

VII.7 Sustainable Hydrogen Fueling Station, California State University Los Angeles*

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Subcontractors:
• General Physics Corporation, Elkridge, MD
• Weaver Construction, Anaheim, CA

Project Start Date: January, 2009
Project End Date: December, 2012

*Congressionally directed project

- **Milestone 26.** Validate refueling site stationary storage technology provided by the delivery team. (4Q, 2012)
- **Milestone 28.** Validate the cost of compression, storage and dispensing at refueling stations and stationary power facilities to be <\$.80/gge of hydrogen. (4Q, 2013)

FY 2012 Accomplishments

- Installed all the core equipment under DOE funding.
- Installed all the equipment beyond DOE funding for station operation.
- Completed station building construction.
- Initiated commissioning phase in preparation for opening.



Introduction

The College of Engineering, Computer Science, & Technology at CSULA as part of its energy curriculum and research efforts is building a sustainable hydrogen station to teach and demonstrate the production and application of hydrogen as the next generation of fully renewable fuel for transportation. The DOE funding is applied toward the acquisition of the core hydrogen station equipment: electrolyzer (partial), three compressors and hydrogen storage tanks.

Approach

The CSULA hydrogen station deploys the latest technologies with the capacity to produce and dispense 60 kg/day, sufficient to fuel 15-20 vehicles. The station is utilizing a Hydrogenics electrolyzer, first and second stage compressors capable of fast filling at 10,000 psi (700 bar), 60 kg of hydrogen storage, water purification and equipment cooling system. The station will be grid-tied and powered by 100% renewable power.

The station will also be used as an applied research facility for equipment testing and verification, testing of hydrogen purity and dispensing accuracy. Another primary function of the station is to be a living laboratory for CSULA students and to introduce hydrogen as a safe transportation fuel through public education and local partnerships.

Fiscal Year (FY) 2012 Objectives

- Procure core equipment for the California State University Los Angeles (CSULA) hydrogen station
- Install/integrate the core equipment

Technical Barriers

This project addresses the following technical barriers from the Technology Validation section of the Fuel Cell Technologies Program Multi-Year Research, Development and Demonstration Plan:

- (C) Lack of Hydrogen Refueling Infrastructure Performance and Availability Data
- (D) Maintenance and Training Facilities
- (E) Codes and Standards

Contribution to Achievement of DOE Technology Validation Milestones

This project will contribute to achievement of the following DOE milestones from the Technology Validation section of the Fuel Cell Technologies Program Multi-Year Research, Development and Demonstration Plan:

Results

The station construction has been completed and it is currently in the commissioning stage, see Figure 1. The equipment under the DOE funding was delivered by General Physics. The equipment integration and station construction was through Weaver Construction. Quantum Corp. provided the hydrogen chiller and dispenser.

The grant provided funding for acquisition of the core hydrogen station equipment: compressors, hydrogen storage and partially electrolyzer. The balance-of-plant equipment was installed including the compressor cooling, air compressor, hydrogen chiller, dispenser, etc. Figure 2 provides a panoramic view inside of the station.

As part of commissioning, purity testing was conducted with the initial test showing slightly higher quantity of nitrogen present in the stream most likely from flushing the storage tanks with it. The follow-up test, after the tanks were emptied and refilled, showed the compliance with SAE J2719. In addition, initial fill tests have been performed with 5,000 psi internal combustion engine vehicles and 10,000 psi fuel cell vehicles, see Figure 3.



FIGURE 1. CSULA Hydrogen Fueling Facility



FIGURE 2. CSULA Hydrogen Fueling Facility, from left to right: storage tanks, PDC 350-bar bar compressor, two Hydro Pac 700-bar compressors, and Quantum chiller



FIGURE 3. Test fueling with General Motors vehicles during commissioning

Conclusions and Future Directions

The station construction has been completed and is currently in commissioning. Future research into station/ vehicle performance is planned.