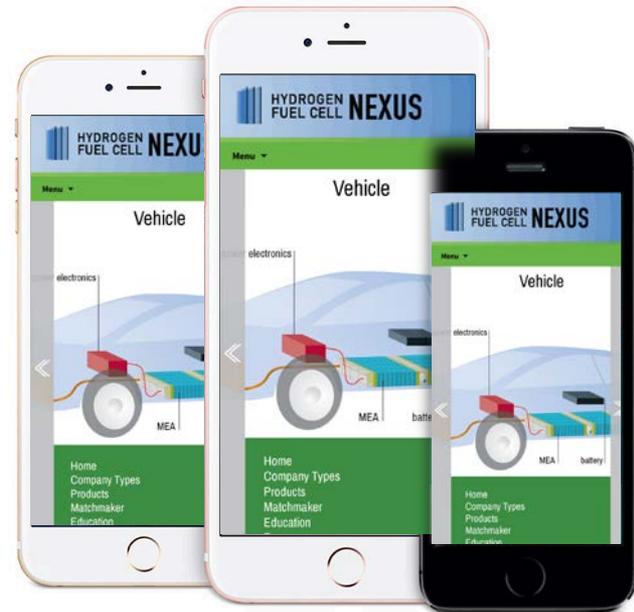
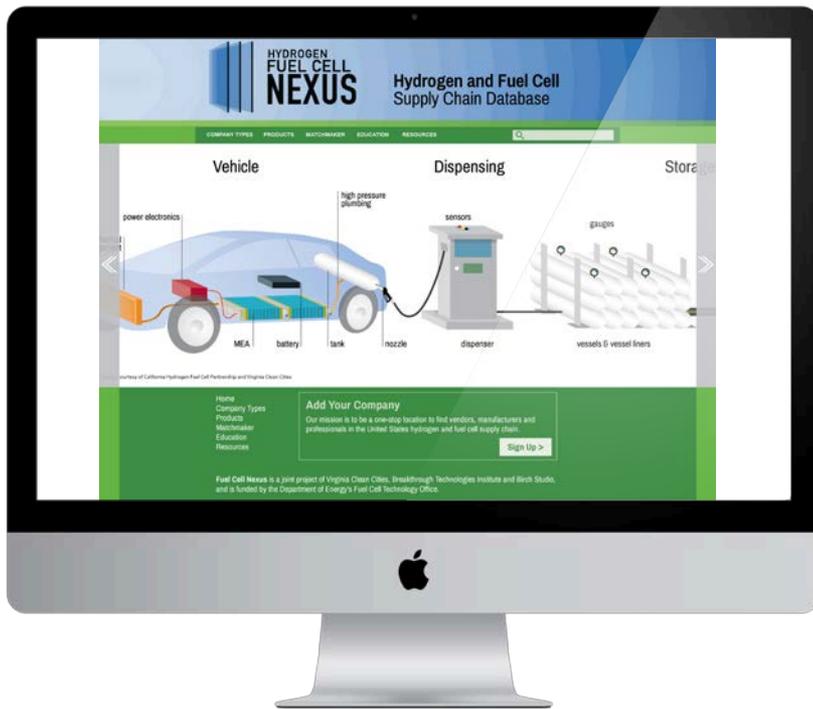




HFCNEXUS.COM



Fuel Cell and Hydrogen Opportunity Center

Project ID # - MN013

June 6, 2017

PI: Alleyn Harned

Virginia Clean Cities

1401 Technology Drive

Harrisonburg, VA 22802

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



Virginia Clean Cities Snapshot

One designated statewide Coalition in Virginia - since 1996

501c3 not-for-profit & James Madison University partnership

Supported by stakeholder members, DOE, DMME, and grants

Managing alt fuel deployment and education programs on behalf of governments, fleets, and other stakeholders

Strategies:

- Partner with States & Local Organizations, Public and Private fleets
- Provide Outreach, Education, & Information Resources
- Facilitate Infrastructure Development
- Provide Technical & Financial Assistance



