

**Sysco Houston's newly built 585,000 square foot state-of-the-art facility is part of Sysco's 80+ broadline distribution centers throughout North America.**

Sysco provides food products to restaurants, healthcare and educational facilities, lodging establishments and other customers who prepare food away from home. Sysco Houston is a subsidiary company of Sysco, handling more than \$30 million in inventory. The facility operates almost non-stop 24-hours a day, 300 plus days a year.



*Class-2 narrow aisle lift truck delivers product to the shelves at Sysco Houston's facility*

## The Power Players

### Scott Kliever

Vice President of Finance and Plant Chief Financial Officer  
Responsible for more than \$40 million in receivables  
Ensures \$30 million+ in inventory is accurate  
Manages IT department

### Chad Harrison

Plant Operations Manager  
22 years at Sysco  
Oversees all equipment and fuel usage

## The Situation

In 2008, Sysco purchased property to build a new distribution center in North Houston. One of the primary goals for this new facility was to make it as environmentally friendly as possible and help reduce the company's carbon footprint. Construction provided a great opportunity to assess sustainable energy solutions for all areas of the facility. Sysco Houston was already in the process of evaluating power solutions to help gain new efficiencies on its 26 forklifts and 72 pallet jacks. If there was ever a time to convert from lead-acid batteries to hydrogen fuel cells, it was now.



An equipment operator refuels the GenDrive powered class-3 pallet jack with hydrogen

## Power Ahead

Discussions with Plug Power Inc., the leader in clean, reliable fuel cell energy solutions, began in the fall of 2008. “We are in the business of getting a case of goods to customers as quickly and efficiently as possible and we do not make a habit of veering from the norm,” said Scott Kliever. “However, when we can make a solid business case to do things better and faster, it is to our advantage and in our best interests to seriously pursue adopting a new solution.”

Plug Power advised and assisted Sysco in securing a \$1.2 million grant from the Department of Energy (DOE). Funding is available as part of the American Recovery and Reinvestment Act to accelerate the commercialization and deployment of fuel cells and create jobs in associated manufacturing, installation, maintenance and support services<sup>1</sup>. The 100 percent hydrogen infrastructure was designed into the new facility. In the seven months since the project has launched, Sysco Houston is reaping the rewards of partnering with Plug Power.

<sup>1</sup> In April 2009, Energy Secretary Steven Chu announced \$41.9 million in American Recovery and Reinvestment Act funding for fuel cell technology to expand the use of clean and renewable energy sources and reduce America's dependence on foreign oil. The new funding will improve the potential of fuel cells to provide power in stationary, portable and specialty vehicle applications, while cutting carbon emissions and broadening the nation's clean energy technology portfolio. Visit [www.energy.gov/news2009/7262.htm](http://www.energy.gov/news2009/7262.htm) for more information.

## The Hydrogen Advantage for Distribution Center Management

The Houston facility has a sustainable design at the core. It has installed motion-sensitive lighting, dual-stage compressor generators and recycling of waste water. Using GenDrive® fuel cells to power its electric lift trucks, Sysco only sees water and heat as by-products and the elimination of toxic lead-acid batteries lowers the facility's carbon footprint and makes for a safer work environment.

This was an important consideration along with the life expectancy of hydrogen fuel cells. With lead-acid batteries, two units are needed for every piece of equipment, which typically last four years versus needing only one GenDrive per piece of equipment with a projected life of eight to ten years. For Sysco Houston, this meant needing only 100 GenDrive fuel cells instead of more than 200 lead-acid batteries, helping them to save on storage space and cutting waste.

Sysco worked closely with Air Products, a hydrogen and hydrogen infrastructure provider, to get the hydrogen system up and running and train staff on the storage and maintenance of the hydrogen system for the fuel cells.

“Our corporation had to take a risk to help the fuel cell technology industry help the food distribution industry long term,” said Kliever. “We have not had these technological opportunities before. It is important for us to prove that hydrogen is a viable alternate energy source and now we are doing that. We say if you go with it, it will work.”

The time savings realized as a result of the hydrogen system have been impressive. A typical lead-acid battery change is required during each shift. Each battery change involves two employees, the operator and a maintenance worker, and takes approximately 10–15 minutes. Meanwhile, refueling of the GenDrive is required only once per shift and takes only three minutes for one employee. “With the GenDrive fuel cells, we are saving time and money. For the 98 units of equipment,

we estimate that about 1,200 hours or approximately \$24,000 is saved per fiscal quarter,” said Kliever. “Almost 1.5 fuel cells pay for themselves per quarter or about six per year. Over the life expectancy of the fuel cells, almost 60 of them will pay for themselves. In addition, there are energy cost savings we gain by using hydrogen to refuel the fuel cells in place of the electrical costs to recharge lead-acid batteries.”

