

# Icelandic New Energy

## Newsletter 2007

*Dear friends and hydrogen interested parties!*

*Herby I send you our annual news letter about the Icelandic Hydrogen initiatives. As you have noticed I have been hesitant to send out any reading material since 2005 to all of you who are drowning in trash mails. But several people have contacted me and shown interest to hear more about our recent activities, and therefore I post it to you whereas you are on our postlist of interested partners. Its still just news, no sales mission.*

*Please let me know if you don't want to stay on our mailing list. The News letter will only be issued yearly.*

*Enjoy or trash!  
Maria Maack*



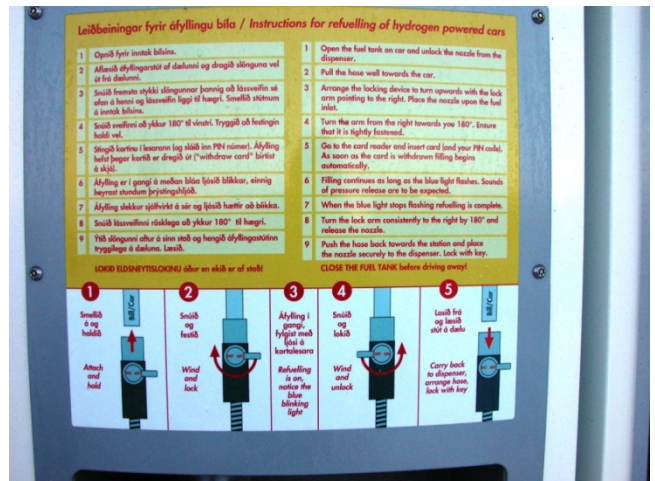
The year 2007 was eventful for the hydrogen community in Iceland, the highlights being the announcement of **SMART-H<sub>2</sub>** a new, ambitious demonstration and research project on a much larger scale than previous projects, and the receipt of the prestigious Global Energy Prize by Professor Þorsteinn I Sigfusson. However, the year began by the successful conclusion of a previous project, namely HyFleet:Cute a succession of ECTOS. As a preamble for the thoroughly and reopened as a liscenced public

hydrogen station. introduction of the vehicles the hydrogen station was inspected



*Two of the FC buses were dismantled and used in spare parts in other buses.*

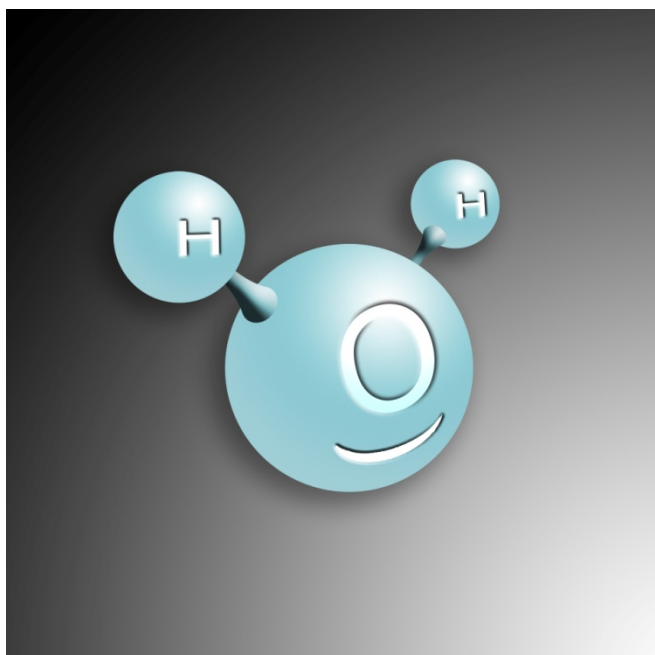
Contracts were made with Icelandic Hydrogen to provides an integrated fuel cell systems and small hydrogen distribution stations.