Timeline

- Commence: July 1, 2015
- End: June 30, 2018

Budget

- Total Project Budget
 - \$475,743
- Federal Share
 - \$450,000
- Recipient Share
 - \$25,743
- Total DOE Funds Spent*
 - \$369,091

*As of 2/28/17

Barriers

- Barriers Addressed
 - The lack of updated readily available, objective, national and accurate supplier information
 - Holes in supply chain information – high soft costs of collaboration

Partner/Collaborators

- VCC at James Madison University, Alleyn Harned and John Hulvey
- Birch Studio, David Robinson
- Breakthrough Technologies Institute (BTI), Robert Rose



- Expand the domestic supply chain of hydrogen components and systems through website.
- Scale-up the fuel cell and hydrogen supply chain by building and populating a comprehensive communications database.
- Drive U.S. companies to the website via an aggressive 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
- Project website successfully launched, information readily available, visitors connecting with U.S. businesses
- Supply chain needs filled with business information

Approach – Budget Periods 1 & 2



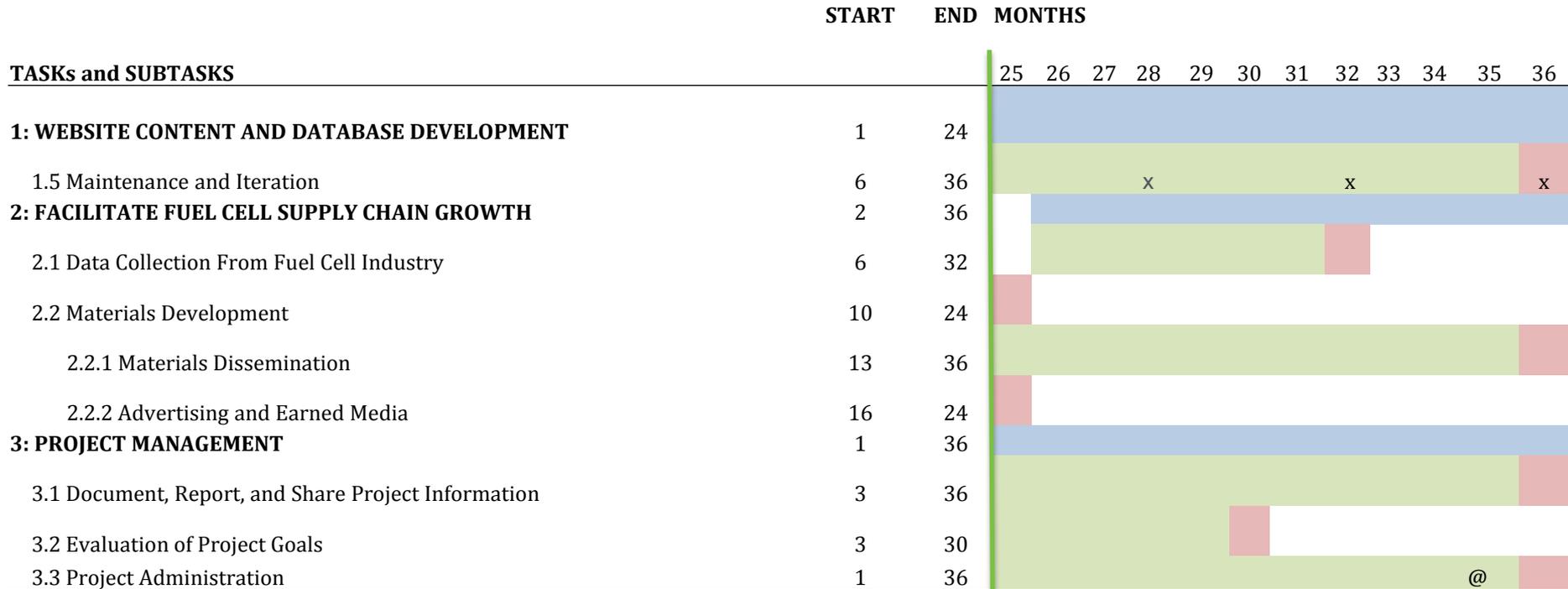
START END MONTHS

TASKs and SUBTASKS			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1: WEBSITE CONTENT AND DATABASE DEVELOPMENT	1	24	[Blue bar]																							
1.1 Solicitation of Input	1	3	x																							
1.2 Comprehensive List of Fuel Cell System Components	1	6					x																			
1.3 Creation of the Opportunity Center	1	9									#															
1.3.1 Develop Web Portal	1	12						0						x												
1.3.2 Develop the Initial Database	1	3	x																							
1.4 Develop Matchmaker Interface	6	15															x									
