

Hydrogen Fueling Station Operations

DOE's Advanced Vehicle Testing Activity



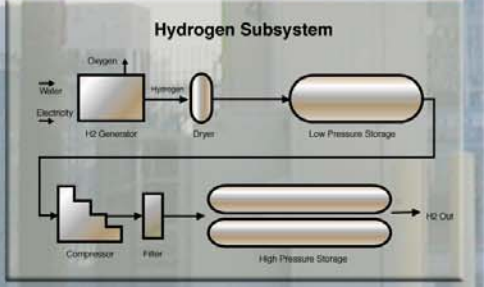
APS Alternative Fuel Pilot Plant

- Partners**
 - Arizona Public Service
 - Electric Transportation Applications
 - U.S. Department of Energy's Advanced Vehicle Testing Activity
 - Idaho National Laboratory
- Location**
 - Arizona Public Service Hydrogen/CNG Alternative Fuel Pilot Plant in downtown Phoenix, Arizona
- Objectives**
 - Evaluate the safety and reliability of operating internal combustion engine (ICE) vehicles on hydrogen and blended hydrogen fuels
 - Evaluate the vehicle/infrastructure interface
 - Quantify vehicle emissions, costs, and performance
 - System optimization analysis, component testing, codes analysis, fleet education, and enhanced fueling practices
 - Support the development of a regional hydrogen fueling infrastructure

- Web Sites**
 - AVTA - <http://avt.inl.gov>
 - Hydrogen reports - <http://avt.inl.gov/hydrogen.html>
- Contact**
 - Jim Francfort
 - Idaho National Laboratory
 - e-mail: James.Francfort@inl.gov

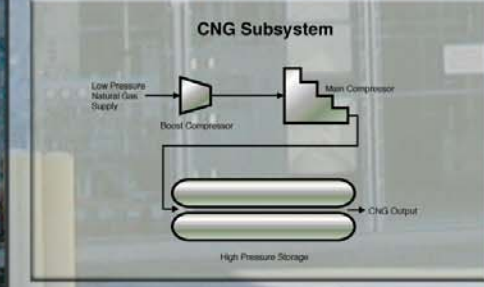
Hydrogen Subsystem

- Electrolytic hydrogen production on site
- Hydrogen generator
- Proton Energy Systems' Hogen PEM fuel cell operating in reverse
- Fuel cell quality hydrogen - 99.9997% purity



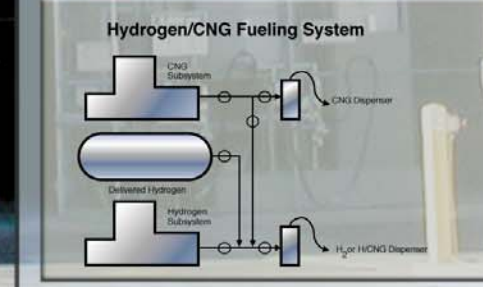
CNG Subsystem

- Compresses CNG from street service



Hydrogen/CNG Fueling Station

- Includes metering and electronic billing interface
- Dispenses either pure hydrogen or CNG fuel or H/CNG blended fuels



Prototype Dispenser

- Uses proportional flow control valves for hydrogen and CNG gas streams to control gas flow rates from 100 to 40,000 scfh
- Dispenser controller adjusts the control valves to provide real-time ratio control of blended fuels
- Control valves are trimmed by a digital dispenser controller using mass flow signals provided by coriolis mass flow transducers in the hydrogen and CNG gas streams
- Delivers 100% hydrogen at 5,000 psi, 100% CNG, and blends of HCNG (15, 20, 30, and 50% hydrogen - by volume) at 3,600 psi, using two independent single nozzles



Monitoring System

- Understand component, subsystems, and plant-level efficiencies & costs
- Real-time station & component monitoring @ 50 monitoring nodes (100 @ completion)
- Fuel quantities collected and costs calculated for pure hydrogen and HCNG blended fuels
- 7,200 kg of hydrogen produced

