The Icelandic Energy & Hydrogen Policy

- Programmes & Progress -

Country Statement for the IPHE Steering Committee
September 2005
Kyoto, Japan

Baldur Pétursson, Deputy-Director
Ministry of Industry and Commerce

Gunnar Pálsson, Ambassador
Ministry for Foreign Affairs

Thorsteinn I. Sigfússon
University of Icelandn, Iceland Delegate ILC

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I. Policy and Programmes on Hydrogen

Historical Steps - Towards a Hydrogen Economy

Past 35 years Iceland has taken various steps towards the Hydrogen Economy

- 1970 Three decades of hydrogen research at the University of Iceland
- ✓1997 Governmental Committee on Domestic Fuel Production
- 1998 Political Statement on Hydrogen Policy
- 1999 New Energy, & the ECTOS project - co-operation with EU & Global Stakeholders
- 2003 The world's first hydrogen station built at a conventional filling station
- ✓ 2003 Testing of the operation of three hydrogen-powered buses commences
- 2003 Member of IPHE - The International Partnership for the Hydrogen Economy
- ✓ 2002-4 Ongoing Programmes & Projects / Committe on Hydrogen Policy, etc

Towards a Hydrogen Economy

Drivers of the Process

1. Energy

- Sustainable use of renewable energy
- Security and diversity of energy supply !

2. Climate

- Climate change challenges !
- Air quality and health
- Protection of the environment

3. Value

- Added value and opportunities
- Making the future by action
- Global - private public co-operation

Towards a Hydrogen Economy Policy of the Government

The Government's Policy has 5 aspects:

- Favorable framework for business and research
- International co-operation
- Hydrogen research and testing
- Education and training
- Ongoing policy formulation

Framework for Iceland as an International Platform for Hydrogen Research & Demonstration

Towards a Hydrogen Economy

- **The long term aim:**
  - **renewable hydrogen fuel replacing the fossil fuels,**
  - **as soon as it becomes economically possible**

Domestic Policy & Project Recent Actions

- Eliminating tariffs and taxes on hydrogen vehicles - as of spring 2005
- "Roadmapping" towards the Hydrogen Economy ongoing process in co-operation with stakeholders
- Hydrogen Technology Center - in preparation
- Development Towards - HYDROGEN CLUSTER

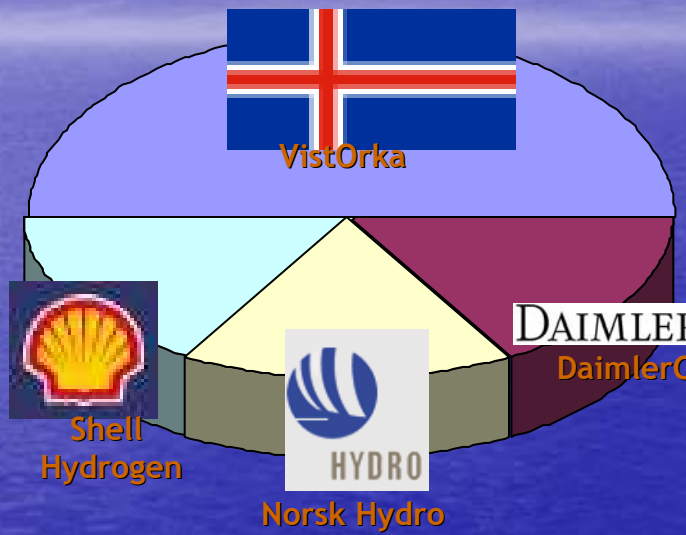
Towards a Hydrogen Economy
International Co-operation

Iceland - Global Co-operation

- ✓ **Member of the IPHE -** The International Partnership for the Hydrogen Economy
- ✓ **Member of the Hydrogen and Fuel Cell Platform in Brussel - EU**
- ✓ **Member of IEA, hydrogen**
- ✓ **Memorandum of Understanding between Manitoba and Iceland,**
- ✓ **Statement of Common Understanding for the Global Icelandic Hydrogen Partnership - between GETF in USA and Iceland**
- ✓ **The ECTOS Project,**
- ✓ **Euro-Hyport,**
- ✓ **HySociety,**
- ✓ **NORDIC ENERGY RESEARCH**
- ✓ **Nordic Summer School on Infrastructure**
- ✓ **Other projects with CEA France, Japan, United States**

