

---

## VI.3 Fuel Cell and Hydrogen Opportunity Center, [www.hfcnexus.com](http://www.hfcnexus.com) (Hydrogen Fuel Cell Nexus)

Alleyn Harned (Primary Contact) and  
Matthew Wade

Virginia Clean Cities (VCC) at James Madison University  
1401 Technology Drive MSC 4115  
Harrisonburg, VA 22807  
Phone: (540) 568-8896  
Email: [aharned@vacleancities.org](mailto:aharned@vacleancities.org)

### DOE Managers:

Nancy L. Garland  
Phone: (202) 586-5673  
Email: [Nancy.Garland@ee.doe.gov](mailto:Nancy.Garland@ee.doe.gov)  
Greg Kleen  
Phone: (240) 562-1672  
Email: [Gregory.Kleen@ee.doe.gov](mailto:Gregory.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: May 31, 2018

their capabilities. The idea is to stimulate a dialogue and encourage supplier-to-end-manufacturer connections.

- Update the opportunity center 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 and final assessment.
- Seek information bi-annually from additional suppliers not previously captured.
- Collect data and research suppliers. Currently there are multiple thousands of suppliers in the U.S. alone and the existing BTI database consists of only 1,000 suppliers. When we reach a critical mass of users, suppliers will hear about the database and be able to sign up on their own initiative, long after our outreach campaign has ended. Rich content will allow for new ways to search and for companies to connect, and also allow organic scaled growth of fuel cell industry sectors.
- 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, webinars participants, and video views.
- Seek opportunities for information placement in trade journals, which often make space available for nonprofits. The team will use free sources and a limited budget to purchase internet-based advertising through Google AdWords and Facebook in order to reach people as they search for words or phrases and browse websites with themes related to fuel cells.
- 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.

### Overall Objectives

- To expand the domestic supply chain of hydrogen components and systems.
- Scale-up of 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.
- Reduce greenhouse gas emissions and air pollution and contribute to a more diverse and efficient energy balance by facilitating the widespread commercialization of hydrogen and fuel cell technologies.

### Fiscal Year (FY) 2017 Objectives

- Develop interface to allow fuel cell and hydrogen companies to post their needs and specifications, and allow potential supply chain companies to post

### Technical Barriers

This project addresses the crosscutting technical barriers of supply chain transparency and business and

product information of the Manufacturing R&D section. The project also addresses the following specific barrier from the Education and Outreach section of the Fuel Cell Technologies Office Multi-Year Research, Development, and Demonstration Plan.

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

### Contribution to Achievement of DOE Manufacturing R&D Milestones

This project will directly contribute to achievement of DOE milestones of the Fuel Cell Technologies Office Multi-Year Research, Development, and Demonstration 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 2017 Accomplishments

- HFCnexus launched on July 11, 2016.
- The HFCnexus has 350 fuel cell and hydrogen companies.
- The HFCnexus has 74 active user accounts.
- HFCnexus.com Matchmaker function launched in October 2016.
- Using Google Analytics to track the website traffic, VCC can report that the directory saw 6,100 users, 8,000 sessions, and an average of eight daily active users from July 1, 2016, through June 30, 2017. Daily use has increased with 38 daily users in recent months compared with lower use at launch. A daily active user is a unique user who had at least one session within a 30-day period. Each daily active user equals one unique user.
- Instructional video created for how to create an account and posted to YouTube and included in every registration confirmation email.
- Instructional video created for how to create a company profile and posted to YouTube and included in every registration confirmation email was created on October 3, 2016. It has 23 views as of December 31, 2016. Another instructional video for how to set up a Matchmaker account was created on October 12, 2016.



## 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 1) will expand the domestic supply chain of components and systems necessary for the manufacture and distribution of the hydrogen and fuel cell equipment. The supply chain will benefit through the development of a comprehensive online database. This effort will 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.

## 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.



FIGURE 1. www.HFCnexus homepage

## RESULTS

The FY 2017 efforts of the Fuel Cell and Hydrogen Opportunity Center project team culminated in 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 350 companies (Figure 2). These companies were verified that they are active in the hydrogen or fuel cell industries. Phone numbers, email addresses, and mailing information for employees at each company was uploaded for each company to provide a method for website users to contact the company (Figure 3). The website has grown from zero user accounts to 74 active user accounts.

