

OPINION COLUMNS

Opinion: Hydrogen-powered vehicles must be part of Colorado's plan to get to zero emissions

Along with stricter fuel standards for internal combustion engine vehicles, both hydrogen fuel cell and battery technologies will be needed to decarbonize transportation.



Brian DeBruine 2:55 AM MDT on Apr 3, 2021



National Renewable Energy Lab has the only working hydrogen fuel pump in Colorado, so far not open to the public, meant for their research. More stations are coming, aimed at consumers. (Dennis Schroeder, NREL)

One of President Joe Biden's first acts as president was to sign a "Buy American" executive order that seeks to overhaul the federal government's fleet of cars and trucks with electric vehicles (EVs) assembled in the U.S. And the U.S. Postal Service in February [announced](#) a new 10-year contract to overhaul its delivery truck fleet with a mix of EVs and traditional vehicles.

Replacing the government's gas and diesel vehicles is a laudable goal, and one that could be a boon to the automotive industry. Indeed, just days after Biden's announcement, American automaker General Motors announced its alignment with the president's policy and declared that its fleet of vehicles would be all-electric by 2035.

Even a few years ago, such a decisive and rapid move by an American auto company would have been hard to imagine. After all, it took until 2019 for the country's most successful and recognizable EV company, Tesla, to turn an annual profit. But as more companies recognize sustainability as a crucial component of future success, we are likely to see others follow suit.

And they will have pressure and incentives from governments, as well. Here in Colorado, we adopted a zero-emission vehicle rule in 2019 to promote clean transportation. And countries around the world are setting climate goals, many of them citing 2050 as the target date to achieve net-zero greenhouse gas emissions. Candidate Joe Biden pledged the U.S. would meet that same mid-century goal and reiterated that pledge from the White House in January.



Brian DeBruine

While Biden's plan is still light on details, there is a smart way to approach vehicle electrification in this country that goes beyond just the government fleet.

When it comes to EVs, most Americans think of battery electric vehicles (BEVs) that are charged overnight in your garage or in the Whole Foods parking lot while you shop. But fuel cell electric vehicles (FCEVs) that run on hydrogen must be part of any net-zero emissions goals.

Transportation accounts for 28% of all U.S. greenhouse gas emissions – more than any other sector, including electricity generation and industry. The federal vehicle fleet in 2019 consisted of 645,000 vehicles that guzzled 375 million gallons of gasoline and diesel over 4.5 billion miles traveled.

Swapping those vehicles with zero-emission EVs will of course take time and money. But it will also significantly reduce the government's emissions footprint.

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So, are FCEVs and BEVs competitors? Far from it. Along with stricter fuel standards for internal combustion engine vehicles, both vehicle technologies will be needed to decarbonize the entire transportation system in the years ahead.

In a fuel cell, hydrogen is combined with oxygen in a chemical reaction that produces electricity. So instead of needing to charge FCEVs by plugging them in, the electricity used to propel these vehicles is produced onboard during operation. The only emissions produced by FCEVs is water vapor.

