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Chief, Transportation Fuels Branch

California Air Resources Board
Low Carbon Fuel Standard Program
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August 5th, 2022

TeraWatt Infrastructure Comments on the July 7, 2022, LCFS Workshop – Potential Future Changes to the LCFS Program

Dear Dr. Laskowski,

TeraWatt Infrastructure, Inc. (TeraWatt) appreciates the opportunity to submit comments on the potential future changes to the Low Carbon Fuel Standard (LCFS) program. TeraWatt is a project developer and long term owner of high powered EV charging infrastructure for light, medium and heavy duty commercial fleets.

Introduction

The following are a summary of TeraWatt feedback to CARB after the July 7, 2022 workshop:

- **Pre-2030 Carbon Intensity (CI) targets** should be strengthened to match or exceed current State and regional transportation fuel emissions reduction goals.
- **Post-2030 Carbon Intensity (CI) targets** should be set and the regulation should be formally extended to 2045 as a result.
- **Fast Charging Infrastructure (FCI) Credits for Medium- and Heavy- Duty Electric Vehicles (MDHV)** should be created through this amendment cycle for publicly accessible, in whole or in part, electric truck charging infrastructure. Several details within the current FCI regulation will need to be adapted for MDHV, most notably the charging capacity crediting rate formula.
- **Zero Carbon Intensity (CI) Book and Claim Accounting** should be codified in the regulation to ensure grandfathering should the pathway be discontinued at some point in the future.

Specific Feedback on CARB Staff Questions and Proposals

Options for 2030 CI Adjustments

TeraWatt supports CARB increasing the stringency of carbon intensity targets prior to 2030. This material action to reduce carbon emissions from the transportation sector is consistent with Governor Newsom's recent "Calls for Bold Actions to Move Faster Toward Climate Goals," in which the Governor "requested that CARB evaluate a more stringent LCFS." This is also an opportunity for California to be in step with Oregon Governor's proposal of 37.5% reduction by 2035 for the State's LCFS-equivalent Clean Fuels Program. As such, CARB should select at least "Option B", or a 30% reduction in CI as the new target for 2030. In addition, given the current credit bank and to continue to stimulate new investment, CARB should consider accelerating the CI targets in the years 2024 to 2026 rather than a straightline reduction between 2024 and 2030.

Feedback on Post-2030 CI Targets

TeraWatt strongly supports the extension of LCFS through 2045, which is consistent with California's net zero policy by 2045 and ICE phase out. In addition, the challenge of decarbonizing the transportation sector requires such a strong regulatory mechanism as LCFS. CARB should implement interim CI targets, not just a 2045 target, as part of this amendment or at regulation specified milestones prior to 2030. If CARB determines that CI levels post 2030 should "stair step" instead of "glide path," then CARB should note that pathways with CI Standard Values (in gCO₂e/MJ) would also stay static for any plateau years.

TeraWatt strongly supports the proposal to establish declining carbon intensity (CI) compliance targets post-2030 as well as to strengthen interim pre-2030 targets. These combined actions will send an emphatic policy signal to the private investment sector to make long-term commitments to decarbonizing California's transportation fuels sector - by both extending the reliable investment horizon and supporting the demand for carbon-reducing projects.

Fast Charging Infrastructure (FCI) Credits for Medium and Heavy Duty Vehicles

General feedback on FCI

TeraWatt commends Staff's new proposal to extend the the Fast Charging Infrastructure (FCI) pathway to specifically support public, medium- and heavy-duty (MHDV) refueling applications, aligning with the already proposed Hydrogen Refueling Infrastructure (HRI) MDHV pathway.

Truck charging infrastructure needs to be scaled urgently in order to support the deployment of medium- and heavy-duty vehicles, ahead of the time when this infrastructure is realistically able to be fully utilized. The economic concepts behind FCI, which has been utilized almost exclusively for light duty vehicle applications, are evident, especially in the heavy-duty vehicle market, albeit with the industry factors and challenges being more extreme. The enhancement of HRI and FCI to support medium- and heavy-duty vehicle refueling is logical in conjunction as these two critical zero emission fuel sources need infrastructure to scale in order to meet California's zero emission transportation mandates.

Eligibility: what role should LCFS credits play in building out infrastructure? Dedicated fleet refueling or public refueling?

