Air Products' Hydrogen Energy Station Renewable Hydrogen Fueling Infrastructure

Air Products' hydrogen fuel dispenser located in Fountain Valley, California.

Air Products' Hydrogen Energy Station produces renewable electricity, hydrogen and heat from biogas.

Features/Benefits

Multiple Products:
Coproduces power, hydrogen and utility heat/chilling.

Configurable:
Power and hydrogen units can be sized independently to allow for multiple supply scenarios.

Modular:
Power, hydrogen and feedstock units can be added independently.

Fuel-Flexible:
Can use multiple hydrocarbon feedstocks, including digester gas, landfill gas, natural gas, syngas, and agricultural materials/wastes.

Renewable:
Bio-base feedstocks minimize fossil fuel use and GHG emissions.

Efficient:
Coproduction and process integration maximize energy efficiency (~70+%).

Low Emissions:
Eliminates virtually all criteria pollutants (SO_x, NO_x, etc.) relative to typical power generation systems.

For the developing hydrogen economy, a critical challenge is putting a cost-effective hydrogen fueling infrastructure in place to service the deployment of hydrogen vehicles. Air Products' Hydrogen Energy Station meets this challenge with an economically viable station that can help to fulfill the needs of the hydrogen economy of the future.

An Economically Viable Solution

Air Products' Hydrogen Energy Station technology combines the high efficiency and superior environmental performance of a high-temperature fuel cell (FuelCell Energy's DFC®300 molten carbonate fuel cell) with Air Products' patented separation system to produce renewable electricity, hydrogen and heat from biogas. The fuel cell reforms the feed stream into syngas (a mixture of hydrogen and carbon monoxide) and simultaneously produces electricity. Excess syngas is processed and purified into hydrogen. The initial demonstration, which produces 250 kW of electricity and 100 kilograms per day of hydrogen, is currently being used in a three-year operating program on anaerobic digester gas at the Orange County Sanitation District facility in Fountain Valley, California. Funding sponsors include the U.S. Department of Energy, California Air Resources Board, South Coast Air Quality Management District and Southern California Gas Company. The National Fuel Cell Research Center at the University of California, Irvine is supporting the project by providing education, outreach and data analytical services. Hydrogen is supplied to a hydrogen refueling station located conveniently off Interstate 405 to serve hydrogen-fueled vehicles in the region.

Delivering Innovative Technology

The novel fuel cells in Air Products' Hydrogen Energy Station differ from other commercially available technologies in a number of important ways. Some of the unique features include:

- Ability to produce a stream of purified hydrogen
- Capability of producing hydrogen from digester gas (typically hydrogen is produced from natural gas via steam methane reformation [SMR] technology)
- Ability to recover hydrogen from waste gas streams as dilute as approximately 23% (traditionally hydrogen is recovered from hydrogen-rich [75%] streams)

The technology is amenable to any methane-rich feedstock, including natural gas, digester gas, landfill gas, synthetic natural gas via biomass, municipal solid waste (MSW), and coal. Air Products' Hydrogen Energy Station has the potential to supply hydrogen fueling stations and power stations with access to hydrocarbon feedstocks and can also be useful to captive industrial users, including steel, glass, electronics, chemicals, and vegetable oil.

Measurable Environmental Benefits

Air Products' Hydrogen Energy Station is amenable to locations across the United States and around the world where it can facilitate emission reductions and enable users to meet emission standards. Any fossil fuel stationary power source could be replaced with the novel technology of Air Products' Hydrogen Energy Station, which can eliminate virtually all criteria pollutants from the source, including SO_X, NO_X, and CO_2.

When green hydrogen product is produced at the Air Products Hydrogen Energy Station and is used in fuel cell vehicles, it will nearly eliminate emissions of CO_2 and all criteria pollutants that would typically be produced by gasoline-fueled internal combustion engine vehicles.

Additionally, the integrated process heat eliminates the need for separate natural gas-fired heaters and their associated emissions.

We Are Committed to You

For more than 50 years, Air Products has been a leader in the hydrogen industry, and today we are dedicated to being at the forefront of hydrogen energy technology development. With more than 130 hydrogen fueling stations installed worldwide, and as the world's largest supplier of merchant hydrogen, we understand the wide range of technical, operation, and economic challenges involved in the transition to hydrogen energy. Our decades of experience in hydrogen applications and our unsurpassed safety record have enabled us to deliver the technology behind Air Products' Energy Stations—the energy-efficient and environmentally responsible strategy for the 24/7 generation of green hydrogen and power from a renewable resource.

tell me more

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