2013 DOE Hydrogen Program and Vehicle Technologies Program AMR

CSULA Hydrogen Refueling Facility Performance Evaluation and Optimization

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Project ID
TV024

This presentation does not contain any proprietary, confidential, or otherwise restricted information

Overview

Timeline

- Start: 10/01/2012
- End: 09/30/2016

5% complete

Budget

- Total project funding
  - DOE $400,000
  - Contractor $400,000

Partners

- California State University, Los Angeles— Project lead
- Hydrogenics Corp.

Barriers

Hydrogen Production and Delivery

- Reduce the cost of compression, storage, and dispensing at refueling stations
- Research and develop low-cost, highly efficient hydrogen production technologies

Technology Validation

- Validate complete systems of integrated hydrogen and fuel cell technologies for transportation, infrastructure and electricity generation applications under real-world operating conditions.

Education

- Educate key audiences to facilitate near-term demonstration, commercialization, and long-term market acceptance.

Project Objectives

- The project objective is to test, collect data, and validate hydrogen refueling architecture deployed at CSULA and its individual components in a real-world operating environment. The performance evaluations data will be provided to the Hydrogen Secure Data Center (HSDC) at NREL.
- Academic objectives
  - Contribute to the development of new industry standards
  - Develop and implement fueling station system performance optimization
  - Conduct outreach and training activities promoting the project and hydrogen and fuel cell technologies
  - Provide a living-lab environment for engineering and technology students pursuing interests in hydrogen and fuel cell technologies

Tasks: Phase 1

Task 1. Develop data acquisition (DAQ) for station performance with existing capability

Task 2. Design and implement enhanced data acquisition (DAQ) for station performance evaluation

Task 3. Enable hydrogen purity testing and reporting

Task 4. Regular data collection and reporting after completing Task 2

Tasks: Phases 2 and 3

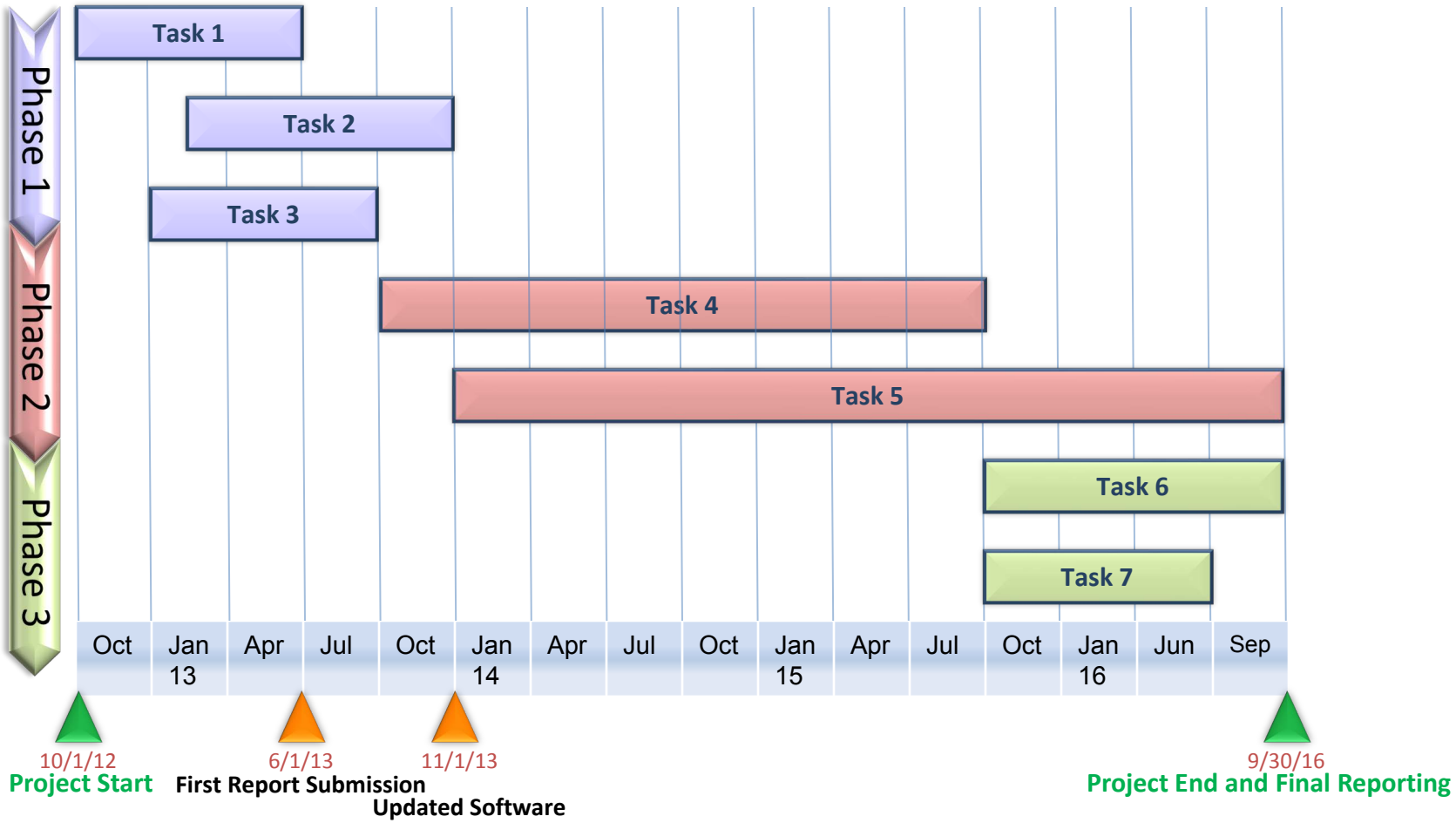
Task 4. Regular data collection and reporting after completing Task 2