FCI for LDV has been very successful at fulfilling its intent as shown in the workshop slides. FCI can play a similar role for MDHV public infrastructure that is necessary for the transportation sector as a whole to decarbonize. Not all MDHV vehicles and fleets have return-to-base operations, nor do they have a base that can host adequate charge infrastructure for 100% BEV penetration. As such, to achieve high penetrations of BEV MDHV, which will require infrastructure for the "long tail" of fleet operators, public infrastructure will be necessary.

The spirit of FCI should be maintained as a public infrastructure pathway; however, CARB should consider whether accommodations should be made for a scenario of MDHV charging. For example, a site may be open to public use for a portion of the day or night, while the other portion of time is dedicated to specific fleets for charging and parking.

This concept of funding support for hybrid public-private facilities has been utilized by ConEd in New York within its PowerReady program. It is also worth noting that under the National Electric Vehicle Investment (NEVI) program of U.S. DOT, a charging site which is contracted with 2 or more fleets is statutorily deemed publicly accessible.

CARB may consider a threshold of contracted parties or vehicles such that a site or EVSE at a site could be deemed eligible for FCI. Alternatively, CARB could modify its FCI crediting formula to account for partial time periods of public accessibility for a site.

Total Credits: How many possible HRI/FCI credits should be available?

TeraWatt supports a similar approach as used previously for FCI and HRI, i.e., 2.5% of deficits limitation for both. TeraWatt would be open to analytical approaches to set the appropriate cap as long as it may be revisited without a full amendment cycle.

Crediting Period: What is appropriate crediting period for incentivizing long-term investment and operation?

Currently, LDV FCI for BEVs provides support for up to 5 years, but 5 years is not assured. 5 full years should be the starting point for consideration; however, if a longer crediting period could increase the number of MDHV EVSE installed, then CARB could consider a longer crediting period but with potentially less utilization backstopped each year. The drawback to a longer crediting period would be a disincentive to replace lower power EVSE sooner at a site for newer, higher power technologies because an investment payback may not yet have occurred under a longer crediting period.

TeraWatt proposes the FCI pathway be available for applications from Jan. 1, 2024 until Dec. 30, 2030, to the extent the percentage of deficits, or other method to, cap is not met prior to the end of the proposed term.

Max Station Capacity: How large should stations be in initial network of stations, relative to refueling demand? Minimal nameplate power to be useful to trucking?

FCI for MDHV needs to support both regional and long haul trucking. Public charging implies short dwell times and thus high powered charging. The FCI pathway should be scalable to support the MegaWatt Charging Standard (MCS) with capacities in excess of 1MW in the near future.

Single sites should be supported by FCI at a scale well in excess of the current capacities contemplated by LDV FCI. TeraWatt suggests that further discussion between Staff and industry is needed to determine the appropriate single site capacity that can be approved by default and by Executive Officer approval.

The decision to allow lower rated charger capacity should tie to whether any longer dwell charging can be supported in off hours, or non-fully public, hours. This would be the rationale to support lower capacity EVSE, but no lower than the *highest* available amperage without requiring liquid cooling of charging cables.

Location recommendations and Network effects: Should there be location and/or network requirements associated with an MHD FCI program? If so, what should the requirements be?

Eligible EVSE should be located either a) within 2.5 miles of an identified California trucking corridor (see California Transportation Commission proposals) or b) within 20

miles of specified ports of entry, such as Ports of Oakland, Long Beach, Los Angeles, San Diego and San Ysidro (Tijuana) or future inland ports.

CARB could consider minimum FCI capacity (or EVSE) per corridor segment, but should not limit or cap applications, capacity or stalls in a zone or corridor segment due to greater interest based on expected demand. In addition, there should be no restrictions on the proximity between two sites receiving FCI.

Recommendations for treatment of sites capable of both LD and MHD vehicle charging

Limiting the use of FCI sites to MDHVs, and not to LDVs, is challenging when the sub-350kW port standard (CCS) is the same between vehicle types. This need not be a deterrent to implementing the FCI pathway for MDHV. In fact, nothing should prevent LDV from charging at a site designed for MDHV with CCS.

