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Sierra Club CA Comments on Solicitation for MDHD Charging and H2 Refueling Infrastructure Projects

Additional submitted attachment is included below.

SIERRA CLUB
CALIFORNIA

April 14, 2023

Sebastian Serrato
Cc: Ben De Alba
California Energy Commission
Transmitted via posting to Docket:
https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=19-TRAN-02

Subject: Comments on CEC Staff Workshop - Potential Solicitation for MDHD Charging and Hydrogen Refueling Infrastructure Projects on Designated Corridors 3/28/23

Dear Mr. Serrato,

We appreciate the opportunity to provide comments on this important solicitation program.

We very much support the objectives and framework of this proposed solicitation and ultimately the resulting useful publicly accessible DCFC charging infrastructure along priority transportation corridors that can provide early support for ZEV medium and long-haul freight movement.

Timeliness of Providing Electrical Capacity - We believe that one of the greatest challenges in this program may be the timeliness of applicants gaining sufficient electrical capacity to their proposed project sites and the impacts on the CEC's administration of projects achieving their timeline commitments from potential project delays.

We agree with proposed requirements that these projects must be publicly accessible, located on the CTC's priority corridors and have a minimum of 10 charging ports at each station. Siting these projects where they are needed may not at times be in locations where sufficient capacity is already available. Applicants can work with their partner utilities to predetermine how much capacity they will need and how much is currently available at their proposed sites. The utilities will need to work in a timely way with applicants on this analysis so that applicants can prepare their proposals and meet program submission deadlines. If there is sufficient capacity, then no problem. However, in some cases a desired site may not have the capacity and it may take longer than allowed under the timeliness requirements for this program. Also, a utility may make a commitment to bring in needed additional capacity in a reasonable time frame but have unexpected delays. The CEC may want to give consideration in advance to how these two circumstances should be addressed. Further, we recommend that where applicants may be having difficulty in getting needed assistance from utilities in a timely way, that the CEC could offer the services of an ombudsman to document what these issues are, try and broker solutions and in any

event better understand these challenges so that multi-agency solutions can be developed going forward.

These projects will be learning experiences for both the applicant organizations and the CEC as it becomes more aware of some of the challenges to get these projects done within a reasonable time. These learnings from the CEC may enable it to offer suggestions to the CPUC, CAISO and utilities on how to streamline their procedures and processes to accelerate and build sufficient grid capacity in advance to get ahead of growing charging capacity needs.

Minimum Charger Power – Since these stations and charger ports will be located along highway corridors, a reasonable assumption is that drivers will be using them for rapid opportunity charging and not for long duration or overnight charging. Time is money and therefore the fastest feasible charging will be highly desired by fleets. We recommend that the CEC set the minimum charging speed at no less than 350 kW. It is true that today, only a few of the electric MHD vehicles can fully utilize 350kW charging but as newer generations of electric vehicles become available they will continue to support faster charging and often also come with longer ranges. Working to make the charging experience as fast as possible should be a high priority objective of this program and the projects it funds. In addition, this is a very cost-effective approach because the station will get higher throughput per day fueling a higher number of trucks at a given property and the number of chargers it can offer, reducing congestion and mitigating truck waiting time. In its study "How much should the U.S.invest in public EV charging? $39 Billion" Atlas Public Policy [1] notes that installing higher-powered fast charging can create savings while providing improved customer service. For creating a national charging network for passenger vehicles, installing 350-kilowatt fast chargers rather than 150-kilowatt fast chargers would decrease needed investment in public infrastructure from $52 billion to $39 billion. This same concept and proportionate benefits could well accrue to the MHD sector in California. The key reason for these cost savings is that with faster charging you get higher through put and don't need as much expensive real estate or as many chargers for a given number of trucks charged per day.

Megawatt Charging System (MCS) Standard Chargers

Today, several OEMs are making fully electric Semi-trucks that are quite suitable for short-haul and medium regional haul applications. Existing charging infrastructure ranging from 50kW to 350 kW is most often very adequate to meet their fueling needs for overnight depot charging. Examples of the electric semis available today include Nikola's Tre with a range of 330 miles, Volvo's eVNR goes 275 miles and Daimler's Freightliner eCascadia, 230 miles. Tesla has now delivered 36 of its 500-mile range semis to PepsiCo/Frito-Lay at one of the company's largest locations in the US in Modesto, CA and its Sacramento site. Tesla has installed four 750 kW chargers both at the PepsiCo location in Modesto and Sacramento. According to Tesla, these chargers can add up to 70% of range in 30 minutes.

