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TRANSPORTATION

Will the Midwest take advantage of the emerging hydrogen economy?

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Sue Sapp / U.S. Air Force

An operator loads a mobile hydrogen refueling vehicle, which refuels forklifts at the Robins Air Force Base in Georgia.

California is a leader in the use of hydrogen fuel cells, but experts say they're also well suited for the Midwest.

When Argonne National Laboratory engineer Theodore Krause spoke to Chicago-area elected officials this year about alternative public transportation fuels, he found many local leaders knew far more about batteries than they did about hydrogen fuel cells.

"There is a lot of development and deployment of hydrogen technology in California, and while it's not as publicized, there are efforts on the East Coast to develop a hydrogen network for light-duty vehicles," said Krause, who heads up Argonne's fuel cell laboratory program. "But when it comes to the Midwest, you don't hear a lot about hydrogen and fuel cells in this part of the country."

Andrew Thomas, director of Ohio-based Renewable Hydrogen Fuel Cell Collaborative, notes that while a significant amount of hydrogen is produced in the Midwest, the region can still learn a lot from California about adapting the fuel for transportation. And while most of that hydrogen is currently produced from natural gas, it can also be produced using renewable electricity.

"It may seem like the Midwest would be No. 1 [for hydrogen], but that may not be the case," Thomas said.

A future for hydrogen

A November report by the Fuel Cell & Hydrogen Energy Association, an industry group backed by automakers, energy firms and other companies, predicts hydrogen could meet 14% of U.S. energy demand by 2050, with the largest share going to transportation.

Hydrogen fuel cells are currently well suited to industrial uses in the Midwest, Thomas said, and have proven useful in forklifts, where the lack of emissions is a particular benefit in warehouses. The Department of Energy reports more than 20,000 hydrogen forklifts have been deployed in the U.S. since 2009, by companies that include FedEx, Amazon and Walmart.

Thomas also sees potential for hydrogen in trucking along the Midwest's busy shipping corridors. A truck debuted by Kenworth and Toyota earlier this year has a range of 300 miles and can refuel in 20-25 minutes.

But hydrogen fuel cell vehicles currently have a drawback due to the expense of building fueling stations, Thomas said. A hydrogen refueling station costs about $2 million now, he said.

Why California leads the hydrogen economy

For now, California leads in the adoption of hydrogen. The state is home to about 40 hydrogen stations, and it has more hydrogen fuel cell cars driving on its roads than any other state, said Pat Valente, executive director of the Ohio Fuel Cell Coalition.

California's Zero-Emission Vehicle Program requires passenger car and light-duty truck makers to produce a certain number of electric and hydrogen fuel cell vehicles per year in the state.

Also, the state offers rebates to individuals who purchase or lease light-duty hydrogen fuel cell and electric vehicles and incentives to fleets to buy light-duty hydrogen fuel cell vehicles, according to the Center for Climate and Energy Solutions (CCES).

> The state is part of the Multi-State ZEV Task Force along with eight other states — Connecticut, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island and Vermont. The task force's mission is to promote electric and hydrogen vehicles so that 3.3 million zero-emission vehicles are on the roads by 2025.

In contrast, Midwestern states have fewer incentives. For instance, Illinois offers funding for replacing public transit buses with alternative-fuel buses. School districts can be reimbursed if they convert school buses to run on alternative fuels, according to the CCES. In Ohio, businesses are offered financial assistance to adopt alternative fueling infrastructure installations.

“California is the center now mainly because of environmental regulations,” said Argonne National Laboratory chemist John Kopasz, who is helping to head up the Midwest Hydrogen and Fuel Cell Coalition. “I don’t know if the Midwest could be the center, but it has the potential to be one of the bigger regions for the development of hydrogen technology as one of the biggest regions for transportation employment in the U.S. It has the potential to be important [for hydrogen].”