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HyPower Announces Research Partnership with Middle Tennessee State University; Focus on Hydrogen Plug-in Hybrids

3 April 2007

HyPower Fuel has entered a research alliance with Middle Tennessee State University (MTSU). Through this alliance, HyPower Fuel and MTSU will jointly fund Dr. Cliff Ricketts' research into series-configuration hydrogen plug-in hybrid vehicles (PHEVs). Dr. Ricketts last week agreed to sit on the HyPower Fuel Scientific Advisory Board.

HyPower currently produces the Hydro Power Pak (HPP)—a retrofit hydrogen generation and injection device developed for use on tractor trailer rigs and stationary diesel engines to improve fuel economy, reduce emissions and increase engine performance and horsepower. The HPP electrolysis unit draws less than 10 amps of the engine's electrical current to produce a small amount hydrogen and oxygen, which is then injected into the combustion cycle. (Earlier post.)

HyPower is developing what it calls the H2 Reactor (H2R) hydrogen system—an on-board electrolysis unit that it claims will produce sufficient hydrogen on-board, on-demand to fuel a combustion engine. (Earlier post.) HyPower claims that the electrolyzer is 2 to 2.5 times more efficient than current competing technology.

Dr. Ricketts was one of the witnesses testifying in 2006 before the US House Science Subcommittee on Energy on the prospects for plug-in hybrid electric vehicles. (Earlier post.) While his focus for the shorter term is flex-fuel plug-in hybrid vehicles, he is interested in the development of hydrogen-fueled plug-in hybrids. He is also a 15-year holder of the Land Speed Record for a hydrogen vehicles at the Bonneville Salt Flats.

> *This research partnership will ultimately result in a number of high-profile demonstrations of a vehicle powered by hydrogen within the next eight months. At the conclusion of this first partnership period, our team will also endeavor to set a new land speed record by a hydrogen powered vehicle at the Bonneville Salt Flats in Utah.*
>
> —Cliff Ricketts

Ricketts is currently developing a hydrogen hybrid conversion of a Nissan pickup truck. The truck has about a 70-mile range on batteries alone, and Ricketts is working on a hydrogen combustion engine range extender that would add another 70 miles to the range.

Ricketts uses a 10 kW solar power unit to generate electricity that is then "banked" through the Green Power Switch program with the Tennessee Valley Authority (TVA). When the battery pack of the electric hybrid truck is grid-charged, the kilowatts used are counted through another meter. In other words, the electricity is taken from the bank and an immediate balance is also available by comparing the difference in the input meter and output meter. The "plug-in" component of the hydrogen/electric hybrid truck uses approximately 1 kilowatt per mile.

Similarly, he uses the banked electricity to power a Proton 40 electrolysis unit for the production of hydrogen to power the combustion engine range extender. In his testimony before the House committee, Ricketts said:

> *Please note that both the electric component of the truck and the hydrogen component of the truck could be powered directly from the solar unit. However, approximately 90 percent of the electricity produced would be lost. By banking the electricity through the grid, the solar unit is working and saving any time the sun is shining and somewhat when it is cloudy. Time has not permitted energy cost calculations as of today.*

Resources:

- Testimony of Dr. Ricketts before the House Committee (May 2006)

From the Dashboard
Audi Showcases Euro-5 V12 Passenger Diesel in Q7 Study

Three BLUETEC Tier2 Bin5 Diesels Shown at Detroit

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There is no such unit as "kilowatt per mile". It's like saying "horsepower per mile" (1 hp = 0.746 kW). The appropriate unit is kilowatt-hour, kWh.

1 kWh/mile is not very impressive if it is in addition to diesel fuel rather than in lieu of it.

Posted by: Engineer-Poet | Apr 3, 2007 5:03:34 PM

A guzzler is a guzzler.

A gas guzzler (10 mph) pick-up simply became an electrical energy guzzler (1 KWh/mile) instead of (0.25 KWh/mile) for a plug-in Prius. Nothing new here.

Large pick-ups (ICE, PHEV, BEV or Hydrogen) are NOT ideal personnal transport vehicles.

Posted by: Harvey D. | Apr 3, 2007 5:47:06 PM

I agree with harvey. this hydrogen-truck-electricity-wasting monstrosity is indeed a terrible way to spend electricity and money...however, it is an excellent platform for research on this topic, because it opens more doors to see what is possible. if a terribly heavy inefficient truck can do it, and they figure out a way to make it far more efficient, just imagine what a hydrogen yaris could do...or a hydrogen smart? but it starts here, with this painful fact of life. people drive the wrong machines because nobody slapped them on the hand when they were younger.

my personal opinion (in case you all didn't already know) is that we need to develop hydrogen, but not at the detriment of accellerated development of other technologies (PHVs, NGVs, etc.)...iceland is one of the only countries in the world who can realistically implement a truly green policy, but then they're possibly the only country in the world with a nearly infinite stable source of zero-emission electricity. geothermal. last i heard they were going 100% green by 2015.

Posted by: Tim | Apr 3, 2007 5:57:01 PM

...forgot to mention why iceland's energy source is so important. as we all know, to make hydrogen--the only way we know how so far--you have to have tons of electricity. so, unlimited geothermal energy=unlimited means of H2 production, and that without a drop/chunk/blob of fossil fuels.

Posted by: tim | Apr 3, 2007 5:59:53 PM

The HPP already being made seems to fit well with the Ford Australian H2 engine research discussed last week.

Injecting minute amounts of H2 to improve ICE ignition and burn seems very promising and near reality.

At least in tests there are significant power increases and pollution goes down.

As to the other (H2R) venture. I have no expectation that H2 will ever be a commonly used main fuel in ICEs - the H2R effort strikes me as really intended for another purpose.

Posted by: K | Apr 4, 2007 1:23:58 PM

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