1.5 Maintenance and Iteration	6	36																								
1.6 Gap Analysis and Plan	1	24																					x			
2: FACILITATE FUEL CELL SUPPLY CHAIN GROWTH	2	36	[Blue bar]																							
2.1 Data Collection From Fuel Cell Industry	6	32																								
2.2 Materials Development	10	24																								
2.2.1 Materials Dissemination	13	36																								
2.2.2 Advertising and Earned Media	16	24																								
3: PROJECT MANAGEMENT	1	36	[Blue bar]																							
3.1 Document, Report, and Share Project Information	3	36																								
3.2 Evaluation of Project Goals	3	30																								
3.3 Project Administration	1	36																								

***Year three represents Closeout. Significantly reduced efforts and budget to maintain website while closing out the 2015 federal awarded funding for the project**

Expected completion	
Milestone Report Quarterly Emphasis	x
Go/No-Go Point	#
Hard Launch of Website	0

Budget Period 3 Timeline



***Year three represents Closeout. Significantly reduced efforts and budget to maintain website while closing out the 2015 federal awarded funding for the project**

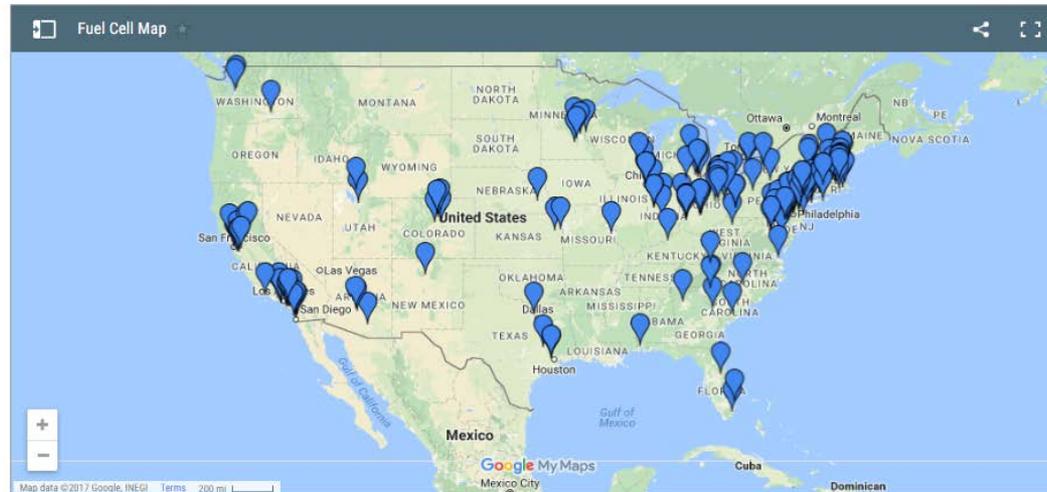
Expected completion	[Green bar from month 25 to 36]
Milestone Report Quarterly Emphasis	x
Go/No-Go Point	#
Project Closeout Period Begins	@

2: FACILITATE FUEL CELL SUPPLY CHAIN GROWTH

In the second year, partners gather national supplier information, encourage suppliers to become engaged in the hydrogen industry, and maintain a public directory tool for interaction with the data.

US MAP

The map below shows the locations of organizations in the Hydrogen and Fuel Cell Database across the US. You can zoom in and click on pins to navigate.





