



# HYDROGEN INDUSTRY SOCIAL NETWORK ANALYSIS FOR MICHIGAN AND OHIO

Workforce Intelligence Network for Southeast Michigan

December 2025



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## Forward

This material is based upon work supported by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) under the Hydrogen and Fuel Cell Technologies Office (HFTO), Congressionally Directed Spending Project, Award Number DE-EE0010706. The hydrogen economy has experienced rapid change in recent years, creating a growing demand for a highly skilled workforce. This effort is led by the University of Toledo, in collaboration with Case Western Reserve University, Cuyahoga Community College, Lorain County Community College, Northwest State Community College, the Ohio Aerospace Institute, Owens Community College, and the Workforce Intelligence Network.

This project seeks to identify current workforce needs and gaps related to technician, skilled trades, scientist, and engineering roles within the hydrogen sector. Insights from this assessment will guide the development of training pathways and credentialing programs aligning with industry requirements for building, maintaining, and utilizing hydrogen infrastructure safely and effectively. The transition to a clean energy economy represents one of the most significant and transformative opportunities of our lifetime. At the heart of this shift lies hydrogen—a versatile energy carrier poised to decarbonize sectors ranging from heavy industry to long-haul transportation and grid-scale energy storage. For the states of Michigan and Ohio, this is not a distant vision; it is a current reality with profound implications for regional prosperity and workforce development.

This report provides a critical, comprehensive look at the diverse applications of hydrogen, spanning nearly a dozen current and potential sectors, from steel decarbonization and glass manufacturing to energy storage and transportation. Our analysis confirms the industry's significant potential to revitalize manufacturing, create new industrial ecosystems, and establish the region as a leader in clean energy technology.

However, opportunity comes with an urgent challenge. Our research, which includes direct feedback from employers across both states, has illuminated a growing concern: the talent gap. While the technical applications for hydrogen are diverse and rapidly expanding, the current talent pool is not yet equipped with the specialized skills needed for this evolving industry. This significant achievement is a direct result of the inter-team coordination and invaluable contributions made by both the University of Toledo and the Workforce Intelligence Network (WIN), whose project contributors are listed below.

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## Executive Summary

Social network analysis (SNA) is a visual and mathematical analysis of how people interact, exchange information, learn, and influence each other. A successful, regional industry ecosystem depends on a strong network of engaged and aligned partners. A mature, thriving sector will often bring firms and institutions together to coordinate information sharing, seek collaborative opportunities, and maximize and expand the workforce.

Social network analysis shows how a group of businesses and organizations work and influence each other, rather than showing the way people think they relate. SNA can show key organizations that are "core influencers" or those with less connectivity. It shows the human system and actual process. SNA is a mirror rather than a report card that can help identify where bridges should be built.

By applying the "snowball sampling" method, WIN identified publicly available data sources related to the hydrogen economy, such as media articles, newsletters, meeting rosters, and websites. The Workforce Intelligence Network identified a total of 739 nodes (organizations) within the Michigan and Ohio hydrogen ecosystem. These nodes resulted in 2,317 total connections--public business ties between the identified organizations.

The top five most influential organizations within the Hydrogen ecosystem are the U.S. Department of Energy, Midwest Alliance for Clean Hydrogen (MachH2), State of Michigan, Michigan Economic Development Corporation (MEDC), and Cleveland-Cliffs.

The U.S. Department of Energy is the most connected organization within the Michigan and Ohio ecosystem. Other strongly connected organizations include General Motors, ARCH2, the University of Michigan, the University of Toledo, and Honda.

A social network analysis ecosystem mapping survey was conducted among hydrogen stakeholders in Michigan and Ohio. The survey yielded 51 responses from 38 unique organizations. The survey results provided another layer of depth and understanding of the ecosystem, with respondents indicating the degree of interactions with other organizations.

This work supports research for curriculum development efforts by the University of Toledo and partners. It is also an opportunity for Michigan and Ohio to establish a leadership role in the hydrogen space through more relationship-building and networking opportunities. Developing these meaningful relationships could connect start-ups with larger companies.

The need for hydrogen mapping and collaboration extends beyond innovation, supply chain, and marketing purposes, to a need for trained and capable talent for the hydrogen sector. A recent literature review and analysis conducted by WIN, identified 26 unique occupation codes linked to hydrogen-specific projects. Due to the need for talent in hydrogen-related occupations, there is an opportunity for collaboration around the creation of a common set of workforce requirements. Funding could support development of public-private partnerships to create innovative opportunities in hydrogen. Collaboration within the network on training initiatives can set standards for workers across the industry and region and can prove cost effective for the companies involved.

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# Project Overview

Social network analysis (SNA) is a visual and mathematical analysis of how people interact, exchange information, learn, and influence each other. A successful, regional industry ecosystem is dependent on a strong network of engaged and aligned partners. A mature, thriving sector will often bring firms and institutions together to coordinate information sharing, seek collaborative opportunities and maximize and expand the workforce. However, there are serious challenges to achieving this.

Collaboration can be challenging across large geographies or among partners with distinct industrial histories. Today, the hydrogen ecosystem is characterized by the continued strength of legacy industries. This includes petroleum refining, petrochemicals production, and ammonia production, which have long served as the backbone of hydrogen utility. However, the landscape is expanding as hydrogen increasingly serves as a vital energy storage material and carrier for emerging sectors. This includes its integration into automotive, heavy trucking, aviation, and marine transport, as well as its role in decarbonizing heavy industries like steel production and potentially glass manufacturing.

To help the industry address these challenges, WIN, on behalf of the University of Toledo, has undertaken a social network analysis of regional hydrogen and hydrogen adjacent stakeholders, broadly defined across industry sectors, to identify where leadership, partnerships, innovative thinking, and collaboration are already occurring. This information will be used to examine pre-existing partnerships, bringing in new leaders who can help improve the health of the regional

hydrogen industry network and various nodes of economic activity (e.g., fueling, manufacturing, decarbonization, etc.) that are essential to it. This overview, methodology, and social network map addresses the ecosystem related to the hydrogen ecosystem.

Goa

The goal of this analysis is to reveal key leaders who are missing from “the table,” and others who might provide critical thinking or serve as points of intersection across key initiatives. The intent is to establish a baseline understanding of the health of the regional hydrogen ecosystem, with a deliberate focus on improving the health of that ecosystem over time. Well-connected ecosystems have a history of learning and innovation that outperform poorly connected regions with poorly-connected participants.

## What is social network analysis?

Social Network Analysis (SNA) turns information about relationships into visual maps that reveal the dimensions of those relationships (shape, depth, concentration, etc.). Differently organized networks benefit or hinder communities in different ways. Research shows that “smart networks” are the most adept at sharing exemplary practices, spreading new innovations, exchanging information, undertaking new projects, maximizing resources, and generally collaborating.

SNA can be used to identify gaps, holes, redundancies, or barriers in communication or engagement of key partners and stakeholders; identify potential new stakeholders; develop a strategy to improve the depth and breadth of networks where needed; and improve collaboration across the region and within sub-regions or issue-/organization-specific communities.

SNA has been applied successfully in numerous communities undergoing structural economic transformation and in businesses seeking to improve processes or other outcomes. SNA will allow the region to identify and track the following metrics:

- **Awareness:** Who knows what is happening in the network? How likely is it that information will spread throughout the network?
- **Influence:** Who are the major influencers in a specific community or region? To whom are people looking for information and insight? How likely are people to positively influence others?
- **Connectors:** Who links people who would not otherwise be connected? How connected are parts of the network?
- **Integration:** What is the overall network health? Who are the network leaders?
- **Resilience:** How dependent is the network on a few individuals?

## The mapping process

Network maps were created using publicly available data and a simple software program.

Each node represents an organization that was identified as having a role in Michigan or Ohio's hydrogen ecosystem, whether this role is as a business developing hydrogen vehicles, an electrolyzer business providing components to support these products, an association, a membership organization, an educational institution training the needed talent, or a non-profit convening stakeholders of this industry.

The power of network mapping comes from the ways communities use the information after it is collected. It can be used to convene interested individuals in solution-based activities and foster a more effective referral-based system.

Increased communication and collaboration can:

- Decrease the number of steps needed to distribute information to everyone in the network.
- Improve programs, projects, and services because of more and better information. This is particularly important in a referral network, where resource providers should know each other's strengths and services so that they can point clients in the right direction for assistance.
- Identify opportunities for joint action.
- Create momentum around collaboration.
- Spread innovation and new ideas throughout the network to address common challenges.

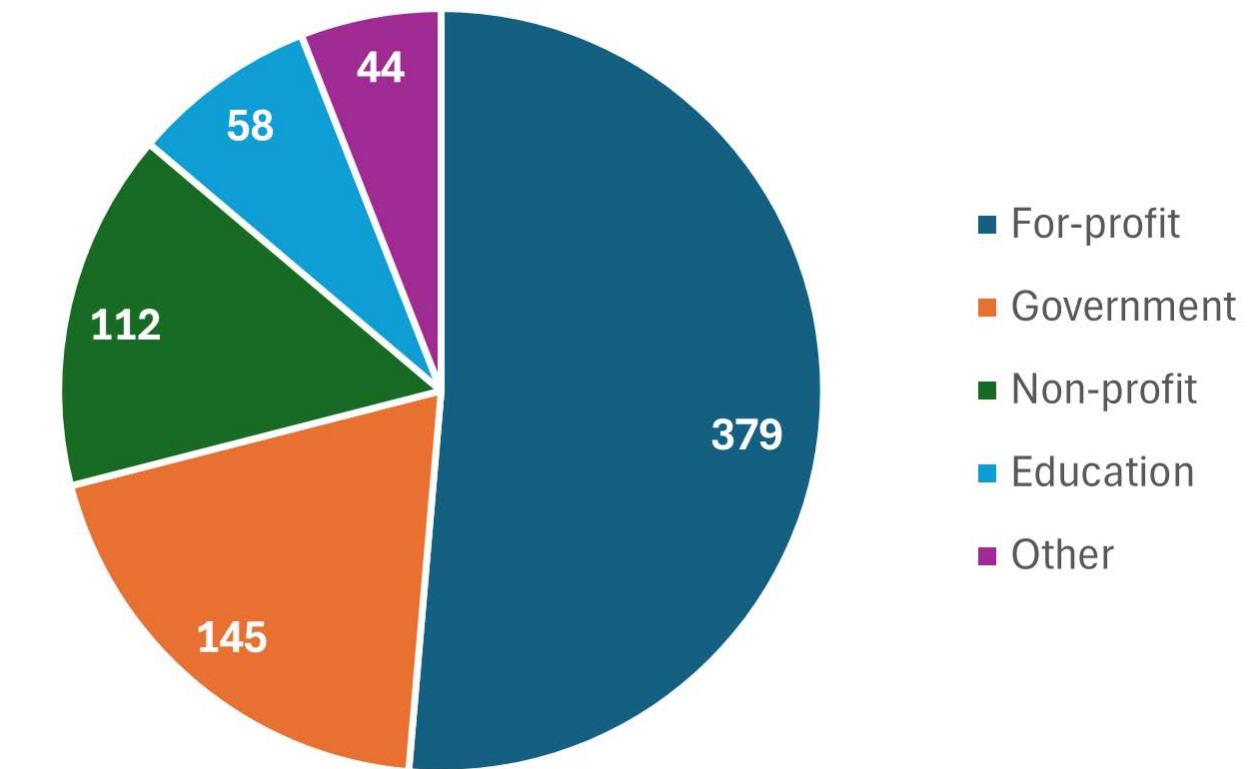
*The mapping software helps illustrate organizations that have an increasing presence (more ties to others in the space) on a sliding scale. The outer zones of the map typically have 1 or 2 connections to others in the space while the inner core holds multiple redundant connections to other well-connected players in the space. Most business ecosystems function as a core-periphery network, with strong redundant connections in the core and more diverse radial connections at the periphery. It is through peripheries that new knowledge and information flow from one cluster to another.*

## Findings and Analysis:

By conducting the Hydrogen Social Network Analysis, WIN researchers revealed a total of 739 nodes within the Michigan-Ohio ecosystem. These nodes demonstrated 2,317 total connections.



The snowball sampling methodology (see Appendix A) was utilized between September 2024 and February 2025\*. This approach yielded insightful findings related to the hydrogen network for Michigan and Ohio. Over half (51.3%) of the organizations identified were structured as for-profit or private entities. An additional 145 organizations (19.6%) were identified as Government entities, as well as 112 (15.2%) which were identified as non-profit. results of that effort will not accurately reflect recent changes to federal funding priorities regarding hydrogen and the current uncertainties in the hydrogen-related markets in the US.



