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Air Products - Comments on Funding of Future Medium- and Heavy-Duty Zero-Emission Infrastructure Projects

Additional submitted attachment is included below.

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March 18, 2022

California Energy Commission
Docket Unit, MS-4
Docket No. 19-TRAN-02
715 P Street
Sacramento, California 95814

RE: Funding Allocations for Future MD/HD Charging and Refueling Infrastructure Projects - Docket No. 19-TRAN-02

Dear Deputy Director Rasool,

Air Products is pleased to provide its response to questions posed at the California Energy Commission (CEC) Medium- and Heavy-Duty (MD/HD) Zero-Emission Vehicle (ZEV) Infrastructure Funding Allocation Workshop held on February 28, 2022. The CEC proposed a wide range of grant solicitation concepts for its Clean Transportation Program (CTP) that will significantly expand infrastructure development and deployment for MD/HD ZEVs throughout the state.

Questions for all Concepts

What Amount Of Grant Funds Would Be Appropriate For Each Project/Concept?

Air Products supports CEC Clean Transportation Program funding and incentive levels that put hydrogen fuel cell electric vehicles (FCEV) and battery electric vehicle (BEV) on an even playing field. Further, we encourage the CEC to prioritize utilization and zero emission vehicle energy/fuel throughput per station in its programs moving forward. CEC should aim to maximize MD/HD ZEVs served per dollar invested, rather than aiming to just deploy as many (of low speed and poorly utilized) chargers as possible. We expect this concept would more equitably treat hydrogen and EV charging stations going forward, while also serving to maximize emissions reductions, accelerate MD/HD ZEV deployment, and leverage CEC dollars to support the MD/HD ZEV market to the greatest extent.

Should The CEC Target Specific Regions In The State?

For MD/HD ZEV infrastructure, the CEC should provide equal prioritization to centralized fueling locations and connector/public retail fueling locations. While larger companies and certain locations like ports will have the land and financial ability to centrally fuel their fleets, many, if not most, small fleet operators do not have the land or budget for central fueling infrastructure and will need strategically placed publicly available fueling to support their fleet operations.

For Infrastructure Projects, Should Grant Funds Be Limited To Equipment Only Costs?

Air Products supports grant funding cost share for equipment costs only.

Which Of The Proposed Concepts Should Take Priority In Being Further Developed?

Given Governor Newsom’s Executive Order (N-79-20) calling for 100% ZEV sales of passenger cars and light-duty trucks (LDT) (as well as drayage trucks) in 2035 and 100% MD/HD ZEVs by 2045, greater priority needs to be given to hydrogen refueling stations. For MD/HD ZEV infrastructure, Air Products suggests that at least 50% of ZEV infrastructure funding should support hydrogen. In contrast, the EnergIZE program as currently structured only allocates 30% of available grant funding for MD/HD ZEV infrastructure.

According to the [CEC California Retail Fuel Outlet Annual Report](#), there were over 8,000 gasoline retail stations and over 5,000 diesel retail stations in California in 2020 serving existing on-road gasoline and diesel vehicles. Given the scale with which ZEVs are expected to begin replacing internal combustion engine vehicles, CEC needs to move beyond focusing on the stated goal of achieving [200 light-duty hydrogen fueling stations by 2025](#) in its funding planning. Policies, grant funding, and other financial incentives should be established to support the development of commercial scale hydrogen refueling stations on greenfield and brownfield properties to improve vehicle access to fueling, safe fuel supplier access to the station, and enable a more economically efficient refueling supply logistics that are not bound to limited delivery windows or public fueling restrictions.

Hydrogen Refueling Concept

The proposed Solicitation Concept would use \$27 million of the \$47 million in FY 2021-2022 (General Funds) to achieve the following objectives:

- Achieve 200 hydrogen light-duty refueling stations
- Bring hydrogen fueling to additional areas of California
- Support fuel cell electric vehicle (FCEV) growth in multiple market segments
- Foster excellent customer experience

As proposed, the concept would offer available funds for projects that would:

- Build hydrogen refueling stations that, at minimum, are publicly available to light-duty FCEVs and provide a minimum of two fueling positions
- Include a private or public fueling point for a medium-or heavy-duty use
- Eligible locations would include:
 - Designated connector/destination areas
 - Any site in California that is on or adjacent to property where a medium-or heavy-duty vehicle fleet is serviced

Is There Interest In Developing Such Projects?

Air Products strongly supports this proposed Solicitation Concept and suggests CEC prioritize it in its MD/HD funding programs.

