Fuel Cell Technology Status

Cost & Price Status

2014 DOE Annual Merit Review

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NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.
## Overview

### Timeline
- **Project start date:** July 2009
- **Project end date:** October 2014<sup>1</sup>
- **Percent complete:** On-going

### Barriers
- Lack of data for current fuel cell system cost and price

### Budget
- **FY13<sup>2</sup> DOE Funding:** $150k
- **Planned FY14 Funding:** $100k
- **Total DOE Project Value:** $550k

### Partners
- See collaboration slide

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<sup>1</sup> Project continuation and direction determined annually by DOE

<sup>2</sup> FY09 – FY13 project objective focused on status of fuel cell durability
Relevance: Objectives

*Benchmark current fuel cell system cost/price*

Utilize National Fuel Cell Technology Evaluation Center (NFCTEC)

- Leverage established fuel cell developer relationships
- Leverage trust established in processing and publishing confidential data

Collaborate with key fuel cell developers

*All data is supplied voluntarily, kept confidential, and published as aggregate results reviewed and approved by data providers.
Composite Data Products (CDPs)
• Aggregated data across multiple systems, sites, and teams
• Publish analysis results every six months without revealing proprietary data

Detailed Data Products (DDPs)
• Individual data analyses
• Identify individual contribution to CDPs
• Shared every six months only with the partner who supplied the data

Bundled data (operation & maintenance/safety) delivered to NREL quarterly

Internal analysis completed quarterly in NFCTEC

National Fuel Cell Technology Evaluation Center

www.nrel.gov/hydrogen/proj_tech_validation.html
Approach: FY13 Lab Data Fuel Cell Technology Durability Status * CDP Example*

Data supplied voluntarily from 15 U.S. and international fuel cell developers.

Analysis – hours to 10% voltage degradation

Data presented at 2013 AMR
Approach: Current Status to Complement DOE Fuel Cell System Cost Based on Models for High Volume

Projected Transportation Fuel Cell System Cost
-projected to high-volume (500,000 units per year)-

The U.S. Department of Energy’s National Renewable Energy Laboratory is seeking fuel cell industry partners from the United States and abroad to participate in an objective and credible analysis of commercially available fuel cell product cost/price to benchmark the current state of the technology and support industry growth.
Accomplishment: Benefits of Cost/Price Analysis

**External**
- Provide current cost status of fuel cell products
- Help set realistic price expectations at small volume production
- One source of realistic cost/price status for DOE from the leading fuel cell developers
- Highlights technology successes
- Helps adoption of fuel cell technology

**Internal**
- Provide independent, credible and consistent product cost/price information that is very useful for external partners (e.g. DOE and industry) without revealing proprietary information
- Benchmarking against CDPs
- Collaboration with NREL’s technology validation team; dedicated analysis team with experience in multiple fuel cell applications

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Provides DOE the actual price at low volume to complement the high volume model cost values.

Supports realistic expectations for current fuel cell system price.

Participation and data share from developers critical for accurate status updates.
Accomplishment: Project Highlighted in NFCTEC DOE Webinar

Webinar covered NFCTEC overview, NFCTEC findings and benefits, and the fuel cell cost/price aggregation project with 150 attendees.
Accomplishment: Example Results

Example results support conversations with developers on how data would be aggregated and published.

**Current fuel cell price by application and production rate**

![Graph showing current fuel cell price by application and production rate.](image)

**Current fuel cell price by application**

![Graph showing current fuel cell price by application.](image)
Accomplishment: Generic Cost/Price Template

Example of generic form that would be filled out by a fuel cell developer.
Collaborations

• Working with multiple fuel cell developers
  o Developer names not released
  o 27 developers contacted

• Data sharing is completely voluntary

• Ongoing effort to include additional fuel cell developers
Future Work

• Publish a current cost/price aggregate CDP
• Alternate between a status update on fuel cell durability and system cost/price
• Update the lab fuel cell durability status (reviewed in 2013 AMR) planned for FY15
• Continue cultivating existing collaborations and developing new collaborations with fuel cell developers.
Summary

Relevance: Independent aggregation of current fuel cell system cost/price complements high volume based model costs without revealing proprietary data.

Approach: Leverage NFCTEC and prioritized industry collaborations.

Accomplishments: Updated partnership pamphlet, project value and benefits, and example results.

Collaborations and Future Work: Continue expanding analyzed data sets, including fuel cell developers, and results.