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[1] How much should the U.S. invest in public EV charging? $39 Billion – Atlas Public Policy (atlaspolicy.com) Note: While this report addresses charging for light duty vehicles, this concept is also valid for MHD trucks.

Federal regulations require drivers to take a 30-minute break every 5 hours. If you have an electric semi that can go 500 miles, and a network of MCS chargers rated at 1.2-1.5 MW that can recharge the vehicle in 30 minutes, you can do long-haul operations essentially as effectively as diesel trucks. Also, if you have regional haul trucks that can be recharged in 30 minutes, they can work close to 24 hours / day in a "hot-seat" use case application.

MCS is coming soon. CharIN[2] is the international charging standards setting organization for MHD and other heavy industrial vehicles. It is the lead agency in collaboration with other standard setting organizations including ISO and SAE on the CCS standard internationally currently used for nearly all passenger vehicles and MHD vehicles today. Its members include nearly all of the major market leading manufacturers of these vehicles internationally including those in the United States such as Daimler, Volvo, Paccar, Navistar, Tesla, Ford and others[3]. It has been working on creating a much more powerful international standard since 2018 to meet the needs of heavy duty on road vehicles such as semi's as well as to meet industrial charging needs for electric ferries, ships, aviation and other use cases known as the MCS standard[4]. CharIN just published its "CharIN Whitepaper Megawatt Charging System (MCS) - Recommendations and requirements for MCS related standards bodies and solution suppliers - Version 1.0"[5] in November 2022. Detailed technical standards building on CCS standards should be finalized between 2024-2025. One vendor is already selling draft standard MCH chargers for use in pilot / test applications.[6] And there are test/pilot programs operating with real electric vehicles and test MCS chargers in Europe today.

We believe that it is not too soon for the CEC to begin including consideration for MCS chargers in some of its pilot programs. By the time some of these grantee's projects are being energized or soon after, it is very possible the MCS standards will have been finalized and the first chargers and MCS charge capable vehicles in addition to Tesla semis will be available for commercial use.

One of the early truck-as-a-service companies, Watt EV[7], is already building out its first sites with MCS planning in mind. They are initially installing modules of 5 240 kW chargers that in the future can have their power aggregated to 1.2 MW to support a single MCS platform. (Please see Addendum 1.)

We recommend that the CEC invite applicants for this program to optionally include in their proposals to provide the flexibility to do something similar to this for near term future MCS chargers and that this program fund some of the additional up-front costs which really should not be that much when planned in advance. (The funds would not include paying for any future MCS chargers but just for the flexibility to aggregate the power, install any needed make ready

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[2] CharIN – Empowering the next level of e-mobility.
[3] Community – CharIN
[4] Megawatt Charging System (MCS) (charin.global)
[5] Megawatt Charging System - Recommendations and requirements for MCS related standards bodies and solution suppliers (charin.global)
[6] Breakthrough in megawatt charging has arrived! - HUBER+SUHNER
[7] Home | WattEV | Electrifying Heavy Duty Transport

conduit, etc.) Applicants could score extra points for including future MCS capabilities in their projects. The CEC could begin learning about MCS chargers sooner than otherwise with such a program. We recommend that encouraging and allowing applicants to also include features of their projects that would cost effectively address future MCS charger additions should be allowed in this solicitation.

We've included an excellent blog post in **Addendum 1** below from CharIN's web site[8] that discusses the co-existing future roles of CCS and MCS and how to plan to add MCS in future charging scenarios to best meet the diversity of charging needs for a wide range of applications.

Sincerely,

Ray Pingle
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Addendum 1

How to prepare for the Megawatt Charging System: The business case for co-investment in CCS and MCS

You may have heard about the **Megawatt Charging System** and are wondering how the new standard will **integrate into your current CCS operations**. CharIN believes there are **opportunities to upgrade or retrofit a CCS charger** if a site or equipment is prepared in advance for MCS.

This article provides **perspectives** on how **automakers and charging infrastructure providers** are preparing for an **MCS transition** along with some useful advice about other considerations, such as utility interconnections.

[8] How to prepare for the Megawatt Charging System – CharIN

You may have seen the recent CharIN whitepaper, **Megawatt Charging System (MCS): Recommendations and requirements for MCS related standards bodies and solution suppliers**, and want to better understand how MCS might impact your business. The Megawatt Charging System is a new standard that builds upon industry experiences with the Combined Charging System (CCS) and uses state-of-the-art technology to provide reliable, high power energy transfer needed for large commercial electric transportation, including marine, aviation, and other off-road applications, for charging power **up to 4.5 MW**!

