



# **The Icelandic Hydrogen Process**

**-Towards a Hydrogen Economy -**

**Country Statement for the IPHE Steering Committee  
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Vancouver, Canada**

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Vancouver, Canada



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# I. The Icelandic Hydrogen Roadmap



# The Hydrogen Process Basics and Elements

- **Why hydrogen economy in Iceland**
  - Part of the energy and environmental policy
  - Clean and environmentally friendly fuel
  - Abundance of renewable electricity
- **The Hydrogen Process**
  - Years of Hydrogen Steps
  - Strong Political Commitment
  - Public Private co-operation
  - Coordinate efforts of different stakeholders
  - Highlight hydrogen policy and action
  - Faster drive towards the hydrogen economy





# Towards a Hydrogen Economy

## Global/Domestic - Drivers of the Process

### 1. Energy

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

### 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:

- Favourable framework for business and research
- International co-operation
- Hydrogen demonstration, research and testing
- Outreach, education and training
- Ongoing policy formulation – the Roadmap

**Iceland - International Platform for  
Hydrogen Research & Demonstration**



# Main elements of the Roadmap

- **Hydrogen roadmap approach – five main elements:**
  - **Hydrogen demonstration and research**
  - **Hydrogen production**
  - **Hydrogen storage**
  - **Hydrogen infrastructure**
  - **Hydrogen conversion/application**





# The Roadmap – Demonstration

## 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





# Extended Hydrogen Demonstration & Research HyFleetCUTE

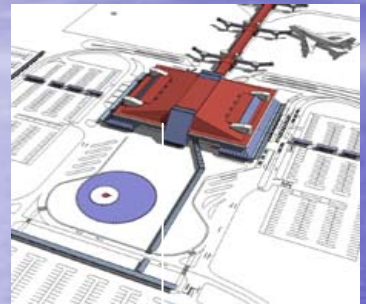
- Prolonging the CUTE/ECTOS demo - 1 year (end 2006)
- Hydrogen bus development project DaimlerChrysler (FCH<sub>2</sub> engines)- MAN (ICEH<sub>2</sub> engines)
- Next generation of H<sub>2</sub> buses, internal combustion from MAN & fuel cells from DC (1 vehicle)
- Information sharing on global bases
  - International cooperation and information sharing
  - With demonstration in Beijing, Australia, US, etc.



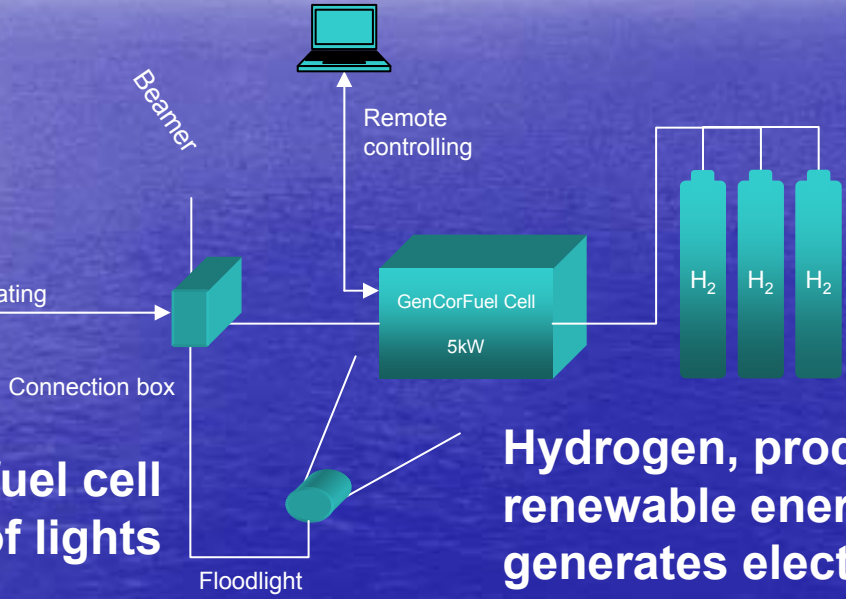
# Demonstration & Research

## Keflavik Airport - US<sub>e</sub> H<sub>2</sub> Backup

(US Army Corps of Engineers, Logan Energy, INE) 2005-



Power supply from the terminal for controls and heating



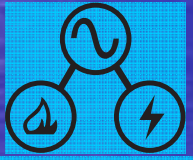
1 year demo  
Started Dec. 05

Electricity from the fuel cell powers different type of lights

Hydrogen, produced from renewable energy sources, generates electricity through the GenCore Fuel Cell