- **2.1 Data Collection From Fuel Cell Industry:** The team will 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.
- Input new suppliers into the opportunity center database
 - **Status: Complete**
- **2.2 Materials Development:** First generation materials submitted and approved by DOE.
 - **Status: Ongoing**



- **2.2.1 Materials Dissemination:** The project team will track the materials distribution by using the number distributed, website hits, webinar participants, and video views. Milestone will be successful with 300 webinar participants in first outreach year and 500 overall and 100 total associated supplier contacts from conferences.
 - **Status: Ongoing**
- **2.2.2 Advertising and Earned Media:** The team will 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.
 - **Status: Adwords launch complete, earned media ongoing**



2016

- Website Launched in July 2016
- Expanded to 337 Organizations
- 63 Users
- 400 unique site visits per month
- Launched Matchmaker Interface
- AdWords campaign
 - 127,039 views
 - 2,108 clicks
- Three Instructional Videos created and posted to YouTube – 100 views
- Earned Media
 - <http://www.whsv.com/content/news/Valley-organization-creates-a-website-for-emerging-technology-387695541.html>
 - NGT News <http://ngtnews.com/dae-announces-14-million-to-advance-hydrogen-fuel-technologies>



 **HYDROGEN FUEL CELL NEXUS** The US Hydrogen and Fuel Cell Directory [Glossary](#) | [Resources](#) | [REGISTER](#) | [LOGIN](#)

[COMPANY TYPES](#) [PRODUCTS](#) [US MAP](#) [MATCHMAKER](#)

Search Results for: 3m



3M Fuel Cell Components

Oakdale, MN

3M is a global supplier of components to the PEM fuel cell industry. 3M specializes in development and volume manufacture of durable, high performance, and consistent MEAs.

ALSO LISTED IN: [Component Accessories](#), [Dispersions](#), [Gas Diffusion Layers](#), [Gaskets](#), [Manufacturer](#), [MEAs](#), [Membranes](#), [Plates](#), [Supplier](#) [Edit](#)

UPDATED: October 12, 2016

HYDROGEN FUEL CELL NEXUS The US Hydrogen and Fuel Cell Directory

Glossary | Resources | REGISTER | LOGIN

COMPANY TYPES PRODUCTS US MAP MATCHMAKER



Company Type: Supplier

Description: 3M is a global supplier of components to the PEM fuel cell industry. 3M specializes in development and volume manufacture of durable, high performance, and consistent MEAs.

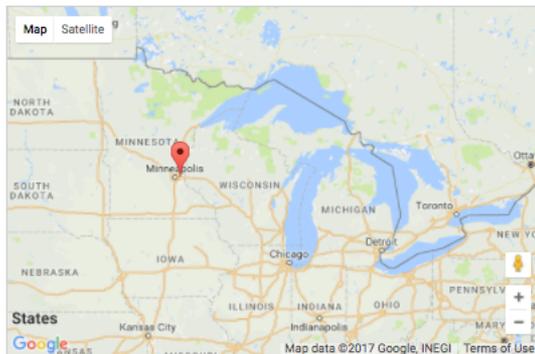
Products: Membrane Electrode Assemblies (MEA), MEA-Membranes, MEA-Dispersions, MEA-Gaskets, MEA-Gas Diffusion Layers, MEA-Plates, MEA-Component Accessories, Other

Other Product: Ultra Low Viscosity Fluoroelastomer, Fluoropolymers, Ceramic Fibers

Fuel Cell Type: Polymer Electrolyte Membrane Fuel Cell

6744 33rd St North
Bldg 504
Oakdale, MN 55128
United States
800-367-8905
eamcustomerservice@mmm.com
www.3m.com/fuelcells

In Business Since: 1902
of US Employees: 1000+
Stock Symbol: MMM



Company Type: Supplier

Description: 3M is a global supplier of components to the PEM fuel cell industry. 3M specializes in development and volume manufacture of durable, high performance, and consistent MEAs.

