

DETROIT'S HYDROGEN MOBILITY FUTURE



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FROM THE DESK OF THE CHIEF OF MOBILITY INNOVATION

The City of Detroit is committed to creating a sustainable future for all our residents and we need hydrogen as a key alternative to fossil fuels for our transportation and mobility future. Whether you arrive at hydrogen to mitigate climate change, reduce congestion, or as a defense against global instability, the time is now to develop local policy and programs, and build the right infrastructure to stimulate hydrogen adoption for transportation and mobility.

Municipal governments often follow established energy policy, but Detroit, in partnership with the State of Michigan, stands ready to take a leadership role in fossil fuel alternatives. As the historic home of the auto industry, Detroit's local knowledgebase and skillset is driving mobility innovation – and is second to none. We are ready to push at this critical tipping point. The conversations about what's next on wheels in c-suites, research labs, innovation incubators, universities, and repair shops all take place here in Detroit. We have the tools, talent, and local use cases to shape the global hydrogen conversation.

This is **not** a this vs. that scenario. Hydrogen and EVs are both needed to reach our clean transportation goals across all sectors. In fact, hydrogen is a form of EV. And what we must learn from the national EV adoption is that this kind of transformational change requires planning for demand to meet supply. To achieve this, I am calling upon the hydrogen industry to partner with Detroit to address current challenges for the success of the hydrogen economy.

Local understanding and advocacy for hydrogen adoption demands urgency – we must act now. There are still voices that either fear hydrogen, don't realize that hydrogen is part of the electrification equation, or haven't yet grasped the critical role hydrogen will play in the future global economy. Our current transportation infrastructure is supported by multiple fuel types today (gasoline, diesel, natural gas, electric, biofuels, etc.) and having more clean energy choices is good for customers. Detroit is ready to make the case with industry to build the necessary public support, operational knowledge, skilled workforce and production infrastructure so that when hydrogen technology is ramping up and ready to change the world, production is ready to fuel the technology adoption.

Join us in Detroit! We put the world on wheels and now it's time to get those wheels on H₂!

Tim Slusser
Chief of Mobility Innovation, City of Detroit

PART 1: WHY HYDROGEN?

The world is largely supportive of the concept that converting our transportation systems to electrified, zero tailpipe emission solutions will contribute positively to climate change and environmental sustainability. However, there are still many that either don't realize hydrogen is a form of vehicle electrification, that it leverages many of the same supply chain components as full battery electric (BEV) or understand what problem hydrogen is solving when compared to BEVs. For clarity, a hydrogen fuel cell electric vehicle (FCEV) is a fully electric vehicle with a smaller battery pack and an on-board generator, called a fuel cell, that consumes hydrogen to produce electricity that keeps the battery charged and the FCEV driving long distances. It also never needs to be plugged in to recharge because that is the role hydrogen plays on the vehicle. For comparison, a BEV can only recharge by stopping and being plugged in.

Hydrogen's role in decarbonizing our transportation system, and our planet, is currently starting with heavy-duty applications such as long-haul trucking. This form of transportation is the backbone of America's economy. According to the American Trucking Associations, trucking companies generated more than \$940 billion in gross freight revenues from trucking in 2022, representing greater than 80% of the nation's freight bill that year. These companies also employed more than 3.5 million truck drivers in 2022. With increases in online shopping and the preference for goods to be delivered directly to consumers doors, all signs point to increased demand for these transportation services.

There are two distinct areas that hydrogen FCEVs are providing significant advantages over competing electrification solutions (i.e., BEV):

- 1. Range and Hauling Capacity** – For heavy-duty trucking, FCEV solutions are able to travel farther and haul larger loads than BEVs. This is largely due to the current energy density of battery technology that necessitates substantially larger battery packs to achieve longer driving ranges. The challenge is that those batteries also add significant weight to the vehicle, which then reduces the size of the loads that can be hauled by those BEVs.
- 2. Refueling Time** – Current technologies can refuel a heavy-duty FCEV in comparable times to that of diesel trucks today, which would be considered the industry standard and takes roughly 10 minutes. By comparison, most resources suggest it will take between 30 to 120 minutes to recharge a comparable BEV. There's more to this equation, however, as the energy required to accomplish the task of "refueling" a FCEV and BEV are orders of magnitude apart. For hydrogen FCEVs, this requires some arrangement of pumps, compressors, and/or cryogenics. During refueling, these components will require 10s of kilowatts (kW) of electrical power being delivered by the electrical grid.

