



“Investing in New Fuels and Vehicles: New Players, New Paradigms”

Session 686

Sponsored by

Committee on Transportation Energy (ADC70)

Committee on Alternative Transportation Fuels (ADC80)



Near-Term Markets for Fuel Cells *- Pathway to Transportation*

P07-0561

Pierre Rivard

Executive Chair

Wednesday, January 24, 2007 10:15am-12:00pm

Hilton Hotel, Jefferson East Room, Washington D.C.

Changing power
...Powering change



Outline

- Hydrogenics Corporation
- BackUp Power
Fuel Cells Near-Term Market # 1
- Material Handling
Fuel Cells Near-Term Market # 2
- Hybrid Midi-Bus
Fuel Cells Near-Term Market # 3
- Discussion





Hydrogenics Profile

NASDAQ: HYGS TSX: HYG



Head Office - Toronto, Canada

- Three business units
 - **OnSite Generation**
 - **Power Systems**
 - **Test Systems**
- Leading global provider of hydrogen infrastructure solutions
- Delivering 'leading edge' fuel cell products to world class OEMs and system integrators
- World leader in fuel cell test systems
- 1,600 + hydrogen products deployed worldwide since 1948
- 84 patents held and 459 patents filed
- Headquartered in Toronto, Canada - approximately 270 employees worldwide

Our Strategic Focus

Hydrogenics offers a comprehensive suite of products through three complementary business units.

OnSite Generation



- *Grow industrial markets*
- *Transition products and expertise to emerging energy markets*

Power Systems



- *Target early adopting markets with certified products*
- *Continue to seed 'later to emerge' markets*

Test Systems



- *Develop customer-driven hardware and software*
- *Market across PEM and non-PEM offerings*



Focused on Commercial Products for Vertical Markets

	Data Center Backup Power	Telecom Backup Power	Material Handling
Fuel Cell Product:			
Customer:	Datacenters, extended run critical backup	Telecom and wireless networks	Lift truck fleet operators in multi-shift indoor operations
Distribution Strategy:	To OEMS for integration	Direct to Customers & OEMs	Direct to Customers & OEMs



HyPM Fuel Cell Power Pack

- Fuel cell hybrid power solution replaces battery pack in Class 1 – 5,000 lbs forklift
 - Fits within existing battery space
 - Refueling time of <2 minutes
 - 1.7 shifts (8 hour shift) per fill
- In 2005, 2 forklifts were deployed at GM Canada Oshawa automotive assembly plant, then FedEx
- New government contribution announced in July 2006 to fund up to 19 forklifts and tuggers at GM



MATERIALS HANDLING GROUP, INC.



Backup Power Systems

- Modular 8 kW – 30 kW UPS systems for Telecom and Data Centers
- Replaces diesel genset and batteries
- Key Benefits:
 - Improved performance and reliability
 - Smaller physical size – rack mounted systems
 - Modular design – redundancy and easy power expansion
 - No downtime for maintenance
- Partners:
 - American Power Conversion
 - Emerson (Marconi)
 - Bell Canada



