
 International Partnership for Hydrogen and Fuel Cells in the Economy


Country Update Austria

Policy framework

R&D-Funding Program “Mobility of the Future”
Call for projects “Vehicle Technologies”

Fall 2013 to spring 2014
Budget 6.75 Mio. Euro

24 Projects for Evaluation

Specific Focus within the Call on:

- **Fuel Cells and Hydrogen (7 projects)**
- Thermal Management including Cabin Climatisation and Waste Heat Recovery (9 projects)
- Alternative Energy Carriers and Storage Systems including Infrastructure, Alternative Fuels, Power-to-Fuel and Battery development (8 projects)

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 International Partnership for Hydrogen and Fuel Cells in the Economy


Country Update Austria



Policy framework

R&D-Funding Program “Mobility of the Future”
Call for projects “Vehicle Technologies”

Fall 2014 to spring 2015
Budget 6 Mio. Euro only for FCH-projects

First Call focusing only on Fuel Cell and Hydrogen based on the Strategy Paper of the FCH-Cluster Austria under the responsibility of A3PS.

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 International Partnership for Hydrogen and Fuel Cells in the Economy


Country Update Austria

Policy framework

“Energy Research Program 2014” Budget 29 Mio. EUR

FCH-relevant content of the Program: **“4.1 Fuel Cell and Hydrogen”**



Targets:

- Speed up the implementation by increasing the power density and life-time
- System optimization as well as reduction of production costs
- Consideration of the whole production chain from CO₂ separation, electrolysis to methanisation

Topics:

- Cost efficient, reliable and stable materials for SOFC, SOEC and PEMFC
- Development of FC-components and stacks
- Electrolysers with high efficiency and flexibility

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 International Partnership for Hydrogen and Fuel Cells in the Economy


Country Update Austria

FINALIZED PROJECT - E-LOG-Bio-Fleet

• „Lighthouse Project - Range Extender in Logistics Application with Biomethane “

• Finalized in May 2014

• Work Packages:



- Development, test and certification of power package
- Development, certification and test of warehouse truck
- Development, certification and test of infrastructure
- Development, certification and test of infrastructure
- Adaption and production of 10+2 warehouse trucks
- Field trial infrastructure
- maintenance & service concept for trucks and infrastructure
- Field trial, data acquisition and analysis of customer acceptance
- Technological consultation and analysis
- Ecologic and economic consultation and analysis

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International Partnership for Hydrogen and Fuel Cells in the Economy

Country Update Austria

(Industry) Activities

Valve Technologies and Test Methods for H2-Pressure Storage
Accelerated Aging Testing for FC-Systems
PEM-FC Range Extender
PEM-High Pressure Electrolysis
Development of cost efficient Components and System Integration for PEM-High Pressure Electrolysis and PEM-FC
Increasing the **Product Portfolio** for PEM-High Pressure Electrolysis and stationary as well as mobile PEM-FC applications

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Country Update Austria

(Industry) Activities




PEM-FC-Systems- and Component Test Bed
Simulation Tools, Measurement- and Test Systems for PEM-FC and SOFC
Analysis of **Aging Processes** of FC-Systems
High dynamic Test Bed Components
SOFC-APU & CHP
SOFC Systems for **Heating/Cooling/Electricity**
PEM-FC-Range Extender Vehicle
PEM-FC-Vehicle
High Temperature Electrolysis SOEC

Automotive PEM compressor (18kW, -2-Bar)

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Country Update Austria

(Industry) Activities



Vehicle Concepts including Simulation
Modular Systems for innovative Propulsion Systems (ICE&xEV)
Development of Production Processes: Synergies and parallel Production of conventional, hybrid and FC-Propulsion Systems
Storage of H₂ in the Vehicle: Optimization of Costs & Storage Capacity
Test and Validation of Components, Systems and Vehicles
 Geometrical and Functional Integration of new Technologies into the Vehicle






21st IPHE SC Meeting Oslo, Norway 7

International Partnership for Hydrogen and Fuel Cells in the Economy

Country Update Austria

(Industry) Activities




H₂-Production: local vs. peripheral, renewable, power-to-hydrogen
H₂-Refilling Stations: Compression, High Pressure Storage
H₂-Refilling Stations Infrastructure in Austria: Model Regions, Networks with DE, IT, SLO, CZ
H₂-Logistics & Distribution
Demo Vehicles FCV (Hyundai, Honda, Toyota 2015, Daimler starting 2017)







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 Anhang 8: Genehmigungsverfahren für H₂-Indoorbetankung
 International Partnership for Hydrogen and Fuel Cells in the Economy

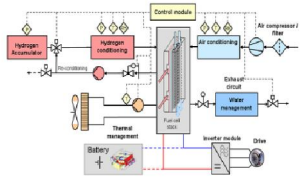
Country Update Austria

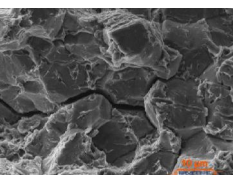
(Industry) Activities

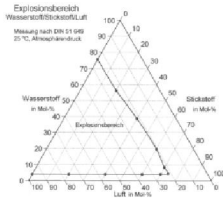





Technical, ecological and economical Analysis of Hydrogen Systems and Processes
 Operation of Hydrogen- and FC-Test Beds and Hydrogen **Discharge Point**
Engineering for Hydrogen Infrastructure and Vehicles including **licensing**
Proposal for a CD-Laboratory „Thermodynamics of Hydrogen“








