

The Power of Innovation

- Innovative manufacturing facilities in NY and WA
- Been in business since 1999
- Premier list of customers:
P&G, Walmart, Kroger, BMW, Home Depot, Lowes
- More than 13,000 units in the field
 - >110 million hours of runtime by material handling customers
 - Supporting 95 distribution centers
- Focused Expansion Opportunities
 - 180+ issued patents
 - Hydrogen storage & generation
 - Motive power applications
 - Stationary Power Applications



Plug Power's competitive advantage is in its ability to create value by providing tools that enable our customers to operate more efficiently and cost effectively!!

Non Productive Time

Space Limitations

Labor Management

Variable Productivity Performance

Monitoring & measuring Performance Levels

Managing and Maintaining too many Assets

Predictability

Managing Expenses

Operational Flexibility

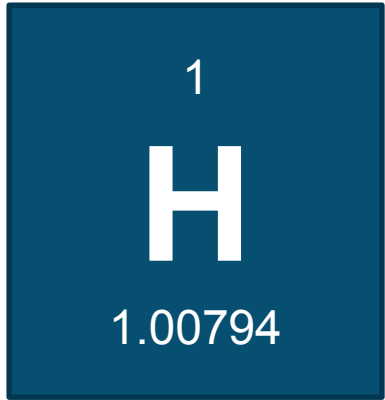
Process Standardization

Energy Expense

Fleet Scalability

Equipment Utilization Rate

Safety Liabilities



Fuel

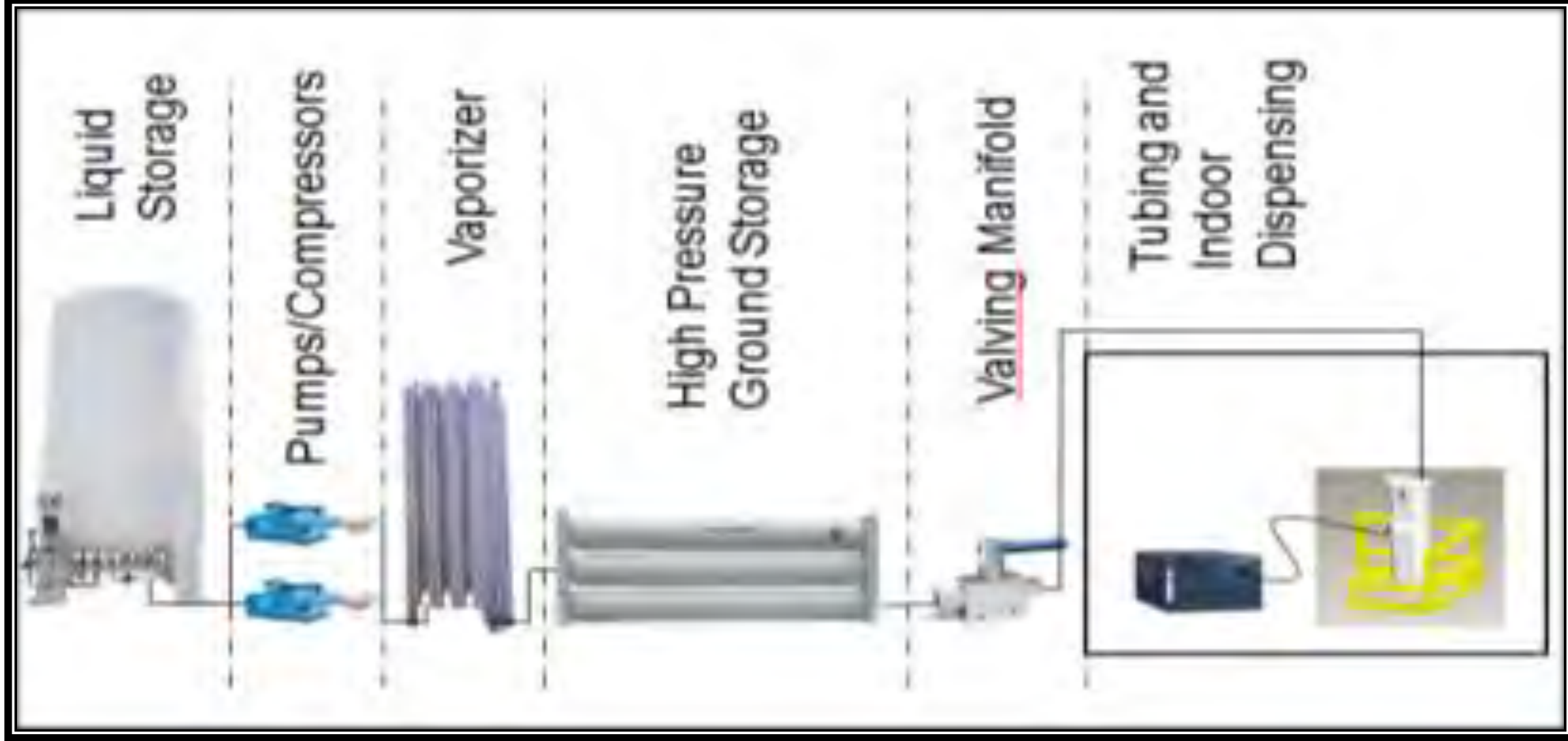
Storage & Conversion

Dispensers

Fuel Cell

GenCare

A typical hydrogen fuel cell solution can generally realize an IRR > 15% with a payback < 3yrs, > \$1M in savings!