Air Products appreciates that there may be uncertainty around the future of hydrogen in the light-duty market but is a clear value and need in the heavy-duty sector. The proposed hydrogen refueling concept, which would pair light-duty and heavy-duty hydrogen refueling, is compelling and deserves priority. This proposal leverages market and policy certainty around need for hydrogen for MD/HD ZEVs to support the state's goals for advancing light-duty FCEVs and hydrogen station deployment. To the extent hydrogen and FCEVs will comprise a significant portion of the MD/HD ZEV fleet, no clear comprehensive solution exists for MD/HD BEVs, and this concept would support both light-duty and MD/HD ZEVs. We believe this concept deserves top priority among those presented.

Should a MD/HD Fueling Component Be Optional or Required? At What Minimum Daily Capacity and Number of Fueling Positions?

Air Products supports making a MD/HD fueling component a requirement of the program.

Conformance To Which MD/HD Fueling Protocols Should Be Required?

MD/HD fueling industry standard protocols are currently under development.

What Amount Of Grant Funds Per Station Is Appropriate For A Station That Has Both LD And MD/HD Components?

Air Products supports a funding structure similar to that of the EnergyIIG program for hydrogen stations, which provides 50% of hardware/software costs and has a project cap of \$2 million, or \$3 million if the project serves a disadvantaged community.

Should Grant Funding Be Limited To Equipment Costs, Or Should It Be For All CEC Budget Categories (i.e., Labor, Subcontracts, Indirect Costs)?

AP supports limiting the grant funding to hardware/software costs consistent with the EnergyIIZE grant funding program and the most recent CEC hydrogen fueling solicitation GFO-19-602.

Should This Concept Include Support For Onsite, Direct Renewable Hydrogen Production? Which Production Technologies Should Be Eligible, At What Minimum Production Capacity, And At What Funding Level?

Onsite distributed hydrogen production for light-duty hydrogen fueling stations has been demonstrated to be less cost-effective than delivered liquid hydrogen and hydrogen pipeline supply. Additionally, these systems may not provide a level of reliability to promote and sustain the adoption of hydrogen.

Truck Parking EV Charging and Hydrogen Refueling

As a fleet operator, Air Products understands that truck parking for independent owner operators and long-haul and regional-haul drivers is extremely challenging, and the company supports the CEC funding centralized locations for overnight public charging and refueling.

What Types Of Entities Should Be Eligible To Apply?

This could be a potential opportunity for a public/private partnership. We encourage broad eligibility to support the widest array of project applicants for this promising concept.

What Would Be The Best Way To Integrate Truck Parking Charging And Refueling With A Freight Corridor?

As a starting point, we hope that the CEC recognizes that the rationale for this concept is a limitation of MD/HD BEVs and is reason to support and prioritize hydrogen refueling and FCEVs in the CEC's MD/HD ZEV infrastructure strategy and programs.

That said, this is a regional problem. Currently, truck stops lease overnight parking spaces to drivers who adjust accordingly and seek out the least expensive options along their routes to minimize costs. Also, land availability is a significant concern, and the location must be well laid out to accommodate significant numbers of overnight trucks. These locations will need permanent charging and hydrogen fueling stations. From this perspective, hydrogen stations are a better option as they take up less space than charging stations. The state may be best served identifying undevelopable lands for public sites purposed for this use.

Which Geographic Locations Should Be Targeted For These Funds?

The CaFCP July 2021 publication [A Vision for Freight Movement in California —and Beyond](#) outlines broadly where heavy-duty hydrogen fueling stations should be located. The Partnership is also in the process of developing more detailed recommendations as to where heavy-duty hydrogen stations should be located. In the meantime, CEC should coordinate with staff working on the California Transportation Commission (CTC) SB 671 [Clean Freight Corridor Efficiency Assessment](#) initiative to identify optimal geographic locations to target in this funding program. The CTC is required to publish a final assessment by December 2023 that will be incorporated into the California Transportation Plan and the California Freight Mobility Plan. Per statute, SB 671 requires that The California Transportation Commission, California Air Resources Board, and California Energy Commission incorporate, to the extent feasible and applicable, the Assessment's findings and recommendations in their programs and guidelines.

Warehouse and Regional Trucking

Air Products agrees that regional haul, heavy-duty trucking operations and last-mile delivery truck operations are excellent candidates for MD/HD ZEVs.

How Can We Best Provide Refueling/Charging Options For Warehouse And Regional Fleets?

In industrial parks, as well as at regional distribution and fulfillment centers (warehouses), the facility owner should plan accordingly for ZEV fueling in or near the facility. CEC and other appropriate state agencies should work with hydrogen suppliers and fleets to identify optimal locations for hydrogen stations.

Air Products recommends that the state develop a heat map to identify optimal locations where such MD/HD hydrogen fueling stations should be installed. This could be a joint effort between ARB and CEC, similar to the California Hydrogen Infrastructure Tool (CHIT) GIS map developed by ARB for identifying the local capacity needs for light-duty hydrogen fueling stations across the state. This could also help with land re-use, with Superfund sites being one example.

