National Innovation Program (NIP)



The NIP is supported by

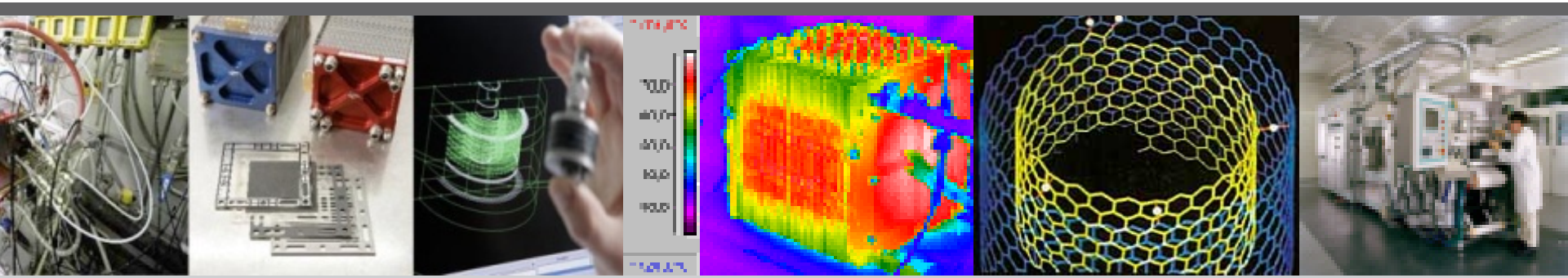
- Federal Ministry of Transport, Building and Urban Affairs
- Federal Ministry of Economics and Technology
- Federal Ministry of Education and Research
- Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Roadmap – R&D

Focussed R&D is necessary to:

- Reduce cost
- Increase
  - Lifetime
  - Reliability
  - Efficiency

In Germany a dedicated technology platform will be installed to coordinate the exchange between demonstration and R&D.