However, there should be requirements for MDHV sites, such as follows, which assure accessibility for MDHVs and may ultimately deter LDVs from visiting:

- Corridor truck charging sites should be either pull-through stalls or pull-in/back-out, capable of charging and circulating Class 8 vehicles with trailers attached.
- Regional truck charging sites must have charging stalls that are wide enough at least for medium duty vehicle charging, plus any other site design requirements supporting truck use cases, e.g., turning radii.
- Charging stalls with MCS EVSE will not be interoperable with LDV CCS ports

Expected capital and operational expenses to MHD stations

TeraWatt proposes that CARB pursue confidential means to collect expected capital and operational expenses for MHDV charging stations to avoid companies from directly providing competitively sensitive information to a government entity. An industry association, such as CALSTART, may be better served to collect, organize and anonymous private information before sending it to CARB.

Is MHD charging equipment life different from LD, based on increased use rates?

TeraWatt suggests that CARB contemplates similar useful life of MDHV charging stations to that of LDV; however, there is not yet enough operational experience to absolutely confirm.

Other FCI Implementation Topics CARB Should Consider

FCI charging capacity kWh/day crediting rate for MDHV

TeraWatt strongly urges CARB to revise its FCI crediting formula for MDHV sites, compared to the formula used for LDV. First, MDHV charging sites, which will be the physical requirements noted above, will require greater non-EVSE capital costs to bring projects to fruition. Whereas a public LDV site can potentially limit construction to a section of a retail parking lot, a MDHV site will require a larger construction project with higher upfront costs, e.g., to install pull-through aisles or shading canopies. Second, the current FCI formula only applies up to 350kW, so it will need to be revised to extend beyond this capacity threshold, as well as to reset the starting point for per kW costs for MDHV and MCS EVSE. Finally, if the potential crediting period is extended to reduce the annual FCI burden of an EVSE, the formula would also need to be revised.

Start of crediting period & required operations deadline after application approval

Due to the more involved and longer project development phase of MDHV, including lead times for equipment and utility service, TeraWatt recommends adjusting the commercial operations deadline to 6 quarters after application approval. In addition, the start of the crediting period should not begin the quarter following application approval, but rather the quarter in which commercial operations begin or the applicant forecasts to begin. In order for the Executive Officer to approve an application, the applicant must show sufficient project viability through achievement of specified milestones in order to avoid project failures within the program.

FCI charging capacity kWh/day crediting rate for sites with gasoline and diesel replacement electric fueling

In calculating the FCI charging capacity kWh/day crediting rate for LDV FCI, the regulation logically treated all kWhs as electric fueling that avoided gasoline consumption and the light duty energy economy ratio (EER). However, for MDHV public charging there could be a mix of liquid fossil fuel substitution and vehicle types. For dispensed fuel, a Fuel Reporting Entity will likely need to be able to differentiate between charging sessions by vehicle class. Whereas for FCI crediting, CARB would be better served to assume all kWh crediting based on a single assumption of avoided fuel and EER. The specific decision is less important than CARB developing a MDHV FCI crediting formula and investment horizon which is appropriate for private investment.

Other Proposed Changes Not Raised to Date by CARB Staff

Zero CI Electricity with Book and Claim Accounting

CARB Staff should consider codifying within the Regulation that each Fuel Station Equipment (FSE) ID at an existing FSE *Location* ID in the LRT system can utilize low or negative CI electricity for the duration of the Regulation for any FSE ID under the same FSE Location ID. Such an amendment can provide much needed certainty to suppliers of low and negative CI RECs and parties to structured EV infrastructure financing as to a project's lifetime value of low or negative CI renewable energy credits. By doing so, a Fuel Reporting Entity may rely upon the ability to generate LCFS credits from EV charging utilizing its approved and valid Alternative Fuel Pathway for Zero or Negative CI Electricity.

EER for Urban Electric On-Demand Transportation Services

CARB Staff should consider the creation of a unique EER for Fueling Supply Equipment (FSE) dedicated to light duty urban electric on-demand transportation services. These transportation applications have a higher fuel efficiency than the average personal passenger vehicle fleet, which should be accounted for when generating LCFS credits.

Conclusion

TeraWatt applauds Staff and the Board for the innovation and progress of California Low Carbon Fuel Standard program to date and looks forward to the amendment process to enhance the Regulation to deliver material carbon reductions directly in California and as a model regulation for other jurisdictions.

Sincerely,

David Schlosberg
Vice President