

Advancing on hydrogen

European Commission

The 89 year old retired farmer, Francisco Muñoz Tierno, has moved to Soria, to the north-east of Madrid. He is one of the first to try a new pioneering vehicle. It is a prototype wheelchair powered with a hydrogen fuel cell. Such prototypes have been built as part of the European project "Hychain-Minitrans". The project will trial vehicles with pressurised hydrogen as an alternative fuel in real-life situations. The devices are to a large extent based on existing electric vehicles. The wheelchair is powered using two main components: a hydrogen energy system based on a fuel cell and a battery array.

The hydrogen fuel cell is a device that produces an electric current by allowing hydrogen to react with oxygen in the air. The system is straightforward and required no complicated conversion processes.

Using the hydrogen energy system for the wheelchair has three primary advantages: a longer travelling range than conventional electrical wheelchairs; it only takes a few minutes to replace an empty hydrogen canister rather than up to 8 hours to recharge an electrical wheelchair; and the lightweight hydrogen makes transportation easier.

Soria is a city already investing in wind and solar energy. It is one of the four regions in Europe being used by the Hychain project as a base for the development of hydrogen transportation networks. Another of these regions is Nordrhein Westfalen in Germany. What was once a former coal mine near the town of Herten is now a hydrogen technology centre. It is here that cargobikes, another form of hydrogen-powered transportation, are being developed. These are lightweight bicycles used for transporting cargo and are being tested by a local telecommunication company.

Hydrogen power can also be used for larger vehicles. The bus line No. 266 in the nearby town Bottrop is run using a hydrogen-fuelled bus that produces no greenhouse gases and is much more quiet without the noise of the combustion engine. However, according to the bus driver, it is not the smoothest of rides and it can be noisy for those inside the bus. Instead of relying on exchangeable canisters of hydrogen, the bus has a gas tank that can be refuelled at particular service stations within the town. But before hydrogen can be used as an alternative, the necessary infrastructure for distribution must be created, including the installation of hydrogen pumps at service stations.

These prototypes are only designed to be driven inside cities. Since they have a range of 100-120 kilometres they would be of very limited use for travelling between cities. Besides, with a maximum speed of 50 kilometres per hour, the vehicles are not fast enough to be operated on highways.

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Unfortunately the production of the hydrogen itself is not yet so environmentally friendly and normally involves the use of hydrocarbons. It is hoped that a greener production method will be possible in the near future. One possibility may be the solar-powered electrolysis of water. But, excluding its production, the employment of hydrogen means no greenhouse gases or pollution, in fact the only by-product of the hydrogen reaction is pure water.

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