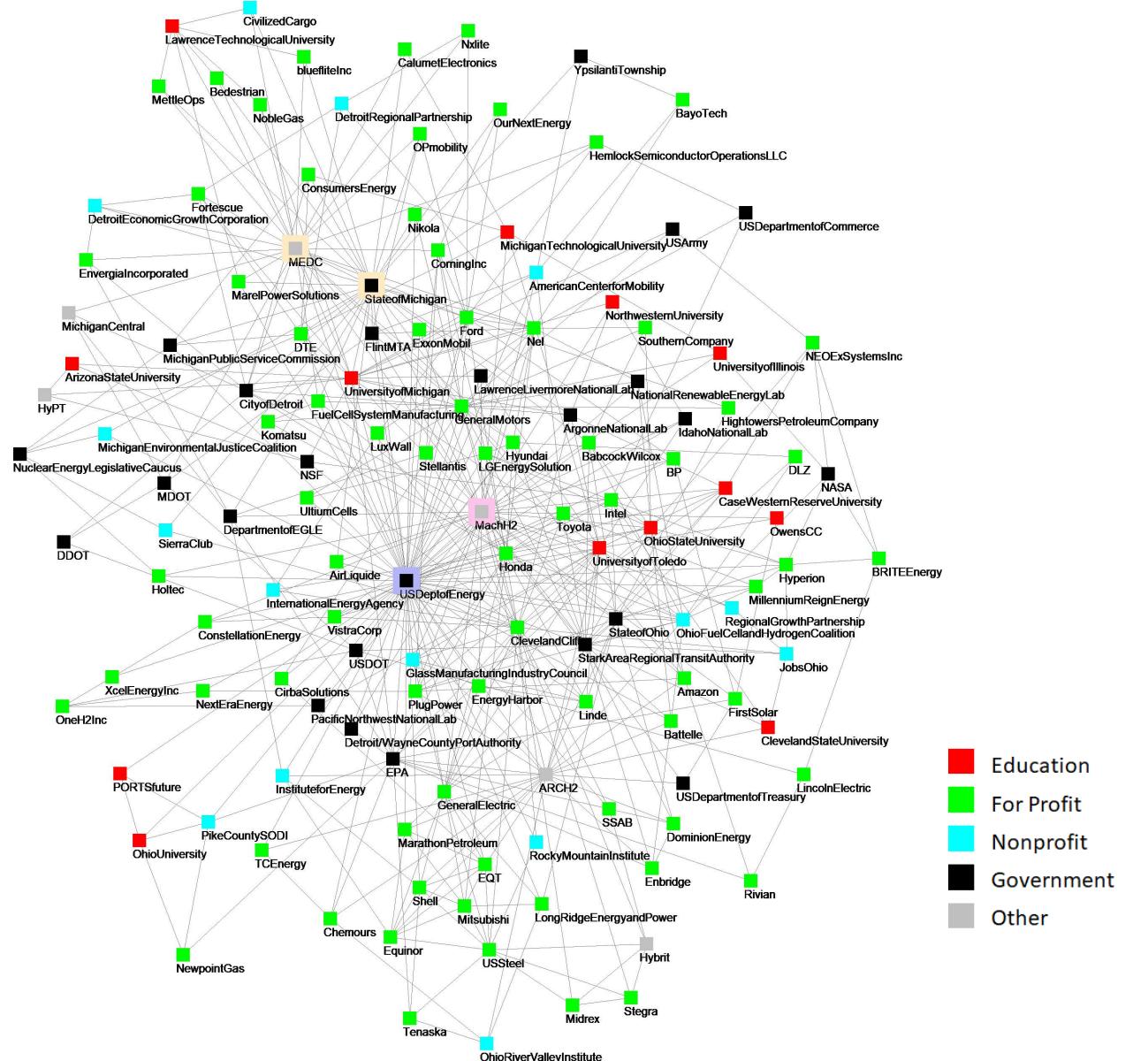
*\*Results of the snowball sampling effort may not accurately capture recent changes to federal funding priorities regarding hydrogen and the current uncertainties in the hydrogen-related markets in the US.*

## Ecosystem: Core Influencers

The golden rule of networks is the same as the golden rule of real estate: location, location, location. Where organizations or individuals are identified in the map matters. Organizations that are centrally located on the map are more likely to be able to influence the ecosystem. High level influencers are often well connected in their own community or “cluster” but also have connections to other clusters. Influencers are identified using a mathematical formula within the mapping software, which identifies connections with nodes

and clusters to assess the value of those relationships and ability to influence all other nodes within the ecosystem. The U.S. Department of Energy is the best connected and most influential in the ecosystem.

This map identifies the core members of the Hydrogen ecosystem in Michigan and Ohio. This group has the most influence on the entire ecosystem. Activities and changes at these organizations can have a drastic influence on the entire community.



NOTE: Colors indicate a type of organization based on their role within the ecosystem. Nodes with like colors may work together more closely and are considered a cluster within the ecosystem.

The top 15 influencers in the Michigan-Ohio hydrogen ecosystem are:

- U.S. Department of Energy (U.S. DOE)
- Midwest Alliance for Clean Hydrogen (MachH2)
- Michigan Economic Development Corporation (MEDC)
- State of Michigan
- Cleveland-Cliffs
- General Motors
- University of Michigan
- Environmental Protection Agency (EPA)
- Nel
- Ford
- Appalachian Regional Clean Hydrogen (ARCH2)
- University of Toledo
- Honda
- Stark Area Regional Transit Authority (SARTA)
- State of Ohio

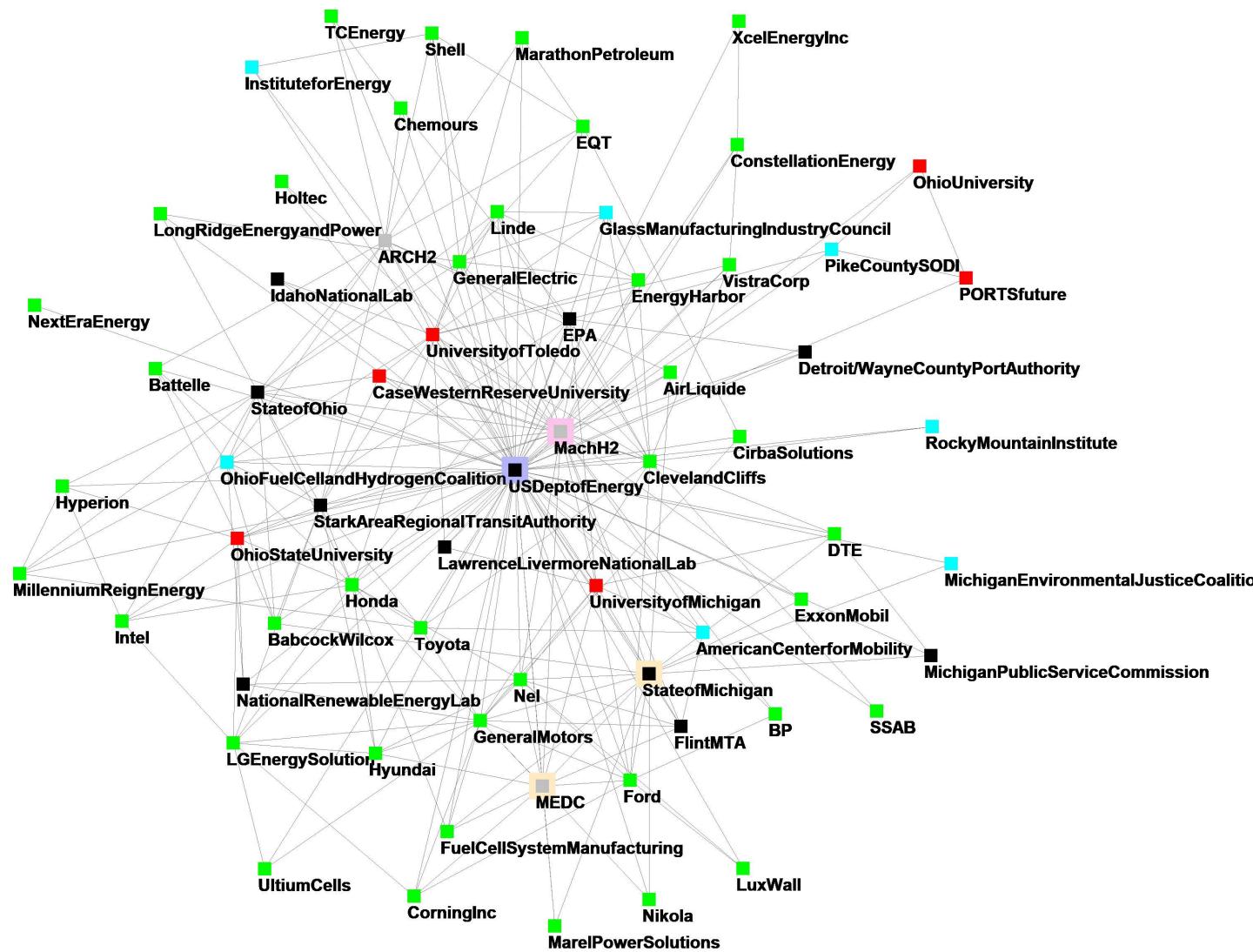


\* Note, certain nodes, such as those for government entities or educational institutions, may include multiple departments. These nodes include any reference to internal departments of that entity and do not specify an office, department, or institute (e.g. MI Hydrogen initiative was included in the count for the University of Michigan.)

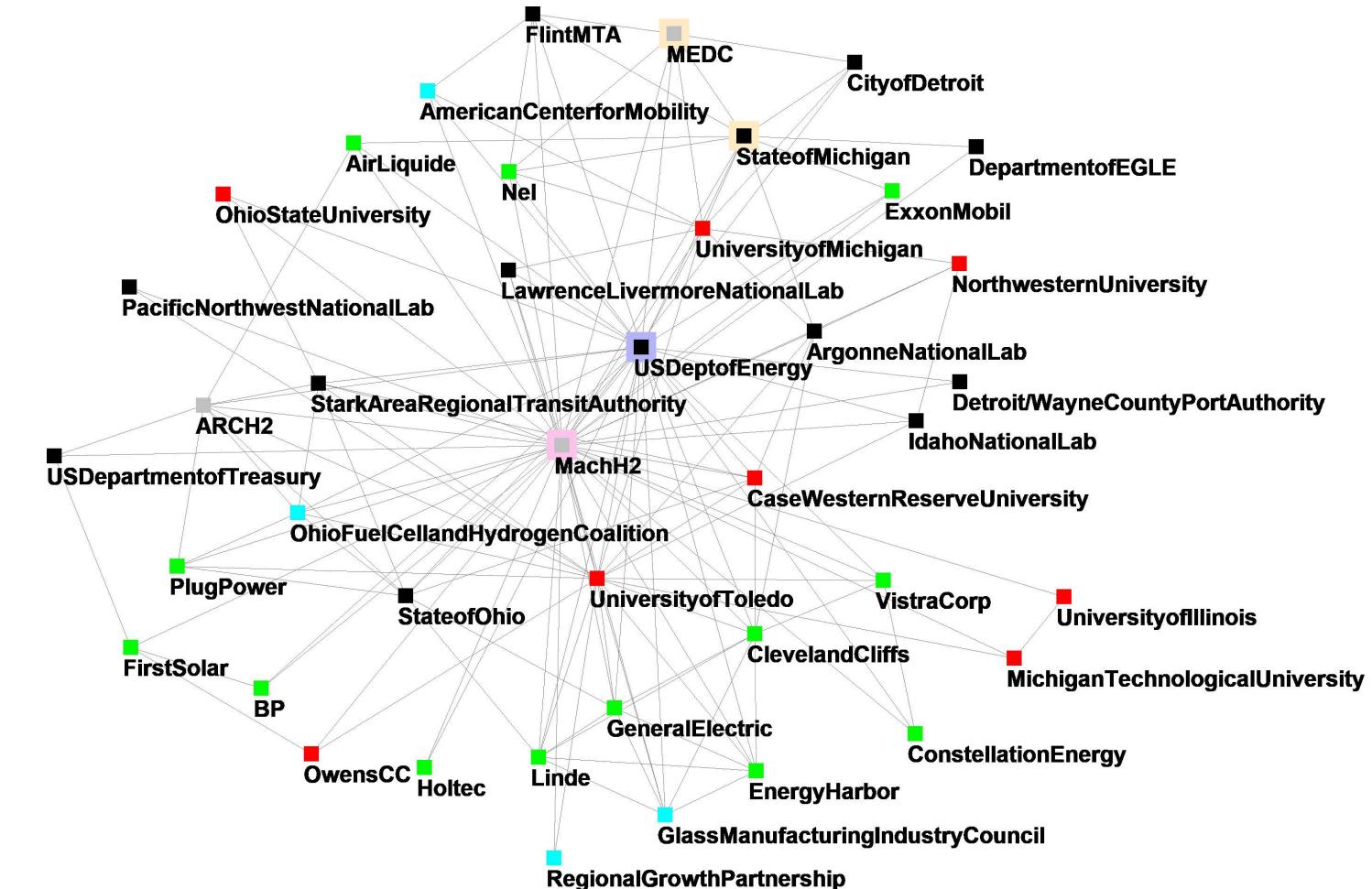
## Breakdown of top 5 influencer clusters:

The following maps show the one step connections of the top five influencers.