Products: Membrane Electrode Assemblies (MEA), MEA-Membranes, MEA-Dispersions, MEA-Gaskets, MEA-Gas Diffusion Layers, MEA-Plates, MEA-Component Accessories, Other

Other Product: Ultra Low Viscosity Fluoroelastomer, Fluoropolymers, Ceramic Fibers

Fuel Cell Type: Polymer Electrolyte Membrane Fuel Cell

6744 33rd St North
Bldg 504
Oakdale, MN 55128
United States
800-367-8905
eamcustomerservice@mmm.com
www.3m.com/fuelcells

OFFERING

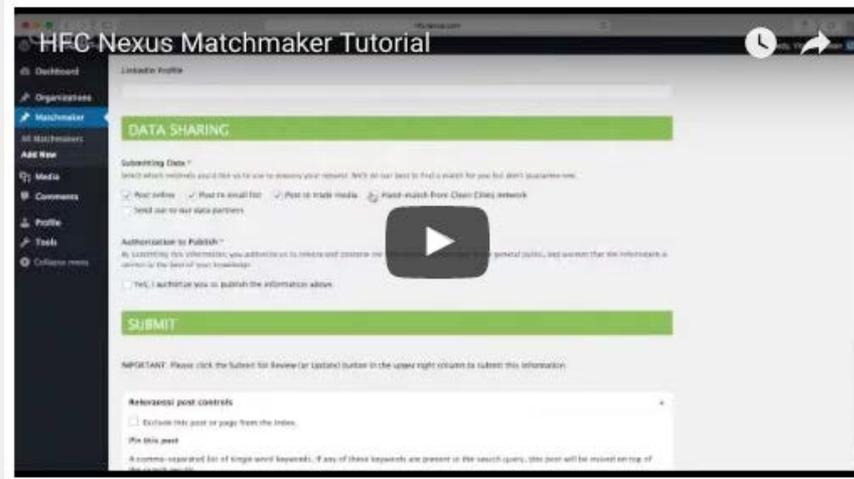
This page lists organizations that are offering products, goods, services, etc in hydrogen and fuel cell markets.

VIRGINIA CLEAN CITIES

Request for Submissions

The Matchmaker module is now live. Its goal is to help you connect with others in the supply chain to help improve communications and speed up development of this critical technology. Please consider adding a listing.

Matchmaker Function Tutorial Video



Activating Web-based Advertising

A screenshot of a web browser displaying the website fuelcellnexus.us. The browser's address bar shows the URL and several tabs. The website has a blue header with the title "HYDROGEN FUEL CELL NEXUS" and the subtitle "The US Hydrogen and Fuel Cell Directory". Below the header is a green navigation bar with links for "COMPANY TYPES", "PRODUCTS", "US MAP", and "MATCHMAKER", along with a search bar. The main content area is divided into two columns. The left column is titled "AUTO MANUFACTURER" and lists two companies: American Honda Motor Co., Inc. and New Flyer. The right column features a large advertisement for Hy-Lok, which includes the text "Hy-Lok USA offers the highest quality instrument valves and fittings for the most demanding fluid system applications in North & South America." and a "Learn more..." button.

fuelcellnexus.us

Essentials Web Tools Code Tools Design Tools Google Tools Green House MLS Tools Government Birch Studio RC Clients Radio VCC

HFC Nexus - DEV Customize 10 New Security Coming Soon Mode Active Howdy, birch

Glossary Resources REGISTER LOGIN

HYDROGEN FUEL CELL NEXUS

The US Hydrogen and Fuel Cell Directory

COMPANY TYPES PRODUCTS US MAP MATCHMAKER Search

AUTO MANUFACTURER

Companies that make and sell cars and trucks

American Honda Motor Co., Inc.

Torrance, CA

Honda has long been a pioneer in the global auto industry with the development and application of edge environmental technologies that improve fuel efficiency and reduce vehicle emissions – with the fun, performance, quality and reliability.