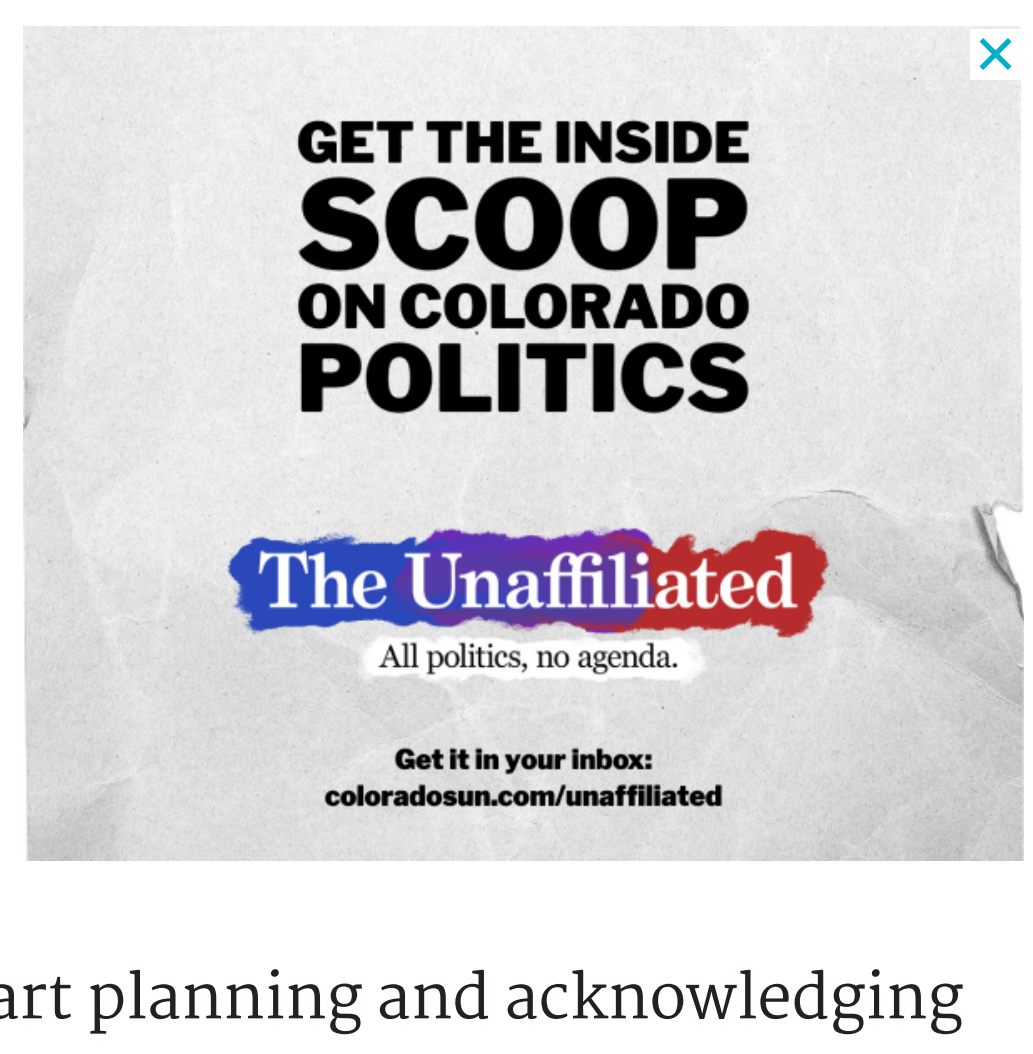
FCEVs make for excellent passenger vehicles because they can travel 300-400 miles on a single tank, behaving similarly to gasoline-powered cars except with zero emissions – a key selling point when it comes to enticing all users to convert to electric. Plus with FCEVs, drivers don't have to worry about diminished performance in cold weather, which is a fact of life in Colorado.

But hydrogen-powered vehicles are particularly beneficial when it comes to heavy-duty transportation, mass transit, and long-haul trucking. Large electric vehicles like tractor trailers and city buses require large batteries, which are extremely heavy and require lengthy charging times. Hydrogen is lighter, faster fueling, and more energy dense than batteries alone.

The biggest challenge facing FCEVs is the same facing BEVs: infrastructure. FCEVs can't exist without hydrogen fuel stations, and there are virtually none outside California. To encourage widespread adoption, we must establish at least a small number of hydrogen fuel stations throughout each state.

Thankfully, that work is already beginning in Colorado, where the [Colorado Hydrogen Network](#) has joined with Colorado's [Clean Cities](#) organizations to encourage commercial users to acquire fuel cell trucks.

Startups are working to finance, build and operate hydrogen fuel stations, the first of which is being installed on the [Colorado State University Powerhouse Energy Campus](#) and should be operational by summer.

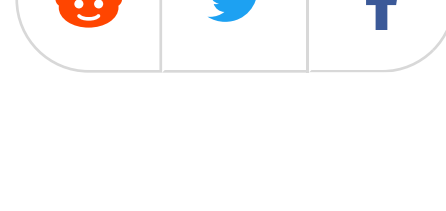


Decarbonizing transportation will not be easy. It will take time and resources. But smart planning and acknowledging that each technology – BEVs and FCEVs – has a role to play is a critical first step.

On their own, neither technology is a silver bullet to solving our transportation-related emissions challenges. But together, BEVs and FCEVs can drive us to a cleaner future.

Brian DeBruine of Evergreen is co-director of the [Colorado Hydrogen Network](#), a nonprofit advocacy organization seeking to promote hydrogen and fuel cell technology.

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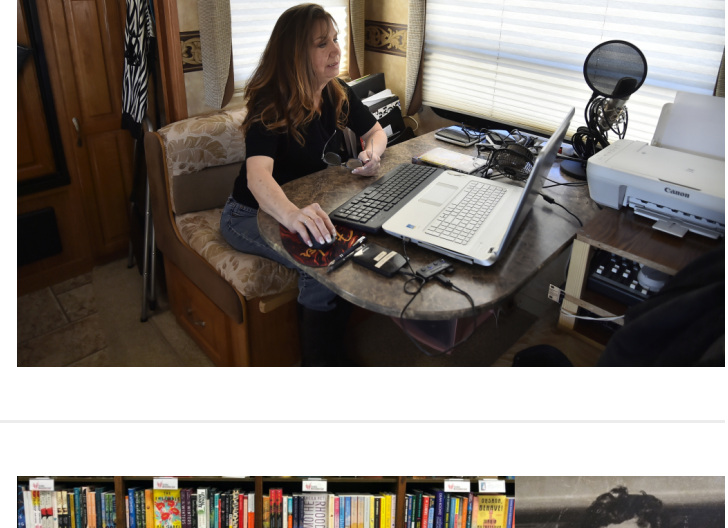