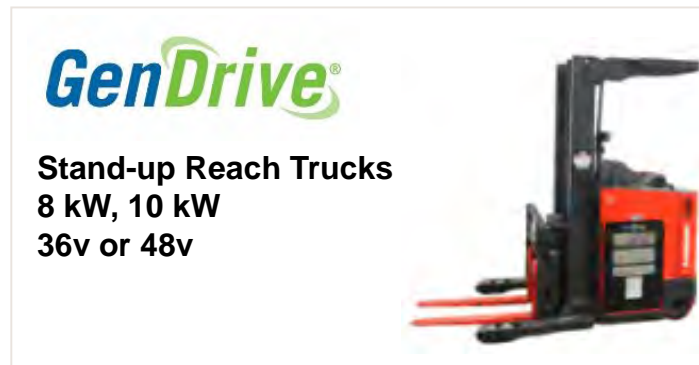
Reformer – Onsite Hydrogen Generation



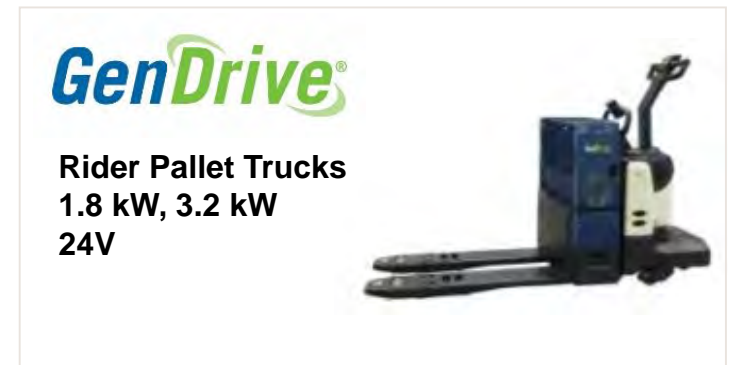
Class 1



Class 2

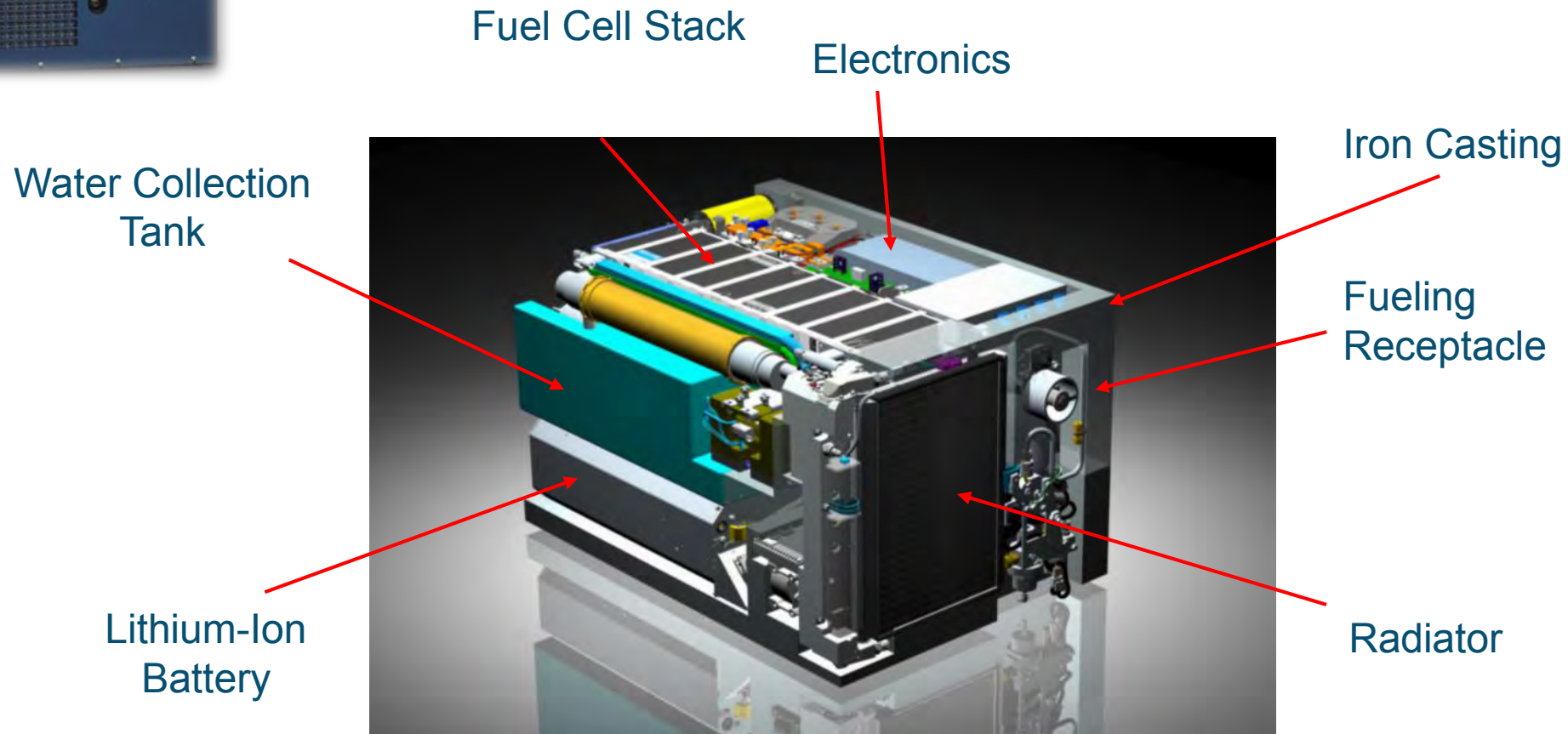


Class 3

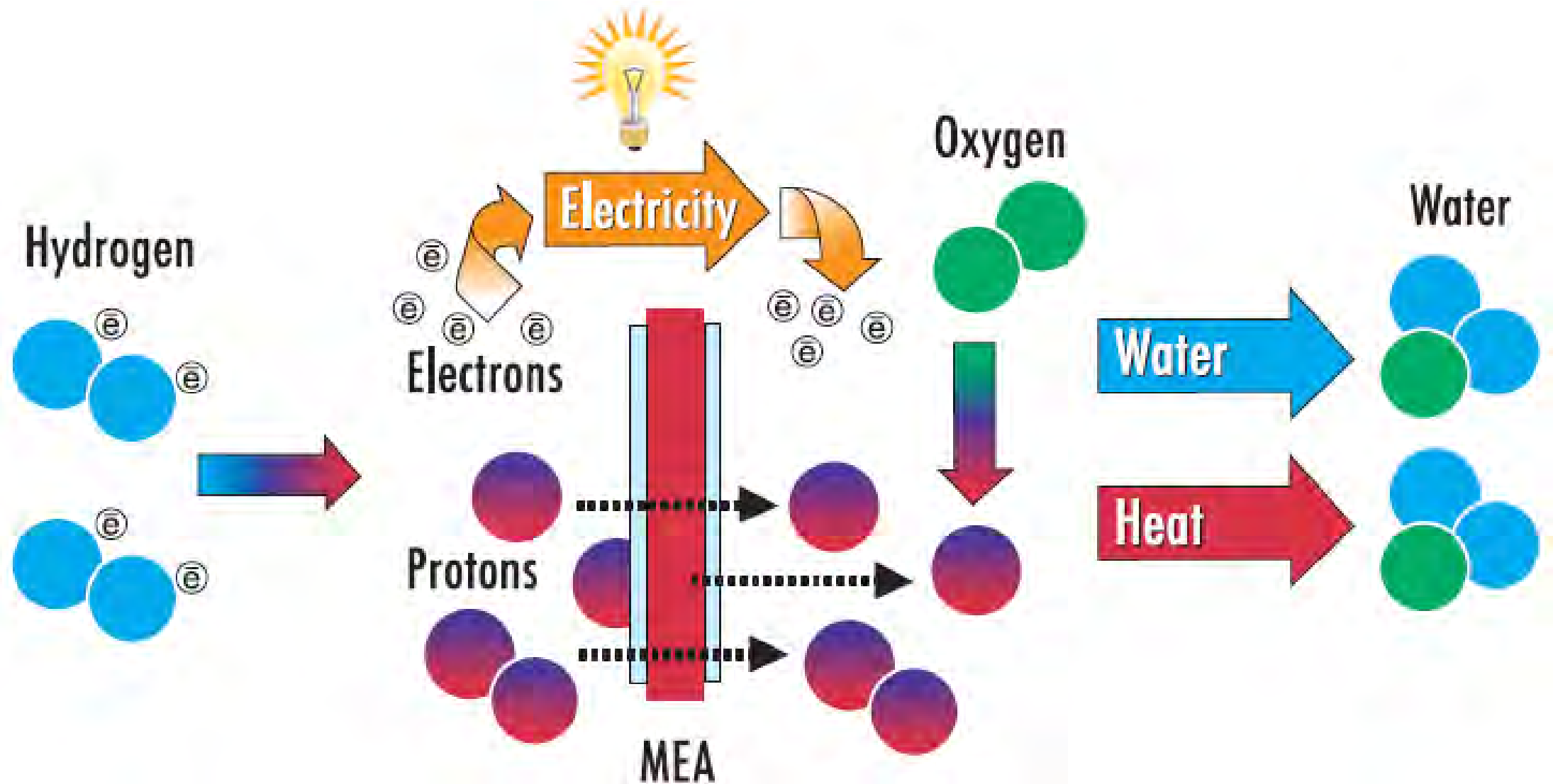




GenDrive[®] Sample Schematic



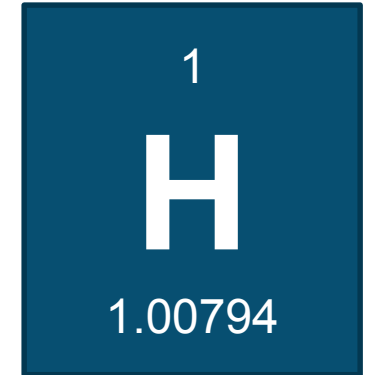
Electrical Energy Generation Process



Fuel Fun Fact... 1

The explosive energy of hydrogen is approximately:

- 1/3rd that of natural gas
- 1/10th that of propane
- 1/20th of gasoline.
- The presence of carbon in natural gas and propane increases their explosive potential, whereas hydrogen is carbon-free. This means the gasoline we use in our cars today has over 20 times the explosive potential of hydrogen.



The auto-ignition temperatures of hydrogen and natural gas are very similar.

Both have auto-ignition temperatures over 1,000°F, much higher than the auto-ignition temperature of gasoline or Propane vapor. This adds to the safer handling of hydrogen.