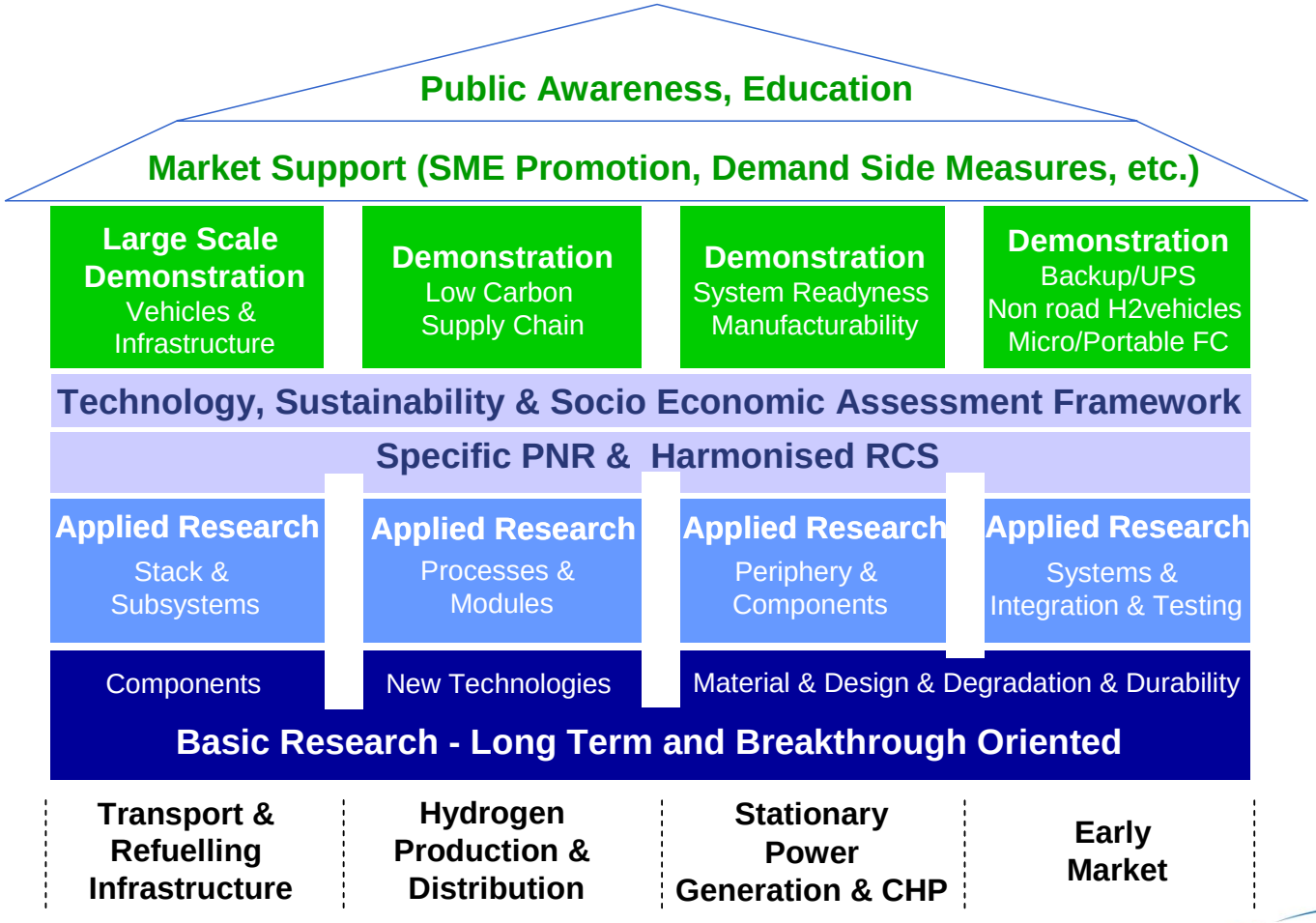


Demonstration: Lighthouse Projects

- Basis for market preparation
- Implementation of infrastructure and vendor systems
- Public awareness and visibility
- Confidence in the future of the technology
- Combination of R&D and demonstration
- Frame for suppliers (esp. SMEs)
- Efficient combination of public and private resources

