Hy9 Corporation

Hydrogen and Fuel Cell Regional Meeting

Northeast Energy and Commerce Association

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Fuel cells are being used throughout our economy in electronics, telecommunications, transportation and energy

Portable Power

Backup Power

Materials Handling

Stationary Power

Combined Heat and Power

Transportation

Each market is slowly emerging, with growth principally constrained by first cost and fuel availability

	Markets	Configurations	Challenges
Portable Power	• Consumer Products including Cell Phones, Laptops, and Generators • Military including Wearable Power and UAVs	• Butane SOFC • Direct Methanol FC • Methanol or Amonia Borane with PEM • Metal Hydrides with PEM	• First Cost • Fuel Availability
Backup Power	• Cellular Towers • Data Centers • Telecommunications	• PEM with Hydrogen • Methanol Reformation with PEM • Propane Reformation with High Temp PEM	• First Cost • Fuel Economics
Materials Handling	• Class I, II and III fork lifts • Large scale new or existing electric installations	• Direct Methanol FC • PEM with Liquid Hydrogen • PEM with Reformed Hydrogen	• First Cost • Fuel Economics
Stationary Power	• Remote Primary Power • Residential and Commercial Power • Grid Scale Power	• Molten carbonate fuel cell • Phosphoric acid fuel cell • SOFC • PEM with Reformer	• First Cost
Combined Heat and Power	• mCHP – Residential • Small Commercial • Large Commercial & Industrial	• High Temp PEM with NG Reformer • SOFC with NG/Propane • PEM with SMR	• First Cost • Longevity • Technical Complexity
Transportation	• Cars and Motorcycles • Buses, Trains and Boats • Trucks	• PEM	• First Cost • Fuel Availability • Range

Hy9's mission is to be a leading manufacturer of high performance hydrogen-based solutions for customers in energy, industrial gas and transportation

Making Hydrogen…Pure and Simple™

Energy Markets	Industrial Gas Markets	Motive Power Markets
High performance hydrogen purification and generation systems to enable PEM fuel cells to operate on hydrocarbon fuels	High performance hydrogen purification systems to deliver low- cost high-purity hydrogen on-demand	High performance hydrogen purification and generation systems to deliver low-cost high-purity hydrogen on-demand
• Reformers and Purifiers for Portable Power • Hydrogen Generators for Cellular Backup Power • Hydrogen Generators for Combined Heat & Power (Planned)	• Purifiers for Laboratory Gas Generators • Purifiers for Industrial Hydrogen Recycling • Hydrogen Generators for Industrial Gas Applications	• Hydrogen Generators for Fork Lift Refueling • Hydrogen Generators for Car and Bus Refueling • On-Board Reformers for Electric Vehicle Range Extenders (Planned)

Hy9's product line is focused on Hydrogen Purifiers and Hydrogen Generators

Purifiers for Laboratory Gas Generators	Electrolyzer Purifier 350 cc/min to 850 cc/min 	Electrolyzer Purifier 350 cc/min to 1600 cc/min
Purifiers and Reformers for Portable Power	Purifier 4 slpm 250 watts 	Methanol Reformer Purifier 500 cc/min 30 watts
Purifiers for Industrial Gas Applications	Hydrogen Recycling 100 kg/day 	Hydrogen Purification 1200 cc/min
Hydrogen Generators for Stationary and Backup Power	Hydrogen Generator Methanol 40 & 80 slpm 2.5 & 5 kW 	Hydrogen Generator Natural Gas 80 slpm 5 kW
Purifiers for Stationary Power	Purifier for Fuel Cells Diesel Reformate 15 slpm 1 kW 	Purifier for Fuel Cells Propane Reformate 15 slpm 1 kW

Not to scale

Achieving commercial success requires addressing all elements of the business

- Technology Readiness
- Product Commercialization
- Driving Cost Out
- Providing Demonstrations
- Availability of Customer Financial Incentives
- Finding, Educating and Acquiring New Customers
- Scaling Up Manufacturing for Volume Economies
- Supply Chain Preparedness
- Securing Reliable Low Cost Components
- Providing After Sales Service and Support
- Acquiring Sufficient Capital Resources

Recommendations for Advancing the Hydrogen and Fuel Cell Industry

- Encourage customers with state and federal financial incentives including equipment purchase tax incentives and direct cash payments
- Prime the market with directed programmatic support of initiatives such as CHP as in Japan and South Korea
- Have state and federal governments procure new energy technologies for more efficient and cleaner buildings and fleet vehicles
- Advance legislation which places a price on carbon
- Support the funding of the DOE's Energy Innovation Hubs and Energy Regional Innovation Clusters (E-RICs)
- Expand scope of Energy Innovation to include commercialization
- Form regional consortiums to advance specific hydrogen and fuel cell objectives and programs, such as building efficiency and transportation