To enable the higher-powered charging, MCS includes unique additional features such as the connector shape, communication electronics, increased current capacity, increased voltage level, and no moving parts on the connector.

Image: Megawatt Charging Plug Layout
Source: CharIN e. V. MCS Subgroup, 2022

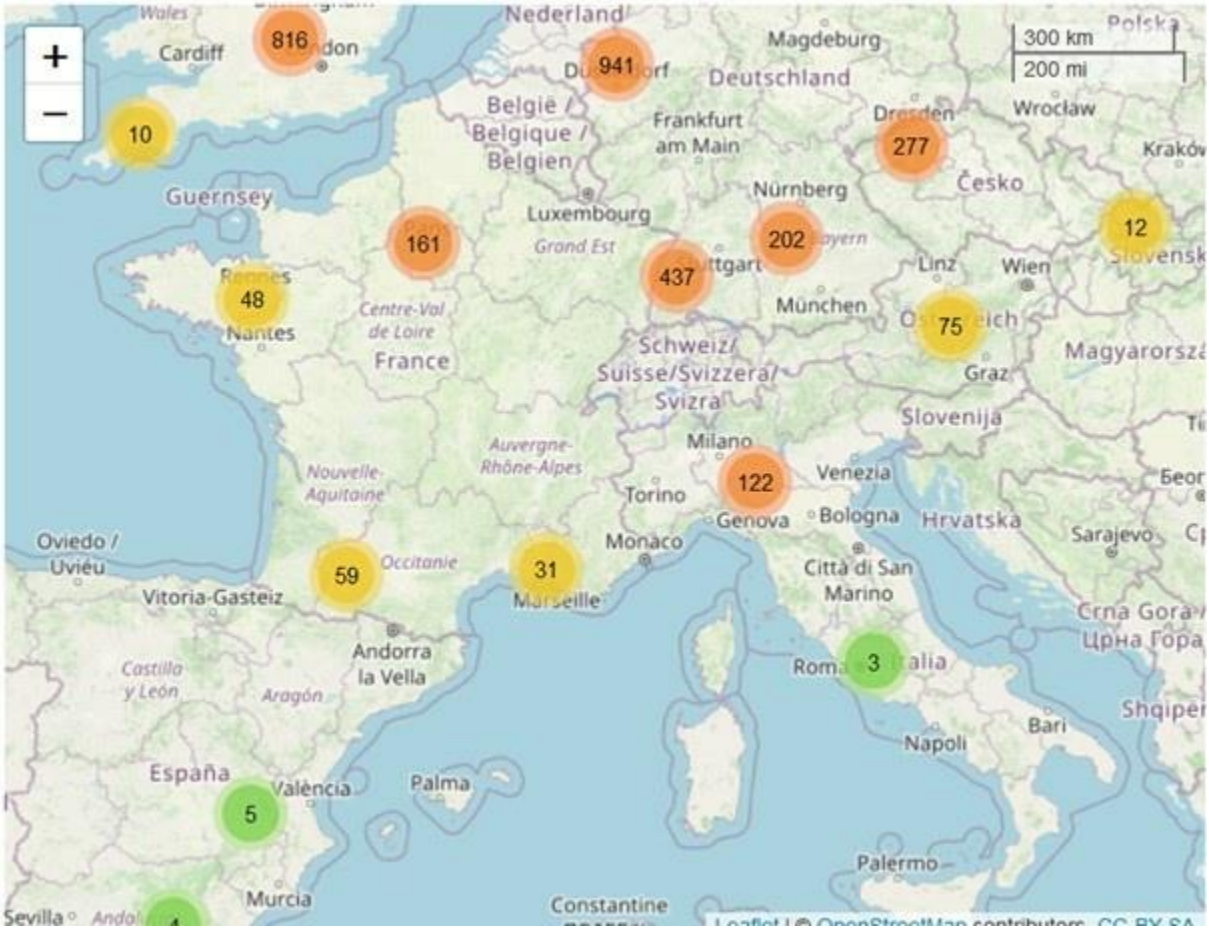
MCS has been developed by many participating businesses, universities, utilities, and laboratories, with a clear focus to provide a superior charging solution needed for global commercial applications – critical for the expansion of transportation electrification.

