

March 6, 2023

HB 889 – SUPPORT IF AMENDED

Dear Chair Wilson, dear Vice Chair Crosby, dear members of the Economic Matters Committee,

Thank you for the opportunity to provide comments to HB 889. The bill is too prescriptive and not technology neutral. I urge the committee to amend this bill by adding the option for station operators to deploy hydrogen fueling instead or in combination with fast charging. The bill with such an amendment would also better align with Maryland's ZEV goals.

Palamedes Strategies is a clean energy consulting firm with over a decade of experience in hydrogen and fuel cells and is based in Takoma Park. It operates the first fuel cell electric vehicle (FCEV) in the State of Maryland.

The state of Maryland follows the clean cars regulation implemented by California, which mandates ever-increasing sales of zero-emission vehicles to meet GHG reduction goals. However, unlike California, Maryland legislation, including this bill, does not support or consider FCEVs as a solution to meet these ambitious climate goals. However, the Clean Cars Act, Advanced Clean Cars 2 regulation, and the currently discussed Clean Trucks rule all include FCEVs as part of the Zero Emission Vehicles (ZEVs) definition.

California has already deployed over 55 hydrogen fueling stations¹ supporting 15,000 hydrogen vehicles. California is expected to have 200 stations operational by 2025². One modern hydrogen fueling station built in California has four dispensers and can fully refuel hundreds of vehicles daily, from empty to full in 5 minutes³. These FCEVs have a range of 380 to over 400 miles.⁴

Figure 1: Commercial Hydrogen Fueling Station in Mission Hills, California
– Source: First Element Fuel



HB 889 ignores the need for hydrogen fueling and mandates new station operators to exclusively install fast-charging equipment. However, hydrogen fueling, with its fast refueling time and similar

¹ Hydrogen Fuel Cell Partnership: https://h2fcp.org/by_the_numbers

² CA Executive Order B-48-18

³ Hydrogen refueling explained: https://www.youtube.com/watch?v=puYg0MEZWx0&ab_channel=ToyotaUSA

⁴ Hyundai Nexo: 380 miles: <https://www.hyundaiusa.com/us/en/vehicles/nexo>, Toyota Mirai: 402 miles: <https://www.toyota.com/mirai/>

operation as gasoline or diesel fueling, is a much better fit for the traditional business model of gasoline stations. These stations generally rely on the sale of convenience goods and food items rather than the sale of fuel. In addition, the more customers can be served in the same amount of time, the more revenue station operators generate.

To exemplify this point, consider that this bill would require that a new gasoline station with 8 gasoline and diesel fuel dispensers install 8 fast chargers. At full utilization for one hour, these 8 fast chargers would serve 16 customers (8 cars with an average of 30 minute recharge time). In those 30-minute charging intervals, drivers would charge from 10% to 80% of their range⁵, or about 70% of their total range, which approximates under 200 miles, using an average range of 260 miles for an affordable battery electric vehicle (BEV). In total, that is 16 customers with 182 miles each, or enough fuel to drive a total of 2912 miles.

Alternatively, if the bill is broadened to include hydrogen, this scenario would occur: The same station could install 8 hydrogen fueling dispensers to serve 8 customers. Each would only take 5 minutes to fuel from empty to full.⁶ In one hour, 96 customers could be served at these 8 dispensers. Each customer would get around 380-400 miles in today’s FCEVs. So for an average of 390 miles for 96 customers, enough fuel is dispensed in one hour to drive 37,440 miles. That’s an order of magnitude higher than fast charging.

		BEV Fast Charging	FCEV Fueling
A	Fueling positions	8	8
B	Time to fuel in minutes	30	5
C	Capacity of fueling	70%	100%
D	The average range of a vehicle in miles	260	390
E	Customers served per hour (60 min/B)*A	16	96
F	Miles provided per hour (D*C)*E	2,912	37,440

In this example, 96 customers could be served at a station with FCEVs, whereas only 16 customers driving BEVs would be served in the same time frame. That is 6x the customers for FCEVs and 6x the revenue for the station operator.

Furthermore, the advantage of hydrogen fueling compared to charging is especially pronounced in the medium and heavy-duty sectors. Any time spent not operating the vehicle, such as time spent to fuel the vehicle, costs money. Hydrogen fueling takes a similar amount of time as fueling with gasoline or diesel, thus avoiding excessive downtime.

Therefore, we request an amendment to this bill to include hydrogen, which would provide station operators an option to invest in a zero emission technology that meets their business model needs. Such an amendment would also better align with Maryland’s state energy policy.

⁵ Auto OEMs use the term “80 percent charge in 30 minutes”, BEVs are recommended to not have less than 10% of charge left in their vehicles: <https://www.caranddriver.com/shopping-advice/a32600212/ev-charging-time/>. Most commentarily, fast charging is recommended between 10% and 80% state of charge. https://www.greencarreports.com/news/1135771_hyundai-ioniq-5-road-trip-charging-350-kw-connectors-150-kw-just-as-fast

⁶ NREL reports an average fill rate of .9 kg per minute per fueling (<https://www.nrel.gov/docs/fy18osti/70527.pdf>), a Toyota Mirai has a tank capacity of 5 kg.

For example, the language could read:

“INSTALL ONE ELECTRIC VEHICLE CHARGING STATION CAPABLE OF PROVIDING FAST CHARGING OR ONE HYDROGEN DISPENSER FOR EACH GASOLINE DISPENSER OPERATED BY THE RETAIL SERVICE STATION.”

Thank you for considering these comments, and I hope you will this ask reasonable to ensure equitable treatment of both zero emission technologies.

Best regards,

/s

Emanuel Wagner

President, Palamedes Strategies