*The instructions for users on how to refill your hydrogen vehicle.*

INE is now implementing a facilitated market introduction of personal vehicles and use of hydrogen in marine vessels; the **SMART-H<sub>2</sub>**

## *SMART-H<sub>2</sub> or Sustainable Marine and Road Transport, Hydrogen in Iceland*



*We have begun using the water molecule to remind people that Hydrogen can be made from water and returns to its former state after carrying energy as hydrogen in fuel cells.*

*- Doesn't it make you smile?*

The SMART-H<sub>2</sub> has three main paths; testing hydrogen personal cars; designing and using fuel cell equipment as auxiliary power unit (APU) on board a ship and a research path based on the data collected in the bus project as well as the current demonstrations. Two small filling stations are also on the agenda, giving further opportunities for hydrogen filling in the University area and at the fishing port. VistOrka (a cooperation platform for hydrogen) will provide at least 3,5 million US\$ to the SMART-H<sub>2</sub>, a project with the total budget of 7-8 million US\$. The foreseen fuel and vehicle types are at least biogas from local landfills, plug in battery cars and plug in motor and space heaters for internal combustion engines, hybrids and imported ethanol. The goal is to run them at least for 18 months and use various brands from Europe, The USA and Japan. Introducing these 25 passenger vehicles means that the

customer group will change and the service requirements will differ from those when only providing hydrogen for buses. INE/Shell Hydrogen will offer hydrogen on a price that makes the fuel costs for driving a fuel cell car comparable to the costs that incur while driving a gasoline car. Within the SMART-H<sub>2</sub> it is also intended to increase the availability of H<sub>2</sub> in Reykjavik by adding dispensing locations.



*Elding the whale watching cruiser demon-strating a hydrogen auxiliary power unit.*

### *The FC system on the boat*

The Icelandic team is convinced that hydrogen can be one of the key energy carriers coupled with extensive use of renewable energy in the future and this new initiative will bring Iceland into a pre-commercial hydrogen society.

The Elding, a 125-ton, well equipped 150 passengers' cruiser and a stable ship, originally built in Iceland as a rescue vessel. The Elding will be used as a 'living laboratory' for the project; the prototype will be installed in real conditions and used to replace the current diesel auxiliary engine (which will still be onboard as back-up). The unit should generate electricity for all normal electricity demands of the boat.



*The space on board where the hydrogen Auxilliary Power unit is to be set up.*

The key components in the hybrid hydrogen auxiliary engine are a Ballard fuel cell, with lots of plugs and buttons, batteries, DC/DC converter and a monitoring and operation system. The goal is to come up with a reliable prototype hydrogen hybrid engine, prove the concept for classification and The APU hybrid system for the ship is based on a fuel cell module developed by H2Logic in Denmark and will contain a Ballard fuel cell stack. It will be a 10-15 kW system installed on a whale watching vessel operating from Reykjavik that can boost power with the aid of integrated battery system up to 35 kW on demand. The storage, monitor and venting system is designed in Iceland with the goal of putting the system under real test and understand the implications for a hydrogen system on the rough sea conditions in the North Atlantic and demonstrate the new engines advantage over current technology. The

goal is also to overcome barriers and evaluate in depth the market for the product.

### *The SMART-H2 vehicle path*

July 11th 2007 the first hydrogen vehicle was handed over to the first customers, two Icelandic power companies. The car was an A-Class fuel cell car, Mercedes Benz, and is used by two energy companies in their service fleets. The A-Class was followed shortly by 10 modified Toyota Priuses retrofitted by Quantum in California. Those are Hydrogen hybrid cars with integrated battery system but burn the fuel in internal comustion engines.



*Agusta Loftsdottir, head of the governmental alternative fuel committee, steps out of the first hydrogen personal vehicle in Reykjavik. This is an A-class that was delivered by Daimler to use within the SMART-H2 conditions.*

The vehicles are imported by Vistorka and leased to companies that are willing to use them in their service operations and fulfil the expected data collection. Icelandic New Energy acts as the project manager, facilitator and promoter and a go between the users and the equipment. Data formats, information to the public and promotion of the vehicles as well as sustainable transport policies is in the hands of INE. The drivers have to fill out formats on the user interface at the wheel and filling systems

but technical data is also collected with the aid of smart cards.