CharIN's whitepaper provided detailed specifications and recommendations for MCS and is intended to support the global standards bodies who will release the final MCS standards, which will ultimately be used by companies, international communities, and governments to ensure interoperability of charging equipment and vehicles. Demand for MCS is moving ahead quickly. The HoLa project in Europe has already committed to deploying four charging locations using MCS, with over 750 kW charging capability by 2024 as a first step. The standards are set to be published between 2024 and 2025 in ISO, IEC, and SAE with up to 4.5 MW.

While the whitepaper covers many technical and non-technical aspects of the MCS, it does not include recommendations for a smooth operational transition from CCS to MCS. CharIN believes there are opportunities to upgrade or retrofit a CCS charger if a site or equipment is prepared in advance for MCS. Given the massive amount of investment required to support the burgeoning EV industry, this article was developed to further the discussion of what a CCS to MCS transition may look like.

How Companies are Managing the CCS to MCS Transition

CharIN views MCS demand as highly dependent on new use cases and vehicle applications. We anticipate a need to operate both CCS and MCS simultaneously, at least for truck applications, for many years to come. For example, the European Automobile Manufacturers' Association (ACEA) has developed an interactive map to identify optimal regional charging locations throughout Europe. Based on forecasted battery electric truck demand, a minimum of 40,000 to 50,000 high-power chargers (above 500kW) are anticipated to be required by 2030. Maps like these make it easier to estimate how MCS installations could be deployed for use by fleets.



Source: ACEA, 2022

With the release of MCS in the near term, many companies that are planning, purchasing, and installing commercial EV charging equipment may be wondering how to handle this transition. Because CCS and MCS are not directly compatible, it may be unclear how companies should manage the immediate needs of fleet electrification and the long-term plans to continue adding charging capabilities with MCS.

According to Salim Youssefzadeh, CEO of WattEV, a company building out public truck charging sites, the company is preparing sites today with multiple CCS ports, with the plan to aggregate the power modules of the CCS chargers to eventually power the MCS ports. Specifically, the power cabinets will have flexibility in the "building block" power modules

to be able to provide power to a CCS charging pedestal and combine multiple modules together to provide higher charging power to an MCS pedestal. Once MCS charging pedestals are available, they can be added to a site, and utilize the power cabinets which already provide power to the CCS chargers. Youssefzadeh stated, “With a focus on heavy duty transport at WattEV, it was imperative for us to find a solution that supports both CCS and MCS so our investment will not become obsolete during the transition. Starting in 2023, all our installations will use modules of 1200kW systems that support 5 CCS at 240kW or one MCS at 1200kW."

Daimler Truck North America, a truck OEM, is taking the logical route of having both MCS and CCS charging ports on their trucks or providing a retrofit option to customers. In a statement provided by Nathan Hill, Head of ZEV Infrastructure and Consulting, “Both CCS and MCS will play important roles in the transition to commercial Zero Emission Vehicles. It will be crucial that vehicle OEMs and charging station designers have a strategy for dual-compatibility or an option to retrofit as the prevalence shifts from CCS to MCS over the next decade or so.”

Starting with the Basics – Utility Interconnections

It remains critically important, independent of specific vehicle needs regarding CCS or MCS, that fleets should start planning with their local utility for electrical service connections and upgrades. While small fleets may not need major upgrades to support their immediate electrification needs, that may not be the case for large fleets. Especially with fleets that need large electric installations, the timelines for these projects can be very long (i.e., 2 to 5 years). Getting power to a specific location is the most important part of a charging location planning, and that power connection can be used for MCS just the same as it can for CCS.

One of the first public truck charging sites, Electric Island in Portland Oregon, was a partnership between Portland General Electric (PGE), the local power utility, and Daimler Trucks North America. Even with PGE covering 50% of costs and deeply involved in the planning, design, and construction of the site, the utility connection took over a year to complete. The site design was focused on future expansion and flexibility, so MCS chargers and stationary storage can be easily added at a later date.

Black & Veatch, a global engineering, consulting and construction firm, has a decade of experience designing high power charging sites that are expandable, such as Electric Island. “As we enter the megawatt charging era, anticipating vehicle fleet requirements and aligning equipment layouts, clean energy supply and configuration optionality will be key”, said Paul Stith, Associate Vice President of Global Transportation Initiatives. “As industrial loads, these sites will often have long schedules to bring power, provide resilience and distributed generation where and when it makes sense. Navigating the mixture of CCS and MCS over time will be one factor among many integrated into site and network scaling plans.”

Becoming well-acquainted with the local power utility should be high on any fleet’s list of important steps to take. The local utility will go from useful business contact to strategic partner, providing the fuel for day-to-day operations.