II. Hydrogen Demonstration Projects

Icelandic New Energy:
Public- Private Partnership



Icelandic New Energy "Roadmap"

1. Fuel cell bus demonstration: ECTOS

Demonstration Programme

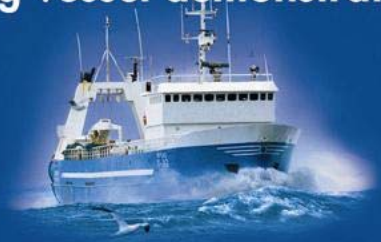
Gradual introduction into bus fleet

2. Fuel cell passenger vehicles

Demonstration Programme

Gradual introduction into passenger car fleet

3. Fuel cell fishing vessel demonstration



Demonstration Programme

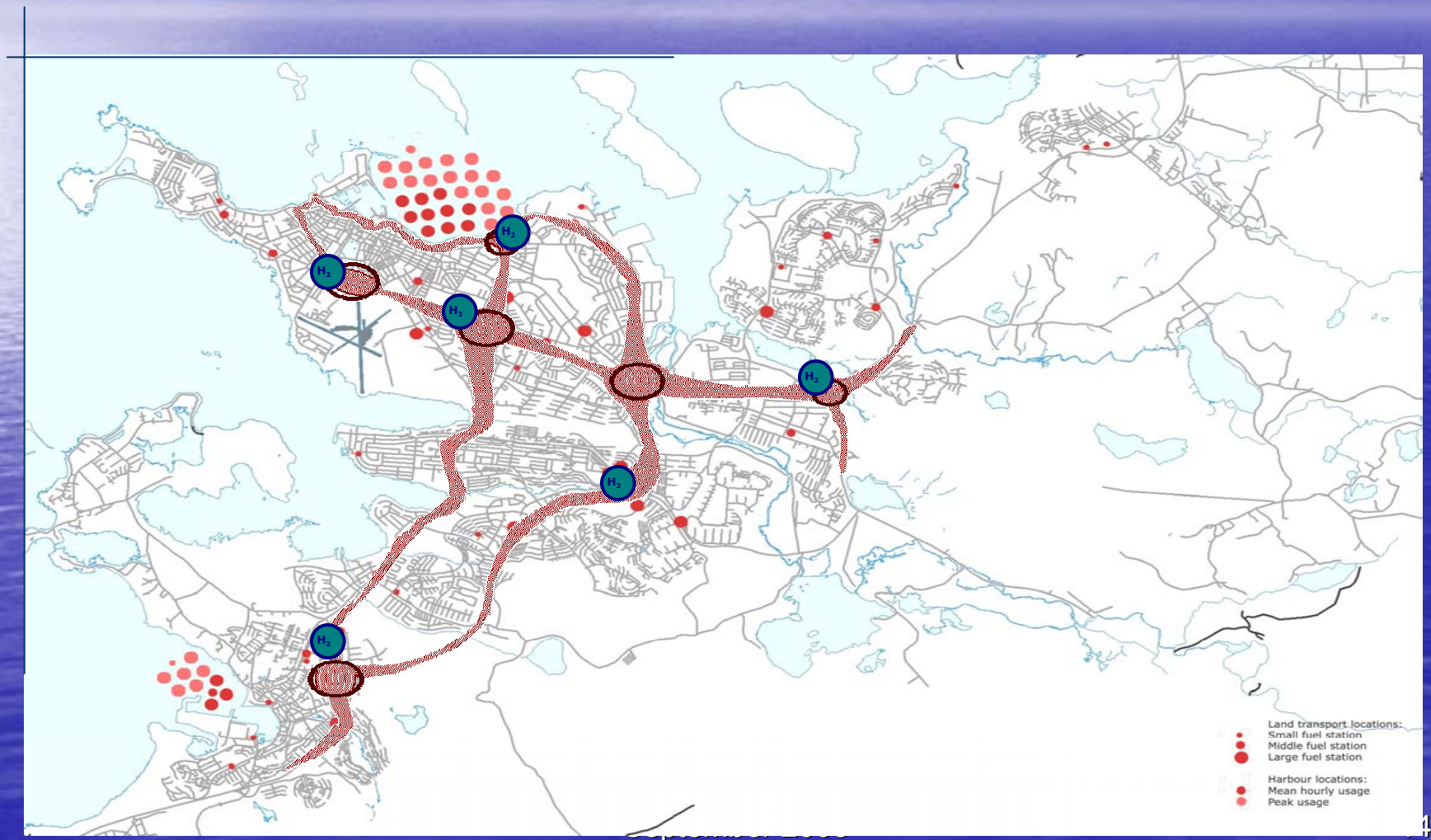
Gradual introduction into fishing fleet

2000 2003 Time

The ECTOS Project
The accomplishment to date

- Results are very promising
- Operation (as of August 31 (end of ECTOS) 2005)
  - 89.243 km to date
  - 5.216 operating hours
- Pumped 17.342 kg of hydrogen
- Saved over 58.000 l. of diesel / and more than 150 tons less greenhouse gas emissions
- Indication that there is over 90% of the public positive towards the new fuel
- ECTOS has been extended to 2006, as a “HyFleet CUTE” element

Hydrogen infrastructure
Options and possibilities by INE



Current project
Key activities

- ECTOS - bus & infrastructure demonstration
  - Preparation underway to extend for 1 year (HyFleetCUTE)
- EURO-HYPORT - education, infrastructure and export of H_2
- Storage of H_2
- Geothermal hydrogen
- Hydrogen passenger vehicles (ICEH_2 &/or FC)
- Market assessment of small fuel cells
  - Stationary application (trial at Keflavik airport)
- Social acceptance - Economics ((external) cost benefit, (NEEDS))
- Marine interest (NEW-H-SHIP)
- Hydrogen Energy Technology Center (in preparation)
- Infrastructure, etc. (HyApproval)
- Consultancy
- Education

Red = finished projects

Hydrogen Projects

at key Research institutions in Iceland

University of Iceland, University of Akureyri, Ice Tec, Power Companies, ISOR, etc.

- Fundamental research into metal hydride chemistry and physics
- Nanostructures and Hydrogen
- Geothermal Hydrogen: geothermally assisted Hydrogen compression using metal hydrides
- Hydrogen from vented H_2S
- SocioEconomic studies of H_2
- Bio Hydrogen
