
Hydrogen Fuel Cell Nexus Business-to-Business Website

Alleyn Harned (Primary Contact) and
Matthew Wade
Virginia Clean Cities at James Madison University
1401 Technology Drive MSC 4115
Harrisonburg, VA 22807
Phone: (540) 568-8896
Email: aharned@vacleancities.org

DOE Managers:
Nancy Garland
Phone: (202) 586-5673
Email: Nancy.Garland@ee.doe.gov

Greg Kleen
Phone: (240) 562-1672
Email: Greg.Kleen@ee.doe.gov

Contract Number: DE-EE0006932

Subcontractors:

- Birch Studio, Charlottesville, VA
- Breakthrough Technologies Institute, Woodbridge, VA

Project Start Date: July 1, 2015

Project End Date: September 30, 2018

Overall Objectives

- Expand the domestic supply chain of hydrogen components and systems.
- Scale up the fuel cell and hydrogen supply chain by building and populating a comprehensive communications database.
- Drive U.S. companies to the free website via an engaging outreach campaign.
- Advance hydrogen fuel cell suppliers in the transportation, utility, industrial, commercial, and residential sectors, with a focus on the transportation sector in fuel and infrastructure supply chain systems.
- Contribute to a more diverse and efficient energy balance.

Fiscal Year (FY) 2018 Objectives

- Develop interface to allow fuel cell and hydrogen companies to post their needs and specifications, and allow potential supply chain companies to post their capabilities. The idea is

to stimulate a dialogue and encourage supplier-to-end-manufacturer connections.

- Update the Hydrogen Fuel Cell Nexus (HFC Nexus) continuously and technical specifications quarterly and, if necessary, revise and update the interface based on user experience. The number of suppliers/components added during each quarter will be included in the quarterly reports.
- Mine the traffic on the website, compile information gained during outreach efforts, and discuss with DOE and fuel cell industry leaders to identify critical gaps in the supply chain and develop a response plan.
- Identify the fuel cell system gaps and cater the opportunity center to narrow the gaps identified. Deliver a preliminary assessment.
- Seek information biannually from additional suppliers not previously captured.
- Collect data and research suppliers.
- Open a dialogue with potential partners through dissemination of the developed materials. The project team will track the materials distribution by using actual numbers of printouts distributed, website hits, webinar participants, and video views.
- Seek opportunities for information placement in trade journals, which often make space available for nonprofits.
- Create and advance a sustainability program for long-term continued life of the website and database and for continued upkeep and enhancement of data. This will include exploring collaboration with industry, federal agencies, and national laboratories.

Technical Barriers

This project addresses the crosscutting technical barriers of supply chain transparency and business and product information of the Fuel Cell Technologies Office Multi-Year Research, Development, and Demonstration (MYRDD)

Plan.¹ The project also addresses the following specific barrier from the Education and Outreach section of the MYRDD Plan:

- (A) Lack of Readily Available, Objective, and Technically Accurate Information.

Contribution to Achievement of DOE Milestones

This project will directly contribute to achievement of DOE milestones from the Education and Outreach section of the Fuel Cell Technologies Office MYRDD Plan. The project is a cross-cutting effort to publish available supply chain business content and connect industry partners. As such, milestones associated with development and demonstration in the Manufacturing R&D section are supported, and this project takes those milestones to deployment.

FY 2018 Accomplishments

- The HFC Nexus has 356 fuel cell and hydrogen companies.
- The HFC Nexus has 104 active user accounts.
- Using Google Analytics to track the website traffic, Virginia Clean Cities (VCC) can report that the directory saw 7,877 users, 9,629 sessions, and an average of 21 daily active users (Figure 1). This is an increase from 6,100 users, 8,000 sessions, and an average of 8 daily active users (DAUs) from July 1, 2016, through June 30, 2017. A DAU is the number of unique users who had at least one session within a 30-day period.
- The project team created an HFC Nexus news blog (hfcnexus.com/blog) dedicated to promoting news about events, conferences, grants, trainings, and new technologies in the hydrogen fuel cell industry.
- The project team launched the HFC Nexus advertising module.

Sessions by country



Figure 1. Sessions by country in the past 12 months. Dark blue—Between 10% and 50% of sessions; light blue—less than 10% of sessions; gray—no sessions.

¹ <https://www.energy.gov/eere/fuelcells/downloads/fuel-cell-technologies-office-multi-year-research-development-and-22>

INTRODUCTION

The Fuel Cell and Hydrogen Opportunity Center, renamed the Hydrogen Fuel Cell Nexus (and live at www.hfcnexus.com and www.hfcnexus.org, Figure 2) sought to expand the domestic supply chain of components and systems necessary for the manufacture and distribution of hydrogen and fuel cell equipment. The supply chain has benefited through the development of a comprehensive online database. This effort advanced hydrogen fuel cell suppliers in the transportation, utility, industrial, commercial, and residential sectors, with a focus on the transportation sector in fuel and infrastructure supply chain systems.



