



Fuel Cell Innovation for Material Handling Applications

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Hydrogenics Profile

- **NASDAQ: HYGS** **TSX: HYG**
- Developer of hydrogen products and infrastructure
 - **OnSite Generation**
 - **Power Systems**
 - **Test Systems**
- World leader in hydrogen infrastructure solutions
 - Stuart Energy acquired in January 2005
- World leader in fuel cell test systems (Hydrogenics Test Systems)
- 1,600 + hydrogen products deployed worldwide since 1948
- 84 patents held and 459 patents filed
- Approximately 260 employees worldwide
- 2005 Revenues of US\$37M
- Headquarters in Toronto, Canada





Strategic Business Units

OnSite Generation

- H₂ Production & Refueling
 - Alkaline electrolysis
 - PEM electrolysis
 - NG reforming



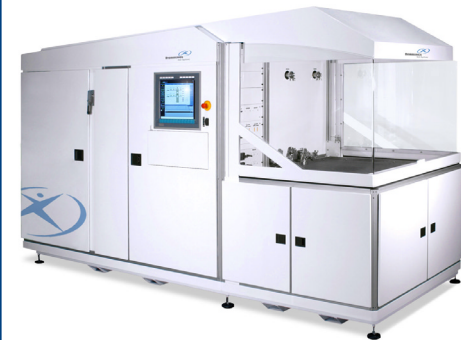
Power Systems

- Fuel Cell Products
 - Stationary
 - Mobility



Test Systems

- Equipment
- Services
- Diagnostics



Fuel Cells for Materials Handling...Why?

■ Material Handling Fleet Operator's Problem:

- Emissions restrict use of ICEs indoors and in operations where contaminants impact product quality
- Battery forklifts in multi-shift indoor applications require multiple batteries per truck
 - Time to swap batteries negatively impacts productivity

■ Solution: Fuel Cell Hybrid Power Pack

- Releases no harmful emissions
- Increases productivity by:
 - Reducing refueling time
 - Extending run-time between fills
 - Providing consistent and abundant power
 - Eliminating need to staff battery charging rooms

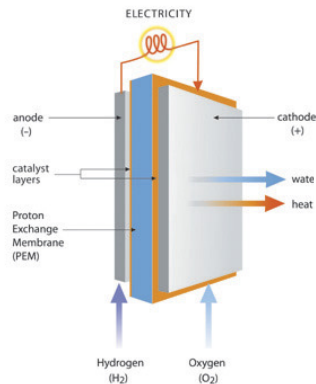




What is a Fuel Cell?

From Cell to Solution

The PEM Fuel Cell



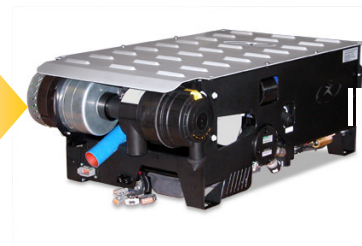
- Fuels:
 - H₂ stored on-board
 - O₂ from intake air
- Single cell by-products are heat and water

The Fuel Cell Stack



- Multiple cells layered to create a stack

The Fuel Cell Power Module



- Heat and water management
- Gas humidification
- Software & hardware controls
- Power conditioning
- Fuel management

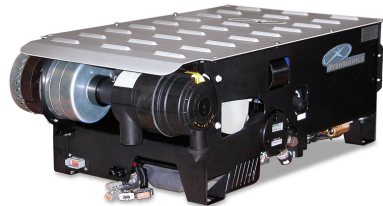
The Fuel Cell Power Pack



- Power Module
- Electrical Storage Device
- Hybrid control hardware & software
- Thermal mgmt.
- H₂ storage

HyPM[®] Fuel Cell Power Pack

Fully Integrated Solutions Fits Existing Battery Compartment



HyPM Power Module



Electrical and H₂ Storage



Power Conditioning



Thermal Management





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Operator Feedback and Impressions

2 FCPPs Deployed in Hyster Lift Trucks @ GM of Canada and FedEx Canada in 2005

**“The lift is faster and quieter.
There is a longer [period time] before
refueling verses battery replacement.
[The fuel cell forklift] is cleaner
operating, there is no battery acid
smell.”**