(continued) For BEVs, refueling requires all of the energy to recharge the battery to be delivered by the electrical grid (hydrogen is an energy carrier for FCEVs). That means charging stations need to deliver powers in the 100s of kW or even the megawatts (MW). To accomplish this, the electrical grid has to be built to achieve these capacities, even if they are only required for very short periods of time throughout the day. This can become problematic for the large portions of our country with aging grid infrastructure because upgrading that infrastructure is typically measured in terms of decades.

These two challenges are major driving factors behind the role hydrogen needs to play in our transportation future as a complement to BEV solutions. Furthermore, they are also reasons why we need to act now to address the remaining gaps for the transportation market of the hydrogen economy.

PART 2: WHY DETROIT?

Detroit is uniquely positioned within the Midwest as a gateway to the US economy and major economic regions. Our 100+ years of automotive heritage and leadership has created the country's highest density of engineering talent and transportation innovation. In addition, greater than 60% of all US mobility and automotive R&D spending occurs in our home state of Michigan. No other city or region in the country has as many unique characteristics to make it a destination for addressing the clean freight sector and creating a long-term local market for developed hydrogen-based solutions.

The City of Detroit, under Mayor Mike Duggan's leadership, was the first in the country to appoint a Chief of Mobility Innovation and create the Office of Mobility Innovation. This role and office were created to allow government to adapt to the rapidly evolving mobility and transportation landscape and their impact on the local economy and community. By creating the position at the cabinet level, Mayor Duggan showed the importance of this industry to Detroit and his commitment to partner with industry along the way. Having the commitment and support of local government when building radically new industry solutions can make all the difference for companies looking to make strategic investment decisions. It is why Detroit is ready to embrace hydrogen.

Recently, the United States Department of Energy (USDOE) established the Regional Clean Hydrogen Hubs, an effort including up to \$7 billion to establish seven (7) clean hydrogen production hubs spread across the country. Detroit is part of the successful Midwest Hydrogen Hub (MachH2) team and will have a "Truck Stop of the Future" deployed as part of that hub. In addition, the United States Joint Office of Energy and Transportation (US Joint Office) released its National Zero-Emission Freight Corridor Strategy in early 2024. This strategy lists Detroit as a "Selected Corridor", "Selected Principal Port", "Selected Intermodal Freight Facility", and "Selected Hub" (Figure 1).