# U.S. DEPARTMENT OF ENERGY

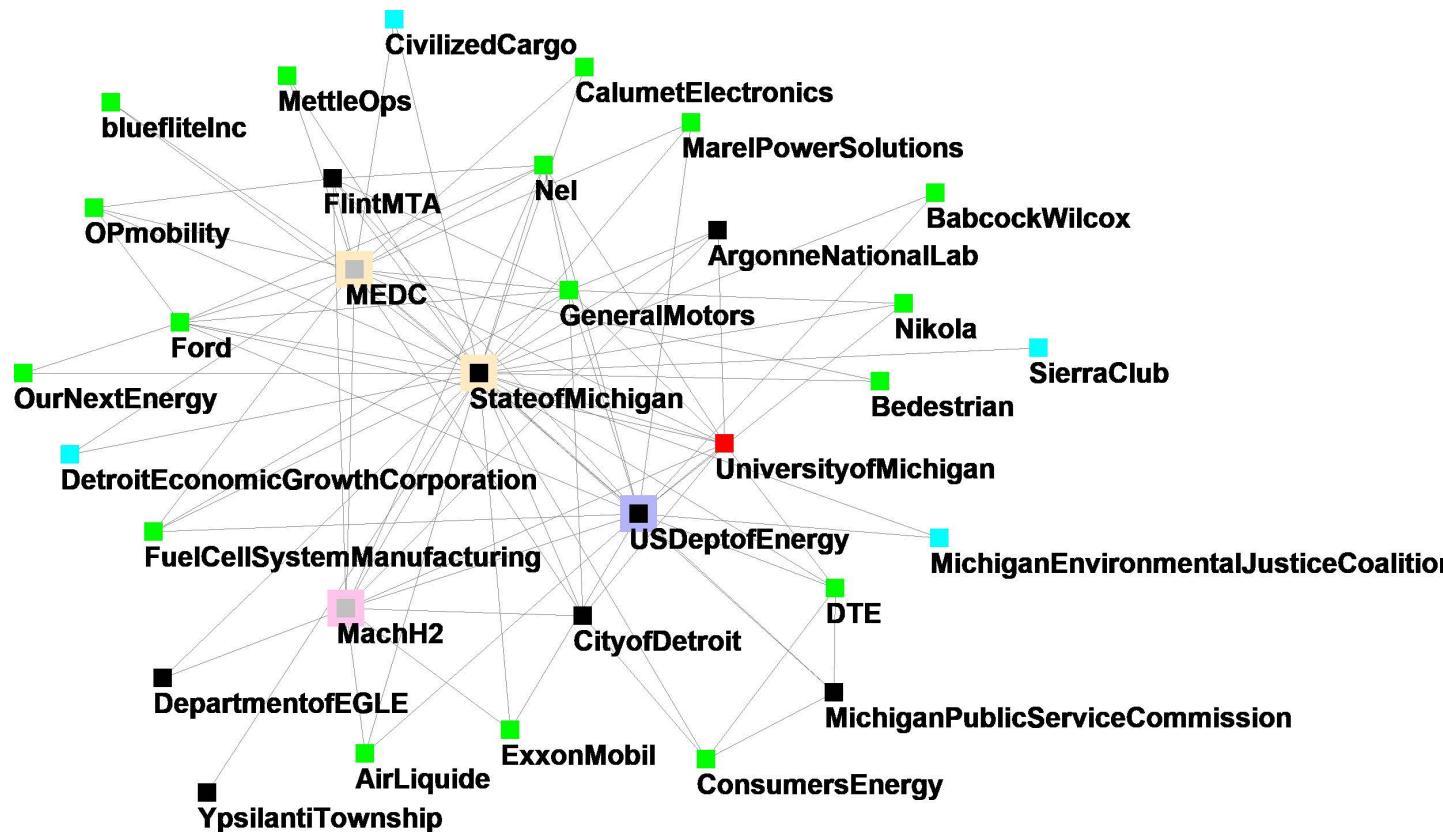


# MACH H2

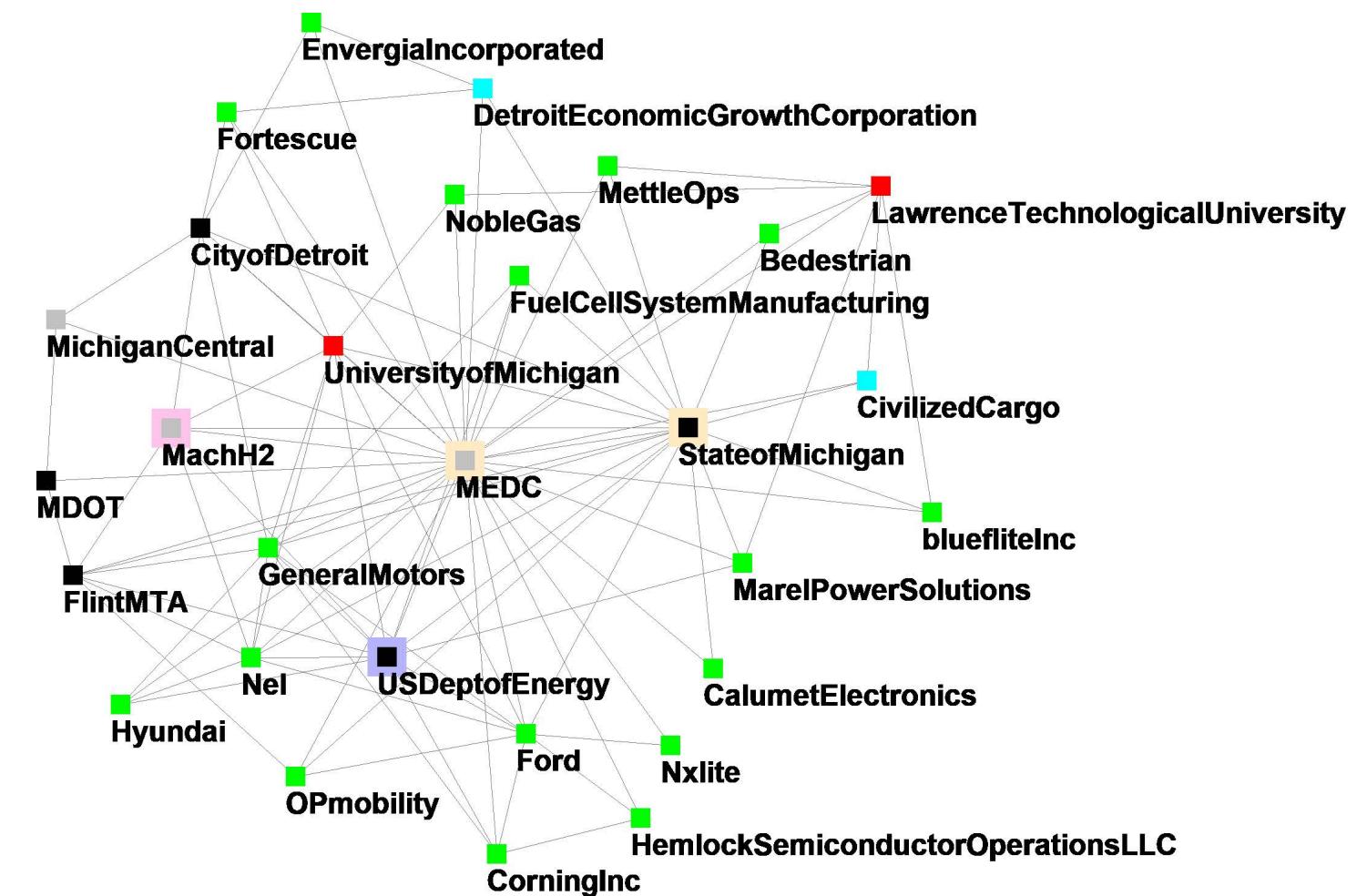


*\* Note, certain nodes, such as those for government entities or educational institutions, may include multiple departments. These nodes include any reference to internal departments of that entity and do not specify an office, department, or institute (e.g. MI Hydrogen initiative was included in the count for the University of Michigan.)*

## STATE OF MICHIGAN

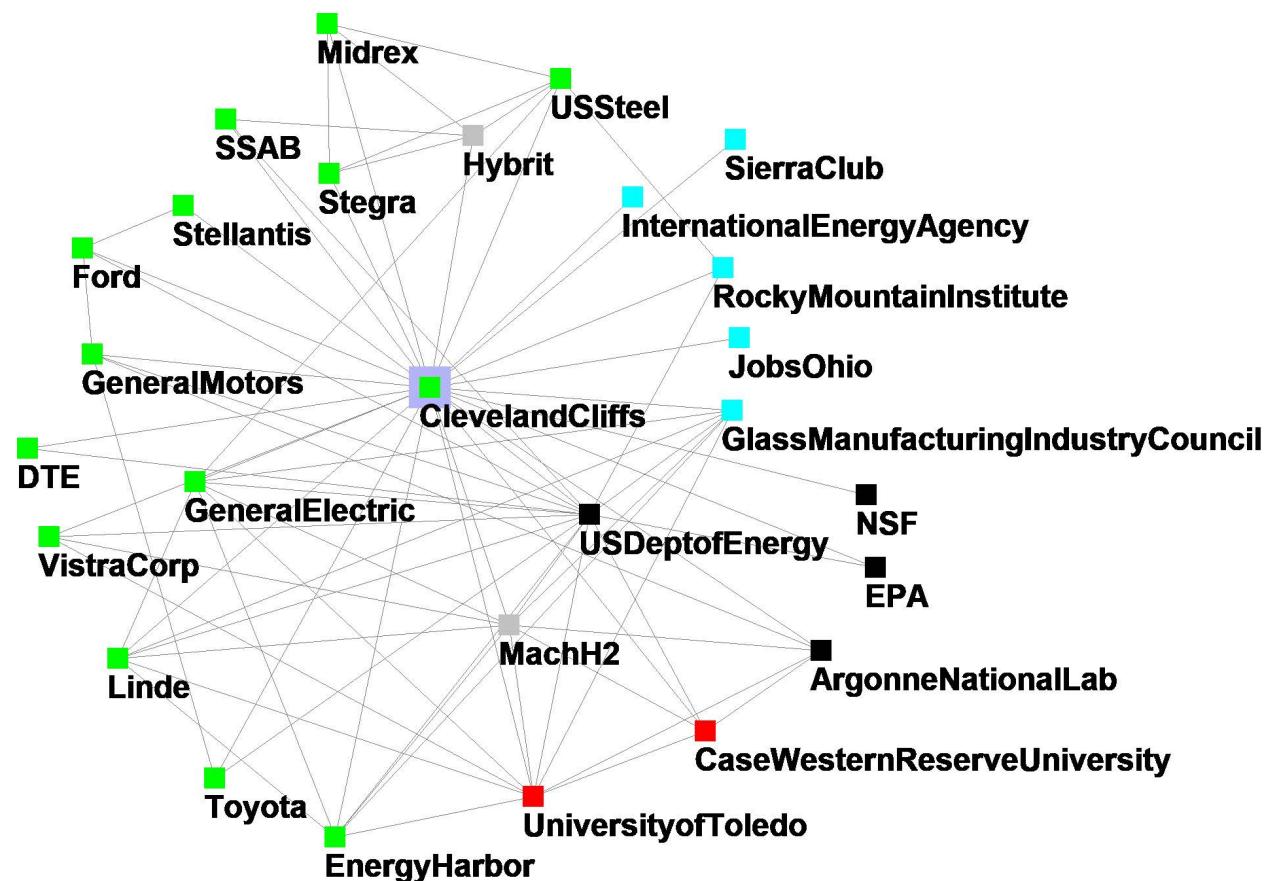


## MICHIGAN ECONOMIC DEVELOPMENT CORPORATION (MEDC)



\* Note, certain nodes, such as those for government entities or educational institutions, may include multiple departments. These nodes include any reference to internal departments of that entity and do not specify an office, department, or institute (e.g. MI Hydrogen initiative was included in the count for the University of Michigan.)

# CLEVELAND-CLIFFS



## Singular connectors

The organizations identified below are connected to nodes that are not connected to any other organization identified in the ecosystem. This is like living in a cul-de-sac, with the routes (information flows and knowledge exchanges) being limited and often focused on only one path. Reaching out to these entities and creating additional collaboration with singular nodes may create a healthier ecosystem. To reach more of the hydrogen industry in Michigan and Ohio, these organizations serve as the gatekeepers to organizations that are not highly involved. Isolated nodes also existed in the research but were eliminated from the map and report, as the isolation of these nodes may indicate that they are either not participating in the hydrogen ecosystem, are outside of the Michigan-Ohio hydrogen ecosystem or do not play an active role.

An entity in control of structural social voids is in a good position. A person or organization with many singular nodes is highly valuable within a network, and can often exercise leverage that lesser-connected people or organizations do not have.

Several organizations (nodes) have connections with organizations that are not replicated by other nodes. These include:

- U.S. Department of Energy
- Midwest Alliance for Clean Hydrogen (MachH2)
- Michigan Economic Development Corporation (MEDC)
- State of Michigan
- Cleveland-Cliffs
- University of Michigan
- Environmental Protection Agency (EPA)
- General Motors (GM)
- Appalachian Regional Clean Hydrogen Hub (ARCH2)
- Nel
- Ford
- Honda
- Stark Area Regional Transit Authority (SARTA)
- University of Toledo
- State of Ohio

\* Note, certain nodes, such as those for government entities or educational institutions, may include multiple departments. These nodes include any reference to internal departments of that entity and do not specify an office, department, or institute (e.g. MI Hydrogen initiative was included in the count for the University of Michigan.)



## Highly connected

Highly-connected nodes are those organizations that have identified relationships with many other nodes specified in the research. These organizations, associations, or private businesses are considered well connected and either work or collaborate with many other players in the hydrogen ecosystem. While these organizations may not have the highest level of influence in the ecosystem, they tend to be well-informed about the ecosystem and may serve as gateways to reach out to other players.

The Top 15 most connected organizations:

- U.S. Department of Energy (U.S. DOE)
- Midwest Alliance for Clean Hydrogen (MachH2)
- State of Michigan
- Michigan Economic Development Corporation (MEDC)
- Cleveland-Cliffs
- General Motors
- Appalachian Regional Clean Hydrogen (ARCH2)
- University of Michigan
- University of Toledo
- Honda
- Stark Area Regional Transit Authority (SARTA)
- State of Ohio
- Environmental Protection Agency (EPA)
- Ford
- General Electric

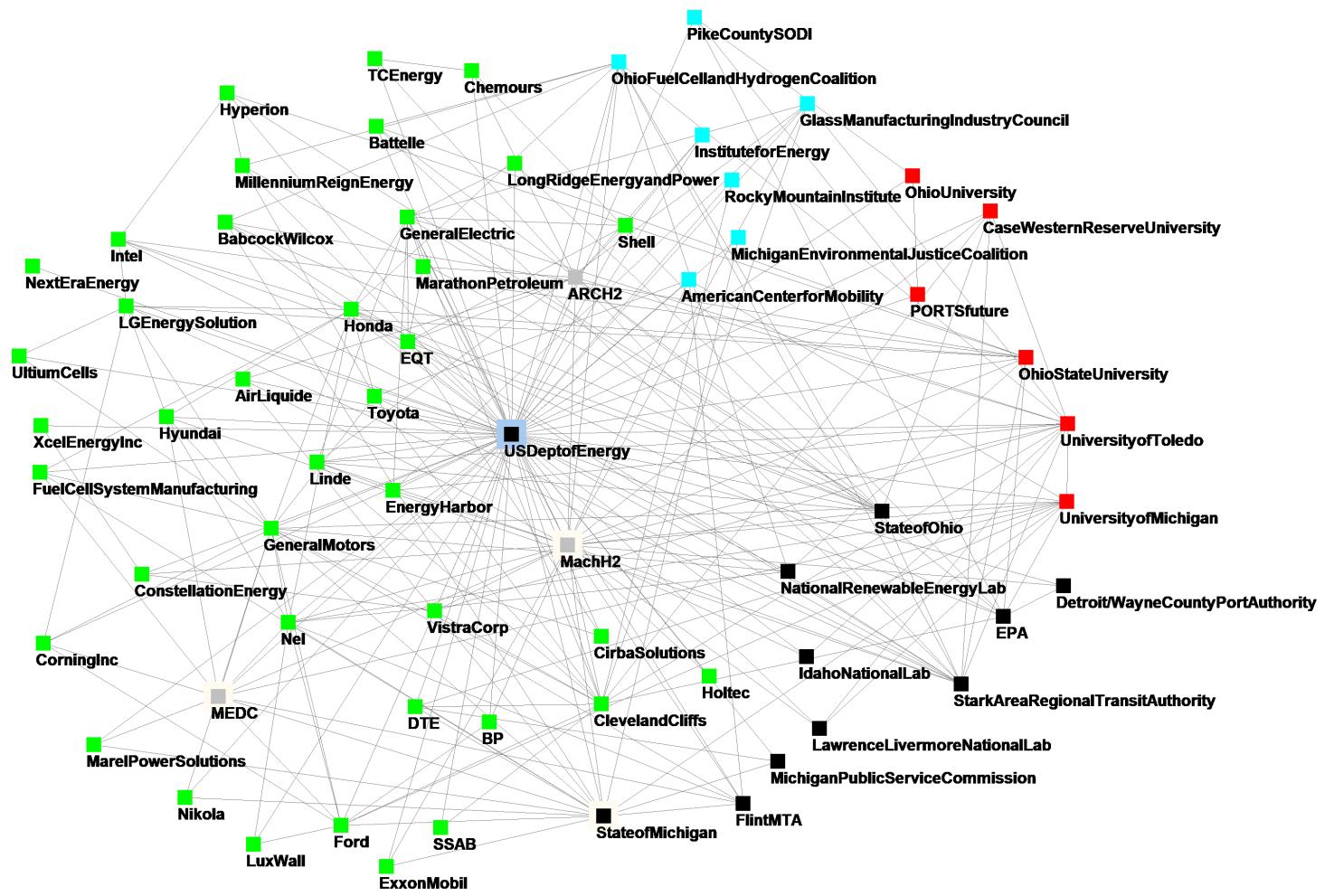


*\* Note, certain nodes, such as those for government entities or educational institutions, may include multiple departments. These nodes include any reference to internal departments of that entity and do not specify an office, department, or institute (e.g. MI Hydrogen initiative was included in the count for the University of Michigan.)*

The quantity of connections does not necessarily reflect the quality of the relationships. However, organizations with more connections may find it easier to foster collaboration with many players and cross industry divides. A node with many connections is often a sign that the overall network finds it beneficial to participate with that organization, which serve as a key player that attracts partners.

