

The role of the IEA in Austrian Energy Research

Fuel Cell and H₂ RTD in Austria

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1. 4. 2004

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The energy research and technology concept – 6 priorities

- ➔ Bio-energy and hydropower
- ➔ Electricity supply systems oriented towards climate protection
- ➔ Sustainable buildings
- ➔ Industrial processes and concepts
- ➔ Energy efficient mobility
- ➔ Long-term climate protection technologies in international networks

Comparison of RTD expenditures

(Data for 2001, OECD/IEA 2003)

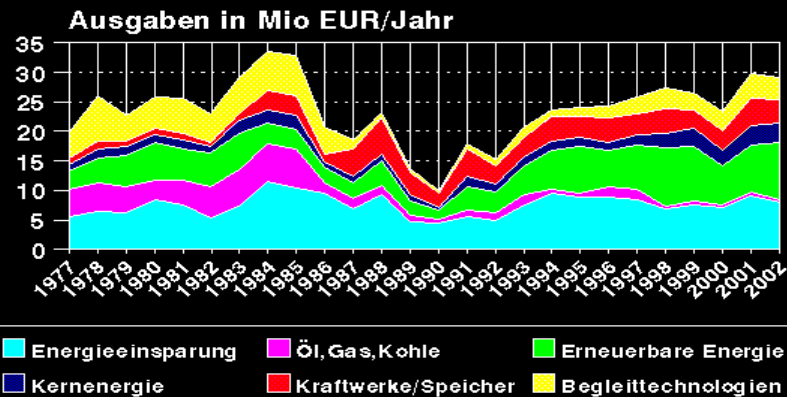
Country	% eff.	% RES	total mio. USD
France	2,67	4,08	423,66
Germany	8,07	24,10	280,16
Japan	16,62	3,74	3.423,37
USA	20,66	8,9	2.845,29
Sweden	40,46	31,34	80,18
Hungary	9,15	65,85	1,48

Comparison of RTD expenditures

(Data for 2001, OECD/IEA 2003)

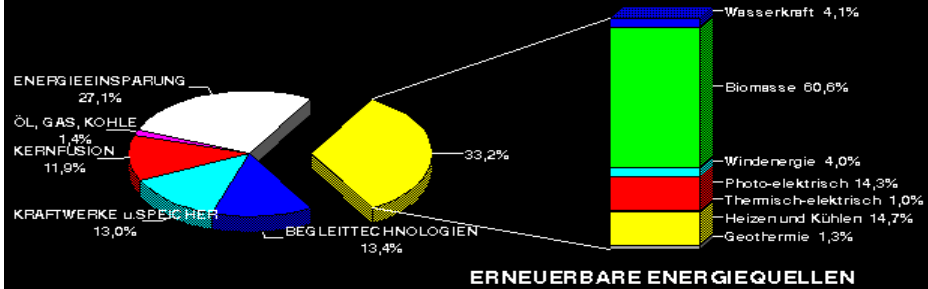
Country	% fossil	% nuc.	total mio. USD
France	7,65	83,11	423,66
Germany	5,98	43,28	280,16
Japan	2,07	70,22	3.423,37
USA	12,54	10,51	2.845,29
Sweden	0,17	5,87	80,18
Hungary	25,01	-	1,48