21st IPHE SC Meeting Oslo, Norway 9


 Anhang 8: Genehmigungsverfahren für H₂-Indoorbetankung
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Country Update Austria

(Industry) Activities



Research on **powder-metallurgical manufactured SOFC Stack Components**
 Light Weight **MSC Stack** for SOFC APU Applications
 Stack Components and Technologies for **SOFC CHP**
High Temperature Electrolysis SOEC
SOFC Stacks and Stack Components for Heating/Cooling/Electricity

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 Anhangung 8: Genehmigungsverfahren für H₂-Indoorbetankung
 International Partnership for Hydrogen and Fuel Cells in the Economy




Country Update Austria

(Research) Activities



Optimization of Performance and Life-time of FC
 FC in Long Term Tests under Real Conditions and Accelerated Stress Tests (AST)
 in-situ Analysis of degradation mechanism of PEM-FC (PEMFC)
 Analysis of the current density
 Development of the Reformer Sponge Iron Cycle (RESC)
 Micro Process Engineering for the Reformation of liquid arenes in Micro Structure Devices for the Application in mobile FC Systems
 Development of innovative Eletrolytes and Membranes for Low Temperature FC





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 Anhangung 8: Genehmigungsverfahren für H₂-Indoorbetankung
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Country Update Austria

(Research) Activities



Mass and Charge Transport of SOFC/SOEC Components
Oxygen Exchange Characteristics of mixed conductive Oxides for SOFC/SOEC Cathodes and Anodes
Transport Characteristics of SOFC-Electrolytes
Long Term Stability and Increase of Endurance of SOFC/SOEC Cathodes / Anodes / Electrolytes under Real Conditions



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12

Abbildung 8: Genehmigungsverfahren für H₂-Indoorbetankung
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Country Update Austria

(Research) Activities



Development of Simulation Tools for System Optimization
 High Resolution Measurement Systems for Hydrogen Propulsion Systems
 Real-world Analysis of Fuel Cell Vehicles
 Optimization of Energy Efficiency of Hydrogen Range Extender
 Control Strategies for FC Systems, CD Laboratory: Model based Calibration Technology
 Nanomembran - biomimetic proton conductive membranes with nanometer thickness
 Reactions in FC – Crystalline Materials for Ionic Conduction
 Elementary Processes like Oxygen Reduction and Hydrogen Oxidation
 Material Synthesis and Characterization, Chemistry and Physics of Surfaces, Electric Catalysis





21st IPHE SC Meeting Oslo, Norway 13

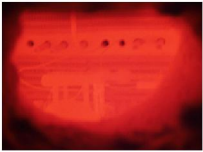
Abbildung 8: Genehmigungsverfahren für H₂-Indoorbetankung
 International Partnership for Hydrogen and Fuel Cells in the Economy



Country Update Austria

(Research) Activities

bioenergy2020+

Allocation of Gaseous Fuels
Processing of Fuel Gases for PEM and SOFC
Cold Processing for PEM
Hot Processing for SOFC
Trace Analysis and Chemistry for all Fuel Gases in all Application
Quality Control of Fuel Gases for all Applications
SOFC Test Bed for Heating / Electricity



21st IPHE SC Meeting Oslo, Norway 14

International Partnership for Hydrogen and Fuel Cells in the Economy

Country Update Austria

VISIONS of the FCH-Cluster Austria

Austria as **qualified Supply Country** for components, engineering services and development tools for FCH Technologies (AVL, MAGNA, MIBA, Plansee)

Niches for Austrian products and services in existing Partnerships (Toyota-BMW, Nissan-Daimler-Renault-Ford, Honda-GM, VW-Ballard,...) (AVL)

Development of the Hydrogen Technologies into a **Business Segment** (Fronius)

Capable HRS-Infrastructure and Demo Vehicle Fleets in Austria (OMV)

Austria as international accepted research partner for FCH-Technologies (HyCentA, TU Vienna)

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International Partnership for Hydrogen and Fuel Cells in the Economy


Country Update Austria


Power-to-Gas

- Strategy process for the FTI-Roadmap „*Power-to-Gas for Austria*“ under responsibility of bmvit.
- Partners from Austria and Germany are:

<ul style="list-style-type: none"> • DBI GUT • DBI GTI • ZSW Ulm • ZSW Stuttgart • DVGW EBI • TU Vienna • TU Graz • Virtual Vehicle 	<ul style="list-style-type: none"> • AIT • HyCentA • JKU Linz • Montanuni Leoben • Climate and Energy Fund • A3PS • New Energy Capital Invest • Air Liquide 	<ul style="list-style-type: none"> • APG • Biovest Consulting GmbH • Christof Group • ErreDueGas Austria • Fronius International GmbH • Österreichs Energie • Ökostrom AG • OMV AG 	<ul style="list-style-type: none"> • RAG • Verbund AG • AVL List • Axiom GmbH • EVN AG • FGW • Linde Gas GmbH • OÖ Ferngas Netz GmbH • Repotec
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21st IPHE SC Meeting Oslo, Norway 16

 International Partnership for Hydrogen and Fuel Cells in the Economy



Country Update Austria

Power-to-Gas

- Targets:
 - Promotion of R&D and technology innovation for P2G
 - Suggestions for Austrian Funding Programs
 - Integration of the mobility sector
 - Expansion of the topic to Power-to-Liquid
 - Expert Workshops

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