## U.S. Department of Energy

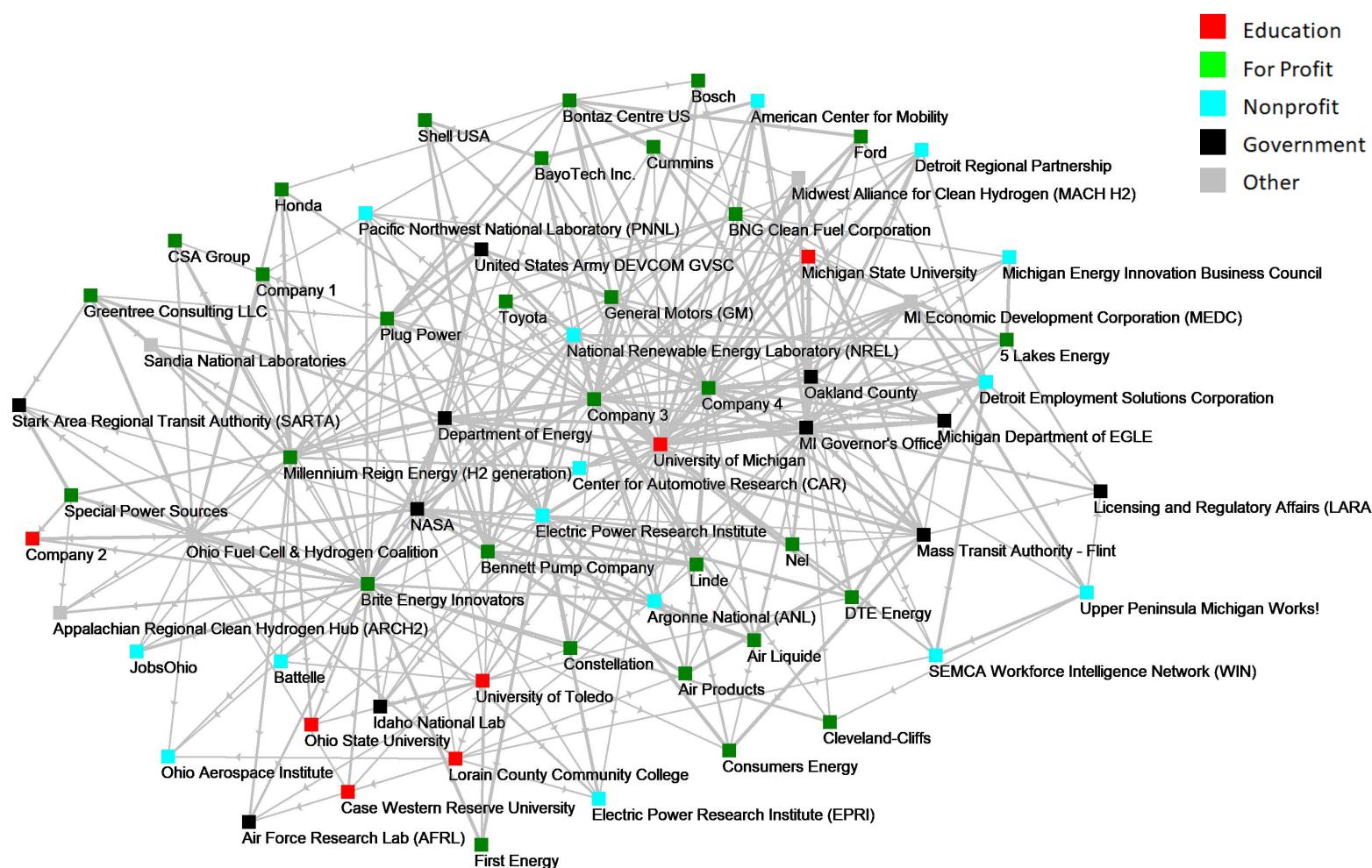
The map below shows the one-step connections to the U.S. Department of Energy (U.S. DOE) and relationships between those companies and organizations. This map also shows the organizations grouped by type, indicating the strength and depth of U.S. DOE involvement across various facets of industry.



## Social network analysis: Survey

To better understand the collaborative landscape of the hydrogen ecosystem in Michigan and Ohio, our team conducted a social network analysis (SNA) survey targeting organizations and stakeholders actively engaged in the sector. This analysis provides insight into how entities are connected, where information and resources flow, and which actors serve as key bridges or influencers. By visualizing and quantifying these relationships, the SNA helps identify strengths, gaps, and opportunities for greater regional alignment in advancing hydrogen development. A total of 51 respondents completed the survey, representing 38 distinct organizations actively involved in the hydrogen ecosystem across Michigan and Ohio.

These participants spanned a range of sectors—including industry, government, research, and workforce development—offering a broad view of the region's collaborative landscape. The responses provided valuable data on existing relationships, frequency of interaction, and areas of shared focus. By analyzing these connections, the SNA offers a clearer picture of how regional coordination is unfolding and where strategic investments in relationship-building may yield the greatest impact. Strength of relationship between organizations is measured on a scale of 1-5, with a response of 5 indicating an ongoing business relationship, perhaps formal or contractual in nature. The stronger a relationship, the more dense the connecting line is shown. Some organizations are anonymized, including core influencers three and four.



NOTE: Colors indicate a type of organization based on their role within the ecosystem. Nodes with like colors may work together more closely and are considered a cluster within the ecosystem.

The top 10 influencers based on a survey of the hydrogen ecosystem are:

- University of Michigan
- MI Governor's Office
- Company 4 (Anonymous)
- Company 3 (Anonymous)
- Ohio Fuel Cell & Hydrogen Coalition (OFCHC)
- University of Toledo
- NASA
- United States Army DEVCOM GVSC
- Electric Power Research Institute (EPRI)
- Bright Energy Innovators



\* Note, certain nodes, such as those for government entities or educational institutions, may include multiple departments. These nodes include any reference to internal departments of that entity and do not specify an office, department, or institute (e.g. MI Hydrogen initiative was included in the count for the University of Michigan.)



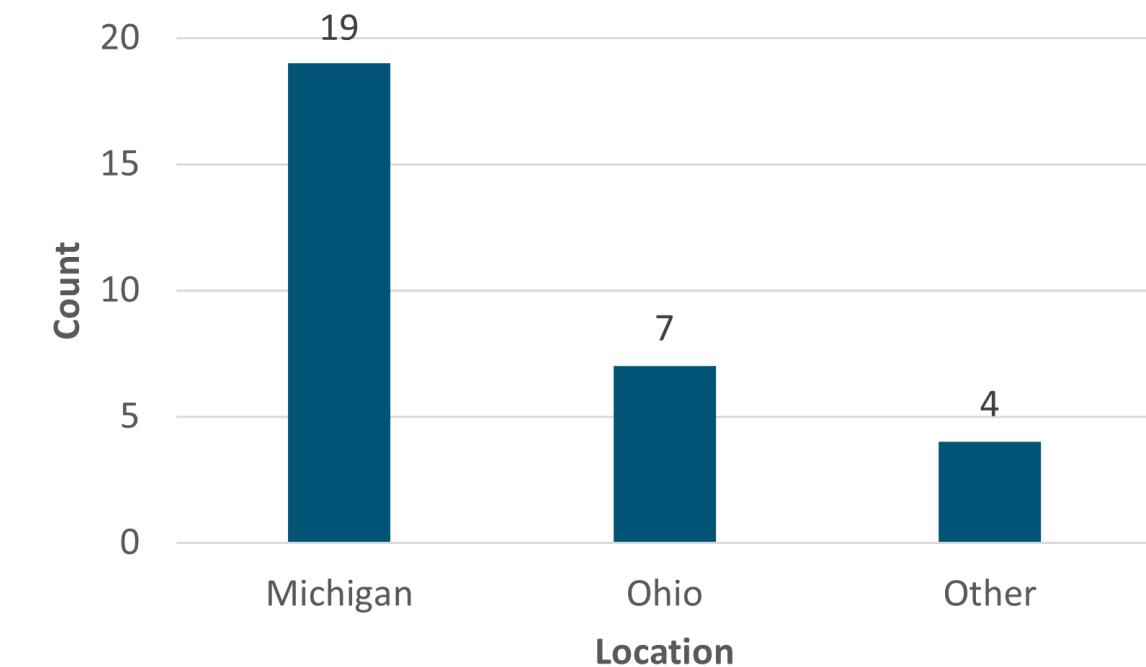
## Occupational skills and labor analysis

This project seeks to identify current workforce needs and gaps related to technician, skilled trades, scientists, and engineering roles within the hydrogen sector. To better understand the needs of industry employers and stakeholders, a survey was launched to measure several key metrics. Insights from this assessment will guide the development of training pathways and credentialing programs aligning with industry requirements for building and maintaining hydrogen infrastructure safely and effectively.

Our survey targets employers and industry stakeholders with expertise in workforce needs, skills development, and training design. Key survey focus areas include:

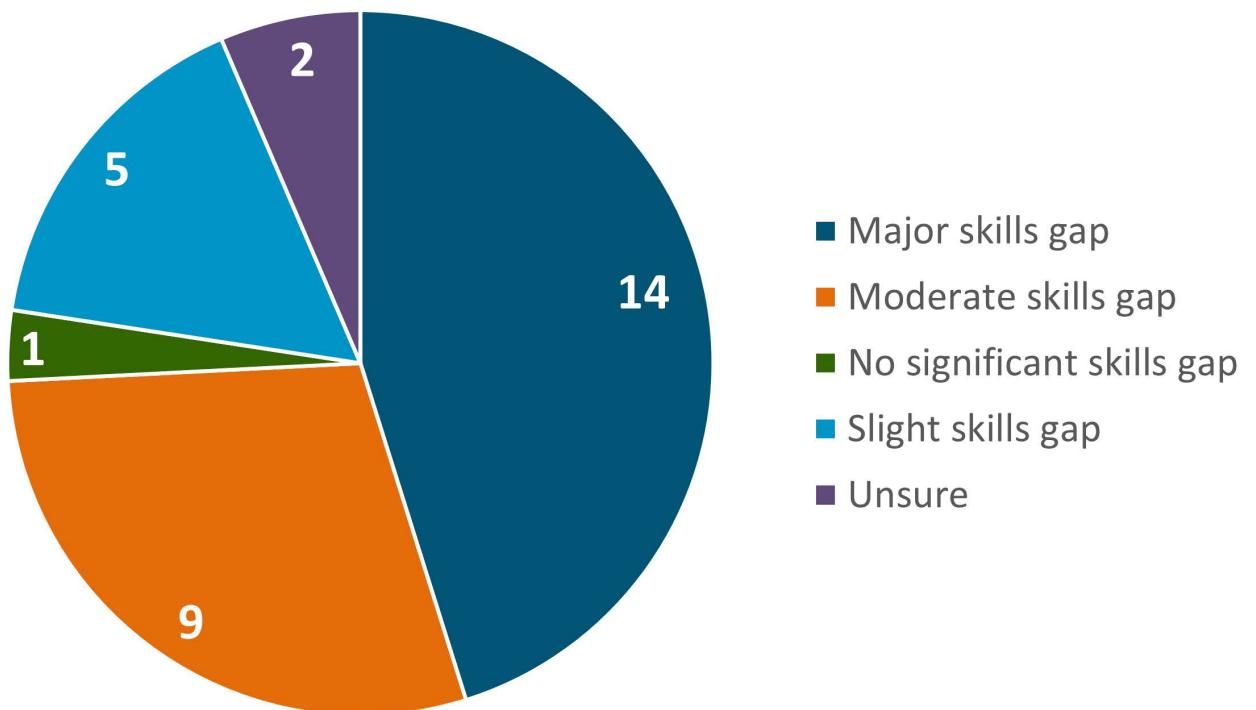
- Identifying critical skill sets and job roles
- Highlighting training format preferences
- Informing curriculum and credential development

As shown in **Figure 1**, a total of 31 responses were submitted, representing 30 unique organizations. Among all respondents, 61.2% indicated their employer is based in Michigan, while 22.6% are in Ohio and 12.9% from a different state. This cross-section of industry and academic representation helps provide a clear view of the current skills needs and training for the future.

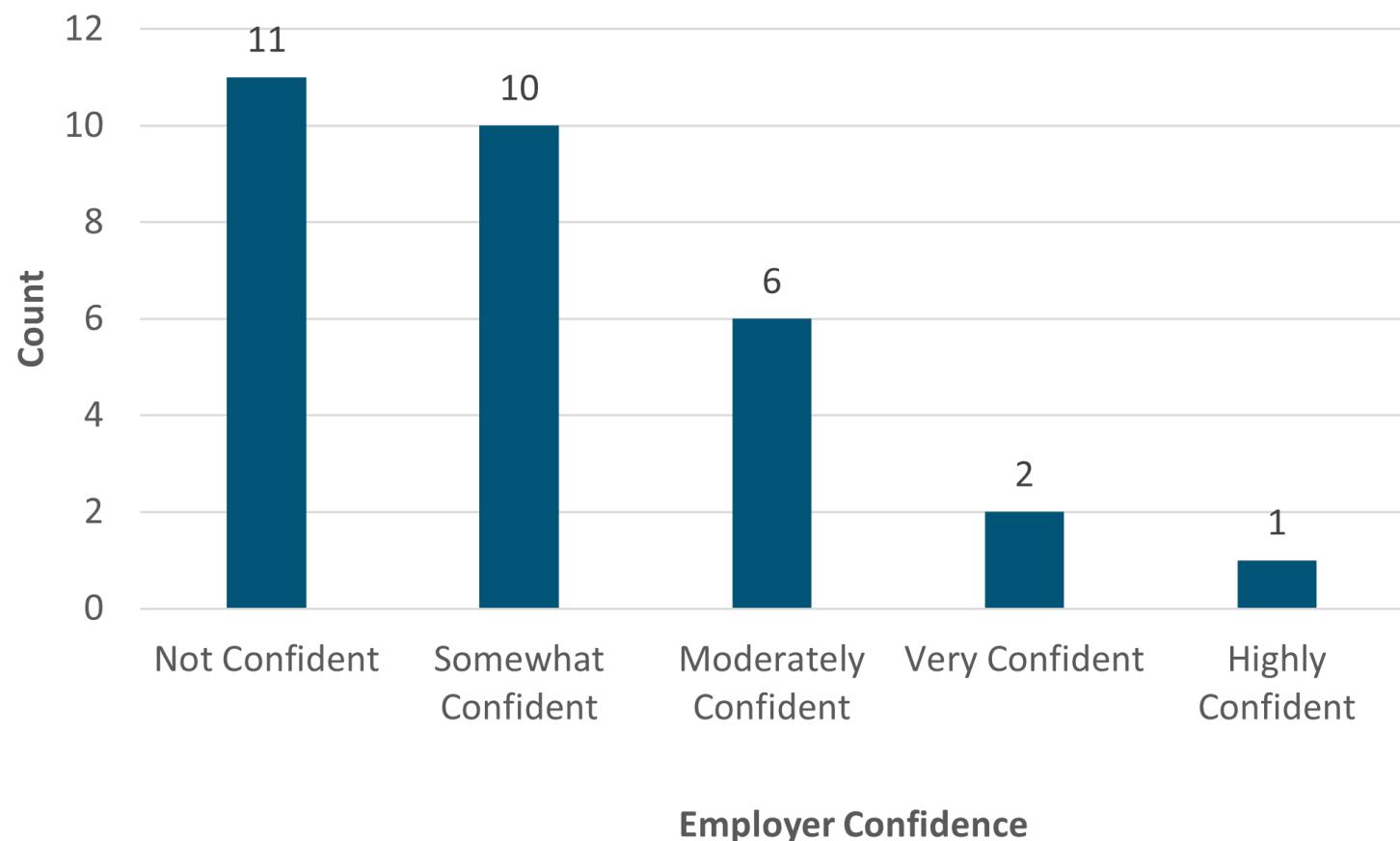


**Figure 1: Employer Location**

The majority of participants indicated a perception of either a moderate or major skills gap. This group comprised 23 of the 31 responses, highlighting the need for additional training and educational opportunities. A full breakdown of responses is shown in **Figure 2** below.