AUSGABEN DER ÖFFENTLICHEN HAND FÜR ENERGIEFORSCHUNG IN ÖSTERREICH 1977 - 2002



AUSGABEN DER ÖFFENTLICHEN HAND FÜR ENERGIEFORSCHUNG IN ÖSTERREICH 2002

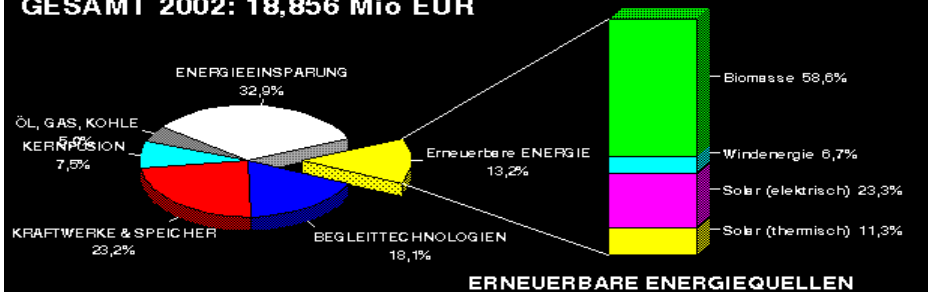
ANTEIL DER STAATLICHEN AUSGABEN in %



GESAMT 2002: 29,180 Mio EUR

RÜCKFLÜSSE AUS EU-FORSCHUNGSPROJEKTEN Themenbereich ENERGIE 2002

GESAMT 2002: 18,856 Mio EUR

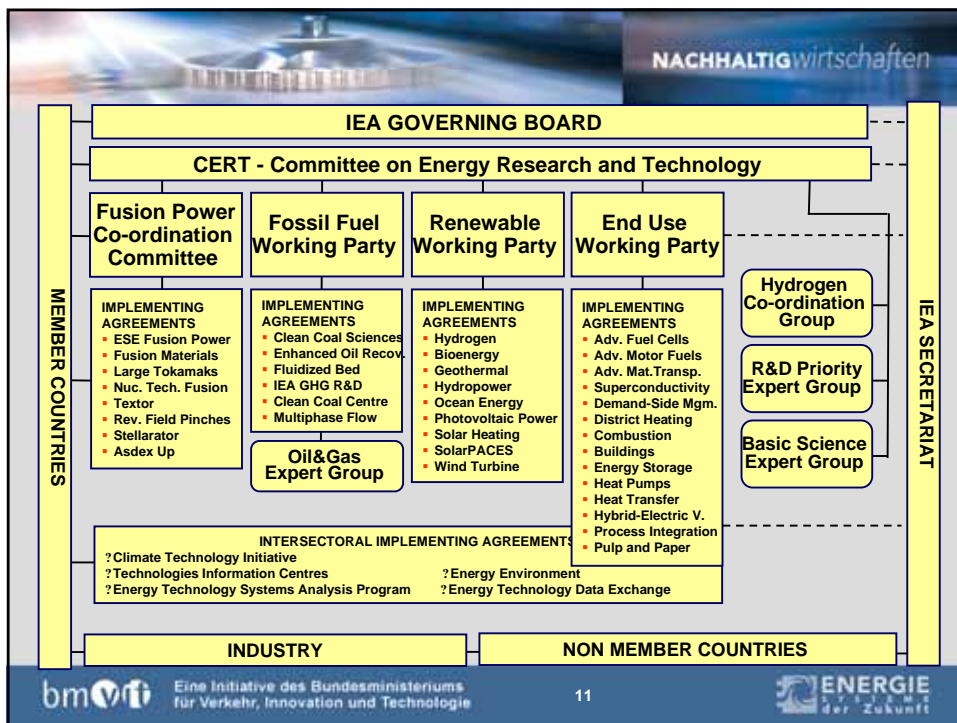


Goals and principles of the IEA

- ➔ To maintain and improve systems for **coping with oil supply disruptions**
- ➔ To operate a permanent **information system** on the international **oil market**
- ➔ To **promote rational energy policies** in a global context through co-operative relations with non-Member countries, industry and international organisations
- ➔ To improve the world's energy supply and demand structure by developing **alternative energy sources** and increasing the **efficiency of energy use**
- ➔ To assist in the integration of **environmental and energy policies**

Organisation of the RTD of the IEA

- ➔ **Committee on Energy Research and Technology (CERT)**
- ➔ **Working Parties**
 - Renewable Energy Technology
 - End-use Technology
 - Fossil Fuel Technology
 - Fusion Power Coordinating Committee (no austrian participation)
- ➔ **41 Implementing agreements, 13 with austrian participation**
- ➔ **Tasks, Annexes**
- ➔ **Expert groups**



NACHHALTIGwirtschaften

Implementing Agreements of the IEA

- ➔ IEA framework for international energy technology co-operation as regulatory framework
- ➔ „Contracting party“: IEA member countries, organisations, non member countries
- ➔ Sponsors
- ➔ Implementing agreement mechanism is flexible
- ➔ Cost have to be carried by participants (cost or task shared or combination of these two)
- ➔ Executive committee leads the implementing agreement

bm Eine Initiative des Bundesministeriums für Verkehr, Innovation und Technologie
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Task / Annex der IEA

- ➔ Implementing agreement as „umbrella“: countries / organisations can carry out tasks / annexes
- ➔ High flexibility at participation in a new task / annex
- ➔ New tasks / annexes can be started anytime
- ➔ „Operating Agent“ leads the task / annex

Benefits of the RTD of the IEA

- ➔ Stronger national RTD capacities
- ➔ Shared costs and pooled technical resources
- ➔ Avoided duplication of efforts and repetition of errors
- ➔ “à la carte“ – participation
- ➔ Good international contacts help to be successful e.g. with EU proposals
- ➔ Enhanced visibility of austrian RTD at an international level
- ➔ World wide cooperation (Japan, USA)

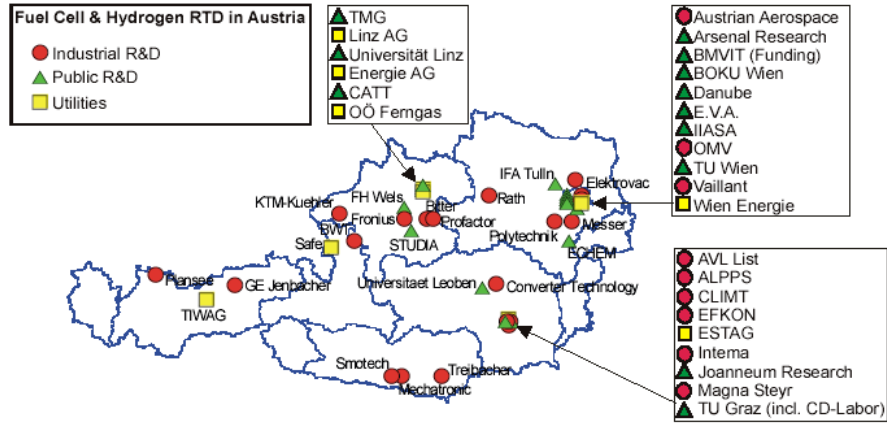
RTD of the IEA– guidelines for austrian participation