➔ **Strengthen German competitiveness**

Program Focus on Applications



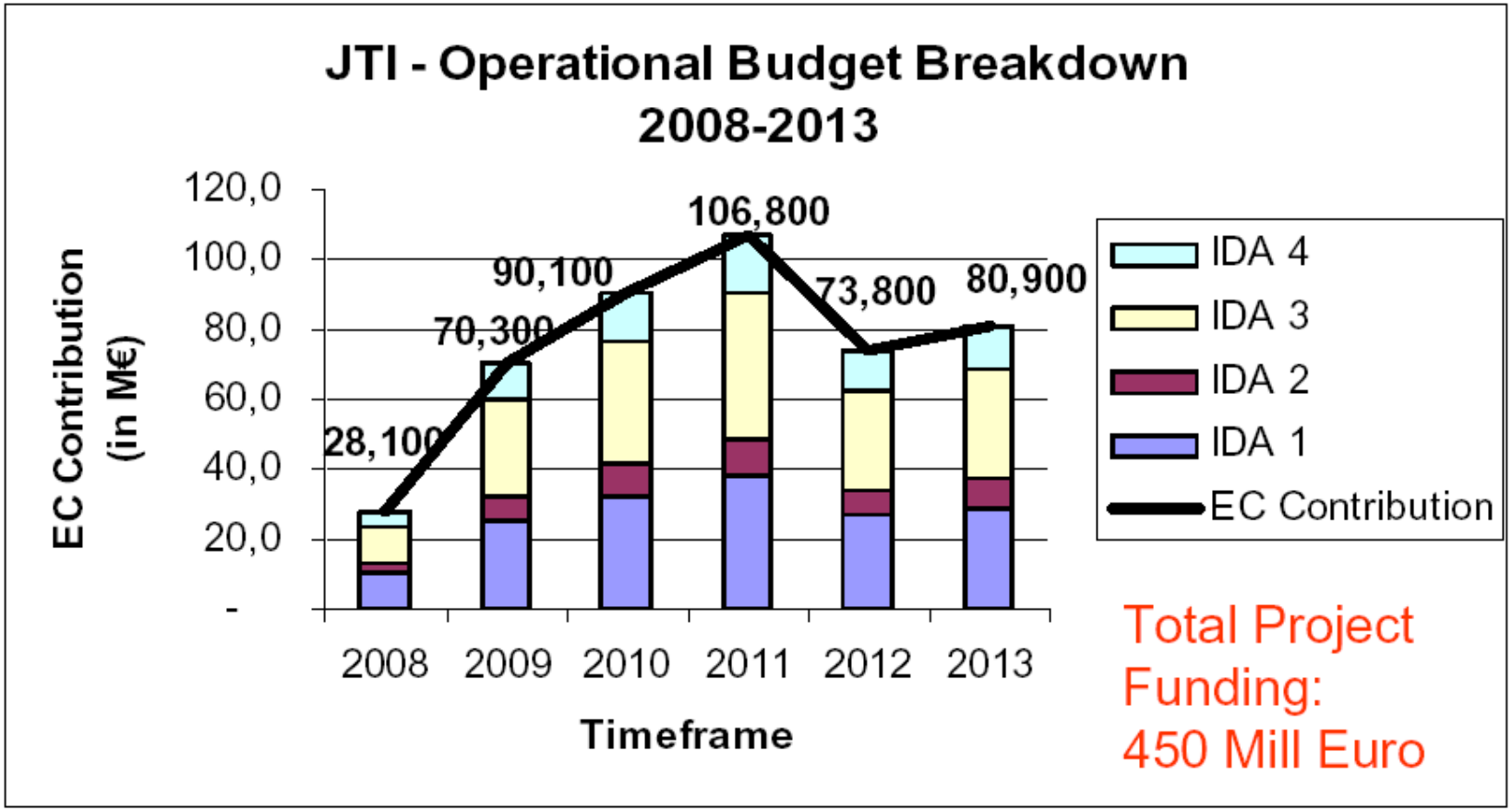
Key actions target commercial markets

- Large scale fleet demonstrations of several hundred vehicles and refuelling infrastructure
- Enforced collaboration on critical stack materials, components and system requirements
- Development of sustainable hydrogen production, storage and distribution methods
- Research and demonstration to meet application targets for Stationary Power and CHP

Key actions target commercial markets

- Demonstration and deployment of back-up power, UPS and portable power products
- Demonstration and deployment of industrial vehicles with focus on material handling
- Establishment of beneficial market conditions including SME facilitation schemes and RCS

JTI Budget


JTI - Operational Budget Breakdown
2008-2013
EC Contribution (in M€)
120,0
100,0
80,0
60,0
40,0
20,0
-
28,100
70,300
90,100
106,800
73,800
80,900
2008
2009
2010
2011
2012
2013
Timeframe
IDA 4
IDA 3
IDA 2
IDA 1
EC Contribution
Total Project Funding: 450 Mill Euro

Hydrogen and Transportation

The transportation industry offers different possibilities to use hydrogen.

Industry is investing heavily in the development of hydrogen and fuel cell related technologies.

Transportation - Overview

All activities aim at preparing the market for hydrogen and fuel cell technology in the transportation sector until 2015.

This includes competitive products, an established infrastructure, well defined legislation and customer acceptance.

To reach this goal all activities have to be coordinated centrally. Especially the exchange between demonstration and research is of importance.