The hydrogen cars are used in service fleets and any member of staff at the municipality energy company and the national power company (Orkuveita Reykjavíkur and Landsvirkjun, respectively) can have training for operating the car and refuelling from the station and use the cars in their commute.



*The hydrogen station with the card reader and surveillance camera*

The Hydrogen station at Grjótháls that had been inaugurated in April 2003 as a pre-commercial testing station, was recertified for continuous operation and was officially announced open to the public in November 2007. This was achieved after thorough inspection by Framtak and Hydro Electrolysers after 4 years of quite successful operation. Instructions on careful filling procedures were designed and set up at the nozzle and a short training course held for eventual users. The instructions are in Icelandic and English and function with a smart-card reader that recognises the vehicle and asks for information before filling begins. If the handling is improper the station shuts down automatically but a surveillance camera helps the inspectors to follow events at the station.



*Hertz car rental in Iceland received a special award for its policy for offering lean fuel cars and hydrogen vehicles in their fleet.*

In November, the 10 hydrogen hybrid Prius cars retrofitted by Quantum in California were also leased to the power companies, Orkuveita Reykjavíkur and Landsvirkjun, and the Hertz car rental service. The participation of Hertz means that for the first time in the world the public can rent and use hydrogen vehicles. That is a very important step towards the future as public acceptance is an important factor in the creation of a new energy paradigm.



*During the coldest spell of the winter some performance difficulties arose in the Prius' cars, but after installing plug-in engine and space heaters the cars have been performing very well.*



*INE asked the registration office to set aside possible registration plates that begin with H2. By April 2008 the range H2 001 – H2 013 is already on the streets of Reykjavik, all hydrogen powered vehicles. Actually Jon Björn Skulason was also considering JB 007..*

### **People**

Hjalti Páll Ingólfsson, who had been working with INE since 2002 moved over to Icelandic Hydrogen, which was founded earlier by Hallmar Halldórs, the owner of Varmaraf. Their mission is to produce small hydrogen standalone systems. Professor Thorsteinn I Sigfússon, former co-chair of IPHE's ILC committee, was awarded the Global Energy Prize by the Russian president Vladimir Putin in February 2007.

The Icelandic team is convinced about the importance of fuel cells in transportation and as Professor Sigfusson, a board member of Icelandic New Energy (INE) stated when awarded the prestigious Globe International Energy Prize for his research “I’m having a platonic love affair with hydrogen and fuel cells”.

### ***Hy FLEET:CUTE successful***

The experimental driving of the three DaimlerChrysler fuel cell hydrogen buses in Reykjavik came to an end in January 2007. The support of EU for the project was of utmost

importance but INE decided not to pursue the continuation of the project, however, the University of Iceland is using some of the results as basis for comparison.

For four years the EvoBus/Daimler fuel cell buses, which were introduced in 2003, were operated successfully and safely in Reykjavik. It was simply too expensive to run the hydrogen station, rent a special maintenance bay, keep specialised staff and rent cleaning facility to clean these gentle giants for only three buses that had already given the lessons we were after. The refuelling station had delivered over 20 tons of hydrogen, to buses and for other hydrogen activities.



The learning from the operation has been of high value to all partners not the least on the system]s perspective and made the next step only a straight forward action based on good experience. Some results have already helped to improve the next generation of hydrogen buses, of which a new prototype is expected to be ready from Daimler in 2009. We wish that hydrogen buses will be integrated in the public transport system of Reykjavik in the near future on a commercial basis where as they have been proven reliable. For historic and educational purposes one of the buses is now on display at Skógar, museum in southern Iceland.

But the HyFLEET:CUTE is still going on in other countries such as Germany and China. If you want to read about the global hydrogen bus demonstrations then check out: [www.global-hydrogen-bus-platform.com/](http://www.global-hydrogen-bus-platform.com/) but news on other projects that INE is participating in are described on our home page [www.newenergy.is](http://www.newenergy.is)