

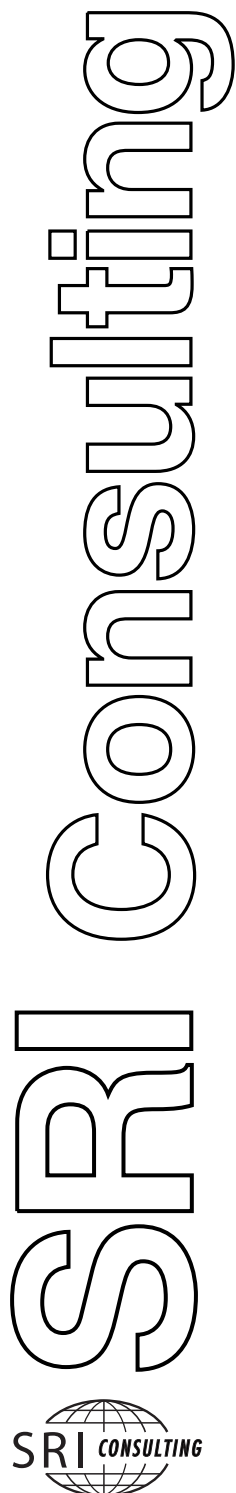
Abstract

Process Economics Program Report 243 Fuel Cells for Vehicles and Power (December 2001)

Fuel cells are an efficient and flexible power source. The technology is advancing rapidly for both vehicle and power applications. Unlike conventional fossil fuel power sources, fuel cells are capable of generating electrical power from a fuel stream and an oxidant stream without producing substantial amounts of undesirably environmental pollutants such as sulfur oxides, nitrogen oxides, and carbon monoxide. Most major auto manufacturers are deeply involved in technology development, typically in partnership with fuel cell and energy companies, and plan to launch fuel-cell powered vehicles as early as 2002. Breakthroughs are being announced in critical need areas such as compact and reliable fuel processors. The biggest question – and potential barrier to widespread use of fuel cell vehicles – remains the feedstock choice. Any fuel other than gasoline will require a new global infrastructure. Continued cost reduction for the fuel processing as well as the fuel cell modules is the key driver for economic viability for vehicles. Stationary power generation by fuel cells may be somewhat ahead of vehicle use due to more attractive economics, particularly in the niche market for moderate size power generation units.

This report has examined the current state of development for both vehicle use and stationary power generation in small (500KW to 10MW) fuel cell systems may soon be competitive in the distributed power market, aimed at customers that are dependent on reliable power supply, such as hospital, manufacturing plants and server farms.

The commercial viability of fuel cell systems will depend on the ability to efficiently and cleanly convert conventional hydrocarbon fuel sources to a hydrogen rich gas stream. The most advanced systems, and those potentially closest to commercialization are based on development of gasoline fueled polymer electrolyte membrane fuel cells for automotive applications, and development of natural gas based solid oxide fuel cells for stationary power generation.



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