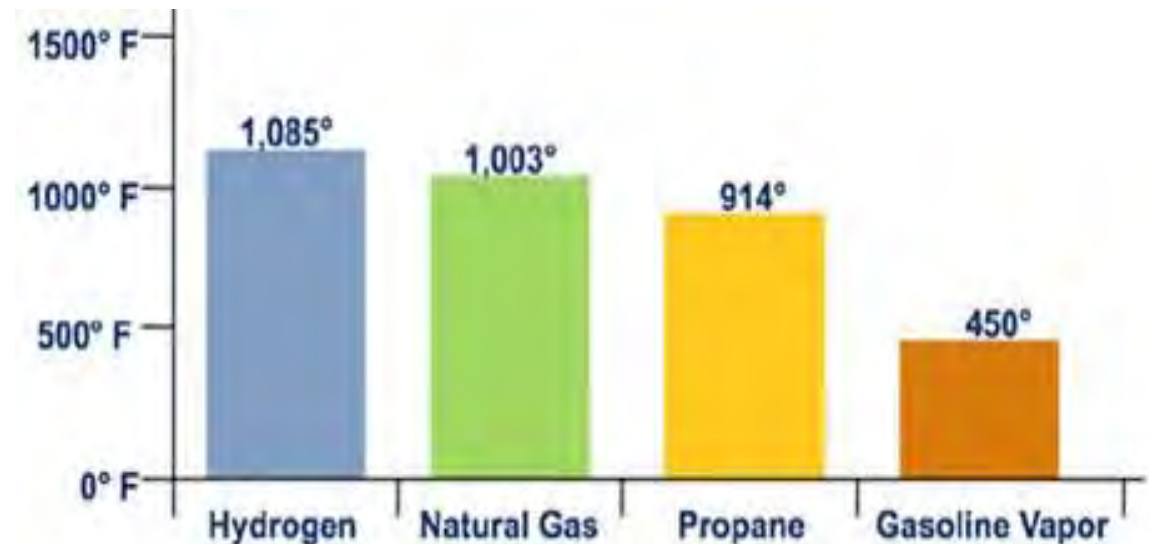
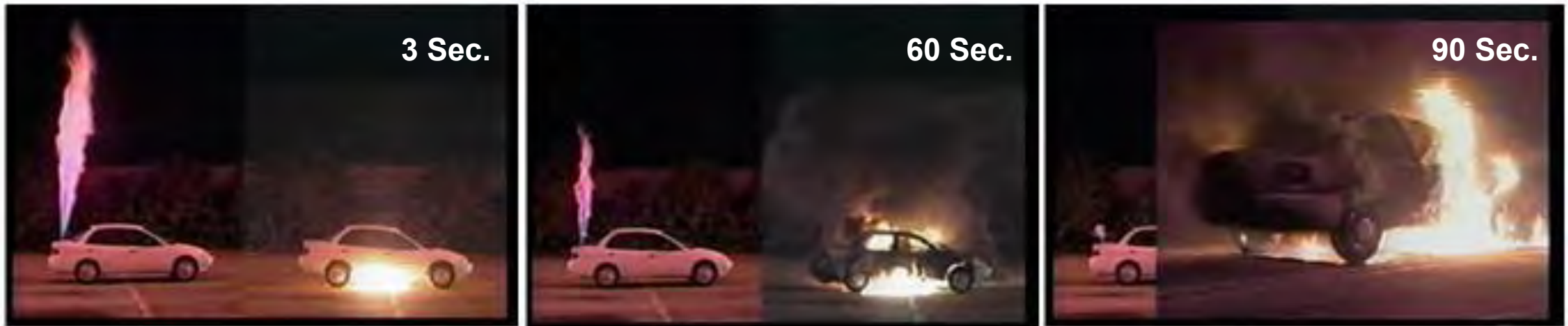


Photo compares fires from an intentionally ignited hydrogen tank release to a small gasoline fuel line leak.

- The maximum temperature inside the hydrogen car's back window was ~ 67°F!
- The gasoline car continued to burn for several minutes and was completely destroyed.
- Hydrogen rises at 20 m/s



Photo/Text: Dr.Swain, University of Miami.

Ground Support Equipment (GSE)

Pushback Tractor

Pushes airplane backwards away from the gate



Ground Power Unit

Supplies power/air conditioning to the aircraft while at gate or during loading



Container Loader

Loads containers from ground level to aircraft by lifting via a platform



Airstart

Provides the initial rotation to start gas turbine engines



Belt Loaders

Loads from ground level to aircraft storage areas by way of conveyer belt



Cargo Tractors

Transports cargo from plane to sorting facility



Expanding Customer Base





Creating A Competitive Advantage Requires Risk and Embracing Change!!



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