US Army Corps of Engineers  
Engineer Research and Development Center



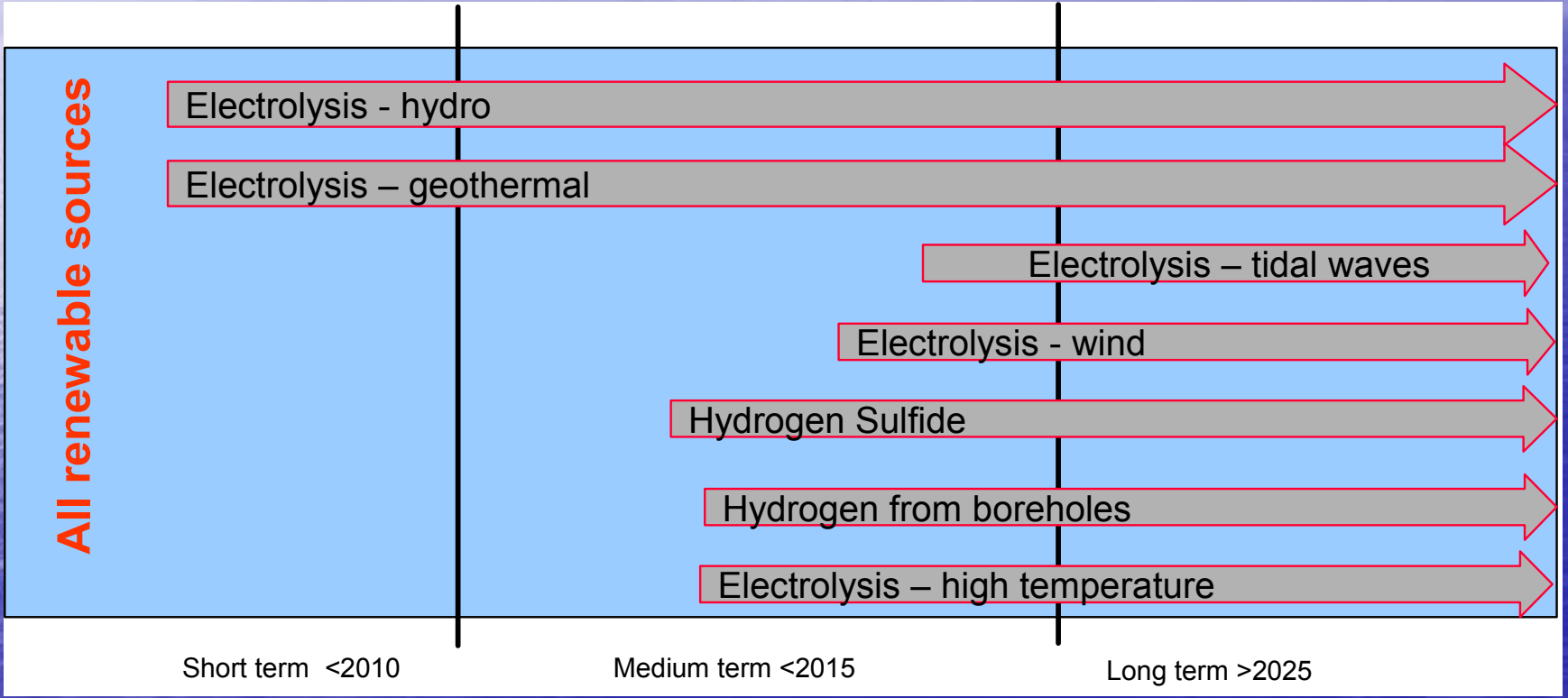
LOGANEnergy



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# The Revised Roadmap Hydrogen Production



## Basic elements

- **Abundance of clean renewable energy,**
- **Global development**

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# Hydrogen Infrastructure Options and Possibilities

## Building up infrastructure

- 1 H2 commercial filling station – up and running
- 5 additional H2 filling stations are discussed





# Roadmap Summary

## Roadmap work revealed:

- **Iceland specific challenges:**
  - H<sub>2</sub> production
  - Infrastructure
  - Research: Focused on optimal geographical solutions
- **Global challenges:**
  - H<sub>2</sub> storage
  - Conversion/applications
  - Research: Participation in domestic and global projects



# II. Domestic & International Outreach



# **Outreach**

## **Hydrogen Study Tours to Iceland**

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

- **Up to 3500 visitors from over 30 countries in the last two years, representing government, private business, institutions and organizations**
- **Over 400 visitors from the media**
- **Ten TV documentaries and uncountable interviews and articles have been published**
- **Larger groups coming to Iceland 2006**



# **Outreach**

## **Hydrogen Internationally**

- **Increase of international awareness of the hydrogen possibilities as a part of sustainable energy policies**
- **Active introduction of hydrogen as a theme of international and regional energy cooperation**
- **Cooperation with other countries and with the IPHE-Secretariat in this respect**
- **information on Iceland's sustainable energy policy and hydrogen distributed to embassies and missions abroad**
- **Formation of The North Atlantic Hydrogen Association**





# **Outreach Internationally**

## **Hydrogen at the – UN at the CSD Meeting**

### **New York, May 1 -12, 2006**

- **Energy is in Focus at the 14th session of the UN Commission on Sustainable Development (CSD-14), May 1 – 12, 2006:**
  - **CSD14 Theme: Energy for Sustainable Development; Industrial Development; Air pollution, atmosphere and Climate Change**
- **UN Department of Social and Economic Affairs (DESA) has indicated that CSD-14 is a good venue for getting focus on hydrogen within the UN system**
- **Iceland will introduce Hydrogen as a theme at CSD-14 in cooperation with DESA and the IPHE-secretariat through a Learning Center**



# **Outreach Internationally Learning Center on Hydrogen at the UN, New York, May 8, 2006**

**Theme:**

## **Renewable Hydrogen for a Sustainable Energy Economy**

**Presentations:**

- **Introduction to IPHE**
- **Introduction to hydrogen technology & development**
- **Hydrogen in Iceland**
- **Hydrogen for a sustainable development  
- China's experience**



**Outreach Internationally**

# **Learning Center on Hydrogen in co-operation with UN Reykjavík Seminar 28 Sept. 2006**

**Back to back with IPHE SC Meeting,  
Cosponsored by UN-DESA & IPHE - A follow-up to WSSD and CSD14**

## **Theme:     **Hydrogen Economy** **for Sustainable Development****

### **Topics:**

- **Progress and trend of hydrogen technology**
- **Challenges to advancing hydrogen economy**
- **Priority areas for international cooperation**
- **Strengthening and expanding IPHE-activity**
- **Participation of developing countries**

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***Thank  
you***

**The Hydrogen Journey Continues**