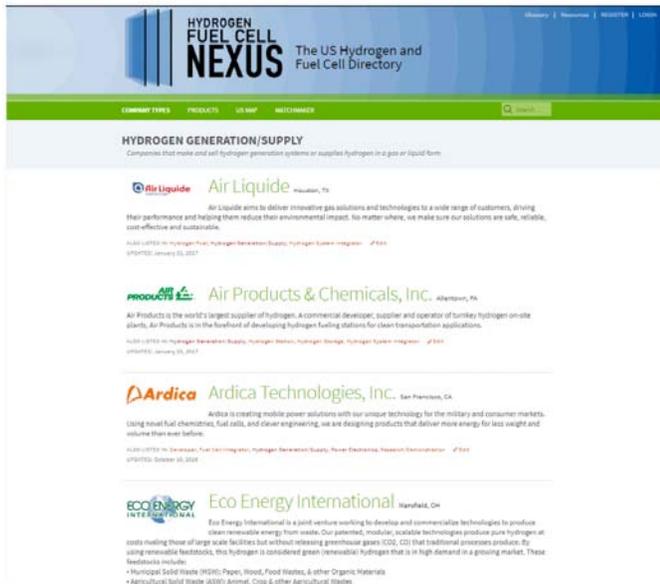


FIGURE 2. Example of category page

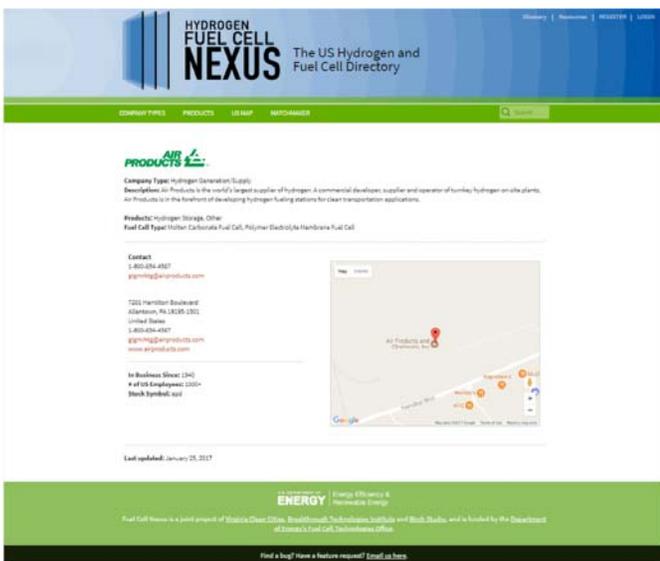


FIGURE 3. Example of company page

During the fourth quarter of 2016 (July to September), 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 began 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 Matchmaker interface for companies to connect with one another. 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 developed website branding with DOE guidance.

Throughout the rest of the year and moving through to June 30, 2017, the project team entered a supply chain growth phase. Throughout the second budget year, the 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 for public access, supplier secure access, and system administrator's access. The content will be accessible 24 hours per day, seven days per week.

For FY 2018, the project team will continue maintenance and iteration of the website, approve new users, add new companies, and begin a campaign to secure outside funding from advertisers. This funding will ensure the website is fully funded and operational into the future.

## FY 2017 PUBLICATIONS/PRESENTATIONS

1. Alleyn Harned presented “Session Remarks and Supply Chain Analysis: Hydrogen Fuel Cell Nexus” at Fuel Cell Supply Chain Stakeholder Session in North Canton, OH on September 27, 2016.
2. Virginia Clean Cities at James Madison University’s Deputy Director Matthew Wade attended the Invest! Design! Make! Use! Hydrogen Fuel Cell Industry Forum in Hartford, CT to present an update on the Hydrogen Opportunity Center on November 17, 2016. The presentation was entitled “Hydrogen Fuel Cell Nexus.”
3. Principal Investigator Alleyn Harned presented the website to the Hydrogen Technical Advisory Committee in Washington, D.C., on December 7, 2016. The presentation was entitled “Hydrogen Fuel Cell Nexus.”
4. Alleyn Harned also presented the project at the Annual Merit Review, Washington, D.C. June 6, 2017. The presentation was entitled “Fuel Cell and Hydrogen Opportunity Center.”
5. Chris Mueller of Virginia Clean Cities moderated a panel discussion the hydrogen summit at the ACT Expo from May 2–4, 2017. VCC did not present a slide deck but provided a summary of the website and distributed informational brochures about the website.