

# IceTec

A Step Forward for Iceland

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# Towards the hydrogen society

- Introducing IceTec as partner in hydrogen R&D projects -



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### IceTec's Vision.

- **Diversified research and knowledge centre.**
- **Progressive institute in selected fields of technology.**
- **Centre for innovation and investment capital that returns greatly added value.**
- **Centre for consultation and information services in the field of innovation.**
- **Centre for creating innovative growth and development in Iceland by providing services, consultation and knowledge transfer.**



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### Primary function is:

- research, both practical and theoretical
- to help ensure technological development and innovation in the economy
- to transfer technology and expertise to business and industry
- to assist companies in innovation, productivity and R&D



# IceTec

## A Step Forward for Iceland



IceTec, located at Keldnaholt, Reykjavik, takes part in developing the hydrogen society. Participation in research and development projects aiming for replacing the use of fossil fuel in Iceland with domestic renewable energy sources.

Among them are “Ectos” and “Borohydride production”



# ECTOS

## - Ecological City Transport System -

### Partners:

IceTec  
Icelandic New Energy  
Norsk Hydro  
Shell Hydrogen  
DaimlerChrysler  
Straeto bs  
University of Iceland  
Shell Iceland  
Vinnova  
University of Stuttgart

### The project:

The ECTOS project is a real scale demonstration where hydrogen fuel cell buses are for the first time operating in daily traffic by an ordinary bus company. Apart from the check up on technical performance there are also accompanying studies that look at economic, social and environmental issues.



# ECTOS

## - Ecological City Transport System -

### Background:



Iceland has the rare opportunity to operate a project, based on hydrogen fuel, in a next to zero CO<sub>2</sub> system. The hydrogen will be produced by electrolysis, where electricity is produced by geothermal steam turbines and hydropower.

# ECTOS

## - Ecological City Transport System -



The hydrogen busses are monitored during the test period, with regard to use of energy, noise and air quality.

IceTec evaluates the environmental effects

IceTec will deliver *Well-To-Wheel* study of the fuel production chain and participate in *Life Cycle Assessment*. Comparison is made with other fuels and their environmental impact.

The work is performed in close co-operation with other hydrogen projects in Europe.



**A Step Forward for Iceland**

# Sodium-Borohydride for storing hydrogen

## Partners:

IceTec  
Icelandic New Energy  
University of Iceland  
Millennium Cell, USA

The project is funded by  
the Icelandic Research  
Consul.

## The project:

IceTec has many years of expertise in renewable energy sources and geothermal industrial processes. Together with Millennium Cell know-how and experience with  $\text{NaBH}_4$  the partners are developing a geothermal production process for  $\text{NaBH}_4$  in Iceland. In addition to primary production of  $\text{NaBH}_4$  regeneration will be taken in to account, that is regeneration from  $\text{NaBO}_2$  to  $\text{NaBH}_4$ .





# Sodium-Borohydride for storing hydrogen

## Background

Scientists all over the world are constantly looking for new ways to store hydrogen in efficient and safe way.  $\text{NaBH}_4$  as a hydrogen storage is an interesting candidate, since  $\text{NaBH}_4$  solution is both non-flammable and non-toxic at ambient temperature and pressure.

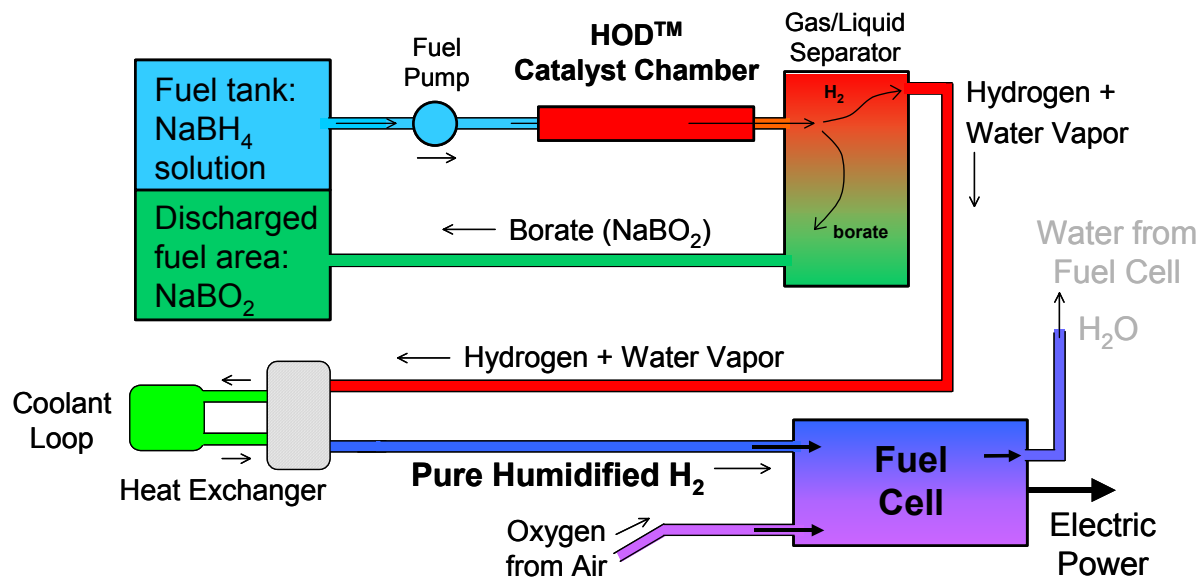


The use of geothermal energy in Iceland is a major factor in this project. The use of geothermal energy for production of  $\text{NaBH}_4$  is an efficient and environmental friendly process.

# Sodium-Borohydride for storing hydrogen

## Function:

Hydrogen generation from Sodium-Borohydride using “Hydrogen on Demand System™” from Millenium Cell is shown on the picture. The hydrogen is then used in a fuel cell to produce electricity.



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# Contact

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