Getting a Lift from Hydrogen

In the broad world of energy efficiency, ‘hydrogen’ is such a buzz word that it’s “buzz” of speculation has become more of a deafening roar–think a swarm of giant killer bees, all carrying killer bees on their backs.

Hydrogenics and LiftOne join forces to power a forklift with a hydrogen fuel cell. The vehicle should be able to refuel in minutes, as opposed to the hours it would take to recharge a battery.

The idea of hydrogen, in fact, shows so much long term promise that fuel cell research and development money has been flooding the market, and spares no vehicle application. So it comes as no surprise the recent announcement by NYSERDA (New York State Energy Research and Development Authority) to contract Raymond Corp. (Greene, NY) to do a little research.

A "Living Lab"

According to a recent Raymond press release, the $750,000 contract begins in 2007, where Raymond’s Greene, NY facility will become a “living lab,” with hydrogen fuel cell powered Raymond forklifts in the facility. Raymond will also develop the necessary infrastructure for indoor fast-fill hydrogen refueling systems, which represents new technology, since refueling systems up to this point have typically been installed outdoors.

“The goal of the program is to study the performance of hydrogen fuel in electric forklifts and to demonstrate the safety of a hydrogen-fueled forklift environment,” says the release. “Expected outcomes include a working indoor refueling system that meets all required code and standard requirements, and documented best practices for the design and application of indoor refueling systems.”

Race to the Finish

Raymond is not alone in this technological race: Recently Hydrogenics Corporation, a designer and manufacturer of hydrogen and fuel cell systems, and LiftOne, a division of Carolina Tractor, have received an award to assist in the deployment of

hydrogen fuel cells in forklifts at several manufacturing facilities in South Carolina.

Raymond has recently been contracted by NYSERDA to turn their Green, NY facility into a “living lab” to monitor the performance of hydrogen-powered forklifts.

This project is an initiative of The Greater Columbia Fuel Cell Challenge which, explains a recent Hydrogenics press release, is in support of Columbia’s efforts to become a center of expertise in the development of fuel cell hybrid technology for the use in the manufacturing and distribution sectors. Says Hydrogenics VP of business development, John Werderman, “The South Carolina Fuel Cell Challenge project that we are doing together is a great way to initiate our relationship, and at the same time develop a market by having forklift fleet operators experience the benefits of fuel cells, firsthand, in real-time operations.”

“LiftOne has engaged and received acceptance by several prominent manufacturers and distributors in the greater Columbia market areas to demonstrate the advantages of Hydrogenics HyPX Fuel Cell Power Packs in class 1 lift trucks furnished by LiftOne,” the release goes on to say. “The deployments are expected to begin in late spring, 2007, and to be completed by November, 2007. In addition to this new initiative, Hydrogenics will be commencing a two year deployment of 19 forklift trucks this summer at General Motors of Canada in Oshawa, Canada.”

Hydrogenics boasts performance gains due to its functional subsystems, which offer benefits like quiet operation, fuel efficiency, and dynamic power response. According to company literature claims, “approximately five minutes at a hydrogen dispenser is all that is required for an operator to refuel a HyPX Power Pack, providing full performance power for at least an eight hour shift.” In addition, “one hydrogen dispenser serves 20 lift trucks and allows the elimination of battery recharging infrastructure, dramatically reducing facility space and other overhead costs.”

Toyota's prototype FCHV-F generates zero carbon dioxide emissions, and should be available within the next several years.

"Hydrogenics has always driven its business strategy from a position of working with viable fuel cell markets that present themselves today," Werderman says. "The awareness is sinking in that when it comes to mobility applications, this exciting new technology first makes commercial sense in certain niche markets in particular, indoor multi-shift material handling operations. This is where Hydrogenics is working with key market players, such as LiftOne, and seeing real promise."

Next Phase

Toyota also made headway in recent weeks, unveiling the first prototype of a fuel cell lift truck in the industry. According to a recent release, using hydrogen as its main power source, the Toyota FCHV-F produces electricity without combustion and generates zero carbon dioxide emissions. Overall operating costs are reduced due to less fuel consumption and lower maintenance.

Maintenance is significantly lower than electric lift trucks, whose batteries must be periodically charged, refilled with water and replaced. In addition, the fuel cell hybrid system ensures constant power delivery and performance, eliminating the reduction in voltage output that occurs as batteries discharge.

Again, the distribution centers seem to have the most promise in terms of vehicle application, since they often run their lifts nearly 24 hours a day. According to Toyota, they plan to bring their fuel cell lift truck to the market within the next few years.

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