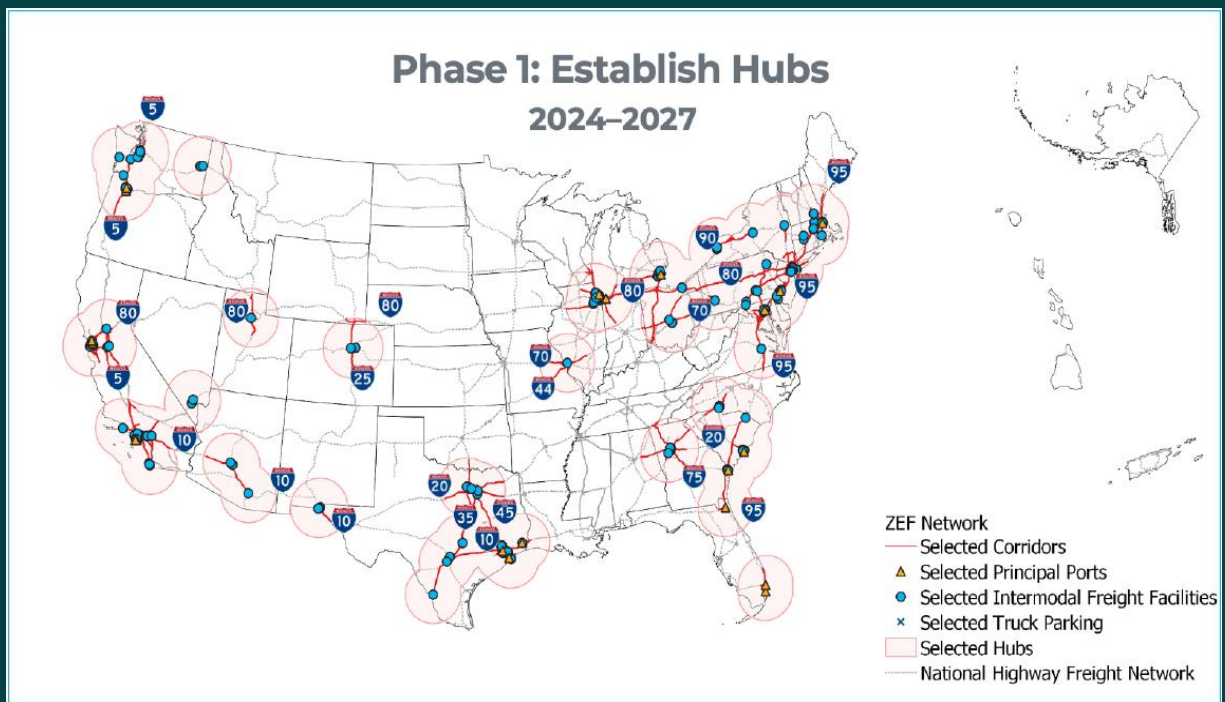


Figure 1: US Joint Office Phase 1 for National Zero-Emission Freight Corridor Strategy

Detroit was awarded these designations in part because the Detroit-Windsor border is one of the busiest international border crossings in North America. Over 40,000 commuters, tourists and truck drivers carrying \$323 million worth of goods across the Detroit-Windsor border each day. This traffic is even expected to grow when the new Gordie Howe International Bridge is completed in 2025, more than doubling our border capacity. It is easy to see how this expansion and stable trade partnership with Canada could become the framework for the greenest clean freight border in the world – a global template for hydrogen adoption.

The US Joint Office wants to begin expanding the hydrogen hub network by 2030. That means the time is now to start forming the partnerships for this vision to succeed and to begin stimulating the hydrogen economy to take advantage of these strategic federal investments by the time they come online.

PART 3: DETROIT’S HYDROGEN VISION

Leveraging Detroit’s numerous attributes that make it a desirable location for hydrogen transportation development, the City of Detroit’s Office of Mobility Innovation seeks to partner with industry to create a nexus of hydrogen-related activity that can stimulate local demand and prepare our local economy to take advantage of the incoming MachH2 investment and infrastructure.

Detroit is already working with several industry partners to support their hydrogen-related efforts spanning:

- Workforce and talent development
- Manufacturing and supply chain components
- Local uses cases and overall demand for hydrogen as a transportation fuel
- R&D and innovation

The link between developing new solutions and creating their markets is identifying local use cases to generate demand. Here are some of the local use cases identified in Detroit:

HYDROGEN AND LABOR

“As part of the Corktown community in the center of innovation around EVs and green tech, we have the responsibility to take a leadership role in all things energy related, especially green energy initiatives. Our current facility is Zero Net Energy and our announced green energy training facility will showcase our commitment to develop a training and safety curriculum for green hydrogen. Through our vast work with EVs we recognize the EV future includes hydrogen.”