Another great feature of the hydrogen fuel cell solution is that the unit is a closed-loop system, meaning there is no risk of spillage or leaks. The fuel cells are lighter than lead-acid batteries making them easier to transport and less likely to cause injuries. The removal of toxic lead-acid from the facility virtually eliminates the potential of a number of hazards. Even better—there are no fumes from the GenDrive fuel cells making for a much more pleasant working environment for employees.

### The Hydrogen Advantage for Equipment Operators

“Hydrogen fueling took it to the next level in terms of operator self-sufficiency. If you can fuel a car, you can use hydrogen,” said Chad Harrison. “With hydrogen it is easier for the operator to take care of equipment on their own. You only need one person to refuel and the process is much simpler. At first, there were concerns about learning the new technology, but now they have embraced it. In fact, most of our employees now prefer the hydrogen fuel cells over batteries.” Sysco Houston has an extensive training program for its employees. Trained personnel swipe their access badge to fuel their equipment at the hydrogen pump.

Harrison continued, “We also saw a shift in how our maintenance team operates. Instead of being a reactive group, they now have the opportunity to be proactive.” Preventative maintenance, like changing air filters, is performed on the fuel cells based on the hourly usage. With lead-acid batteries, Sysco Houston relied on a calendar system, which did not account for uneven usage like they are now able to do with the fuel cells.



*An operator readies a class-3 pallet jack fitted with a GenDrive fuel cell for its shift*

Operators also like the system because GenDrive provides full power throughout the shift, while lead-acid batteries degrade, affecting operator efficiency and potentially impacting their job and incentives.

Disruptions are minimized. The operators no longer need to wait for someone to change a battery. It takes three minutes to fuel them.

“There is never going to be a time when there is not enough fuel to run a shift,” said Harrison. “With lead-acid batteries, you always have a concern. If the previous shift does not charge the batteries properly, the next shift suffers. With hydrogen, if an operator forgets, then the unit can be refueled within three minutes and be up and running.”



## Why Plug Power & Hydrogen Fuel Cells

Plug Power is the industry leader and the only provider of a full suite of fuel cell products for class-1, -2 and -3 equipment. This was an important factor when Sysco Houston was choosing a partner. Plug Power delivered the GenDrive fuel cells to meet their needs allowing the Houston facility to be built with only a hydrogen infrastructure in place. This is a serious commitment to hydrogen fuel cells for the long-term.

Additionally, Plug Power's support in securing the DOE grant was exceptional. Plug Power handled a lot of the 'behind the scenes' requirements for Sysco Houston to receive the funding. "Plug Power was great and without their partnership it would have been a much more difficult process," said Kliever. "They knew everything about the program and knew what to do to secure the grant approvals. This enabled us to focus on the implementation."

"The GenDrive fuel cells work extremely well. The results are great and we are very happy with the program," said Harrison. "Plug Power has been outstanding in terms of its support of the technology, parts, service, training and tracking of progress. Plug Power's technicians are invested in our success as much as we are. Plug Power has been a real partner in this program."

## The Vital Stats

- » 98 Plug Power GenDrive fuel cells deployed at Sysco Houston
- » DOE grant of \$1.2 million helped offset the cost of the hydrogen program
- » Indoor hydrogen fueling dispensers provided by Air Products & Chemicals Co. are strategically located throughout the distribution center
- » Truck operators can quickly refuel the GenDrive units in about three minutes, completely eliminating the need to change, store, charge and maintain multiple lead-acid batteries
- » Sysco Houston operates with a fully implemented hydrogen safety plan
- » More than 100 employees are trained on the operation and safe use of hydrogen
- » Improved operator productivity due to elimination of battery degradation and charging time
- » Through life of project 5.5 jobs have been created
- » Close monitoring and return on investment calculations have increased Sysco's involvement in fuel cell-powered lift truck operations
- » Other Sysco distribution sites are evaluating a hydrogen program and Sysco Houston is providing all of the support and evidence necessary to build the business case for this technology

### Hydrogen fuel cells vs. Lead-acid batteries

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Quick and easy refueling

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No extra space required for battery charging infrastructure

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Reduced greenhouse gas emissions and waste

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Safe by-products (heat & water)

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Full power throughout entire length of shift

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Optimal operation in sub-zero temperatures

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Proactive maintenance; not reactive

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Closed-loop system; no risk of leakage/spillage

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No fumes

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