Is Depot Charging/Home-Base Charging Sufficient Or Is Public Charging Or Opportunity/Destination Charging Necessary?

Again, the questions posed in the workshop about viability and needs for several different BEV charging solutions points to their limitations. That doesn't mean CEC shouldn't support them, but only that CEC should put BEVs and FCEVs on equal footing, especially in the MD/HD space, and commit at least 50% of funding to hydrogen refueling in these applications. Unlike BEV MD/HD vehicles, FCEVs operationally are a one-to-one replacement for their diesel counterparts, and therefore the hydrogen fueling stations needed to support them will likely need a similar deployment to today's diesel fueling stations. Therefore, a combination of central fueling and destination/connector refueling locations will be needed.

Should Geographic Areas Be Targeted For These Funds?

Ports, industrial and manufacturing centers, and regional clusters of warehouses and distribution centers would be ideal initial candidate geographies for such a program as these are often located in or near disadvantaged communities with the highest areas of emissions.

Should Infrastructure Be Shared Between Organizations/Businesses?

Yes. This would allow for shared use of refueling stations and lower costs for individual businesses, as well as serving light-duty and MD/HD applications.

Innovative EV Charging and Hydrogen Refueling Technologies

Should There Be An Increased Focus On Innovative Hydrogen Refueling Stations In MD/HD BESTFIT?

Per the BESTFIT solicitation manual, the goals of the funding program are to demonstrate transformative technology solutions and work to accelerate the successful commercial deployment of electric vehicle charging for both light-duty and MD/HD applications.

The solicitation has two areas of focus:

1. projects designed to increase or maximize efficient utilization of charging infrastructure
2. efforts to maximize the benefits of charging installations by avoiding high operating, purchase, and installation costs as well as costly grid impacts

Given that the refueling time of hydrogen FCEVs is comparable to that their diesel truck counterparts, and existing hydrogen station designs allow for significant numbers of back-to-back fuelings, there is less need for utilization maximization with hydrogen station technology compared with EV charging stations.

Likewise, minimizing purchase, installation and operating costs is a continual objective of hydrogen fueling station developers and operators in order to obtain competitive advantage over other equipment providers and station developers. Therefore, it is unclear how a competitive innovative technology grant program would be defined to make it attractive to hydrogen station technology developers.

This program concept appears to be grasping for solutions to BEV limitations and therefore in and of itself is reason to support FCEVs and hydrogen. If there are applications where charging solutions are extremely challenging, the state should support hydrogen FCEVs instead. At best, this should be a low priority.

Mobility-as-a-Service Models

The proposed solicitation concept provides funding for EV charging or hydrogen refueling infrastructure to support Mobility-as-a-Service applications. Examples may include:

- Charging-as-a-Service
- Infrastructure-as-a-Service
- Maintenance-as-a-Service
- Trucking-as-a-Service
- Parking-as-a-Service

What Current Models Exist And How Could They Be Innovated/Improved? How Can This Concept Specifically Target The Drayage Sector, Which Is Heavily Composed Of Independent Owner Operators (IOOs), Who May Be Unable To Purchase ZEVs Or Finance Their Own Infrastructure Upfront?

One possible trucking-as-a-service scenario would be to bundle trucks and fuel for lessees who would then operate the vehicles on their own. In this example, a large corporation could electrify another fleet and then take the ZEV and clean fuel credit for transaction. Air Products would support these types of trucking-as-a-service models and would allow its hydrogen fueling stations to accept all forms of credit card or electronic payment to reduce barriers to adoption.

Rural Small Transit Fleet Infrastructure Deployment

This solicitation concept supports the deployment of fueling infrastructure for MD/HD zero emission transit bus fleets targeting only small, rural transit fleets – areas with a population below 200,000 and total buses operated in annual maximum service is under 100.

Should A Separate Solicitation Be Developed For Rural Small Transit Fleets?

Air Products supports dedicated funding to small, rural transit fleets throughout the state. This is another example from the presentation and concepts presented where CEC seems to be searching for solutions to BEV limitations in the MD/HD sector that hydrogen is perfectly capable of addressing. Rural small transit fleets often have long routes and definitely deserve support in transitioning to ZEVs, like any other transit agency, but may be well-suited for hydrogen and FCEVs.

How Can This Solicitation Concept Address Funding Gaps Within EnergIIZE? Are There Funding Needs Outside Of Infrastructure-Only Costs?

The EnergIIZE program is a competitive grant with limited hydrogen fueling solicitations serving many different potential MD/HD hydrogen FCEV fleets, including large transit agencies. A dedicated grant funding program will help ensure that public funding will be directed to smaller transit agencies and therefore expand geographically the benefits of zero emission fuel cell vehicles throughout the state.

