

Media release

Duebendorf, St. Gallen, Thun, 29th May 2012

Hydrogen as a fuel

Mobility without noxious exhaust gases

Hydrogen created using renewable energy sources is a form of power which could free us from our dependency on oil, gas and coal. When hydrogen is used to generate power it produces no CO₂ as an unwanted byproduct. Examples such as «hy.muve», a hydrogen powered communal cleaning vehicle, and post buses powered by fuel cell technology, both co-developed by Empa, emit only water vapor as exhaust gas and in addition are very quiet in operation. Room heating and cooking can also be performed using hydrogen – in Empa's energetically independent SELF living quarters, a hydrogen powered stove provides warm meals for the inhabitants.

At the end of May, in front of the Empa in St Gallen, three vehicles were introduced to the public: «hy.muve», a communal street cleaning vehicle, a fuel cell powered post bus and the «Self», living module, a kind of giant caravan in which the inhabitants live and work independently of external sources of energy. Common to all three systems is the fact that they use hydrogen as a source of power. The utility vehicle and the post bus use the gas to power their engines, and the self-sustaining living module uses its own hydrogen plant to generate the gas in summer, storing it in novel metal hydride tanks for heating in winter and cooking all year round.

Hydrogen powered vehicles are particularly suitable as city buses and for special purposes such as municipal cleaning machines which need to be able to work in pedestrian precincts or indoors in market halls, for example. The fuel cell, which is used to convert hydrogen directly into electrical energy, shines with its high-efficiency – above all under partial load conditions, which frequently occur during everyday use. A further advantage to their use in areas where there are many people is that hydrogen vehicles produced almost no noise. The current challenge they face is that to be categorized as "cleantech", the hydrogen used to power them must be produced in a way which is climate neutral, such as directly from solar energy. This is rarely the case today, but this topic is the subject of many research and development projects, including several at Empa.

A clean machine that cleans up –the «hy.muve» street cleaner

From 2009 until March 2012 the «Bucher Schörling CityCat H₂» hydrogen powered street cleaning vehicle, jointly developed by Empa, PSI and their industrial partners, underwent field trials on the streets of Basel. The project was intended to take hydrogen drives "from the laboratory onto the street", and to gain practical experience of using them under real-life conditions. The conclusions drawn from the pilot tests: using hydrogen as a fuel for street cleaning vehicles saves energy, is good for the environment and is technically possible. In April 2012 the test infrastructure and the vehicle were moved to St Gallen for further practical trials. During this phase of the project the primary aim is to carry on testing the vehicle under everyday conditions now that its teething problems have been sorted out, to accumulate operational experience and to investigate the ageing behavior of various components in the vehicle.

Hydrogen powered post bus

Postauto Schweiz AG is the first Swiss company to use buses powered with fuel cells for public transport purposes. In the region around the town of Brugg, in Canton Aargau, the transport undertaking of the Swiss Post is testing five hydrogen powered post buses. In operation during braking phases these vehicles also recover energy for later reuse. PSI and Empa are among the project partners involved, with Empa assuming a primarily consultative role during the trial phase.

Living and working independently – «Self», the energy-autonomous living module

Also open for viewing at Empa's site in St. Gallen was «Self», a state-of-the-art living and working module complete with a bedroom, bathroom and kitchen, which does not need external energy or water supplies. Empa and Eawag are using this module to investigate new building concepts and related cutting edge technologies. Hardly any aspect of «Self» is made with conventional technology – practically every constituent component is specially designed and conceived, including the building shell itself. The project is also using practical trials to investigate hydrogen technologies such as the synthesis, storage and utilization of hydrogen, for example for cooking and heating. The hydrogen is generated by electrolysis using electrical energy directly from environmentally friendly solar cells on the roof of the module. Until the gas is required it is stored in metal hydride filled containers, another novelty developed by Empa.

(<http://www.empa.ch/self> und http://tv.empa.ch/empa_tv_self_20100408.m4v)

Further information

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Images of the event can be downloaded from <http://www.empa.ch/bilder/wasserstoff/Anlass/>.

Further images of Self and the street cleaning vehicle hy.muve can be found here:

http://www.empa.ch/bilder/wasserstoff/Wasserstofffahrzeuge_Empa_25-05-2012