Phase 1 until 2010	Phase 2 2010 - 2015	Phase 3 from 2015
Technology development Cost reduction	Market preparation Technology refinement	Market introduction

Hydrogen Production

- prepare for a diversified portfolio
- prepare for large production capacities

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Clean Energy Partnership

Common vision to introduce hydrogen as a fuel in the transportation sector

Current status

- day-to-day operation of hydrogen and fuel cell cars
- public hydrogen stations usable by all OEMs (retail settings, full capacity)

Future plans

- Expand vehicle fleet
- Include bus activities
- Install further hydrogen stations
- Connect Berlin and Hamburg

Die Bundesregierung · BMW · BVG · DAIMLER · Ford · GM · OPEL · HOCHBAHN · Linde · Shell · StatoilHydro · TOTAL · VATTENFALL · VOLKSWAGEN

Lighthouse Home Energy Supply

- Cooperation of well known manufacturers of heating technology, energy suppliers, research institutes and users
- Installation von more than 600 systems in 3 - 5 German regions
- Deployment of synergies through cooperation in demonstration, development, RCS, qualification and communication

Fuel cell based home energy supply is a chance for both users and industry.

Lighthouse Industrial Power Generation

60 biogas systems

- High temperature fuel cell, 200-700 kW
- Combined with gas washer, ORC, heat usage
- Cooperation of fuel cell and biogas system manufacturers with operators and energy suppliers

Industry has accepted the opportunities that hydrogen and fuel cell technology offers.

Special Markets

Special Markets have a key role within the NIP.

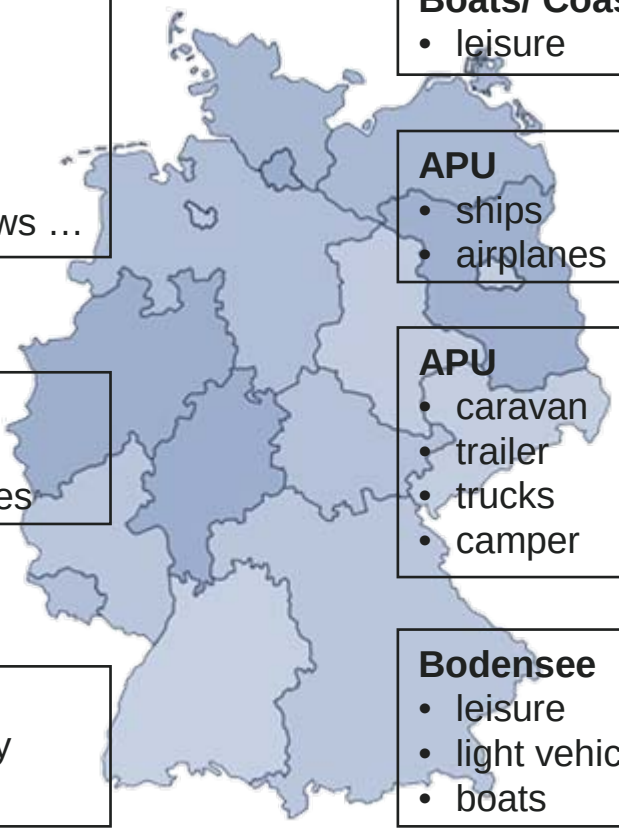
- Early market opportunities especially for the supply industry
- Create Public acceptance and visibility

Material Handling
- forklifts
- industrial trucks
- etc.

For manufacturing airports, trade shows …

Special Vehicles
- Cargo bikes
- Municipal vehicles

USV
- mobile telephony
- railroad



Boats/ Coast
- leisure

APU
- ships
- airplanes

APU
- caravan
- trailer
- trucks
- camper

Bodensee
- leisure
- light vehicles
- boats

Hydrogen Energy

18 WHEC 2010

Host and organizer:

EnergieAgentur.NRW

In cooperation with:

DWV Deutscher Wasserstoff- und Brennstoffzellen-Verband

JÜLICH FORSCHUNGSZENTRUM

MESSE ESSEN Place of Events

Fuel Cell and Hydrogen Network NRW.

Supported by:

EHA EUROPEAN HYDROGEN ASSOCIATION

NOW Nationale Organisation Wasserstoff- und Brennstoffzellentechnologie

wiba Koordinationsstelle der Wasserstoff-Initiative Bayern

ZSW

First major sponsor:

RWE The energy to lead

Welcome to the WHEC 2010

May 16 – 21, 2010
Essen, Germany

Nationale Organisation Wasserstoff- und Brennstoffzellentechnologie

THANK YOU!

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