



## ENERGY, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT



### Icelandic New Energy's 4<sup>th</sup> newsletter

**ECTOS: The Ecological City Transport System, EC 5<sup>th</sup> framework programme. In short: the fuel cell buses have passed all tests with flying colours. For details and publications attend the final conference for ECTOS Hy-Pro-Files 27<sup>th</sup>-28<sup>th</sup> April 2005 in Reykjavik. This newsletter adds a few more insights into the tasks within ECTOS. All former newsletters are to be found on our website.**

### Comparing fuel consumption

How do you ensure that a public bus is fully loaded with happy passengers during a fuel consumption test? First your excellent staff estimates how many pavement-tiles would correspond to the weight of 43 'average' passengers. Then you simply arrange these 75 tiles neatly on the floor (on top of cardboard sheets to prevent scratches) and then you invite 29 members of the association of elderly citizens to take a seat on that same bus and 29 to take a seat on a second hydrogen bus. With this arrangement nobody has to stand during the 90 min test-session and yet it is feasible to make a comparison between the fuel consumption of a fully loaded, half loaded and the third fuel cell bus, which drives the same route totally empty. Before the buses all set off to run on the selected bus route, driving one after another (called nose to tail arrangement), all the buses are

weighed on a truck scale for an accurate measure. And to ensure a nice atmosphere during the ride, representatives from bus company's choir joined the volunteers, accompanied by two guitar players and an accordionist.. There is actually very little difference between the hydrogen consumption of the three various weights. Details will be revealed on the conference HY-PRO-FILES.

### Passenger acceptance

IN the spring of 2004 three students from the University of Iceland conducted interviews with bus-passengers and people on the streets of Reykjavik. They posed questions like: what do you associate with the Hydrogen, have you noticed any difference in the noise in your neighbourhood since the hydrogen buses started to drive on route no 2 and whether people would be willing to accept a higher price for cleaner fuel. As in the survey made in 2001 the general attitude towards using hydrogen as the main fuel for vehicles and ships is very high; around 90% of respondents claim to have a positive or a very positive attitude towards hydrogen as a fuel for buses, boats and cars. The people in Reykjavik associate hydrogen with water, clean environment, less air pollution and domestic production rather than accidents or explosions. Also a majority claimed to be willing to accept 10 – 20% higher price for hydrogen during its introduction phases compared to gasoline. - Which is interesting, considering that fuel prices in Iceland are among the highest in the world (1,2€/liter).



Still the public claims not to have enough information about the opportunities that hydrogen technology offers. Women and youngsters are those who ask for more public information. The day before the Hy-Pro-Files conference we invite participants to discuss information and education about hydrogen and new demonstration or research projects. see [www.newenergy.is](http://www.newenergy.is) - Hy-Pro-Files.

**Hy-Pro-Files  
First Lessons & New Challenges  
April 27-28<sup>th</sup> 2005  
Reykjavik, Iceland**

Follow up of the 2003 ECTOS conference:  
Making Hydrogen Available to the Public  
For more information and registration:

[www.newenergy.is](http://www.newenergy.is)  
[camilla@icelandtravel.is](mailto:camilla@icelandtravel.is)

**Fuel cell cardboard buses will be one of the surprises handed out at the Hy-Pro Files. Made in Australia and flown in to Reykjavik, they were delivered by the same printer's shop that also made the STEP buses down under. CUTE! Eh?**





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### *Information for the public*

Most cities that participate in the CUTE project have tried to catch the public's attention to the fuel cell bus tests within their boundaries. In Reykjavik it is considered more exciting that the buses are fuelled by hydrogen rather than the new drive technology. The drivers offer small folders to the passengers at the entrance of the hydrogen buses, but people seem rather to be enthusiastic to try to ride the buses and form an opinion on their own.

Yet, teachers and students have shown growing interest and ask the office to provide more specific information on the hydrogen tests and permit to visit the maintenance bay and the hydrogen station.. The Web-page of Icelandic New Energy will undergo a face- lift soon. One of the novelties will be a section in Icelandic for teachers looking for material that fits interested students.

### *The Hydrogen station*

During the autumn of 2004 the hydrogen station underwent a thorough check-up and redesign. A few of the pipes within the electrolyser unit showed signs of stress corrosion and were changed to a higher-grade material. Norsk Hydro has 75 years of experience with atmospheric electrolysis-units for industrial applications, while the components in Reykjavik's station are made to work under pressure (11 -14 bar) resulting in different material requirements. The purpose of the participation of the partners in ECTOS is to learn about the performance of the technology and systems in a fuel station environment, and the up-grade of materials is part of these learning –from-experience-procedures..

The production was restarted 18th of December and in total over 9000 kg H2 gas has been filled on the buses in Reykjavik since Oct 2003. Skeljungur, the operator of the Reykjavik hydrogen station, has experienced higher than expected maintenance costs during their first year of operation. – (Details: HY-Pro-Files !).



### *Visitors at INE*

In the year 2004 INE had about 400 visitors that requested information about the company's projects. 2 TV teams came from Korea and the first delegation from China arrived in September, but a fuel cell bus project is about to be launched in Peking. INE participated in an Energy week sponsored by the USA in Manila, the Philippines. Several groups came from regions in Italy, to learn about the ECTOS project and the national policy. Around 300 international guests attended the University and INE's scheduled seminars about hydrogen in the year 2004. The Chancellor of Canada and the Bundespresident Rau asked for presentations about INE's projects during their official visits to the president of Iceland.

A few distinguished members of the environmental committee of the American Senate came in October to meet INE and the Icelandic government. Currently a small Fuel Cell project within the NATO-base in Keflavik is in the crucible.

### *The electrolyser in short*

Energy use: 4,8 KWh/Nm<sup>3</sup> Energy efficiency: 75-87% - Capacity: 10 – 65 Nm<sup>3</sup>/h – H<sub>2</sub> Purity; . 99,9% directly from Electrolyser - Oxygen directly from Electrolyser 99,8 After purification: H<sub>2</sub> 99,9998%. N<sub>2</sub> is used for purging before shutdown. The production rate can be adjusted and slowed down during times of low demand for hydrogen. The unit measures the same as a 20feet container. See further:

[www.electrolysers.com](http://www.electrolysers.com)



It can be hard on the back to work in the hydrogen sector. An ECTOS meeting was held in Stuttgart in October. On Saturdays' agenda was a football match in the German Liga between Stuttgart and Dortmund. To get the whole consortium to the stadium, INE's General Manager had to carry the environmental manager and experts from DaimlerChrysler brought the