Figure 2. www.HFCnexus homepage

APPROACH

VCC and project partners addressed the main objective of the Fuel Cell and Hydrogen Opportunity Center project by collaboratively identifying gaps and developing elements of interest for a comprehensive supplier tool, gathering national supplier information to fill the database, identifying and encouraging new suppliers to become engaged in the hydrogen industry, and releasing and maintaining a public directory tool for interaction with the data. Birch Studio developed the user interface for the website. VCC populated the database with U.S. companies from the FuelCells2000 directory. After the website was launched, VCC began an aggressive outreach campaign using trade association outreach, webinars, social media, and personal contact to drive companies to this resource. The mechanism for the project to continue with a sustainable stream of revenue through advertisements and donations has been created. No revenue has been raised through this mechanism to date.

RESULTS

The efforts of the Fuel Cell and Hydrogen Opportunity Center project team began with the release of a live and interactive website directory on July 11, 2016. The website directory has grown from an initial population of 220 companies to 356. These companies were verified as active in the hydrogen or fuel cell industries. Phone numbers, email addresses, and mailing information for employees at each company were uploaded for each company to provide a method for website users to contact the company (Figure 4). The website has grown from zero user accounts to 104 active user accounts in 2018.

HYDROGEN GENERATION/SUPPLY

Companies that make and sell hydrogen generation systems or supplies hydrogen in a gas or liquid form.



Air Liquide Houston, TX

Air Liquide aims to deliver innovative gas solutions and technologies to a wide range of customers, driving their performance and helping them reduce their environmental impact. No matter where, we make sure our solutions are safe, reliable, cost-effective and sustainable.

ALSO LISTED IN: [Hydrogen Fuel](#), [Hydrogen Generation/Supply](#), [Hydrogen System Integrator](#) [Edit](#)

UPDATED: January 31, 2017



Air Products & Chemicals, Inc. Allentown, PA

Air Products is the world's largest supplier of hydrogen. A commercial developer, supplier and operator of turnkey hydrogen on-site plants, Air Products is in the forefront of developing hydrogen fueling stations for clean transportation applications.

ALSO LISTED IN: [Hydrogen Generation/Supply](#), [Hydrogen Station](#), [Hydrogen Storage](#), [Hydrogen System Integrator](#) [Edit](#)

UPDATED: January 25, 2017

Figure 3. Example category page

The screenshot shows the 'HYDROGEN FUEL CELL NEXUS' website. The header includes navigation links for 'Glossary', 'Resources', 'REGISTER', and 'LOGIN'. Below the header is a green navigation bar with 'COMPANY TYPES', 'PRODUCTS', 'US MAP', and 'MATCHMAKER'. A search bar is also present. The main content area features the Air Products & Chemicals, Inc. logo and the following information:

- Company Type:** Hydrogen Generation/Supply
- Description:** Air Products is the world's largest supplier of hydrogen. A commercial developer, supplier and operator of turnkey hydrogen on-site plants, Air Products is in the forefront of developing hydrogen fueling stations for clean transportation applications.
- Products:** Hydrogen Storage, Other
- Fuel Cell Type:** Molten Carbonate Fuel Cell, Polymer Electrolyte Membrane Fuel Cell
- Contact:** 1-800-654-4567, gigmktg@airproducts.com
- Address:** 7201 Hamilton Boulevard, Allentown, PA 18195-1501, United States
- Phone:** 1-800-654-4567
- Email:** gigmktg@airproducts.com
- Website:** www.airproducts.com
- In Business Since:** 1940
- # of US Employees:** 1000+
- Stock Symbol:** apd

A map shows the location of Air Products and Chemicals, Inc. in Allentown, PA, near Hamilton Blvd. Other nearby businesses like Wendy's, KFC, Applebee's, and MCD are also marked. The footer includes the U.S. Department of Energy logo and text: 'Energy Efficiency & Renewable Energy'. It also states: 'Fuel Cell Nexus is a joint project of Virginia Clean Cities, Breakthrough Technologies Institute and Birch Studio, and is funded by the Department of Energy's Fuel Cell Technologies Office.' A link to 'Email us here' is provided for reporting bugs or feature requests.

Figure 4. Example of company page

CONCLUSIONS

During the final project year, the project team was active in several areas of the project related to improving the website and adding companies. The project team continued verifying data and company information and revising as needed. The project team engaged in direct marketing and outreach to hydrogen and fuel cell companies. During this period, VCC developed and disseminated marketing and outreach materials that described the website and how to utilize it. Birch Studio developed the news blog for providing important updates on developments in the hydrogen and fuel cell industry. Birch Studio began a maintenance and iteration phase to continue improving the website interface. VCC staff continued promoting the database at events and collected data on hydrogen and fuel cell companies to include in the database. Project staff continued website branding with DOE guidance. The project team engaged in an outreach campaign to drive appropriate suppliers to the site by initiating friendly partnerships with business-to-business marketing associations and other business associations in areas of critical need.

The database and website tools have three main areas: public access, supplier secure access, and system administrator’s access. Figure 4 is an example of a company page. This page is useful to the user because it provides information on the company, including products, address, and contact information. The content is accessible 24 hours a day, 7 days a week. A news blog was added to generate additional content for the Nexus (Figure 5).



Figure 5. Example of news blog page