Australian Electric Vehicle Association

AEVA POLICY RECOMMENDATIONS: HYDROGEN
APPROVED BY THE BOARD: 25 JUNE 2024

Policy statement

[1] AEVA recommends governments should not tie hydrogen investments to the land transport sector. Hydrogen for transport represents a higher investment risk compared to general electrification and support for battery EVs, which is well proven. Hydrogen *may* see application in key non-road heavy haulage transport applications, particularly shipping and aviation.

Commentary

It is the view of AEVA that hydrogen has very limited value in the land transport sector. For ordinary light vehicles, hydrogen fuel cell EVs (FCEVs) have been surpassed by battery EVs. The problem they purport to address is recharging speed, but improvements in battery technology over the past decade have closed that gap with fast charging times of around 15 minutes for some models, which is ample for most use cases.

Moreover, most of the time vehicles are parked at home or work where charging does not need to be fast. With larger battery capacities, one rarely needs a full charge to have ample range for the overwhelming majority of trips. During long trips, many current models of EVs can add sufficient charge for several hundred kilometres of driving in the time that is needed for short (and recommended) driving breaks. Charging equipment manufacturers continue to push the envelope with charging speed, so it is expected that EVs will be able to be charged to at least 80% in less than 10 minutes.

Assuming "green hydrogen" is produced from renewable energy, electrolytic hydrogen for a FCEV requires about three times more electricity[1] compared with charging an equivalent battery EV directly. Even if the production cost of hydrogen is reduced to competitive levels (eg, $2/kg), it will always be much cheaper to use electricity directly (via the battery) than to convert electricity to hydrogen and then convert it back again on-board the vehicle. The energy losses at each step of electrolysis, compression, and fuel cell operation reduce the round-trip efficiency to about 30 percent. Furthermore, a battery is still required in a FCEV to buffer the output of the fuel cell against rapid changes in power demand.

[1] Seba, Tony. EnergyPost.eu, 23 October 2015. https://energypost.eu/toyota-vs-tesla-can-hydrogen-fuel-cell-vehicles-compete-electric-vehicles/

AEVA recognises that hydrogen is absolutely essential for some applications and quite likely for some other applications. Liebreich Associates maintains a chart called the Hydrogen Ladder[2] which shows the suitability of hydrogen to various applications ranging from domestic heating to fertiliser production. A considerable number of applications are very unlikely to be competitive for hydrogen. AEVA is not suggesting the technology should be ignored; indeed it may prove successful (directly or in a carrier form such as ammonia or synthetic hydrocarbons) for extremely heavy, extremely long-range vehicles such as intercontinental shipping and aircraft. It remains very unlikely to find application in light vehicles.

Battery electric semi-trailers are now entering the freight vehicle fleet in countries such as the USA with very fast charging infrastructure. Trials with these trucks have successfully completed routes in excess of 1,000 km per day. For trucks on regular long-distance routes, battery swapping may also be successful[3].

[2] Liebreich Assocates. https://www.liebreich.com/hydrogen-ladder-version-5-0/

[3] See, for example: Janus Electric. https://www.januselectric.com.au/