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## Segway's new way

### THE PERSONAL TRANSPORTER MEETS THE HYDROGEN ECONOMY

Hydrogen Hybrid Mobility is a start-up company in a niche market that gave away its first two products. Not much of a business plan.

Now, USC professor John Weidner and engineer Chuck Holland have plans for the next phase of the business that will sell their products and grow the company.

H2M modifies the standard battery-powered Segway personal transporter to run on a fuel cell that uses hydrogen stored in a canister.

The fuel cell extends the Segway's range by several hours. One hydrogen canister increases the range by roughly a third, Weidner said.

"So if you have three of those (canisters) on board, you have double the range of the battery. Instead of being out for three or four hours, you can be out for six or eight hours," he said.

The niche that Hydrogen Hybrid Mobility is going after is small, mobile devices, like wheelchairs or scooters. The company is part of the USC Technology Incubator, which has helped devise and refine a business plan.

The first two Segways were acquired as part of the Greater Columbia Fuel Cell Challenge to demonstrate a relatively good, low-cost way of using fuel cells for transportation, Weidner said.

With \$50,000 in funding from the challenge, Weidner and Holland bought two Segways from a dealer in Greenville.

The fuel cell and the hydrogen fuel canisters were purchased from Jadoo Power Systems. Weidner and Holland integrated the two systems.

Jadoo, a California company, was already involved in the fuel cell challenge, and one of its products turned out to be a nice fit for the Segway, Weidner said. "We just had to come up with the housing to mount it and to hide the electronics," he said. That job fell to Holland.

Their original fuel-cell-powered Segways have been donated to the Columbia Police Department and to USC. They were seen in the Columbia Christmas parade. Cocky rode USC's Segway during the Kentucky game in October.



USC engineering staffer Charles Holland demonstrates a hydrogen fuel cell-powered Segway. USC engineering professor John Weidner and Holland have launched a start-up company, Hydrogen Hybrid Mobility, to use hydrogen fuel cells to power forms of personal transportation such as Segways, scooters and wheelchairs.

But donating products doesn't make a business.

Weidner and Holland have applied to Phase 2 of the Greater Columbia Fuel Cell Challenge with a plan to build more fuel-cell-powered Segways, this time to sell. The phase 2 awards are expected to be announced in January.

They are asking for money to cover half the cost of six Segways. The sale of the machines after they are converted would cover the other half. Phase 2 also would include a marketing study to help determine potential customers.

"A preference would be that these six would stay in Columbia, but we have gotten a tremendous amount of interest from the various Segway dealers," Weidner said.

Weidner and Holland have also been contacted by tour operators who use Segways.

"One company out of Charlotte said that if they could get hydrogen capabilities on their Segways, they could get three tours a day, instead of the normal two with battery-powered Segways," Holland said.

Weidner would like to have similar tours in Columbia, at least during the National Hydrogen Association meeting in 2009.

Increased productivity is the selling point for companies adopting the fuel-cell-powered Segways, which are pretty pricey. Each one costs about \$5,000 before it is modified for a fuel cell, Weidner said.

But recharging or changing out batteries is down time that is not productive.

Potential markets would include warehouse operators, law enforcement and airport operations, Holland said. "Any work environment where a Segway is used, the hybrid would make sense," Weidner said.

Right now the company involves just Weidner and Holland, and the two "still like their day jobs," Weidner said.

As Hydrogen Hybrid Mobility grows, they are going to need help. "Our company is not locked into Segways," said Holland, a chemical engineer who works for the College of Engineering and Computing. "It is all small, portable vehicles."

The two also want eventually to build their own fuel cell for the Segway, Weidner said.

That is a quantum step, "but if we get enough orders to justify doing it" and "if we got some partner, that would really make an exciting fuel cell market for Columbia."