—

*Andre Crook,
Business Representative
**The International
Brotherhood of
Electrical Workers
(IBEW) Local 58***

- **Long-Haul Trucking** – A busy and expanding (Gordie Howe International Bridge) international border crossing, a rail port and access to greater than 1/3rd of the US population within a 500-mile radius.
- **Regional Transit** – A proven track record of FCEV buses operating year-round (Flint MTA) and interest from multiple transit agencies to invest in hydrogen for regional transit now.
- **Warehousing and Logistics** – Warehousing and logistics businesses feature hydrogen forklifts that have become a proven use case.
- **Ports and Rail** – The Port of Detroit is Michigan’s largest inland port and the city also contains the CSX, Norfolk Southern and CP Railway Intermodal Terminals, which require significant drayage and cargo handling operations.
- **Aerial Mobility** – Vertical take-off and landing vehicles (VTOLs) and drones are expected to favor hydrogen solutions in the near future.
- **Grid Resilience** – Use of fuel cells to provide backup power and FCEVs to provide bi-directional charging for emergency response.
- **Other Heavy-Duty Applications** – Detroit is investigating the use of FCEVs to support snow plows, street sweepers, refuse trucks, fire engines and emergency vehicles.

PART 4: THE INNOVATION ECOSYSTEM

Detroit is world-renowned for its automotive engineering knowledgebase and skilled workforce. When combined with Detroit's burgeoning startup and mobility ecosystem, it is a potent combination. Headlined by the Michigan Central development, Detroit has become the go-to destination for companies developing clean transportation and mobility solutions.

- [Michigan Central](#) – A destination for advancing technologies and programs that address some of the most pressing challenges facing humanity today and unlock a more sustainable and human centered future.
- [Newlab @ Michigan Central](#) – A collaboration with Newlab, laying the foundation for the mobility innovation ecosystem.
- [Plug and Play Detroit](#) – Its Detroit location closer to the OEMs and Tier 1 suppliers aims to involve the business units directly with the startup technologies, ultimately achieving more pilot projects, proof of concepts, and strategic partnerships.
- [Techstars Detroit](#) – Building on the unique strengths of Detroit's startup and innovation ecosystem through game-changing investment, mentorship, and community partnerships.
- [NextEnergy](#) – A non-profit technology commercialization accelerator that works with innovators to accelerate smarter, cleaner, more accessible mobility and energy solutions for communities and cities.
- [University of Michigan Center for Innovation](#) – A \$250 million research and graduate academic center for UM students in mobility, artificial intelligence, data science, climate tech, entrepreneurship, and other innovation and technology-related disciplines.
- [Black Tech Saturdays](#) – A transformational effort fostering a culture of innovation and imagination to support the growth of Black tech.
- [Mobility Meetups](#) – Designed to bring together dynamic startups in the automotive technology space with Michigan's automotive and mobility industry stakeholders to connect, share, and collaborate.
- [United States Patent and Trademark Office](#) – The USPTO's Elijah J. McCoy Midwest Regional Office (MWRO) was the first USPTO regional office and opened in July 2012.

The Detroit region has seen significant investment in hydrogen related activities recently. We would like to add your company to this growing list:

- Alta Equipment Group Inc. launched Alta eMobility business unit ([November 2022](#)).
- Nel Hydrogen announces gigafactory in Michigan ([May 2023](#)).
- Charbone Hydrogen announces MOU to build first green hydrogen production facility in US ([December 2023](#)).
- Fortescue commits to establish a US Advanced Manufacturing Center in Detroit ([January 2024](#)).
- GM and Honda begin commercial production at industry's first hydrogen fuel cell system manufacturing joint venture ([January 2024](#)).
- Detroit DOT awarded FTA grant, including funding for 4 FCEV buses and refueling infrastructure ([July 2024](#))

PART 5: CONNECT WITH DETROIT

The City of Detroit's Office of Mobility Innovation (OMI) is seeking to connect and partner with companies building solutions for the hydrogen economy. Our goal is to help foster hydrogen-related development and innovations leading to enhanced solutions for clean transportation and energy.

What Your Company Can Bring

- Technology and innovation
- Investment
- Jobs

What OMI and Detroit Can Bring

- Support for permitting
- Assistance with site selection
- Support for developing local partnerships
- Feedback and input on developing hydrogen solutions for government customers
- Partnerships for grant opportunities
- Opportunities to deploy and test

How to Contact Us

Email us at mobility@detroitmi.gov

Visit our website at
<https://detroitmi.gov/OMI>

