

DOCKETED

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Hyroad Energy comments for the 2024 CEC CFI application

Additional submitted attachment is included below.

1. Please disclose your business type and vehicle class, if applicable. Are you a driver, fleet operator, truck stop operator, charging and/or hydrogen fueling provider, installer, manufacturer, utility, public agency, or other? Are you part of a small, veteran-owned, woman-owned, or minority-owned business?

Hyroad is a company dedicated to accelerating the adoption of hydrogen-fueled trucks, which we are doing by providing Hydrogen Trucking as a Service to trucking fleets. Hyroad provides a turnkey solution where it bundles fuel, truck and maintenance for its customers under a simple dollar-per-mile commercial model. To enable this, we are building hydrogen distribution and open access refueling infrastructure at scale and optimizing supply channels with a view to drive the cost of adoption towards diesel parity.

2. The purpose of this RFI is to help inform the CEC's application to the Federal Highway Administration (FHWA) for federal funding. If awarded, the CEC will release a competitive grant funding solicitation to provide funding to end recipients who would develop and construct the zero-emission MDHD infrastructure. Would you consider applying for CFI grant funding for site development if the CEC is awarded funding?

Yes. Hyroad is actively developing hydrogen refueling stations for heavy duty FCEV trucks in California, targeting Southern California and the Central Valley.

3. Do you already operate or plan to use zero-emission MDHD vehicles in the next five years? Please use a 1-5 rating scale where 1= least likely and 5= most likely. Please add additional information regarding your (planned) use of zero-emission MDHD vehicles as desired.

5 – most likely. Hyroad is aggregating trucking demand from California and Texas operators and developing hydrogen refueling stations to support its bundled truck as a service product in those markets. Hyroad will own and fuel class-8 FCEV trucks in its fleet that will be operated by its customers. We were recently awarded grant funding from the Texas Commission on Environmental Quality's THIVE program for over \$9M to offset the cost premium of 28 class-8 hydrogen FCEV trucks in Texas. Hyroad's hydrogen refueling stations in California (and eventually in Texas) will be open access for unaffiliated retail hydrogen customers. We primarily expect to support longer routes and/or continuous drayage operations where hydrogen FCEVs have comparative advantage.

4. For drayage fleet operators and drivers:
 - a. For 2024-2027, what would you like to see as the priority for zero-emission infrastructure? Hydrogen or electric? Or a mix of both?

Hyroad Energy acknowledges that a mix of both will be required. However, we believe that hydrogen will ultimately be the better option for heavy duty trucking applications in most circumstances. As refueling times and the cost of hydrogen come down and the fuel economy of hydrogen fuel cells steadily improves over the coming years, class-8 FCEVs will quickly approach cost parity with diesel trucks with similar range and duty cycle capabilities. BEVs have a role to play, but the physical limitations of the trucks and infrastructure will constrain their market share.

- b. To meet Advanced Clean Fleet (ACF) requirements, are you considering battery electric or hydrogen trucks?

Hyroad is seeing significant interest in heavy duty hydrogen FCEV trucks from potential truck fleet customers in California seeking to meet ACF requirements. The main obstacles are risk appetite for fleets and reliable fueling options with stable hydrogen prices, all of which Hyroad is directly addressing to meet market demand.

- c. When/where would you prefer to recharge/refuel? E.g.: Depot charging vs. on-route, during loading/unloading, overnight or as needed.

Hyroad expects all of these use cases to be supported over time as the capabilities of hydrogen fueling infrastructure expand. On-route, as-needed fueling will be required first to support a viable network.

- d. Do you have a preference for the power level or speed of charging infrastructure? E.g. 150kW, 250kW, 350kW or 1MW. What would meet your needs and why?

Hyroad will be operating its hydrogen refueling stations to minimize class-8 truck refueling times within limitations imposed by current standards (e.g. SAE J2601), codes and truck OEMs. We are designing Hyroad's refueling stations to support the current maximum target mass flow rate of 3.6 kg/min, which translates to potential refueling times of less than 20 minutes from 5% to 95% state of charge for a typical 70kg onboard compressed hydrogen storage system.

- e. Are you willing to provide a non-binding letter of commitment for the CEC's application stating that your organization would utilize EV charging and/or hydrogen fueling infrastructure located within five miles of the AFCs found in the "Corridor Segment" below? If so, please see the attached letter of commitment template. Letters of commitment may be sent to Sarah Sweet, Federal Liaison at sarah.sweet@energy.ca.gov.

Hyroad has provided a letter of commitment.

5. For EV charging and hydrogen fueling providers, describe:

- a. Your organization's business model for public charging and/or hydrogen fueling offerings.

