High-tech hydrogen scooter designed to sell clean technology

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The Fhybrid scooter can be powered by hydrogen. Apart from being environmentally friendly, it also performs better than conventional petrol-powered scooters. Credit: Crijn Bouman

An Industrial Design Engineering graduate from Delft University of Technology in the Netherlands has designed and built a working prototype of a scooter, which can be powered by hydrogen. Crijn Bouman, who graduated for his Master's degree with credits, designed the Fhybrid scooter for the purpose of fighting pollution in inner-cities.

The scooter has an electric in-wheel motor that derives its power from a (Li-)ion battery. This battery (primarily when the scooter is stationary) is charged by a compact fuel-cell system, which derives its energy from hydrogen (from a tank) and oxygen (from the air). The battery moreover stores up energy when the scooter brakes. Depending on the amount of traffic, this so-called regenerating braking system reduces the hydrogen consumption by 10-20 percent. To use the energy generated during breaking optimally, the scooter is front-wheel driven.

Apart from being environmentally friendly, the Fhybrid performs better than regular petrol powered scooters during test drives. The Fhybrid has a top speed of 65 km/ph, accelerates faster than regular scooters and can travel approximately 200 km on a full tank of hydrogen. An additional feature is the parking assistant. The electric engine can be very precisely controlled when travelling at low speeds, enabling the driver to park backwards or forwards without having to push the entire scooter into place.

The Fhybrid is designed to be hydrogen-powered, but for now the prototype is powered by batteries, with the help of a fuel-cell simulator that was specially designed for this project. "A special course and various permits are required to build a hydrogen-powered engine. It wasn't possible to achieve this during the time period of my graduation project", Crijn Bouman explained. "The faculty is now trying to assemble all the necessary means to fully develop the hydrogen-powered scooter."

The Fhybrid's complete drive system and energy management system were built by Epyon, a TU Delft spin-off company, of which Bouman is one of the founders, and in partnership with the Delft Design Institute.

Source: Delft University of Technology