the Energy to Lead

Performance Evaluation of Delivered Hydrogen Fueling Stations

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gti

Overview

Timeline

- Start: 03 / 2013
- End: 09 / 2016
- Progress: 5% Complete

Barriers

- Unforeseen Permitting Issues
- Construction Delays
- Efficient Integration of Data Collection Equipment

Budget

- Total funding: $800,000
  - DOE Funding: $400,000
  - Cost Share: $400,000

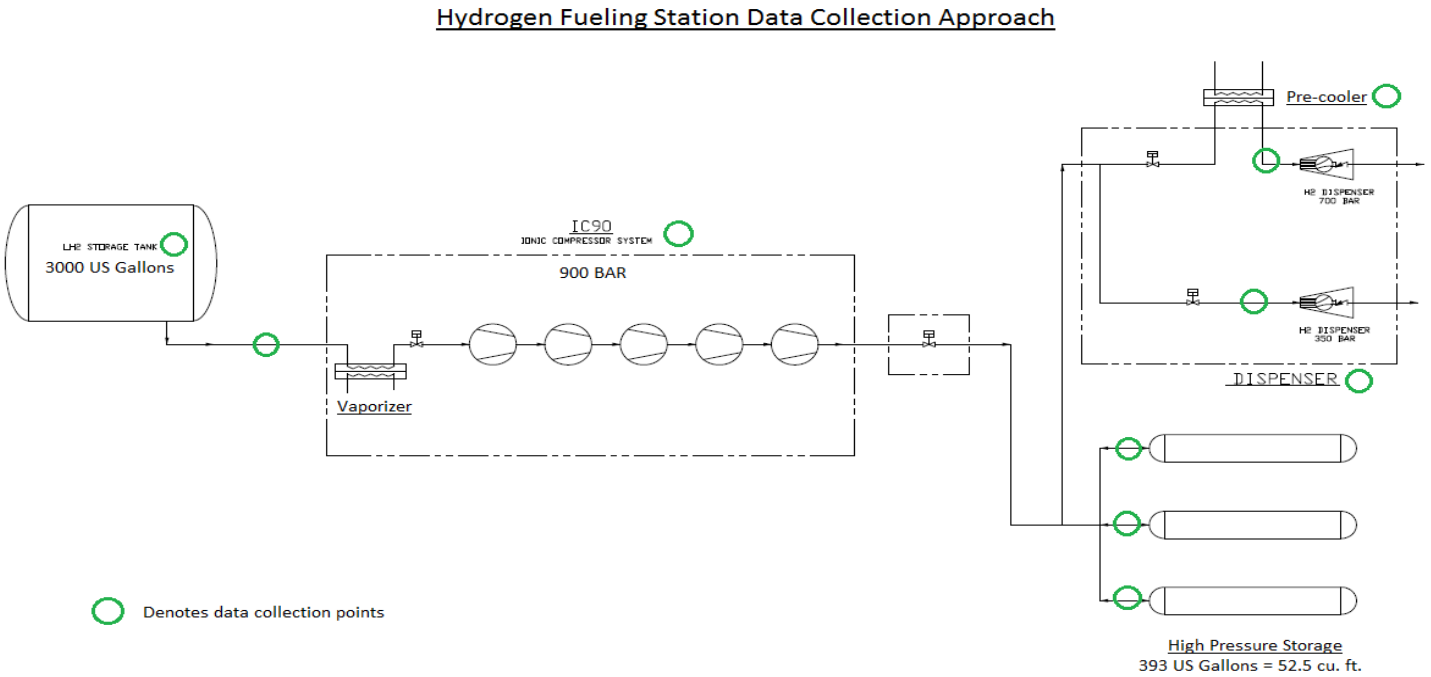
Partners

- Gas Technology Institute (GTI)
- Linde, LLC.

