

International Conference, Tuesday, April 12, 2005**"Hydrogen + Fuel Cells on their way to commercialisation"****Utsira - demonstrating the hydrogen society on renewable terms.****Knut Harg****Senior Vice President, Managing Director of Hydro, Electrolysers, Norway**

The presentation describes the Utsira project, the world's first full scale autonomous renewable energy system. This is seen in the context of Hydro's other research activities, projects and investments within new energy and hydrogen. The Utsira challenge is presented in detail, discussing lessons learned and how to meet the future with new technology developments.

Utsira, a wind swept island off the Norwegian coast is the site for a small energy revolution: 10 households with an annual average consumption of approximately 20000 kWh are supplied by renewable energy only - using hydrogen to store the surplus renewable energy generated by the wind turbines when there is plenty of wind. The project is a co-operation between the Norwegian energy and aluminium company Hydro and the German Wind turbine producer Enercon. The project, financed by the partners and Norwegian public funding, recently received the Platts Global Energy Award "Renewables Project of the Year".

The Utsira demonstration project is only one of many remarkable projects with renewable energy in which Hydro is involved. Hydro has a 100-year history in renewable energy and about 80 years in producing and handling hydrogen from electrolysis. The uniqueness of the Utsira project is that it is a full-scale test with real customers getting their entire energy supply either by wind power or by wind generated hydrogen.

The project equipment consists of two Enercon E40 wind turbines, each with a capacity of 600 kW. The highest peak power demand on the island is measured to be 900 kW. One turbine produces for the grid only, so that all islanders get most of their power from wind. The other turbine is connected to the stand-alone system, serving first the ten households, then the electrolyser if there is room for hydrogen storage, and then the grid. To stabilize the intermittent renewable energy, a flywheel with a 5 kWh capacity and a 100 kVA master synchronous machine are installed to balance and control voltage and frequency. In order to store the surplus energy a 10 Nm³/h Hydro electrolyser with a load of 48 kW, a 5 kW Hofer compressor and a 2400 Nm³ hydrogen storage pressure vessel are installed. This is sufficient to supply power for two days. To generate power when there is no wind, or too much, a MAN hydrogen internal combustion engine and an IRD fuel cell are installed.

Utsira is practically offshore - 1,5 hours with the local ferry from the nearest town three times a day - and weather conditions are often severe. This has required solid engineering and meticulous project execution. The wind turbines had to be installed before the autumn storms, and roads and a small port were constructed for equipment transportation. After start-up, the facility has been remotely operated from one of Hydro's inland power plant control centres.

The Utsira project has successfully demonstrated the feasibility of combining renewable energy and hydrogen in remote locations. This opens new opportunities for the application of electrolysers in future energy systems.

For further information please contact the organizers!

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