CCS Infrastructure Won't Become Obsolete

As sites come online, CCS will be used in the immediate term, and MCS will add capabilities and robustness that improve on CCS as time goes on. Infrastructure providers and fleets don't need to worry that installed CCS infrastructure will become obsolete for several reasons:

- **Passenger vehicles will use CCS:** Most of today's CCS installations are located on charging sites which are dedicated for passenger cars, which is unlikely to change.
- **Commercial vehicles using CCS will be in service for many years to come:** Just like today's CCS installations last for many years, the commercial vehicles using CCS will symbiotically be in operation for extended periods of time. As fleets continue to become more electrified and vehicles with MCS are added to those existing CCS fleets, the infrastructure will need to grow to serve the increased numbers of EVs. MCS infrastructure will be additions to locations with existing CCS infrastructure, not replacements for CCS charging equipment. This means charging sites should always be developed with future expansion in mind.
- **CCS will continue to be used in vehicles that don't demand MCS capabilities:** CCS is so abundant and common that it will likely remain relevant for cost-sensitive buyers for many years to come. For example, passenger cars will continue to use CCS long after MCS becomes available, and the high volumes of CCS equipment will inevitably help to keep prices for CCS equipment low. While MCS offers many important features for commercial vehicles, it's unrealistic to expect per/kWh cost parity with CCS until much later in the product cycle, when more products are competing for a larger market. As a result, many fleets that require low acquisition costs will utilize smaller, lighter vehicles that don't need MCS-level charging power or operate vehicles with duty cycles that allow for longer charging times.

Other Considerations for Fleets

As CCS and MCS continue down the road of continuous improvement, there are still some important topics that commercial fleets will need to consider, including:

- **Daily operations**: fleet managers will need to balance charging speeds with different types of vehicles, use cases, costs, and duty cycles. MCS will provide a new tool in the toolbox for fleet operators, but it will require significant re-alignment of standard operating practices, including everything from reconfiguring site design to maintenance schedules to charging schedules and demand charge avoidance.
- **Communication changes:** CharIN embraces the opportunity to work with customers to better understand and improve standardization around topics such as operator-focused signage and communication to vehicle operators.
- **Interoperability testing:** CharIN supports the industry through Testival events around the globe, providing many different vehicle and charging infrastructure providers to test their equipment together before release to customers, ensuring interoperability continues to improve. Upcoming CharIN Testivals will focus on the newly released MCS specifications, ensuring improved power capabilities and

communication robustness to support complex use cases enabled with ISO 15118-20. Fleets should ask about charger company participation at Testivals to avoid potential interoperability issues. Furthermore, CharIN is providing a separate conformance test procedure at testing houses, such as DEKRA and KERI, to ensure compatibility for the charging partners. By passing this conformance test procedure the product will be certified with the CharIN conformance logo.

In Conclusion

The focus on bringing products to market and accelerating the world's transition from combustion-propelled fleets to electric propulsion systems remains intense. This short overview should help fleets understand that future roadmaps for charging installations likely will include both CCS and MCS, not just one or the just the other.

The CCS to MCS transition can be smooth and easy if it is well-prepared. Good planning and foresight will go a long way to supporting the commercial EV industry. Key takeaways include:

- Current CCS charging sites should always be developed with future expansion in mind, including MCS. For example, developers can plan for the appropriate grid interconnections, make enough space for charging stations and cable handling, and lay sufficient conduit for future new stations during construction.
- Automakers should plan to incorporate multiple charging ports in commercial vehicles to ensure operational availability to provide MCS charging when needed and for long distance applications, and CCS charging in for example urban areas during longer parking times and on existing CCS charging sites.
- Independent of specific vehicle needs regarding CCS or MCS, fleets should start planning with their local utility for their future power needs.
- Charging solutions with flexibility in their power "building blocks" (modules) can individually power CCS at lower power and combine to power MCS chargers at higher power.

Finally, for groups working on the single MCS standard, such as in IEC, ISO, SAE, the pressure is high to stay on track to release the standards as soon as possible.
This is not only critical to speed the world's transition to electric commercial vehicles, but also to prevent fragmentation into "similar, but not the same" standards. Taking lessons from other standardization journeys, it is critical that we not divide the market and negatively impact the EV customer journey.
Please consider joining the CharIN MCS working group and sharing your ideas and opinions to further improve MCS and help support the smooth transition from CCS.
For more Information, go to the CharIN MCS home page, or contact us at northamerica@charin.global.