Relevance

DOE Technical Objectives	Project Team Goals
1. Confirm performance of systems in real world applications through data collection.	• Integrate non-intrusive data collection systems at 5 delivered hydrogen fueling stations located in CA.
2. Provide the public with aggregated data presented in composite data products, and secure confidential data in NREL Hydrogen Secure Data Center (HSDC).	• Submit station data specified in the NREL Hydrogen Station Data Templates.
3. Benchmark station capacity, utilization, maintenance, and safety.	• Provide useful data to the industry

Approach: General



- A combination of the cooperation between Linde's station controls and GTI's data acquisition system are required to meet project objectives.

Approach: Budget Period 1

Task 1

- Station Assessments- Evaluation of station adequacy to ensure deliverables are achievable. A data acquisition plan will be developed.

Task 2

- Engineering Design and Packaging – Station design package will be reviewed for data acquisition integration. The data collection system design will be finalized.

Task 3

- Data Acquisition Preparation (Initial 3 Sites) – Specification of project materials, execution of HAZOP, and fabrication and installation of equipment.

Go/ No Go Decision Point: A decision to move forward with full project scope will depend on project team's ability to secure funding for remaining two station sites.

Approach: Budget Period 2

Task 4

- Data Acquisition Preparation (Remaining 2 Sites) – Specification of project materials, participation of HAZOP, and fabrication and installation of equipment.

Task 5

- Data Collection– Performance period of two years for each station. Equipment and system integrity will be maintained through periodic inspections and maintenance.

Task 6

- Data Analysis and Reporting – Data from equipment and Linde operations will be compiled by GTI and submitted to the HSDC on a quarterly basis throughout the life of the project.

Accomplishments and Progress

Major Accomplishments:

- Subcontract with Linde put in place (4/2013).
- Selection of Data Acquisition hardware and software appropriate for application (4/2013).
- Preliminary design and integration of data collection systems in station design in order meet project objectives and data requirements set forth by NREL (commenced 4/2013).

Accomplishments and Progress

- Initial site locations identified in San Capistrano, West Sacramento, and Mountain View, California.
- Permitting phase initiated for San Capistrano and West Sacramento sites Q1 2013.
- Remaining sites have been awarded funding from the California Energy Commission.

Accomplishments and Progress

- Obtained Station Technical Specs:
  - Design Capacity: 100 kg/day
  - Liquid H2 Storage: 938.5 kg (11,355 L)
  - Compressor Discharge Pressure: 900 bar

Accomplishments and Progress

- Obtained Station Technical Specs (Continued):

  Gaseous H2 Storage: 70kg (1490 L)

  Dispenser Delivery Pressures: 350 & 700 bar

Awardee

Project Team:

Gas Technology Institute (Prime) – Prior experience:

- Design and build of a 350 Bar delivered hydrogen refueling station in Columbia, South Carolina.
- Design, built, and operated digester bio-methane to hydrogen generation pilot plant in Ft. Lewis, Washington.
- Currently operating 50kg/day hydrogen generation, compression, dispensing station at Univ. of Texas-Austin.

Collaborations

Project Team Continued:

Linde Hydrogen Fueling (Sub) –

- Linde LLC. is a global supplier of industrial gases and is committed to developing fueling infrastructure in the U.S.
- In 2004, Linde launched a fuel cell forklift operation and fueling program with BMW in it's manufacturing plant in South Carolina.

Proposed Future Work

- Completion of station and site evaluations. (Q3-2013)
- Obtain technical documentation and develop universal data acquisition plan that can be applied to all project sites. (Q3-2013)

Summary

Relevance: GTI will compile, analyze, and submit pertinent data to meet technology validation objectives and goals set forth by the Fuel Cell Technologies Program through its multi-year research, development, and demonstration plan.

Approach: Develop, integrate, and maintain non-intrusive data collection systems to produce meaningful observations and data for the HSDC.

Accomplishments: Subcontract with project partner in place and technical review has commenced.

Summary

Collaborations: Project team and structure have been assembled. Key team members from both organizations have been identified and roles have been defined.

Future Work: Completion of station design evaluations and development of project data collection scope and plan.