**Figure 2: To what extent do you feel there is a skills gap in the current workforce for your hydrogen-related operations?**

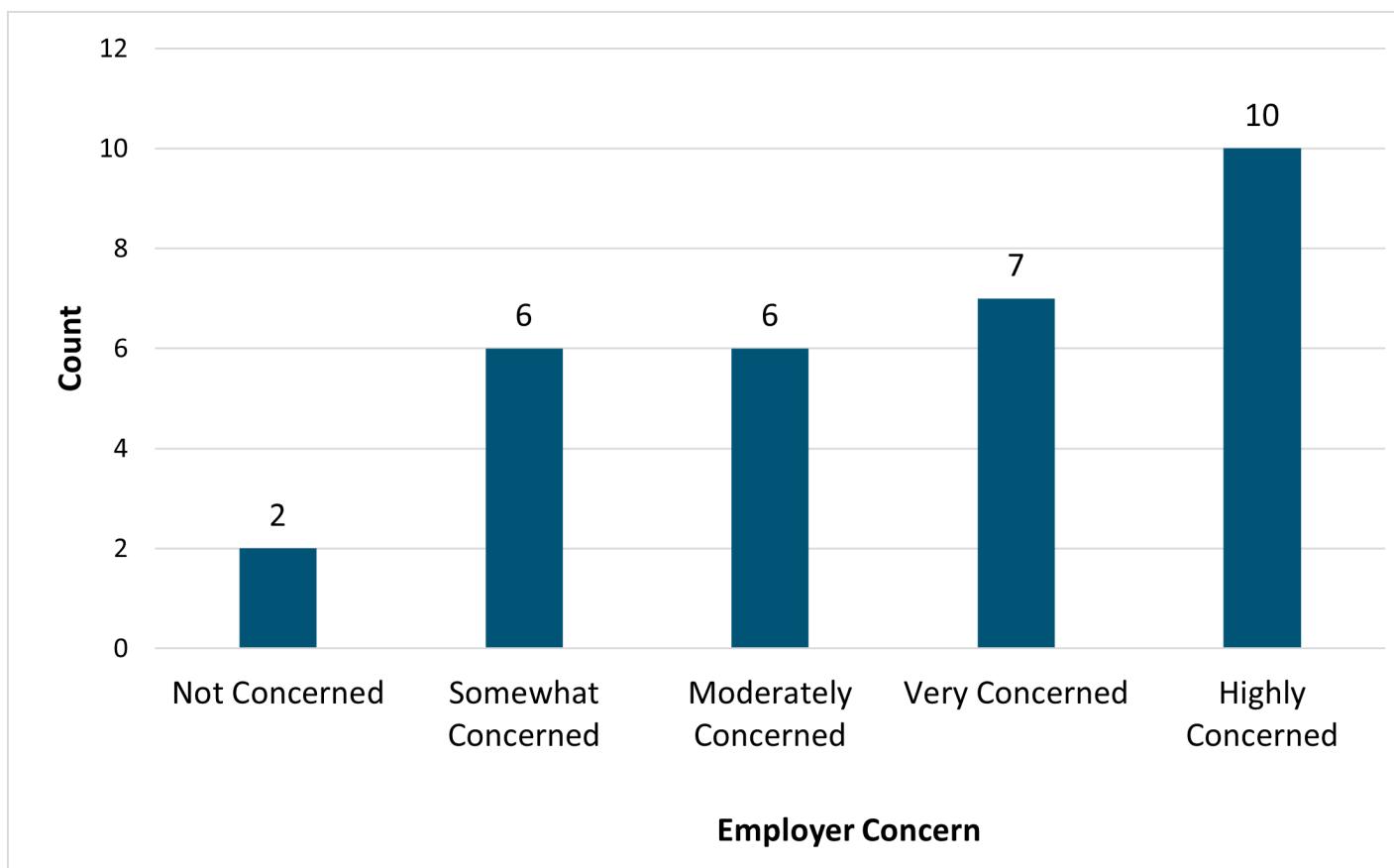


**Figure 3: Are current educational programs preparing workers with the skills needed for key hydrogen roles? Please rate your confidence level. (Scale: 1 = Not confident, 5 = Very confident)**

As shown in **Figure 3**, the majority of participants (70.0%) indicated little or no confidence that current educational programs are adequately preparing workers for roles in hydrogen. This finding suggests an opportunity to review existing programs and better align their outcomes with industry needs. Employer feedback will be vital to adequately inform new curriculum to address these needs.

**Figure 4** highlights that most participants (74.2%) indicated moderate to high levels of concern regarding a potential shortage of qualified workers in the next five years. In conjunction with the findings on the previous page, it is reasonable to conclude that industry representatives perceive a need for change. One approach that has been successfully replicated in workforce development initiatives is the use of up-skilling or re-skilling of the existing labor force to develop in-demand skills as occupations change.

Among the top roles identified as having the greatest need for new or up-skilled talent in the next 3-5 years were H2 Technicians, Safety Managers and Process Engineers. While several organizations identified similar needs in the top three roles, there was considerable variety in the remainder of responses. A total of 56 unique job titles were provided from respondents, indicating a diverse range of needs. Many of these titles can be characterized as either engineering or technician-related in nature. The full responses are shown in **Table 1**.



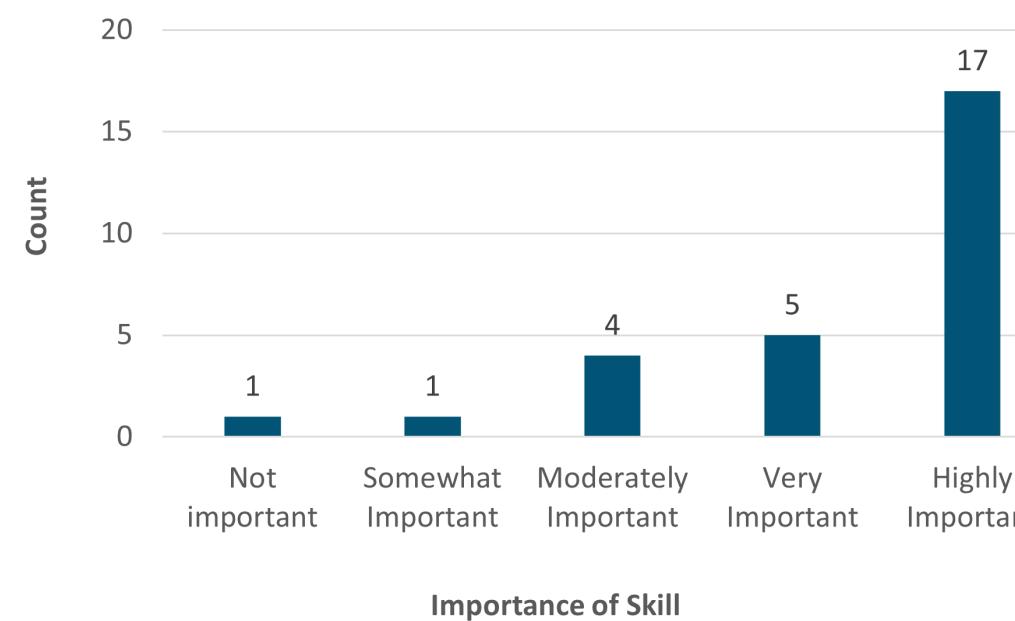
**Figure 4: To what extent do you anticipate a shortage of qualified workers over the next five years? Please rate your level of concern. (Scale: 1 = Not concerned, 5 = Highly concerned)**

**Table 1**

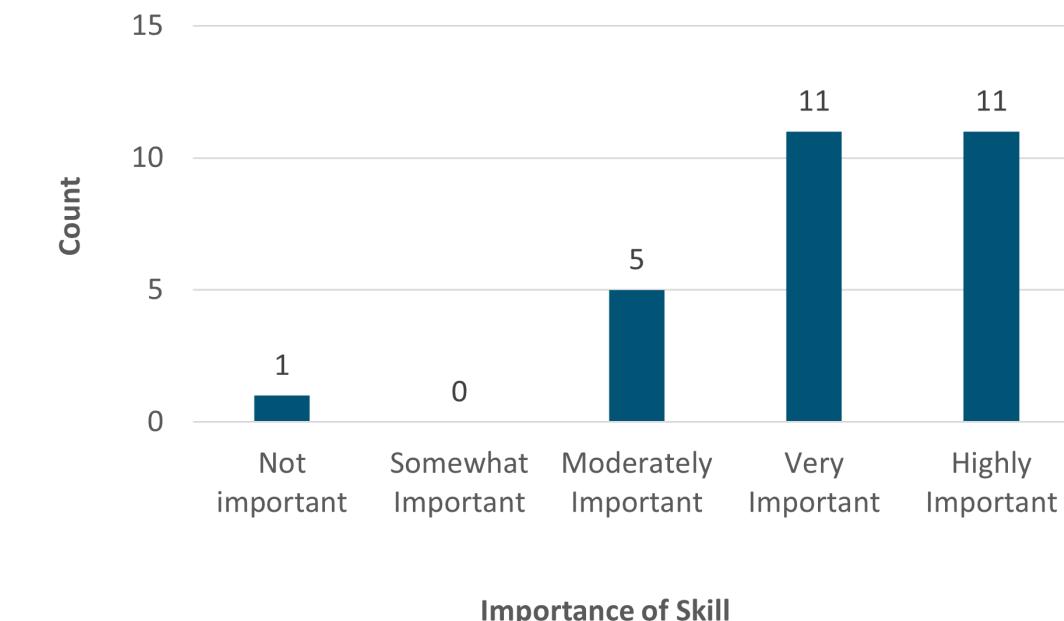
Occupation	#
H2 Technician	12
Safety Manager	6
Process Engineer	5
Engineer	3
Technician	2
H2 Production Technician	2
Pipefitters	2
Electricians	2
Welders	2
Advanced Materials Technician	1
Apprentice Electrician	1
Boilermakers	1
Cryogenics Engineer	1
Data Scientist/Engineers	1
Electrical Technician	1
Electrochemist	1
Environmental Impact Engineer	1
Equipment/Facility Technician	1
Facility Operations	1
Field Service Technicians	1
Fuel Production	1
Fueling Technician	1
Gas Processing Technical Experts	1
H2 Applications Engineer	1
H2 Designers	1
H2 Engineers	1

Occupation	#
H2 Fleet Technician	1
H2 Fuel Cell Engine Technician	1
H2 Fueling System Technician	1
H2 Safety Manager	1
H2 Storage Facility Technician	1
H2 Transport	1
Hydrogen Process Engineer	1
Hydrogen Safety Manager / Specialist	1
Hydrogen Technician (Operations & Maint)	1
Lab Technician	1
Logistics and Handling	1
Manufacturing	1
Manufacturing Engineers	1
Manufacturing Process Engineer	1
Materials Engineering	1
Materials Process Engineer	1
Mechanical Technician	1
Process Control Technician	1
Project Management	1
Safety & Quality Engineers	1
Safety Engineer	1
Sales/Marketing	1
Systems Engineer	1
Technical Process/Ops Manager	1
Utilization Engineer	1
Vacuum Engineer	1

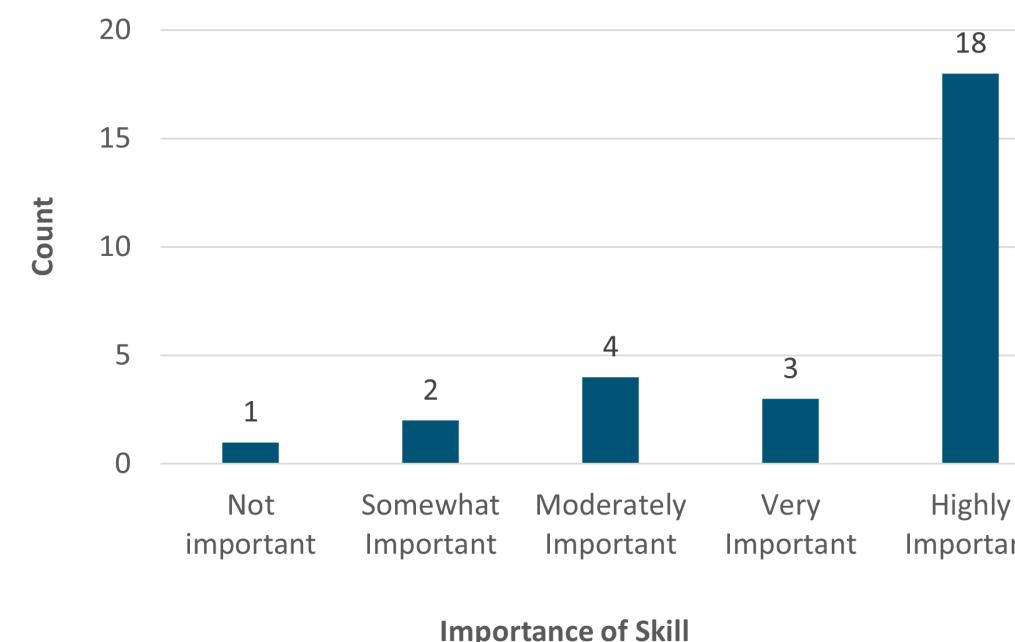
Understanding where talent originates and where skills can be obtained is a critical first step to supporting the hydrogen workforce of the future. Knowing what skills are most important to employers is the next step in this progression. When respondents were asked "Based on your organization's current and future needs, please rate the importance of the following technical skills for your workforce: (Scale: 1 = Not important, 5 = Essential)", the following four metrics (shown in **Figures 5.1 - 5.4**) emerged as the most important.



