



Hydrogen as a Transportation Fuel in Rural Communities

Based on the August 18, 2020 webinar by Alison Smyth, Cory Shumaker, Keith Lehmeier, Al Cioffi, and Debbie Swickard

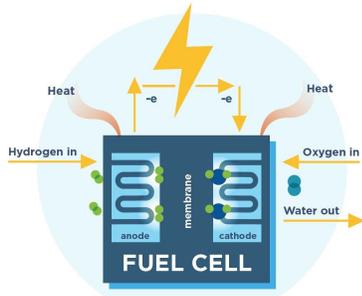


Diagram of basic hydrogen fuel cell operations

Hydrogen as Fuel

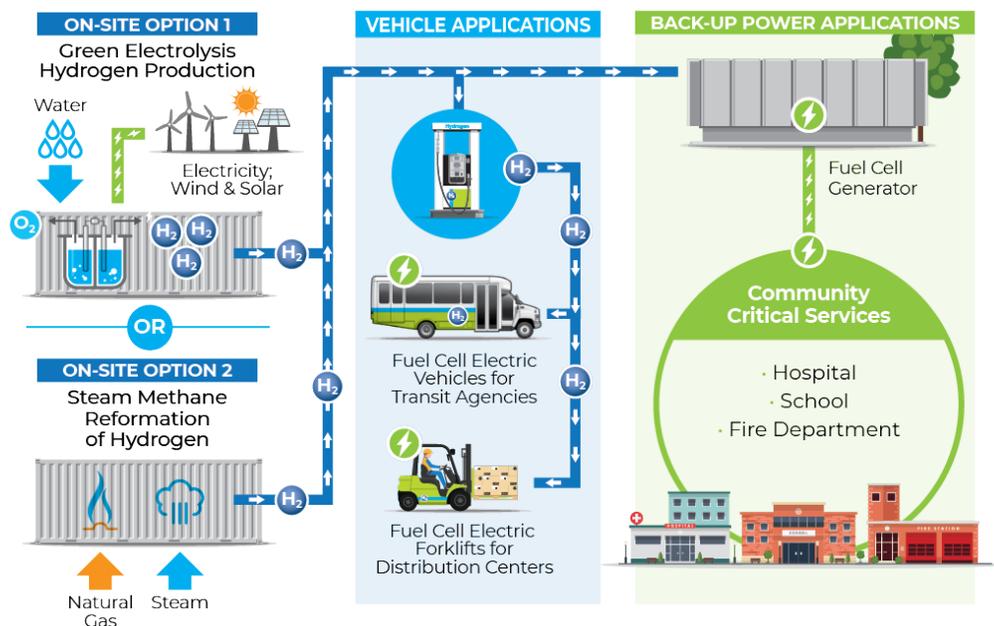
Hydrogen, in terms of transportation, is an energy carrier like any fuel. When used in fuel cell, hydrogen is shot through cell, creating electricity while only emitting water vapor.

Hydrogen is as safe, if not safer, than fuels commonly in use. It is non-toxic, and because hydrogen gas is lighter than air, any breach of a fuel cell will release the hydrogen straight into the atmosphere, with no lingering fumes. It is commonly used in various industries, and as a result there are many standards for safely handling and using hydrogen.

Advantages of Hydrogen to Rural Communities

Hydrogen has many applications which can greatly benefit a rural community.

- Hydrogen can be produced locally very easily. They can take advantage of alternative energy sources already in place like wind or solar to produce Hydrogen through electrolysis, or use Natural gas and steam to produce Hydrogen gas.
- Hydrogen Gas can be used in multiple ways for vehicles. Hydrogen gas can be stored in fueling stations similar to how gasoline is stored and sold today. This can then dispense hydrogen into any fuel cell vehicles, in addition to fuel cell generators which often as backup power sources in vital services like hospitals.



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Allison Smyth is an Engineering Consultant and Electric Utility Specialist at CTE. She provides project management and analytical support for advanced transportation projects, including battery electric and hydrogen fuel cell electric vehicles.

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Keith Lehmeler is Director of New Product Development at Lightning Systems, and was the engineering lead and project manager for the development of Lightning System's first all-electric platform, the Lightning Electric Ford Transit

Al Cioffi has 36 years of management and executive leadership experience in reliable power, and alternative energy industries, and is working with Plug Power to advance the commercialization of hydrogen fuel cell technology

Debbie Swickard has been Grants Manager at SARTA since 2015, and is responsible for SARTA receiving grants and funds for hydrogen fuel stations, and other Low Emission technologies.

Deploying a Hydrogen Fuel Cell Electric Fleet

There are many different fuel cell electric vehicles on the market. There are 40-60 foot passenger buses produced by New Flyer and ENC that use hydrogen fuel cells. There are also large format passenger vans and cutaways for smaller public transit needs produced by Lightning Systems. Car manufacturers like Toyota and Hyundai are also offer light-duty FCEVs for consumers. With FCEV alternative for many different types of transit vehicles, transit agencies, even rural ones, can find a hydrogen fuel cell alternatives to most vehicles in a fleet.

There are many different ways to store and deliver hydrogen, so when thinking about adopting hydrogen as a fuel, there are many things to consider. As stated before, producing hydrogen locally is simple and can benefit the community through the creation of green jobs. But it is also to source hydrogen from elsewhere, and get it delivered as either a gas or a liquid.

Action Plan for Adopting FCEVs

1. Reach out to peer agencies to learn from their experience with zero-emission technology.
2. Develop support within the agency for pursuing hydrogen fuel cell technology.
3. Perform a planning study to evaluate the feasibility of deploying hydrogen FCEVs at the agency. Don't forget to account for infrastructure!
4. Contact local partners and speak to local and state officials about your project proposal. Identify opportunities for collaboration and funding support.
5. Pursue and Secure funding for the FCEV deployment and associated facilities and fueling infrastructure.
6. Create a project plan and execute the hydrogen fuel cell electric vehicle deployment project.

Funding a Hydrogen Fleet

There are Federal Programs that can help fund converting to a Hydrogen fleet, including the Low-No Emissions Program. There are also many state-wide programs available. Looking locally, and working with local utilities and other partners that also work with or can work with FCEVs, as collaboration can greatly reduce costs.



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