Should Infrastructure Be Just For Bus Depot Conversion Or For The Entire Fleet?

This question is inherently biased against hydrogen and assumes rural transit agencies are using BEVs. To the extent they identify FCEVs as a preferred option, hydrogen refueling infrastructure should be eligible for the entire transit bus fleet and may be located at the depot or anywhere else that is convenient and sensible for a given transit agency.

Should The Solicitation Target A Geographic Area?

The rural small transit fleet solicitation should allow eligibility to fleets from across the state.

Are There Small Fleets Interested In Forming A Bus Group To Share Infrastructure?

A number of small transit fleets in California have plans to share hydrogen fueling infrastructure to support a potential multi-city bus transit network. This is a sound concept that should be replicated in other geographies throughout the state.

MD/HD Blueprint Planning Documents

The goal of this solicitation concept is to fund MD/HD planning blueprints to accelerate the deployment of MD/HD ZEVs and ZEV infrastructure with a holistic and futuristic view of transportation planning. The plans would identify actions and milestones needed for implementation of MD/HD ZEVs and the related hydrogen refueling and/or electric charging infrastructure.

Is There Interest To Have The CEC Fund More Blueprint Documents?

At this point in the commercial market development of MD/HD ZEV infrastructure, Air Products recommends that the best use of public funding is to focus on deploying infrastructure rather than supporting paper planning documents.

Infrastructure Concepts to Complement CARB Demonstration and Pilot Project Concepts

CARB's Long-Term Heavy-Duty Investment Strategy laid out a roadmap showing how much heavy-duty incentive funding would be needed over the next three years to help put the State on a trajectory to meet its ZEV adoption and emission reduction goals. As a result, CARB is proposing to focus on off-road demonstration and pilot projects with this year's funding of \$40 million. CARB and the CEC will coordinate and collaborate on matching ZEV projects with the needed refueling infrastructure.

This solicitation concept would:

- Support CARB’s upcoming zero-emission vehicle demonstration projects with ZEV infrastructure funding
- CEC funding must mitigate on-road emissions, so projects must be co-located with on-road vehicle infrastructure
- Project types include:
 - Green zones – municipal level and small off-road engines (SORES)
 - Commercial harbor crafts and microgrids – tugboats and ferries
 - Modular zero-emission cargo handling equipment and off-road equipment
 - Ocean going vessels while at anchor
 - Locomotives – zero-emission interstate line haul

Air Products supports joint CARB/CEC funding for hydrogen infrastructure development projects and deployment.

As This May Be A Joint Funding Opportunity With CARB, Is There Interest In Having Potential Funding Opportunities Be Administered By A Third-Party Implementer?

Air Products supports such funding opportunities administered by a knowledgeable, experienced third-party administrator.

What Are The Best Scoring Criteria That Should Be Used To Determine Which Entities Should Be Awarded Funding?

In all of its programs, whether related to pilots or otherwise, CEC should prioritize utilization, ZEVs served, and emissions reductions over arbitrary metrics like number of EV charging stations or hydrogen stations deployed. Air Products also recommends that all financial incentive funding should incorporate a station pay for performance milestone payment mechanism to ensure that station operators are rewarded for maintaining a level of station reliability consistent with market expectations. This would include making multi-year investments contingent upon the HRS operator achieving established performance metrics periodically over time.

MD/HD Loan Pilot

The solicitation concept states that public loan programs have demonstrated effectiveness in stimulating private investment in critical infrastructure. Also, CEC released a Request for Information on August 24, 2021, seeking information to assess if a loan program would be an efficient use of state funds to enhance MD/HD ZEV charging and refueling infrastructure.

How Should A Loan Program Be Structured To Deliver Maximum Effectiveness? Are there any other thoughts or recommendations that you would like us to consider?

Air Products is not a proponent of government loan programs for the development of hydrogen fueling infrastructure. While this may be attractive for small companies without solid balance sheets, the capital markets already provide this function. Instead, we recommend the state focus on grant funding and

structural policy frameworks that create a race to deploy infrastructure, utilizing some form of “pay for performance” incentive where funding can be forfeited if certain milestones are not met.

Thank you for your leadership on hydrogen and other broader activities to accelerate clean energy and climate solutions in California. We appreciate the opportunity to comment on these solicitation concepts and look forward to working with you to help enable clean hydrogen as a climate solution for California. Please do not hesitate to reach out with any questions or to discuss any of these comments in greater detail.

Sincerely,

A handwritten signature in black ink, appearing to read "Eric J. Guter". The signature is fluid and cursive, with the first name "Eric" being the most prominent part.

Eric J. Guter
Vice President, Hydrogen for Mobility
Air Products & Chemicals, Inc.