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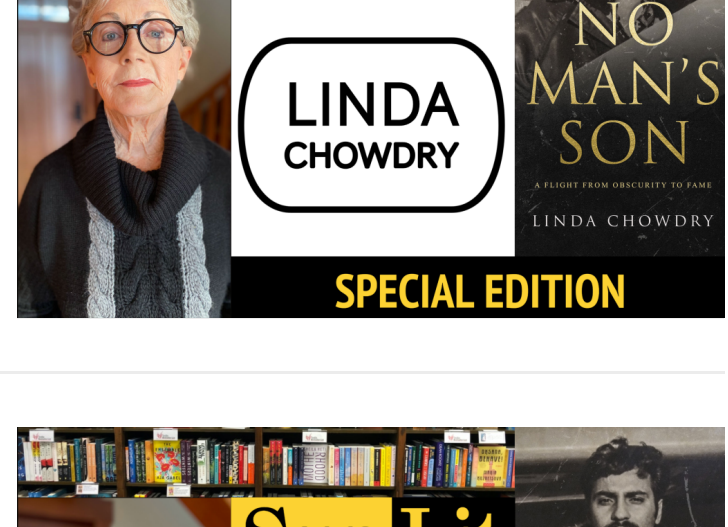
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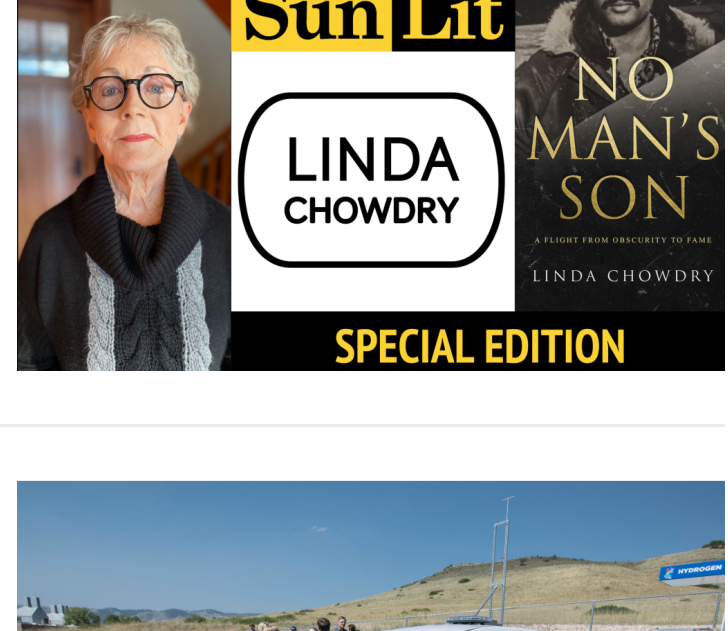
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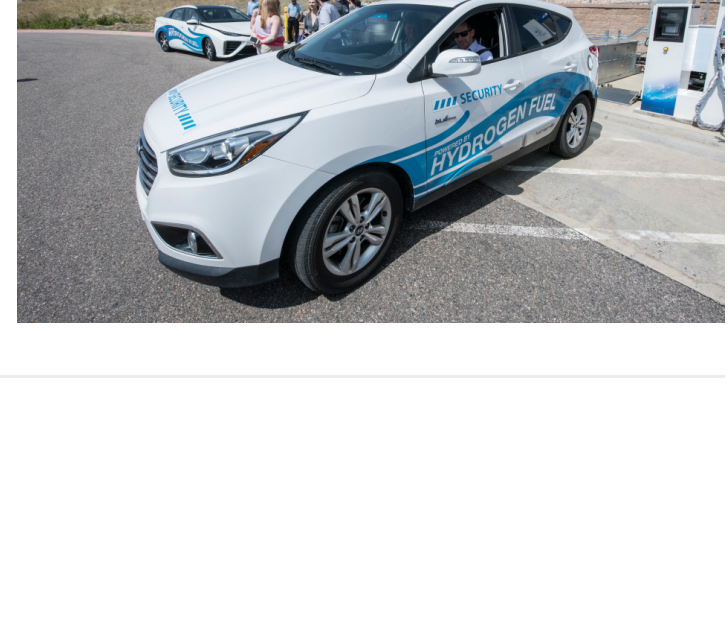
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