HyPM XR-12



Fuel Cell Hybrid Midi Bus Benefits

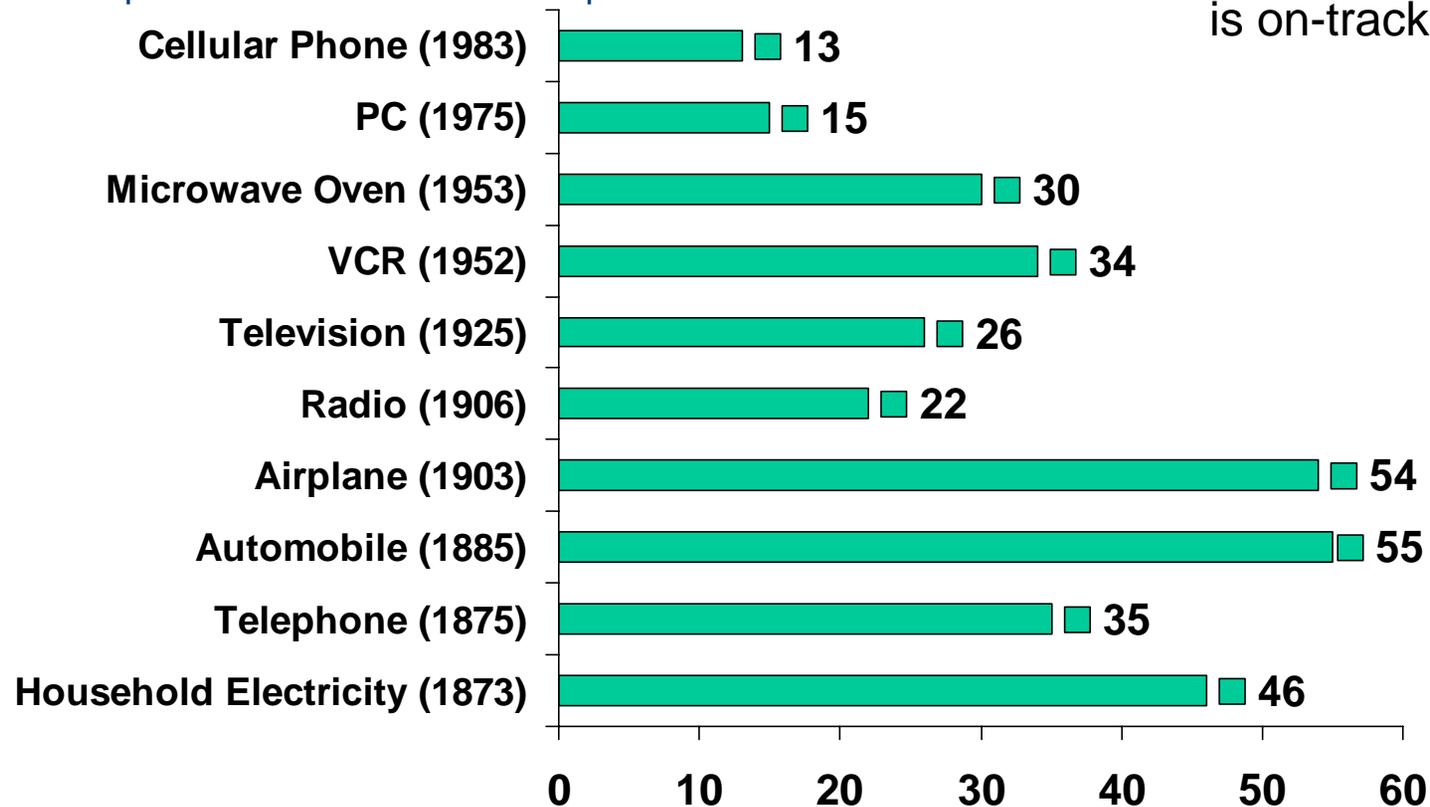
- **Compared to battery-only systems:**
 - Lighter weight, better performance and increased payload
 - Increased driving range without recharging 10 h / 200 km (vs 6 h / 80 km)
 - Fast re-filling time
 - Overall significant savings in labour costs
- **Compared to fossil-fuel combustion systems:**
 - Zero emissions
 - High efficiency (FC 50% vs ICE ~25%)
 - Quiet operation
- **Economic:**
 - FC system relatively low cost compared to the bus cost
 - Low relative operating costs per bus
- **Market:**
 - Midi bus fits unique gaps in transit routes
 - Multiple small FC buses can be afforded at same price as a single large FC bus





The Speed of Change

How Many Years it Took Each of These Technologies to Spread to 25% of the U.S. Population



“On an historical basis, the hydrogen and fuel cell industry is on-track”

Summary



FC Near Term Markets

- Fuel Cells' near-term markets:
a stepping stone to broader mass markets
and transportation
- “Priming the pump” of the Supply Chain,
establishing alliances, accumulating IP,
attracting investment and talent, achieving
durability / cost / performance milestones





Thank you!