- Boro Hydrides
- Over a dozen graduate students in projects related to Hydrogen

III. Domestic / International - Education and Outreach

Education & Outreach

Domestically

Events on Hydrogen

- **Presentations for Schools and Colleges**
- **Conferences**
- **Educational Materials**

Education & Outreach

Internationally

- International focus needed to facilitate the transition to the hydrogen economy
- Iceland highlighting hydrogen in different regional and international fora

Education & Outreach

Hydrogen for Regional Co-operation

- **The Baltic**

  Hydrogen introduced in the Baltic Sea Region Energy Cooperation (BASREC)

- **The Barents Region**

  The Energy Working Group of the Barents Euro-Arctic Council has identified "implications of hydrogen development" as an area of interest for the region

- **The Arctic**

  The Arctic Council has recognized the relevance of hydrogen development for the Arctic and is following IPHE work

Education & Outreach

Internationally - Hydrogen at the UN

- **Briefings:**
  - **UN Permanent Missions and UN officials**
  - **UNDP**
  - **UNEP**
  - **DESA**

- **Increased awareness:**
  - **Secretary General's Report:** "Promotion of new and renewable sources of energy, including the culmination of the World Solar Programme, 1996-2005" - July 2005

Education & Outreach

Hydrogen Study Tours to Iceland

Organised by Iceland New Energy, University of Iceland, Ministries, Agencies & Embassies

- **Up to 2000 visitors from over 25 countries in the last two years, representing government, private business, institutions and organizations**
- **Over 200 visitors from the media**
- **IPHE ILC/EU Eduction and Training Task Force meeting**

Further Follow - up

- IPHE SC in Iceland September/October 2006
- Possible Symposium on Renewable Energy with particular focus on Hydrogen organised by Iceland, DESA and IPHE (?) back to back with IPHE SC
- Hydrogen side-events, possibly in connection with the 13th and the 14th sessions of the Commission on Sustainable Development (CSD)

Thank you