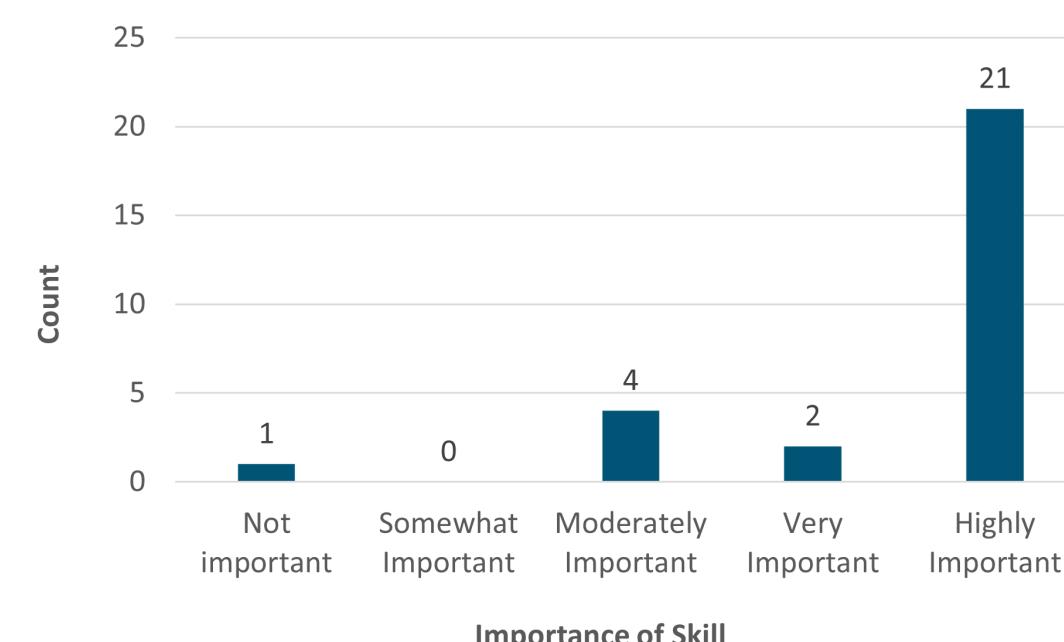
**Figure 5.1: Knowledge of regulatory compliance issues**



**Figure 5.3: Fuel cell system integration and operation**



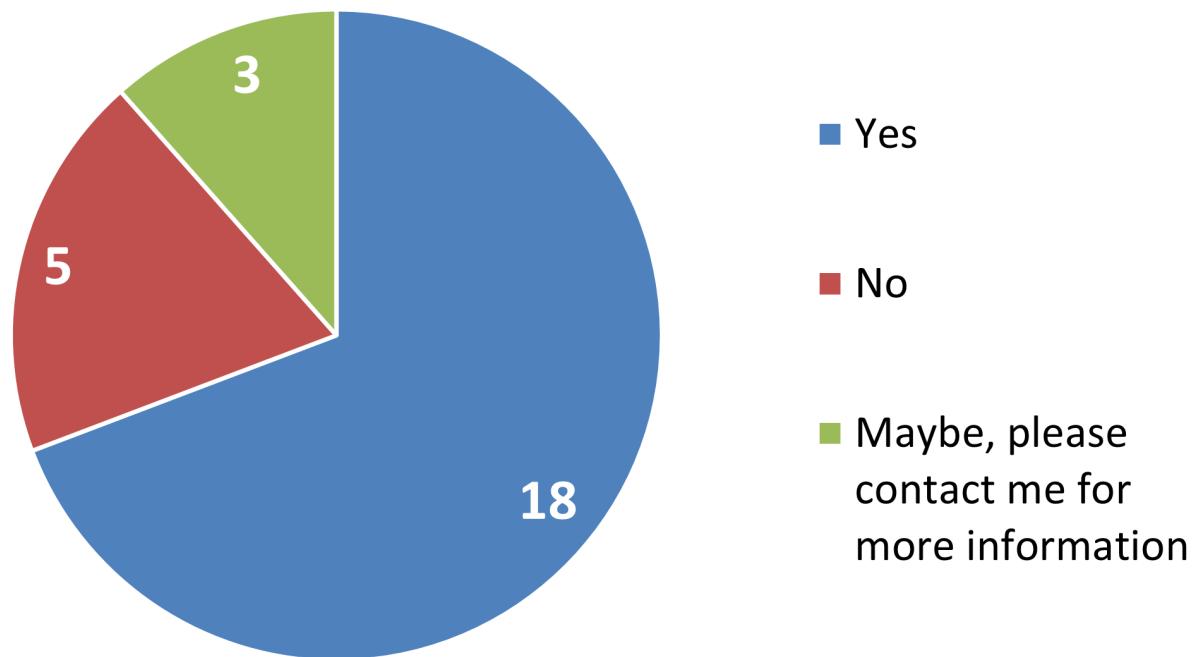
**Figure 5.2: Hydrogen storage and handling**



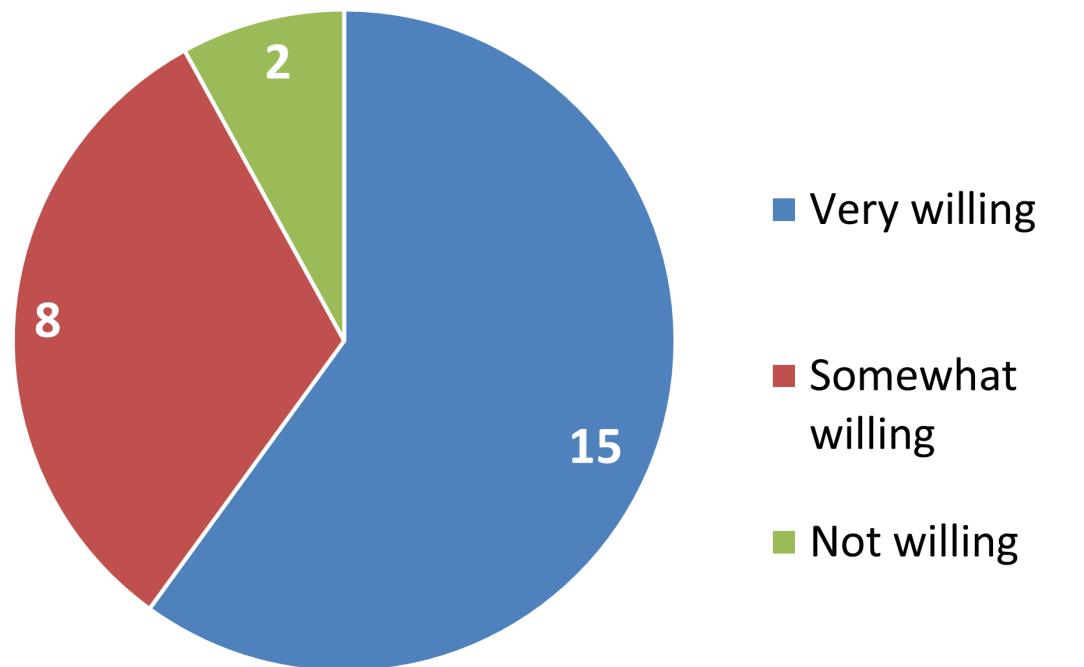
**Figure 5.4: Hydrogen safety protocols and risk analysis**

Despite the challenges identified in other areas of the survey, there is a high level of willingness from industry employers to collaborate with institutions for higher education. These proposed efforts will serve to identify skill gaps, develop curriculum, and better prepare employees in the hydrogen sector to meet the current or future demands of employers.

When asked about organizational partnerships as a means to inform curriculum development, the response was very positive, with 69.2% of respondents indicating support. Three more respondents indicated the possibility of a partnership, as shown in **Figure 6** below.



**Figure 6: Would your organization be interested in partnering with an educational institution to help develop a curriculum for hydrogen-related jobs?**



**Figure 7: How willing is your organization to partner with an educational institution to develop and implement new re-skilling or up-skilling programs for the hydrogen workforce?**

As shown in **Figure 7**, the majority of participants (60.0%) indicated a strong willingness to support partnerships. This finding suggests an opportunity to review existing programs and better align their outcomes with industry needs. Employer feedback will be vital to adequately inform new curriculum to address these needs.

## Key Takeaways

### 1. Network Composition and Influence

The Social Network Analysis (SNA) revealed a large and interconnected ecosystem consisting of 739 nodes and 2,317 connections. The landscape is primarily driven by the private sector, but anchored by federal funding and regional conveners.

- Sector Breakdown: The majority of the network (51.3%) is comprised of for-profit or private entities, followed by Government (19.6%) and Non-profit (15.2%) organizations.
- Primary Influencers: The U.S. Department of Energy (DOE) was identified as having the strongest influence in the network, most likely due to its role in project funding.
  1. Regional Conveners: The Midwest Alliance for Clean Hydrogen (MACH H2) and the Michigan Economic Development Corporation (MEDC) emerged as top influencers, driving network activity through stakeholder engagement and coordination.

### 2. Workforce Readiness and the "Skills Gap"

Data from the occupational skills survey indicates significant industry anxiety regarding the current talent pipeline, particularly in the Great Lakes region (Michigan and Ohio).

- Extensive Skills Gap: 74.2% of respondents perceive a moderate to major skills gap in hydrogen-related training.
- Low Educational Confidence: A significant majority (70.0%) lack confidence that existing educational programs are sufficient to prepare the future workforce.
- Imminent Labor Shortage: 74.2% of participants expressed moderate to high concern regarding a shortage of qualified workers within the next five years.

### 3. Priority Roles and Technical Competencies

The research identified specific "high-demand" areas where upskilling and reskilling efforts should be concentrated over the next 3-5 years.

#### Top Priority Roles:

- Hydrogen Technicians
- Safety Managers
- Process Engineers

### Critical Technical Skills:

1. Regulatory Compliance: Understanding the evolving legal and safety framework.
2. Fuel Cell Integration: System operation and technical assembly.
3. Storage & Handling: Specialized knowledge in high-pressure or cryogenic hydrogen management
4. Safety Protocols: Risk analysis and emergency response specific to hydrogen.

### 4. Collaborative Opportunities

There is a clear mandate for workforce development organizations to act as intermediaries between industry and academia.

- Curriculum Development: There is robust support (69.2% of respondents) for organizational partnerships to help shape training curricula.
- Institutional Partnership: Engagement levels are moderate, with 60.0% of respondents (15 of 25) expressing a strong willingness to partner with educational institutions on upskilling and reskilling initiatives.



## Appendix A: Methodology

Based on training with Orgnet, LLC, a contractor procured to assist with social network analysis, WIN researchers chose to focus social network analysis research efforts on open source data with a focus on media articles, company sponsored websites, and available meeting information from known conveners of hydrogen stakeholders. Staff attained articles between September 2024 and February 2025. WIN researchers saved articles, sources and searches of additional articles using applicable keywords in the news “app” of search engines such as Google and Yahoo to ensure data was attained from a broad range of sources. The team used a wide range of methods to gather articles, including those received directly from media through regularly received email updates, newsletters from organizations known to provide this type of material, and keyword searches.

The sampling method, commonly known as snowball sampling, is a technique which starts with a focus node. WIN researchers identified multiple levels of connections with this additional research. Researchers used the following keywords to search for applicable articles:

- Hydrogen Energy
- Hydrogen Production
- Hydrogen Industry
- Hydrogen Economy
- Hydrogen Emissions
- Hydrogen Fuel Cell
- Hydrogen
- Hydrogen Research
- Clean Hydrogen
- Hydrogen College Programs
- Hydrogen Distribution
- Hydrogen Hub
- Hydrogen Delivery
- Hydrogen Storage
- Hydrogen Transportation
- Hydrogen Chemical industry
- Hydrogen Cement Production
- Hydrogen Glass Making
- Hydrogen Semiconductor Manufacturing
- Hydrogen Safety
- Michigan\*
- Ohio\*

\*Researchers combined the keywords with an asterisk with the rest of the search terms to create a list related to the region. For example, “Ohio” would have been added to the “Hydrogen Storage” search to obtain articles related to hydrogen storage in Ohio.

The tables below contain a list of the news sources and the number of articles from each news source. Bylines of news articles were used to determine the originator of each article.

#	Website	#	Website	#	Website	#	Website
21	Canarymedia	6	Power-Eng	3	Cleveland	2	10Tv
18	Mlive	5	Cantonrep	3	Crainscleveland	2	Americanprogress
12	Fuelcellsworks	5	Eenews	3	Debbiedingell	2	Apnews
12	Michiganbusiness	5	Hondanews	3	Detroitmi	2	Bechtel
11	Hydrogeninsight	5	Manufacturingdive	3	Enr	2	Cleantechnica
10	Crainsdetroit	5	Powermag	3	Etn	2	Cnbc
10	Detroitnews	5	Spectrumnews1	3	Governing	2	Compositesworld
9	Freep	5	Utilitydive	3	Greencarcongress	2	Datacenterfrontier
8	Dispatch	4	Abc12	3	Hydrogen-Central	2	Daytondailynews
8	Hydrogenfuelnews	4	Babcock	3	Hydrogentoday	2	Dbusiness
7	Energy	4	Ece	3	Michauto	2	Desmog
7	Energytech	4	Energynews	3	Mitechnews	2	Earthjustice
7	Ohiocapitaljournal	4	Forbes	3	Mtu	2	Farmanddairy
7	Prnewswire	3	Autoblog	3	Osu	2	Fastcompany
6	Alleghenyfront	3	Autonews	3	Politico	2	Ft
6	Bridgemi	3	Autoweek	3	Pv-Magazine	2	Gandernewsroom
6	Duke-Energy	3	Axios	3	Pv-Magazine-Usa	2	Glass-International
6	Ideastream	3	Businessfacilities	3	Research	2	Glassmagazine
6	Insideclimatenews	3	Caranddriver	3	Wcpo	2	Gophouse

WIN chose to focus on the connections between organizations rather than connections between individuals. Public sources were less likely to discuss individuals and it was more difficult to determine if individuals were working directly with one another. Articles were most likely to address organizational relationships, partnerships, etc. Each article was treated with the same process for determining the links.