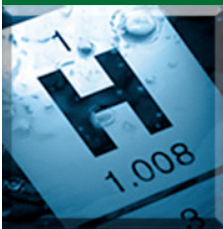
Shift 2 Operator



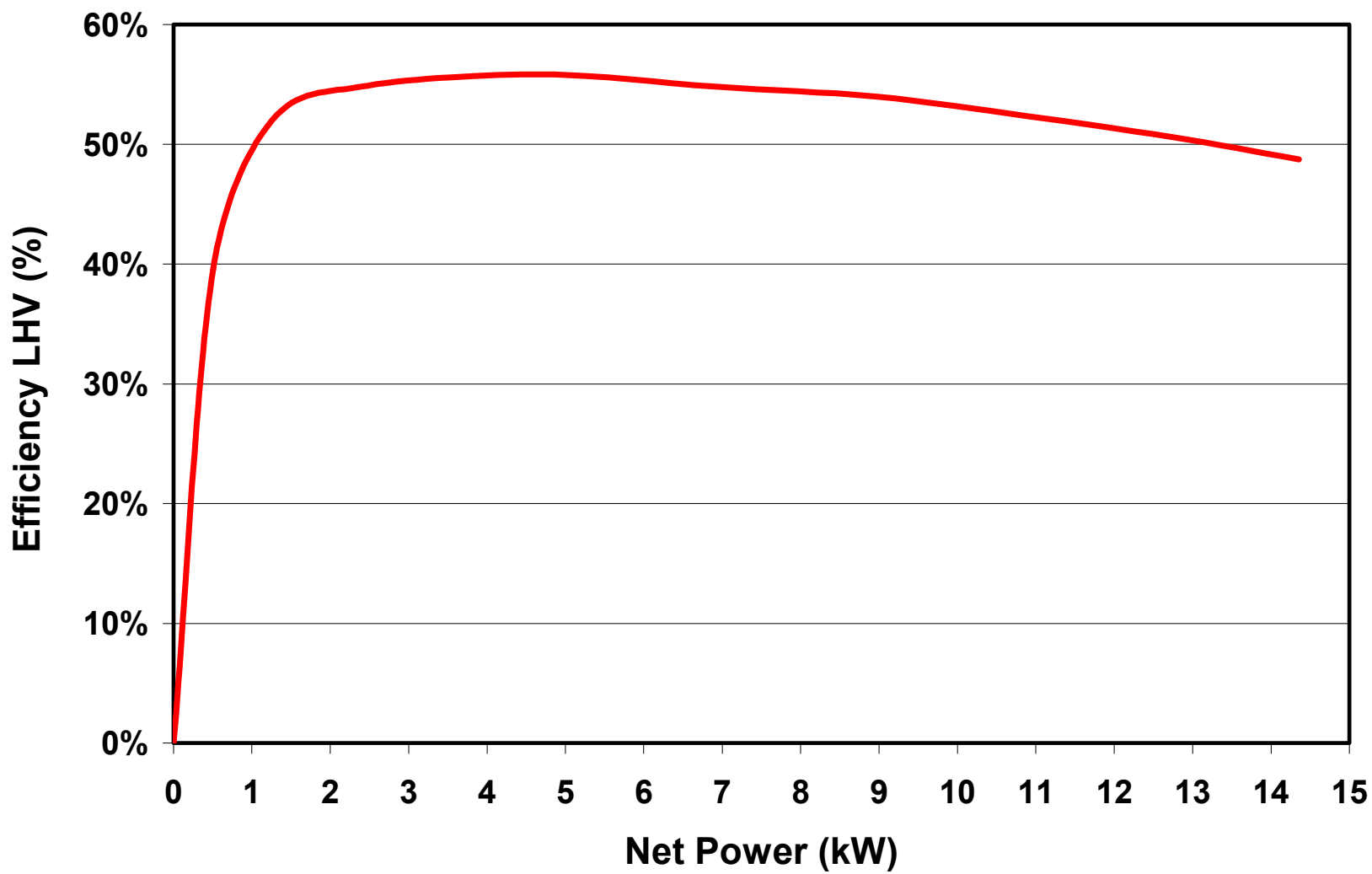
Consistent and abundant power, quiet operation, lack of fumes and longer time between refueling



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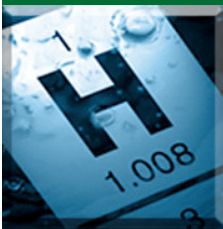


