

Understanding hydrogen fuel supply.



Hydrogen sourcing.

Hydrogen fuel can be produced onsite, delivered from a supplier, or both. Geographic availability of hydrogen is often the main factor for determining how it is sourced.



Onsite Production

- ✓ You produce and compress your own hydrogen fuel



Delivery

- ✓ A third-party supplier delivers hydrogen fuel to your site

Common requirements.

Both onsite production and delivery will require storage and fill stations.

Building resiliency in your hydrogen fuel supply helps keep your buses on the road. It is important to plan backup sources for either fuel or the inputs needed to make it in case of supply chain issues and other disruptions.



Storage

- ✓ How fuel is sourced is a major factor in determining storage requirements
- ✓ Fuel usage and replenishment rates will also impact storage needs



Fill Stations

- ✓ Hydrogen vehicles need specialized fueling stations
- ✓ Safety measures for these stations depend on where they are located on the property

Government initiatives.

Both the United States and Canada have launched government initiatives to expand hydrogen production and infrastructure across North America.

Goals for these programs include:



Reducing Hydrogen Costs



Expanding Geographical Availability



Improving Hydrogen Fuel Cell Technology

Hydrogen Initiatives

- [US Website](#)
- [Canada Website](#)

These investments will help make both hydrogen production and hydrogen delivery feasible for more transit agencies in the future.

Delivering hydrogen fuel.

When considering hydrogen fuel delivery, it is important to account for:

- ✓ Proximity to major producers
- ✓ Potential partners' production capacity, methods, and willingness to sell
- ✓ Total fuel cost, including transport expenses, storage capacity, and the impact of potential disruptions
- ✓ Carbon intensity of the production process and fuel transportation
- ✓ Fuel grade of the final output
- ✓ Current fuel prices and future price projections

Benefits

- ✓ Reduced up-front investment
- ✓ Reduced long-term costs for staffing, permits, facilities, and scope of operations
- ✓ Reduced fuel costs from producer price competition
- ✓ Expedited hydrogen access for agencies building production capacity
- ✓ Added supply capacity and resilience for agencies that produce hydrogen fuel

Drawbacks

- ✓ Larger onsite storage capacity required
- ✓ Additional facilities to receive hydrogen deliveries required
- ✓ Gasifier required to process hydrogen delivered in liquid form
- ✓ Reduced control over hydrogen access
- ✓ More susceptible to production disruptions that could mean:
 - ✓ Increased fuel prices
 - ✓ Reduced fuel availability
 - ✓ Delayed or reduced deliveries



Producing hydrogen fuel.

When considering hydrogen fuel production, it is important to account for:

- ✓ Different production processes and the carbon intensity of each method
- ✓ Expansion project scope and ability to scale over time
- ✓ Project management and available funding
- ✓ Workforce and training requirements
- ✓ Input cost, availability, and security of supply
- ✓ Resiliency measures required to ensure hydrogen supply

Benefits

- ✓ Increased control over fuel supply and which production process is used
- ✓ Less geographical restrictions and reliance on third-party fuel suppliers
- ✓ Better access to hydrogen during supply chain challenges
- ✓ Lower overall fuel storage requirements
- ✓ Additional revenue stream available through overproducing and selling hydrogen fuel

Drawbacks

- ✓ Higher up-front investment and more long-term commitment
- ✓ Additional investments for facilities, equipment, civil work, and infrastructure required
- ✓ Increased staffing, training, permits, and maintenance costs
- ✓ Widened scope of operation beyond the agency's core competency
- ✓ Additional planning for production disruptions required
- ✓ Backup fuel supplier may be required

Hydrogen vehicle facilities.

Adding hydrogen vehicles to your fleet may require you to retrofit old facilities or design and build new ones.



Know Your Jurisdiction

The specific steps you need to take and regulations you need to follow will depend on your local, state, and national jurisdictions.



Major vs Minor

Facilities are classified as either major or minor repair garages and have different safety requirements based on what work is done there.

Avoid some facility upgrades by performing operations like fueling, maintenance, and storage outdoors. Special land allocations and separation measures may still be required.

Minor repair garage.

“ A building or portions of a building not used for work required to be performed in a major repair garage, such as lubrication, inspection, and minor automotive maintenance work, fluid changes (e.g., brake fluid, air conditioning refrigerants), brake system repairs, tire rotation, and similar routine maintenance work.”

NFPA 2: Hydrogen Technology Code

A garage that is up to code for servicing diesel or gasoline vehicles may not require any additional safety upgrades to serve as a minor repair garage.

The main recommended safety measures are:



Sprinklers



Ventilation



Precautions Around Heat Sources

Major repair garage.

“ A building or portions of a building for major repairs, such as work on the hydrogen storage system, the fuel cell system, the propulsion system, repairs that require defueling of the hydrogen fuel cell vehicle, and maintenance or repairs that require open-flame cutting or welding”

NFPA 2: Hydrogen Technology Code

An isolated hydrogen service area can be created to meet these codes and reduce the amount of required space, cost and overall impact of upgrades.

Safety upgrades for a major repair garage include:



Gas Detection Equipment



Precautions for Devices that Spark, Heat, or Produce Electrical Arcs



Ventilation Upgrades



Dedicated Areas for Activities with High Combustion Risks

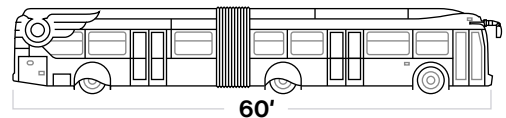
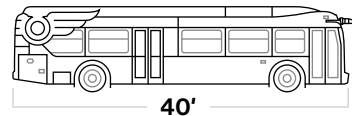
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Available in 2 Lengths



Contact Us

To learn more about the next steps for adding hydrogen vehicles to your fleet, contact your regional sales manager using the rep locator tool at:

newflyer.com/rep-locator

