

# COLDFACTS

CONNECTING A VITAL INDUSTRY JANUARY-FEBRUARY 2011

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Refrigerated warehousing and logistics professionals agree that today's warehouse management systems are critical to their operations

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# A HOT ITEM IN THE DEEP FREEZE



## FORKLIFTS POWERED BY FUEL CELLS CAN SAVE ENERGY AND IMPROVE EFFICIENCY IN REFRIGERATED WAREHOUSE OPERATIONS

BY SANDRA CURTIN

**F**uel cell-powered forklifts are taking off in a big way, providing a host of cost, performance, and productivity benefits over existing materials handling technologies. Fuel cells are especially well-suited to refrigerated and freezer operations, a fact that has been recognized by several well-known companies. Here's why:

- Fuel cell technology delivers constant power to forklifts throughout the shift. No performance lags, as when a battery's charge decreases.
- Operator downtime is eliminated. No need to swap the power source – just fuel up the tank and go for the entire shift.
- Warehouse productivity is increased because fuel cells run up to three times longer per fill-up than battery-powered units.
- Refueling is accomplished in just minutes using a fuel pump and dispenser that provides hydrogen or methanol fuel, depending on the fuel cell's manufacturer and design.
- The infrastructure for fueling is small compared to batteries, allowing recovery of valuable warehouse space – no need to invest in battery swapping and charging equipment, extra batteries and battery storage, and personnel dedicated to this task.
- Fuel cell forklifts are “grid independent,” so there are no added electricity costs.

- Fuel cells have demonstrated an ability to meet or exceed performance requirements in sub-zero temperatures, an environment that can be challenging for battery technology. Walmart was an early fuel cell convert. In 2005, the company tested hydrogen fuel cell-powered pallet trucks at distribution centers in Missouri and Ohio and, in 2007, ordered 55 fuel cell-powered pallet trucks to replace lead-acid battery units at a food distribution center.

Walmart Canada opened its first sustainable refrigerated distribution center in Alberta in 2010 that is 60 percent more energy-efficient than Walmart's traditional refrigerated distribution centers. The site features 60 Crown Equipment lift trucks fitted with Plug Power GenDrive™ fuel cells and is Canada's first fuel cell-powered lift truck fleet.

In 2009, Central Grocers chose fuel cells over lead-acid batteries to power its forklift fleet at a new distribution center in Illinois. This eliminated the need for capital investment in an electric changing infrastructure, since the entire fleet – 220 units – operate using Plug Power GenDrive™ fuel cells fitted onto Yale pallet and reach trucks. Twenty-five of the purchased forklifts are “Freezer” units capable of operating at sub-zero temperatures. The company anticipates using fuel cell power will lead to a savings of \$1.5 million over 10 years.

Sysco Houston deployed new fuel cell-powered pallet jacks and Reach-Fork® trucks at its new, high-efficiency



distribution center. Seventy-nine Plug Power GenDrive™ Class-3 fuel cell power units, fitted onto Raymond forklifts, were placed in service in January 2010. Twenty-five of the forklifts are used for sub-zero freezer operations. An additional 26 GenDrive™ Class-2 power forklift units were added to Sysco's fleet in June 2010.



To date, Plug Power has over 175 fuel cell-powered forklift trucks specifically operating in sub-zero customer locations, with over 165,000 total hours of

operation for these units in the cold environment. The water and software management systems on the freezer ready trucks is unique, and the fuel cells have been tested and run reliably in temperatures ranging from -22 to 104° F.

Another manufacturer, Nuvera Fuel Cells, has placed 14 PowerEdge™ fuel cell hybrid systems and a PowerTap Hydrogen Generator and Hydrogen station at H-E-B to power Class II reach trucks at its San Antonio Perishables

Distribution Center. H-E-B will validate lifecycle cost projections, productivity gains, and environmental benefits of the Total Power Solution and will assess whether to expand the fleet. Nuvera is developing PowerEdge models for use in additional forklifts types and applications.

Super Store Industries has deployed fuel cells on "a significant portion" of the forklifts and pallet jacks deployed at its Lathrop, California warehouse, including the entire freezer fleet. Oorja Protonics supplied their OorjaPac methanol-powered fuel cells, which serve as an on-board charger, trickle-charging batteries while the forklifts are running or parked. Battery state-of-charge is maintained at 30-80 percent, reducing the need to swap and charge batteries, increasing battery life and improving battery performance. The OorjaPac operates at temperatures as low as -4° F, and under testing has performed successfully to below -30° F.

There are many more companies adding fuel cells forklifts to their warehouse fleet, including familiar names such as Coca-Cola, Nissan North America, Whole Foods and Wegmans. You can learn more about fuel cells and their commercial applications at <http://www.fuelcells.org/BusinessCaseforFuelCells.pdf>. ☺

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