- ➔ National priorities are also priorities for IEA participation
- ➔ Goals for RTD policy
- ➔ High potential areas of austrian RTD
- ➔ Long term cooperation in selected areas
- ➔ Participation in interesting international developments at a top level
- ➔ Industry involvement
- ➔ Dissemination and cooperation

Overall Picture of H2 and FC RTD in Austria

- ➔ Since 2000, an increasing activity level of hydrogen and fuel cell projects has been noticed
- ➔ In 2003/2004 over 50 on - going RTD projects
 - including both H2 and FC activities
 - Including all different RTD programs and instruments (public, public / private, EU / international programs)
- ➔ Up to 7,5 Mio.€ in 2003 and 5,0 Mio.€ (> 7 Mio € expected) in 2004 were/will be spent for FC and H2 RTD
 - Including all different RTD programs and instruments (public, public / private, EU / international programs)

Fuel Cell and Hydrogen RTD in Austria



RTD policy in FC and H2 RTD (national)

- ➔ Formulation of an Austrian fuel cell strategy in 2001/02
 - stationary (incl. portables)
 - mobile applications
- ➔ Recommendations for an increased activity level in the fuel cell area were implemented in two RTD programs:
 - at:sd - (focus on stationary applications)
 - A3 - Austrian advanced automotive applications (focus on mobile applications)
- ➔ „Hydrogen as a future energy carrier“ will receive a national strategy by 2004

RTD policy in FC and H2 RTD (international)

- ➔ IEA Hydrogen Coordination Group (HCG) since 2003
 - Dr. Simader (E.V.A. – the Austrian Energy Agency) nominated as Austrian representative
- ➔ IEA Implementing Agreement Advanced Fuel Cells (AFC) since 2004
 - Dr. Simader as Austrian representative and Dr. Hacker (CD Laboratory for fuel cell systems) as alternate
- ➔ IEA Implementing Agreements Production and Utilization of Hydrogen – Austrian participation?
- ➔ Participation of BMVIT in the HYCO – Hydrogen Coalition project (ERA-Net on H2 and FC)

Strengths of Austrian Fuel Cell RTD activities

- ➔ Use of RES (biomass, biogas, PV / electrolysis) in fuel cell systems
- ➔ Demonstration projects concerning residential fuel cells (1 – 5 kWel PEFC and SOFC)
- ➔ Private / public start – ups in DMFC research activities (portables)
- ➔ Component development of high – temperature fuel cells (mainly SOFC)
- ➔ RTD activities for transportation and APU applications

E.V.A: activities in the field of fuel cells and hydrogen

- 1999/2000: dissemination activities for fuel cells including both stationary and mobile applications (workshops, studies, advice sessions, etc).
- 2001/2002: Formulation of the national fuel cell strategy for stationary and portable applications (on behalf of BMVIT)
- 1998 – 2002: Several studies and analysis for STEWEAG//ESTAG and OMV (concerning natural gas and fuel oil fuel cell systems)
- 2003/2004: National study on future hydrogen RTD in Austria (on behalf of BMVIT)
- IEA/EU expert organisation nominations:
 - Since 2003: IEA Hydrogen Coordination Group (HCG),
 - Since 2004: ExCO-Representative in the IA on Advanced Fuel Cells (AFC),
 - Since 2004: Nomination in the Mirror Group (EU H2 and FC Technology Platform)
- EU-Projects (5. und 6. FTE RP)
 - Hysociety (and HYWAYS) – Analysis of barriers for the introduction of hydrogen as future energy carrier in Europe,
 - SOFCnet – Analysis of the state of the art of solid oxide fuel cells (in cooperation with research center Jülich),
 - AMONCO – RTD activities concerning biogas fuel cell systems.

Christian Doppler Laboratory for fuel cell systems, Graz, University of Technology

The CD-Lab for fuel cell systems was installed in the year 2001 at the Institute for Chemical Technology of Inorganic Materials at Graz University of Technology in close co-operation with the industrial partners of the CD-Lab.

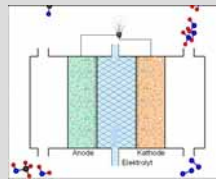
Main research areas:

- development and modelling of low temperature fuel cells
- hydrogen production

Contact person:

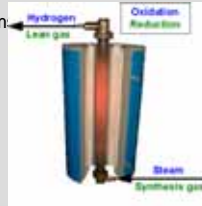
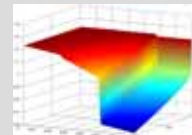
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DMFC with liquid circulating electrolyte

Voltage current characteristic of single cell



Test stand for gas purification

Further Information

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- www.nachhaltigwirtschaften.at
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- **Viktor Hacker**, CD laboratory for fuel cell systems, viktor.hacker@tugraz.ac.at, www.ictas.tugraz.at/cd_lab/