Hyroad provides a turnkey solution where it bundles fuel, truck and maintenance for its customers under a simple dollar per mile commercial model. We are doing this to make the transition to zero emissions, low carbon intensity trucking simpler and lower risk for early adopters.

To enable this, we are building H2 distribution and open access refueling infrastructure at scale and optimizing supply channels with a view to drive the cost of adoption towards diesel parity. Hyroad's liquid hydrogen refueling station designs range from 1000 kg/day to 4000 kg/day throughput with 1-2 fueling positions supporting 40-100 trucks per day. Hyroad's trucking fleet customers will provide a baseload for its refueling stations so that they can maintain operational efficiency and continuous availability for open access hydrogen customers on demand.

- b. Mechanisms your organization might leverage to provide affordable charging and fueling services to drayage fleet operators.

Hyroad has a diverse, resilient and low-cost portfolio of hydrogen supply from multiple producers in California. In addition, Hyroad is developing a state of the art control system, data analytics and preventative maintenance program to minimize the cost of operations.

- c. The scope of services, facilities and amenities provided at your recharging / refueling locations.

Hyroad's hydrogen refueling stations (HRS) will have restroom facilities for customers. Hyroad, like other HRS developers, is providing the necessary infrastructure to support fueling operations as the top consideration to build and support FCEV trucking demand in key markets. Future HRS designs will evaluate the inclusion of more amenities for customers like existing travel center providers do today. Hyroad's HRS facilities are designed for 24/7 operation, initially with in-person Hyroad staff facilitating truck refueling. This may become self-serve as dispenser and truck technology improves.

- d. The anticipated site size, parking configuration (e.g., pull-through), total number of charging stalls capable of simultaneous charging, and total number of truck parking spaces that are not dedicated to charging or refueling.

Hyroad is targeting land parcels in the 1-3 acre range for refueling stations. Our design intent for each site is ultimately to support up to 4000 kg/day hydrogen throughput with at least 2 refueling position. Parking, ingress/egress and layout vary widely by site.

- e. How your organization approaches right-sizing infrastructure for near-term market demand and future-proofs infrastructure to be responsive to evolving needs.

Hyroad's liquid hydrogen refueling stations will be designed from the start to expand onsite storage and hydrogen throughput over time. Supply offtake agreements are structured to support this model. Stations will be modular,

starting from 1000-2000 kg/day throughput with expansion capability to 4000 kg/day.

6. What distance should separate stations to support zero-emission drayage truck activities around California ports? Provide a description of a typical route or use case considered when making this recommendation. Describe the vehicle class and vocation if it differs from the information provided in question 1.

Current class-8 hydrogen FCEV trucks are operating near 500 mile range loaded, supporting a variety of duty cycles, including back-to-back drayage runs on a single refueling cycle, back-to-base runs from distribution centers of 200+ miles, and longer haul routes over 400 miles with refueling at each endpoint.

7. If possible, provide any general cost estimates for MDHD charging and/or hydrogen fueling stations you have designed, built, or have experience with, including charger power levels and number of stations installed. Please provide a range of public cost-share as a percentage of the total project cost necessary to support more public charging stations to serve zero-emission trucks along drayage corridors. For example, should the publicly funded cost share be 50% CEC/federal and 50% private/other?

Hyroad's leadership team has industry-leading experience developing and operating liquid hydrogen refueling stations (in California specifically), as well as designing, financing, engineering, commissioning and operating large-scale energy infrastructure and commercial facilities. Our current capital budget estimate for a CA-based modular liquid hydrogen refueling station in the 1000-1300 kg/day range from bare land to operational handover is around \$6M excluding the acquisition cost of land. (Land cost is the largest variable and highly location specific.) A 4000 kg/day station built from the start is around \$10M capex budget (excluding land).

Hyroad assumes a minimum of 50% private cost share from any funding opportunity, as that is a typical threshold. However, for key strategic locations (e.g. sites very close to the ports), we could see benefit from a higher public funding share simply to offset the higher cost of land, which would ultimately support providing more competitive hydrogen pricing to customers.

8. Use the maps in the "**Corridor Segments**" section to identify areas where you expect to need zero-emission truck infrastructure in the next three years (2024-2027). These Corridors have been selected to align with the [National Zero-Emission Freight Corridor Strategy](#), the California Transportation Commission's [SB 671 Clean Freight Assessment](#) and to complement California, Washington and Oregon's [Tri-state application](#).

Hyroad is primarily targeting routes along the I-10 / I-710 corridor supporting the San Pedro Bay ports, as well as longer inland routes along I-10, I-5 and CA-99.