HyPM[®] 12 System Efficiency: High Efficiency Over Broad Operating Range





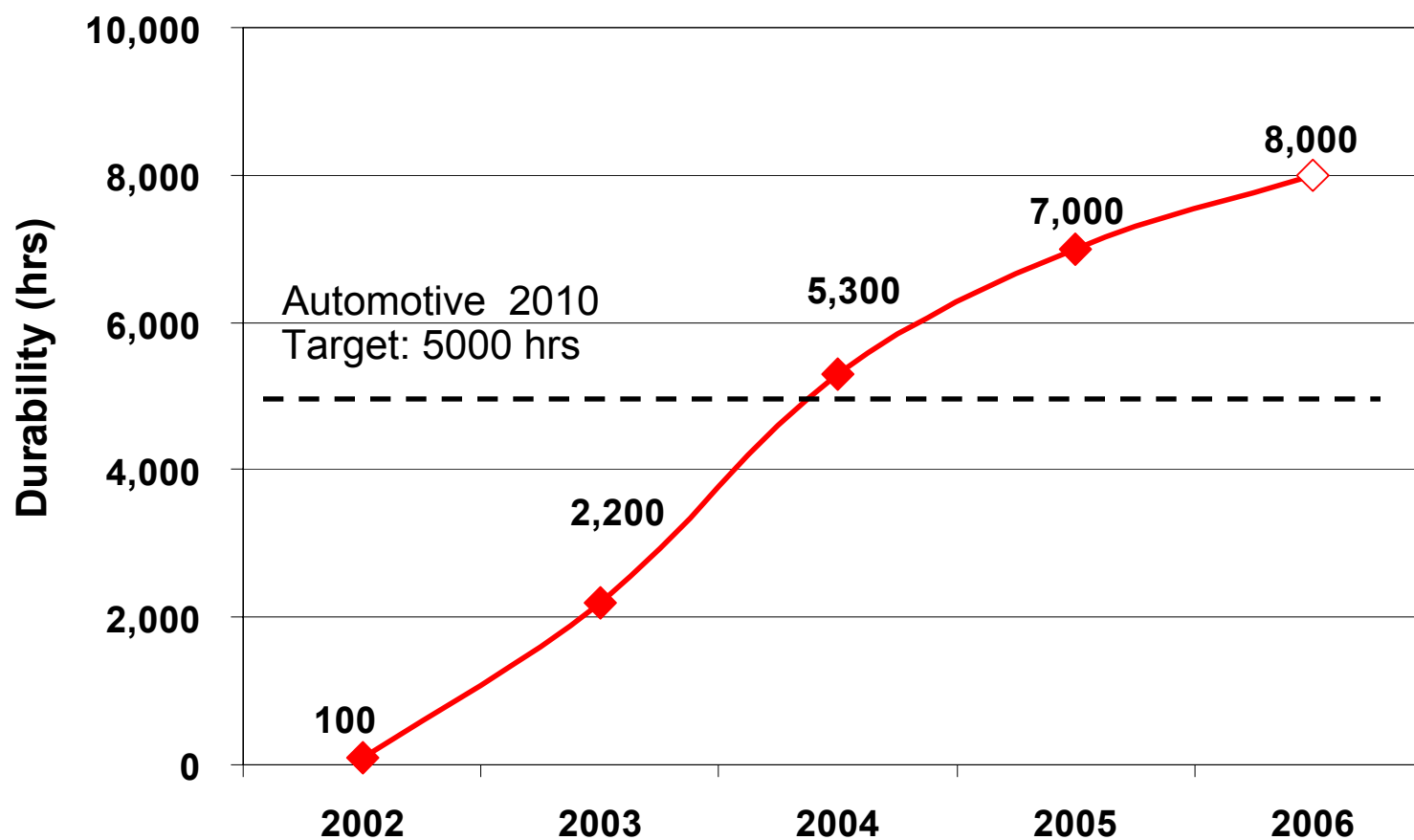
HYDROGENICS



Driving Innovation Within Hydrogenics:

Increasing Fuel Cell Durability* Through 5 Generations over 4 Years

Stack durability improvements a result of a superior soft goods package developed in collaboration with suppliers and advanced plate design, facilitated by our extensive testing facility:



* Data is from full size stacks in HyPM10 configuration on the bench.



HYDROGENICS



Enabling Innovation Outside Hydrogenics: Unleashing Design Freedoms to Improve Ergonomics

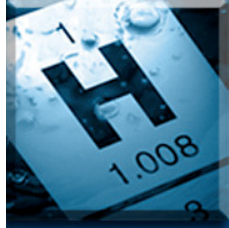
Lift trucks designed around ability to swap batteries



Removing constraints associated with battery boxes and mechanical drive shafts enables new thinking...



GM's Hy-wire uses by-wire technology and distributes fuel cell hybrid power train components throughout the floor of the vehicle



Thank you!