Task 5. Conduct outreach and training activities for public and government and engage students in station related activities.

Task 6. Data reporting update and station performance optimization after completing Task 4

Task 7. Evaluate station utilization and assess the need for station upgrades and enhanced performance

Project Timeline



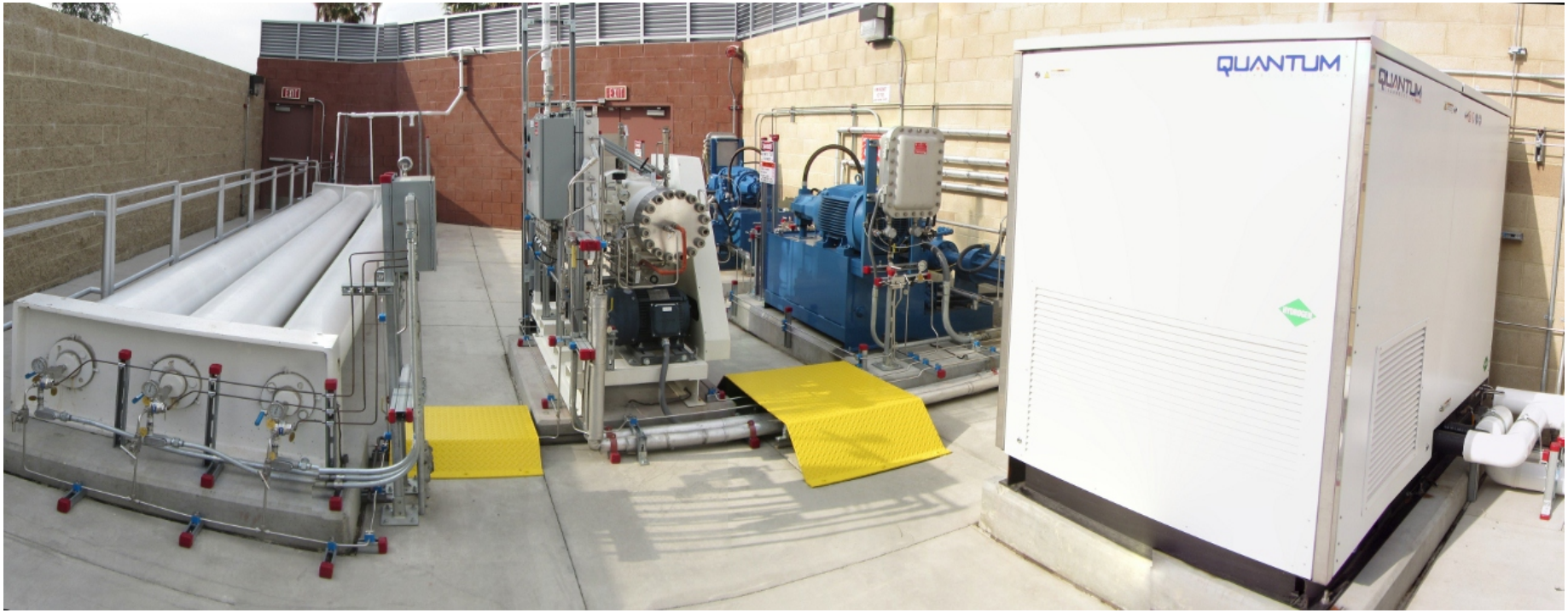
Hydrogen Fueling Facility

- Establish a Sustainable Hydrogen Fueling Facility at Cal State L.A
  - CARB No. 06-618 $2,700,000
  - DOE Award #DE-09EE0000443 $475,750
  - AQMD, MSRC, Ahmanson Foundation, AAA

CSULA Hydrogen Fueling Facility

CSULA Hydrogen Station Specs

Production: 60 kg/day
Storage: 60 kg
Pressure: 5,000 and 10,000 psi
Capacity: 15-20 fuel cell vehicles per day



Station Look From Inside