ALSO LISTED IN: [Auto Manufacturer](#), [Vehicles](#) [Edit](#)

New Flyer

Mercer Island, WA

New Flyer is the leading manufacturer of heavy-duty buses in the U.S. and Canada. Offering the full range of transit vehicles, we have secured our strong position by providing reliable transportation solutions that meet the needs of today while anticipating the needs of tomorrow. Known for breaking new ground with the first low-floor diesel-electric bus and most recently, the world's first zero-emission hydrogen fuel cell fleet, we remain dedicated to innovation and excellence as we provide customers with a wide range of products such as clean-running, fuel-efficient hybrid buses; zero-emission electric trolleys; buses with alternative fuels, like hydrogen and CNG and clean diesel buses. Our products put us on the market and innovation keep us ahead.

ALSO LISTED IN: [Auto Manufacturer](#), [Vehicles](#) [Edit](#)

Hy-Lok

Hy-Lok USA offers the highest quality instrument valves and fittings for the most demanding fluid system applications in North & South America.

[Learn more...](#)

Proposed Web-based Advertising



The screenshot shows a web browser displaying the fuelcellnexus.us website. The browser's address bar shows the URL and several tabs. The website's header includes the site name "fuelcellnexus.us", a search bar, and a navigation menu with items like "Essentials", "Web Tools", "Code Tools", "Design Tools", "Google Tools", "Green House", "MLS Tools", "Government", "Birch Studio", "RC Clients", "Radio", and "VCC". Below the header, the main content area features a large blue banner with the text "HYDROGEN FUEL CELL NEXUS The US Hydrogen and Fuel Cell Directory". A green navigation bar below the banner contains links for "COMPANY TYPES", "PRODUCTS", "US MAP", and "MATCHMAKER", along with a search bar. The main content is divided into two columns: "Featured Organization" and "Upcoming Events". The "Featured Organization" section highlights "Hy-Lok" with a large image and text: "Hy-Lok USA offers the highest quality instrument valves and fittings for the most demanding fluid system applications in North & South America." Below this, there are social media icons for Facebook, Google+, LinkedIn, Twitter, and YouTube, followed by statistics: "SPEC SHEETS 24", "CATEGORIES 6", and "CERTIFICATIONS ISO 9001". The "Upcoming Events" section lists three "Fuel Cell Seminar, Long Beach, CA, November 7-10" events. At the bottom, there are two sections: "Hydrogen Fuel Cell Vehicle" and "Dispensing", each with a plus sign icon.



Remainder for FY 2017

- Site Maintenance and Iteration
 - Additional Companies
 - Additional active users
- Final Gap Analysis
- For Advertising and Marketing
 - Materials Development
 - Materials Dissemination
 - Initial Sponsor Acquisition for FY 2018
- Document, Report, and Share Project Information



- Virginia Clean Cities at James Madison University
 - Manages project through Virginia Clean Cities – 20 year old program with past hydrogen education project with DMME /DOE
- Birch Studio
 - an experienced branding agency that has advanced a diversity of online informational tools and networking opportunities and focused visualization and user interface design in the alternative energy sector. Birch has advanced thousands of projects and currently hosts over 100 websites.
- Breakthrough Technologies Institute
 - an independent, non-profit educational organization dedicated to promoting advanced environmental and energy technologies from the perspective of the public benefit



- Website Development and Database Management
 - VCC will work with DOE and program partners to find additional third-party funding to maintain the database
 - The primary barriers to success for this task are obtaining additional funding from organizations to support the continued development and management of this database
- Facilitating Fuel Cell Market Growth
 - VCC will continue the process of marketing the website through advertising and earned media.
 - VCC will work with DOE and project partners to develop informational and promotional materials that will highlight the benefits of participating in this database.



- **Objective:** Build and market a comprehensive hydrogen and fuel cells database for U.S. companies interested in alternative fuels.
- **Relevance:** Reducing barriers to education on hydrogen and fuel cells as an industry and expand market opportunities for the fuel
- **Approach:** Develop a comprehensive list and database of hydrogen and fuel cell system components. Begin work with partners on the creation of the Fuel Cell and Hydrogen Opportunity Center and Web Portal. Develop marketing plan for the promotion of the website.
- **Accomplishments:** www.HFCnexus.com, 337 entries, UI and website deployed, Gap Analysis, and Plan
- **Collaborations:** JMU, Birch Studio, and BTI



Virginia Clean Cities

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