Links identified within the map will only be presented once within the map, regardless of the number of times this link was identified within the articles and materials analyzed. This was determined to be the best process as a higher profile story that may have been covered by multiple stories does not indicate additional strength in the connection, nor does this necessarily indicate a stronger relationship between nodes. Creating network maps is an iterative process. With multiple sources of data, conflicting information can be seen and explored and alternate spellings and acronyms can be found. This results in input and correlation activities related to the social network map. Data was de-duplicated manually using Excel formatting by the WIN research team. A series of maps were created and revised for minor errors and accuracy (duplicate organization names, spelling errors, etc).

## Reading the map and explanation of connections

The research team revised its approach to focus on the “central hubs,” eliminating organizations with one or fewer connections (the outliers). Included in the list were organizations with two or more connections on the maps.

## Methodology and standardization: Company specific webpage research

The following parameters were used to decide whether to include an organization in the SNA:

1. For membership organizations (ex: Ohio Fuel Cell & Hydrogen Coalition), all members were included in the list if the membership organizations were actively working in the hydrogen space.
2. For general partnerships, researchers required that there be a hydrogen component as part of the relationship. Example: OFCHC lists all its partners on their website. These partners were included if there is a hydrogen component to their relationship.
3. Meeting attendees were included if they were linked to the meeting host, but not necessarily to each other. If an organization representative attends a meeting, it can be assumed that a relationship exists between the meeting holder and the attendee, but this does not guarantee that interaction or a relationship was developed between meeting attendees. Example: WIN Hydrogen Research Team can be linked to University of Toledo, but not necessarily to other University of Toledo partners (one assumes they are working with WIN, but attending a meeting does not mean they are working with each other).

## Limitations:

### Link Strength

The current maps reflect connections that have been established using our described methodology. While the strength of these connections is relevant, it was concluded that an assignment of strength between nodes is not able to be determined using the existing public data sources. The recurrence of connections in news articles, on website pages, and in meeting notes may only represent that a story is of a higher profile and therefore received more coverage than other stories. For example, when NEL announced their electrolyser factory in Michigan, the coverage of this story dominated all other hydrogen and industry news reports. Thus, the strength of these ties would be inaccurately magnified.

### Elimination of Single Nodes

WIN’s elimination of organizations with a single connection before the website research phase did not eliminate single nodes from the final map. The organizations on the current map with only one connection are those that were discovered because of the website research of the better-connected organizations. For example, on WIN’s map, the National Science Foundation (NSF) is only connected to Cleveland-Cliffs. This connection was discovered while doing research on Cleveland-Cliffs. WIN did not encounter other connections to NSF in its initial research.

The single connection nodes could be further developed in a future stage of the project, as they may be connected to several different organizations in the hydrogen space.

### Additional Limitations

1. Strength of connections is not accurately determinable using existing data sources.
2. The variety of news sources is limited based on what WIN staff members encountered and could attain through searches.
3. Hydrogen research and development is considered proprietary information by many organizations. Proprietary information is not shared with the public and, thus, many existing relationships may not be included in this analysis.
4. Due to the competitive nature of the current hydrogen industry, many organizations have kept their relationships and partnerships with others confidential.
5. Networks change, and change is more likely to occur early in the life of the sector. This sector, while tied to a mature energy industry, is likely to shift drastically in the next few years. Consistency will develop over time.

## Appendix B: Identified hydrogen nodes

Organization Name	Org Type
4M	For-Profit
5 Lakes Energy	For-Profit
6K Inc.	For-Profit
Ace Hardware	For-Profit
Action Center on Race and the Economy	Non-Profit
Advanced Clean Energy Storage	Other
Advanced Propulsion Centre	Non-Profit
AGBU Alex & Marie Manoogian School	Education
Air Liquide	For-Profit
Air Products and Chemicals	For-Profit
Airbus	For-Profit
Albion College	Education
Allegheny Science and Technology	For-Profit
Alliance for Low-Carbon Cement and Concrete	Other
Alta Equipment Group Inc.	For-Profit
Alterra	For-Profit
Amalgamated Transit Union Local 26	Other
Amazon	For-Profit
Ameren Illinois	For-Profit
American Airlines	For-Profit
American Automotive Policy Council	Non-Profit
American Battery Solutions	For-Profit
American Center for Mobility	Non-Profit
American Chemistry Council	Non-Profit
American Classic	For-Profit
American Clean Power Association	Non-Profit
American Council on Renewable Energy	Non-Profit
American Electric Power	For-Profit
American Gas Association	Non-Profit
American Geophysical Union	Non-Profit

Organization Name	Org Type
American Petroleum Institute	Non-Profit
American Rolling Mill Company	For-Profit
American Transmission Co.	For-Profit
Ann Arbor Area Transportation Authority	Government
Ann Arbor City Council	Government
Apex Power Group	For-Profit
Appalachian Energy Future	Non-Profit
Appalachian Partnership for Economic Growth	Non-Profit
Appalachian Regional Commission	Other
ArcelorMittal	For-Profit
ARCH2	Other
Archbold Fire Department	Government
Archbold Water Department	Government
Argonne National Lab	Government
Ariel Corporation	For-Profit
Arizona State University	Education
Armstrong International	For-Profit
Association of American Railroads	Non-Profit
ATEL Capital Group	For-Profit
AUO Corporation	For-Profit
Autocar Industries	For-Profit
Avangrid	For-Profit
Avari Aerospace, LLC	For-Profit
Avis	For-Profit
Axpo	For-Profit
Babcock & Wilcox	For-Profit
Ballard Power Systems	For-Profit
Bank of America	For-Profit
Baruch Future Ventures	For-Profit
BASF Chemical Company	For-Profit

Organization Name	Org Type
Bass Family Companies	For-Profit
Baton Rouge Hydrogen Plant	For-Profit
Battelle	For-Profit
Bay City	Government
BayoTech	For-Profit
BE NKY	Non-Profit
Bechtel	For-Profit
Bedestrian	For-Profit
Belmont County	Government
Bendix Commercial Vehicle Systems LLC	For-Profit
Bettergy	For-Profit
Big River Steel	For-Profit
Black & Veatch	For-Profit
Black Hills Energy	For-Profit
Black Tech Saturdays	Non-Profit
Bloom Energy	For-Profit
Blue Engineering	For-Profit
blueflite Inc.	For-Profit
BMW	For-Profit
Boeing	For-Profit
BorgWarner	For-Profit
Bosch North America	For-Profit
Boston Metal	For-Profit
BP	For-Profit
Breakthrough Energy	Non-Profit
Brimstone	For-Profit
BRITE Energy	For-Profit
Buckeye Environmental Network	Non-Profit
Bullen Ultrasonics	For-Profit
Burlington-Elmira Fire Department	Government
Burns & McDonnell	For-Profit
Business Leaders For Michigan	Non-Profit
Caithness Energy	For-Profit
Calumet Electronics	For-Profit
Cambustion	For-Profit

Organization Name	Org Type
Canterbury High School	Education
Canterbury Township, MI	Government
Canterbury's Transit authority	Government
Capital Power	For-Profit
CarbonCure	For-Profit
Carnegie Mellon University	Education
Carroll County Chamber of Commerce	Government
Case Western Reserve University	Education
Cass Tech High School	Education
Caterpillar	For-Profit
C-Crete Technologies	For-Profit
Celadyne	For-Profit
Cellcentric	For-Profit
CEMEX	For-Profit
Centarus	For-Profit
Center for Astrophysics, Harvard and Smithsonian	Other
Central Michigan University	Education
Central Ohio Transit Authority	Government
Centrus Energy	For-Profit
Century Aluminum Co	For-Profit
Certarus	For-Profit
CGI Gases	For-Profit
Charbone Hydrogen	For-Profit
Chement	For-Profit
Chemours	For-Profit
Chemtrade Logistics Inc.	For-Profit
Chicago's Metropolitan Planning Agency	Other
Cinnaire Solutions	Non-Profit
Cirba Solutions	For-Profit
Citizens Action Coalition	Non-Profit
City of Akron	Government
City of Ann Arbor	Government
City of Auburn Hills	Government
City of Cairo	Government
City of Canton	Government

Organization Name	Org Type
City of Chicago	Government
City of Columbus	Government
City of Detroit	Government
City of East Palestine	Government
City of Eaton	Government
City of Farmington Hills	Government
City of Kalamazoo	Government
City of Lansing	Government
City of Marysville	Government
City of Middletown	Government
City of Oberlin	Government
City of Toledo	Government
Civilized Cargo	Non-Profit
Clark State College	Education
Clean Air Task Force	Non-Profit
Clean-Seas, Inc	For-Profit
Cleantech	For-Profit
Clearway Energy Group	For-Profit
Cleveland Foundation	Non-Profit
Cleveland State University	Education
Cleveland-Cliffs	For-Profit
ClimateWorks Foundation	Non-Profit
CMBLu Energy	For-Profit
CNX Resources	For-Profit
Columbiana County	Government
Columbus Chamber of Commerce	Non-Profit
Columbus City Council	Government
Columbus State Community College	Education
ComEd	For-Profit
Constellation Energy	For-Profit
Constellium	For-Profit
Consumers Energy	For-Profit
Cornell University	Education
Corning Inc.	For-Profit
Cummins Inc.	For-Profit

Organization Name	Org Type
Daimler Truck	For-Profit
Dana Corporation	For-Profit
Dayton Area Chamber of Commerce	Non-Profit
Dayton County	Government
Dayton Development Coalition	Non-Profit
DDOT	Government
De Nora	For-Profit
Decarbonized Cement and Concrete Alliance	Other
Deerfield Ag Services	For-Profit
Delta Air Lines	For-Profit
Delta College	Education
Delta Electronics	For-Profit
Delta Fire Department	Government
Delta Township	Government
DENSO	For-Profit
Department of Defense	Government
Department of EGLE	Government
Department of Naval Architecture and Marine Engineering	Government
Dept of Naval Architecture, Marine Engineering	Government
Detroit Collegiate Preparatory High School	Education
Detroit Economic Growth Corporation	Non-Profit
Detroit Metropolitan Airport	Other
Detroit Public Schools	Education
Detroit Regional Chamber	Other
Detroit Regional Partnership	Non-Profit
Detroit/Wayne County Port Authority	Government
DLZ	For-Profit
Dominion Energy	For-Profit
Dow Inc.	For-Profit
Downriver Township	Government
Downtown Detroit Partnership	Non-Profit
Drive Capital	For-Profit
DroneUp	For-Profit
dSPACE, Inc.	For-Profit
DTE	For-Profit

Organization Name	Org Type
Duke Energy	For-Profit
Dunamis Charge Inc.	For-Profit
Edison Electric Institute	Other
EDP	For-Profit
Electra	For-Profit
Electric Hydrogen	For-Profit
EmberClear	For-Profit
Empire Diversified Energy	For-Profit
Enbridge	For-Profit
Energy Capital Partners	For-Profit
Energy Development LLC	For-Profit
Energy Harbor	For-Profit
Energy Impact Partners	For-Profit
Energy Systems Network	Non-Profit
Envergia Incorporated	For-Profit
Environment Michigan	Other
Environmental and Energy Study Institute	Non-Profit
Environmental Health Project	Non-Profit
EOG Resources Inc	For-Profit
EPA	Government
EPRI	Non-Profit
EQT	For-Profit
Equinor	For-Profit
ESB	For-Profit
ECOtality	For-Profit
EV Thermal Flow Solutions	For-Profit
Exelon	For-Profit
Expleo USA	For-Profit
ExxonMobil	For-Profit
Faraday Technology	For-Profit
Farmington High School	Education
City of Farmington Hills	Government
Fayette Fire Department	Government
Federal Trade Administration	Government
FedEx	For-Profit

Organization Name	Org Type
Ferris State University	Education
Fidelis New Energy	For-Profit
Fifth Wall	For-Profit
First Movers Coalition	Other
First Solar	For-Profit
FirstElement Fuel	For-Profit
FirstEnergy Corp.	For-Profit
Fisker Inc.	For-Profit
Flenco	For-Profit
Flint and Genesee Economic Alliance	Non-Profit
Flint and Genesee Group Foundation	Non-Profit
Flint MTA	Government
Florida A&M University	Education
Florida Institute of Technology	Education
Foothill Transit	Government
Ford	For-Profit
Fordson High School	Education
Fortera	For-Profit
Fortescue	For-Profit
Fortress Transportation and Infrastructure Investors	For-Profit
Forvia	For-Profit
Foxconn	For-Profit
Franklin County	Government
Franklin Templeton	For-Profit
Freshwater Research Innovation Center	Non-Profit
Friends of the St. Clair River	Non-Profit
Fuel Cell and Hydrogen Energy Association	Non-Profit
Fuel Cell System Manufacturing	For-Profit
FuelCell Energy	For-Profit
Fuels & Lubes Asia	For-Profit
Gallo Glass	For-Profit
Lightstone Generation LLC	For-Profit
GCM Grosvenor	For-Profit
GEM, Inc	Non-Profit
General Accountability Office	Government

Organization Name	Org Type
General Electric	For-Profit
General Motors	For-Profit
General Service Administration	Government
Genesee County	Government
Glass Manufacturing Industry Council	Non-Profit
Glasstech Solar	For-Profit
Global Cement and Concrete Association	Non-Profit
Gordie Howe International Bridge	Other
Gotion	For-Profit
Grand Blanc Enterprise Park LLC	For-Profit
Grand Blanc Township	Government
Graphic Packaging's International	Non-Profit
Great Lakes Environmental Law Center	Non-Profit
Great Lakes Innovation and Development Enterprise	Non-Profit
Greater Cleveland Partnership	Non-Profit
Greater Cleveland RTA	Government
Green Baxter Court	Non-Profit
Green Business Group	For-Profit
GTI Energy	Non-Profit
Güdel Inc.	For-Profit
Guernsey Power Station	For-Profit
H2GLASS	Other
H2GP Foundation	Non-Profit
Halliburton	For-Profit
Hannibal, OH	Government
Hatch	For-Profit
Heidelberg Materials	For-Profit
Heinz Endowments	For-Profit
Hemlock Semiconductor Operations LLC	For-Profit
Henderson Academy	Education
Highland Copper	For-Profit
Hightowers EV	For-Profit
Hightowers Petroleum Company	For-Profit
Hog Lick Aggregates	For-Profit
Holcim Group	For-Profit

Organization Name	Org Type
Holtec	For-Profit
Home Depot	For-Profit
Honda	For-Profit
Hope Gas Inc.	For-Profit
House Energy, Communications, and Technology Committee	Government
Huntington Bank	For-Profit
Hy Stor Energy	For-Profit
Hybrit	Other
Hydro Aluminum	For-Profit
HydroGEN	Other
Hydrogen Council	Non-Profit
Hyperion	For-Profit
HyPT	Other
HyTech Power	For-Profit
Hyundai	For-Profit
Hyzon Motors	For-Profit
IBEW Local 58	Non-Profit
Idaho National Lab	Government
Ideanomics	For-Profit
IEEE	Non-Profit
Ikea	Other
IN-2-Market	Non-Profit
Independence Hydrogen	For-Profit
Industrial Realty Group	For-Profit
Industrious Labs	Non-Profit
Infinity	For-Profit
Innovation Norway	Government
Innovation Partnerships	Other
Institute for Energy	Non-Profit
Institute for Energy Innovation	Non-Profit
Intel	For-Profit
Interlake Steamship Company	For-Profit
Intermountain Power Agency	Other
International Association of Machinists	Non-Profit
International Brotherhood of Electrical Workers	Non-Profit