Hydro-Pac 700 bar compressor
0.5 kg/min
2 units installed

Hydrogenics Electrolyzer

-25 °C Chiller

PDC 350 bar compressor

60 kg Storage

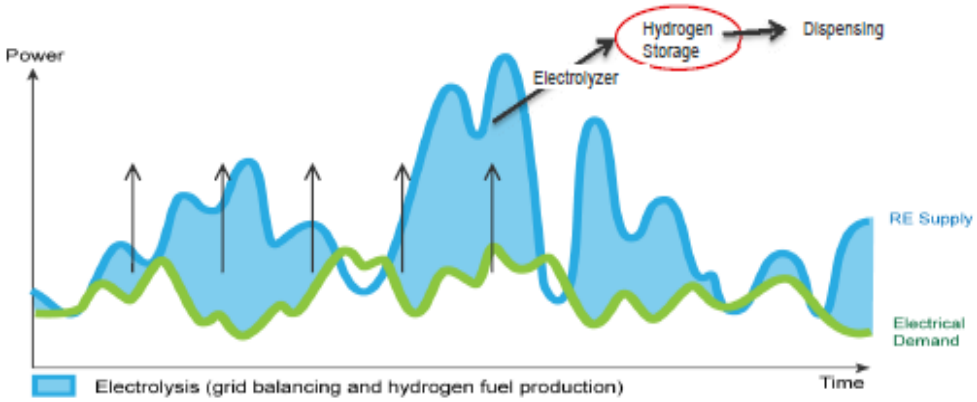
Walkway

Hydrogen Purity Testing

- MRI: Acquisition of a Multifunctional Hydrogen Gas Analyzer for the Center for Energy and Sustainability
  - NSF, $512,000

Future Work: Research Opportunities

- Performance Optimization, Hydrogen Fleet and Infrastructure Analysis
  - Weekly patterns/storage
  - Availability via mobile app
  - Metering
- Smart Grid: Load Following with Renewable Power Generation
  - Off-peak load
  - Load shedding
- Workforce, Public and Professional Education



Intermittent wind exceeds load

Summary

- Program demonstrates high relevance to the DOE Hydrogen and Fuel Cell program.
- The Task 1 is underway.