Organization Name	Org Type
International Energy Agency	Non-Profit
International OEMs	For-Profit
International Society for Optics and Photonics	Non-Profit
Interstate Natural Gas Association of America	Other
Invenergy	For-Profit
InvestUP	Non-Profit
Isuzu	For-Profit
ITC Michigan	For-Profit
J.B. Hunt	For-Profit
Japan Hydrogen Station Network Joint Company	For-Profit
JobsOhio	Non-Profit
John Cockerill	For-Profit
Johnstown Monroe School Board	Education
Joule	Non-Profit
JPMorgan Chase	For-Profit
Kalamazoo City Commission	Government
Kent State University	Education
Keystate Energy	For-Profit
Khosla Ventures	For-Profit
Kiewit Power	For-Profit
Kings Island	Other
Koloma Inc.	For-Profit
Komatsu	For-Profit
Kraft Heinz	For-Profit
Labor Energy Partnership	Other
Laboratoria Energia Ambiente Piacenza	Other
Lake Township	Government
Landen Motors	For-Profit
Lanza Tech	For-Profit
Lawrence Berkeley National Lab	Government
Lawrence Livermore National Lab	Government
Lawrence Technological University	Education
Lectric Boil	For-Profit
Lectrodryer	For-Profit
LG Energy Solution	For-Profit

Organization Name	Org Type
Libbey Glass	For-Profit
Licking County	Government
Liebherr	For-Profit
Lincoln Electric	For-Profit
Linde	For-Profit
Lipari Foods	For-Profit
LIVAQ	For-Profit
Long Ridge Energy and Power	For-Profit
Lorain County	Government
Lorain County Airport	Government
Lorain County CC	Education
Nu Ride Inc.	For-Profit
Love's Travel Stops & Country Stores	For-Profit
LT Precision	For-Profit
Lubrizol Corp.	For-Profit
Lux Research	For-Profit
LuxWall	For-Profit
LyondellBasell	For-Profit
MachH2	Other
Macomb CC	Education
Madison Heights Fire Department	Government
Magna New Mobility	For-Profit
MAGNET	Non-Profit
Makel Engineering	For-Profit
Marathon Petroleum	For-Profit
Marel Power Solutions	For-Profit
Marshall University	Education
Marubeni	For-Profit
Massillon Energy and Technology Park, LLC	For-Profit
Massillon, OH	Government
McCarthy Building Companies	For-Profit
MCP	For-Profit
MDOT	Government
MEDC	Other
Merck	For-Profit

Organization Name	Org Type
Meta	For-Profit
Metals Company	For-Profit
Mettle Ops	For-Profit
M-H2	Other
MICHauto	Non-Profit
Michigan Business Network	Non-Profit
Michigan Central	Other
Michigan Chamber of Commerce	Non-Profit
Michigan Clean Cities	Non-Profit
Michigan Conservative Energy Forum	Non-Profit
Michigan Department of Environmental Quality	Government
Michigan Department of Health and Human Services	Government
Michigan Department of Labor and Economic Opportunity	Government
Michigan Economic Development Foundation	Non-Profit
Michigan Energy Innovation Business Council	Non-Profit
Michigan Environmental Justice Coalition	Non-Profit
Michigan Infrastructure Office	Government
Michigan International Technology Center	Other
Michigan League of Conservation Voters	Non-Profit
Michigan Public Service Commission	Government
Michigan State University	Education
Michigan Technological University	Education
Michigan Works!	Non-Profit
Midrex	For-Profit
Mi-Jack	For-Profit
Millennium Reign Energy	For-Profit
Minneapolis-St. Paul International Airport	Government
MISO	For-Profit
Mission Acceleration Center	Other
Mitsubishi	For-Profit
Modal Motors	For-Profit
Momentum Technologies	For-Profit
Monolith Materials	For-Profit
Monroe County, OH	Government
Moody's Investor Service	For-Profit

Organization Name	Org Type
Mostardi Platt	For-Profit
Mountaineer GigaSystem, LLC	For-Profit
MS-RT	For-Profit
Mundy Township	Government
Munson Healthcare	For-Profit
Muskegon County Board of Commissioners	Government
Muskegon County	Government
NAES	For-Profit
NASA	Government
National Association of Manufacturers	Non-Profit
National Carbon Capture Center	Other
National Cement Company of California	For-Profit
Manufacturing Technology Deployment Group, Inc.	Other
National Electrical Manufacturers Association	Non-Profit
National Energy Technology Lab	Government
National Highway Traffic Safety Administration	Government
National Oceanic and Atmospheric Administration	Government
National Petroleum Council	Non-Profit
National Renewable Energy Lab	Government
National Response Center	Government
National Transportation Safety Board	Government
Natural Resources Defense Council	Non-Profit
Navajo Technical University	Education
Navigator CO2	For-Profit
Navistar	For-Profit
Nel	For-Profit
NEOEx Systems, Inc.	For-Profit
New Flyer	For-Profit
New Fortress Energy	For-Profit
NewHydrogen, Inc	For-Profit
Newlab	For-Profit
Newpoint Gas	For-Profit
Nexceris	For-Profit
NextEnergy	Government
NextEra Energy	For-Profit

Organization Name	Org Type
Nextracker	For-Profit
Nicor Gas	For-Profit
Nikola	For-Profit
Nippon Steel	For-Profit
NiSource	For-Profit
Noble Gas	For-Profit
Nooter Toledo	For-Profit
North Star Blue Steel	For-Profit
NorthStar Clean Energy	For-Profit
Northwestern Michigan College	Education
Northwestern University	Education
Norwegian Hydrogen Forum	Non-Profit
NOVA Chemicals	For-Profit
Novi High School	Education
NS Fuels Inc.	For-Profit
NS Nanotech Inc.	For-Profit
NSF	Government
Nu:ionic	For-Profit
Nuclear Energy Legislative Caucus	Government
Nuclear Regulatory Commission	Government
Nucor	For-Profit
Nuvera Fuel Cells	For-Profit
NX Fuels Inc.	For-Profit
Nxlite	For-Profit
Oak Ridge National Lab	Government
Oak Run Solar LLC	For-Profit
Oakland Community College	Education
Oakland County Michigan Works!	Non-Profit
Oakland County	Government
OASiS	For-Profit
Oberlin City Council	Government
Ocado Retail	Other
ODOT	Government
Office of Clean Energy	Government
Office of Future Mobility and Electrification	Government

Organization Name	Org Type
Office of Manufacturing and Energy Supply Chains	Government
Office of Mobility	Government
Ohio Aerospace Institute	Non-Profit
Ohio Department of Development	Government
Ohio Fuel Cell and Hydrogen Coalition	Non-Profit
Ohio Gas Co	For-Profit
Ohio National Guard	Government
Ohio Nuclear Free Network	Other
Ohio Oil & Gas Association	Non-Profit
Ohio Power Siting Board	Government
Ohio River Valley Institute	Non-Profit
Ohio Southeast Economic Development	Non-Profit
Ohio State Highway Patrol	Government
Ohio State Innovation Foundation	Other
Ohio State University	Education
Ohio Tax Credit Authority	Other
Ohio Turnpike Commission	Government
Ohio University	Education
Ohio Valley Green Energy and Manufacturing Initiative	Other
O-I Glass	For-Profit
Old Redford Academy	Education
Olympia Development	For-Profit
Omnis Fuel Technologies	For-Profit
One Columbus	Other
One Six Energy	For-Profit
OneH2 Inc.	For-Profit
Ontario Ministry of the Environment	Government
OPmobility	For-Profit
Optical Society of America	Non-Profit
Orb Aerospace	For-Profit
Oregon Clean Energy	Non-Profit
Original United Citizens of Southwest Detroit	Non-Profit
Orion Township	Government
Ormet Aluminum Corp	For-Profit
Our Next Energy	For-Profit

Organization Name	Org Type
Owens CC	Education
Owens Corning	For-Profit
P2H2	For-Profit
PACCAR	For-Profit
Pacific Northwest National Lab	Government
Palo Verde	For-Profit
Pegasus Specialty Vehicles	For-Profit
PennFuture	Non-Profit
Pennsylvania Chamber of Business and Industry	Non-Profit
pH Matter, LLC	For-Profit
Piedmont Natural Gas	For-Profit
Pike County	Government
Pike County SODI	Non-Profit
Piston Automotive	For-Profit
PJM Interconnection	Non-Profit
Plug and Play Detroit	For-Profit
Plug Power	For-Profit
Plymouth Charter Township	Government
Politecnico di Milano	Education
Port of Detroit	Government
Port of Long Beach	Government
Port of Oakland	Government
Port of Virginia	Government
PORTSfuture	Education
POSCO	For-Profit
Power to Hydrogen	For-Profit
Powertech Labs	For-Profit
Prelude Ventures	For-Profit
Pritchard	For-Profit
Prometheus Materials	For-Profit
PSEG Power	For-Profit
Public Service Company of North Carolina	For-Profit
Public Utilities Commission of Ohio	Other
Purdue University	Education
Purecycle	For-Profit

Organization Name	Org Type
Quantron US, Inc.	For-Profit
Range Resources Corp.	For-Profit
Re:Build Manufacturing	For-Profit
REDI	Other
Redwood Materials	For-Profit
Regional Growth Partnership	Non-Profit
Resources for the Future	Non-Profit
ResponsibleSteel	Non-Profit
Rev1 Ventures	For-Profit
Revision Autonomy	For-Profit
Richland Township	Government
Rivian	For-Profit
Rocky Mountain Institute	Non-Profit
Roosevelt Institute	Non-Profit
Roush Industries	For-Profit
Rudolph Libbe	For-Profit
RW Energy	For-Profit
Saginaw Career Complex	Education
City of Salem, OH	Government
Salzgitter	For-Profit
Samsung	For-Profit
Sandia National Laboratories	Other
Sarnia Lambton Environmental Association	Non-Profit
Save Lake St. Clair	Non-Profit
Science and Environmental Health Network	Non-Profit
Scioto Valley-Piketon Area Council of Governments	Government
Scout Motors	For-Profit
SeaLandAire Technologies, Inc.	For-Profit
Sealed Air	For-Profit
Seimens Energy	For-Profit
SEMCOG	Non-Profit
Sesame Solar Inc.	For-Profit
SGS	For-Profit
Shell	For-Profit
Siemens	For-Profit

Organization Name	Org Type
Sierra Club	Non-Profit
Sierra Lobo	For-Profit
Silicon Valley Bank	For-Profit
SK Siltron CSS	For-Profit
SkySpecs	For-Profit
Small Business Innovation Research	Government
SOBE Thermal Energy	For-Profit
SoCalGas	For-Profit
Solar Cells, Inc	For-Profit
Solar Energy Industries Association	Non-Profit
Southern Company	For-Profit
Southeastern Ohio Port Authority	Government
Special Power Sources	For-Profit
Specialty Equipment Market Association	Non-Profit
SSAB	For-Profit
Stanford University	Education
Stark Area Regional Transit Authority	Government
Stark Economic Development Board	Non-Profit
Stark State College	Education
State of Illinois	Government
State of Indiana	Government
State of Iowa	Government
State of Michigan	Government
State of Ohio	Government
State of Pennsylvania	Government
SteelWatch	Non-Profit
SteelZero	Other
Stegra	For-Profit
Stellantis	For-Profit
Strategic Council for Higher Education	Non-Profit
Sublime Systems	For-Profit
Sumeeko	For-Profit
Summit Materials	For-Profit
SunCoke Energy	For-Profit
Swagelok	For-Profit

Organization Name	Org Type
Synhelion	For-Profit
Talen Energy	For-Profit
TC Energy	For-Profit
Team NEO	Non-Profit
Team Pennsylvania	Non-Profit
Tech4Imaging LLC	For-Profit
Techstars Detroit	For-Profit
Tenaska	For-Profit
Tesla	For-Profit
Texas Based Energy Transition & Environmental Management	For-Profit
Toledo Area Regional Transit Authority	Government
Toledo Solar	For-Profit
Topsoe	For-Profit
Township of Brownstown	Government
Toyota	For-Profit
Transports Canada	Government
TRC Companies	For-Profit
Tri State CCS	For-Profit
Trillium H2 Power	For-Profit
Trillium Transportation Fuels, LLC	For-Profit
TriplePundit	Non-Profit
Troy High School	Education
TSMC	Non-Profit
Tung Thih Electronics	For-Profit
Twelve Benefit Corporation	For-Profit
U. S. Steel	For-Profit
Ultium Cells	For-Profit
United States Patent and Trademark Regional Office	Government
University of Antioquia	Education
University of Cincinnati	Education
University of Dayton	Education
University of Delaware	Education
University of Illinois	Education
University of Michigan	Education
University of Toledo	Education

Organization Name	Org Type
University of Wisconsin	Education
US Air Force	Government
US Army	Government
US Chamber of Commerce	Government
US Department of Commerce	Government
US Department of Defense	Government
US Department of Energy	Government
US Department of Treasury	Government
US DOT	Government
US Energy Information Administration	Government
US Occupational Safety and Health Administration	Government
US Patent and Trademark Regional Office	Government
USG Corp	For-Profit
Van Buren Township	Government
Verne	For-Profit
Vertiv	For-Profit
Village of Piketon	Government
Viritech	For-Profit
Vistra Corp.	For-Profit
Vitesco Technologies	For-Profit
Volvo Group	For-Profit
Wabtec	For-Profit
Walmart	For-Profit
Walsh University	Education
Wärtsilä	For-Profit
Washington County Planning Commission	Government
Washtenaw Community College	Education
Watt Fuel Cell Corporation	For-Profit
Wauseon Fire Department	Government
Wayne County	Government
Wayne County Airport Authority	Government
Wayne Disposal Inc.	For-Profit
Wayne State University	Education
WEC Energy Group	For-Profit
West Michigan Environmental Action Council	Non-Profit

Organization Name	Org Type
West Virginia University	Education
Westrafo America	For-Profit
Wood Mackenzie	For-Profit
Workhorse	For-Profit
Worthington Enterprises	For-Profit
Wright State University	Education
X3 Energy	For-Profit
Xcel Energy Inc.	For-Profit
Youngstown City Council	Government
Youngstown-Warren Regional Airport	Other
Ypsilanti Township	Government
ZeroAvia	For-Profit
Zeus Electric Chassis	For-Profit

