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WAVE Comments - Workshop on Funding Allocations for Future MHD Charging and Infrastructure Projects

Additional submitted attachment is included below.

WAVE
by Ideanomics

March 18, 2022

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California Energy Commission
715 P Street
Sacramento, CA 95814

RE: Workshop on Funding Allocations for Future Medium- and Heavy-Duty (MHD) Charging and Infrastructure Projects

WAVE (Wireless Advanced Vehicle Electrification) appreciates the opportunity to comment on the February 28, 2022 staff workshop on funding allocations for future MHD vehicle charging and refueling infrastructure projects.

Heavy-duty vehicles use up to 10 times more power than passenger vehicles. As battery-electric MHDs move from the trial stage to full-scale adoption, the challenges associated with using manual plug-in chargers will scale accordingly. At higher power levels, especially those needed to charge heavy-duty trucks, the weight and heat of larger plug-in cables become unmanageable.

Conversely, wireless inductive chargers are fully automated and hands-free. Embedded in the roadway or depot pavement, high power (125kW to 500kW and beyond) is automatically delivered to MHD vehicles within seconds of regularly scheduled stops. Reaching full power quickly, and free of the concerns that come with handling high-power cables, wireless charging captures time that is lost in manual charging operations, resulting in meaningful range extension that would otherwise be lost. The resulting speed and convenience enable battery-electric vehicles with operational cycles that meet or exceed those of diesel vehicles. This case study highlights the range extension capabilities of wireless charging at the Antelope Valley Transit Authority – the largest operating battery-electric bus fleet in the United States, where the technology has been used at scale since 2018.

In addition to mass transit deployments, WAVE currently has four projects underway at the Port of Los Angeles, all if which aim to bring much-needed zero-emission operations to cargo handling equipment and drayage vehicles.

Free of overheard charging gear, ground clutter, and heavy cables, wireless charging reduces many of the challenges of deploying MHD charging infrastructure at scale. With no moving parts, wireless charging is more durable, reliable and affordable to maintain. Embedded into the pavement, the system is less susceptible to wind damage, collisions, vandalism, and theft. And the fully automated nature of the technology aligns perfectly with the need to charge autonomous vehicles without human intervention.

Support Wireless Charging as a Promising MHD ZEV Solution and as Part of a Technology-Neutral Approach to Incentives

As range and duty cycle extension of battery-electric vehicles continues to be a paramount concern of fleet operators, and with wireless, high-power charging proven to address many of fleet operators' concerns of operating MHD EVs at scale, we encourage the California Energy Commission (CEC) to directly and proactively include wireless charging as an eligible technology. Funding programs should avoid presupposing solutions and allow all technologies and interested parties to compete, to accelerate competition, innovation, and ultimately MHD ZEV adoption at low cost.

Maximize the Reach of CEC Funds by Future-Proofing Investments, Requiring Interoperability, and Maximizing kWh Throughput per Public Dollar Invested

Additionally, at a high level, we encourage CEC to future-proof and require interoperability for all infrastructure it funds. This is especially important for technologies like wireless and ultra-fast charging, which are likely to be critical in the future market but are still in the midst of standards development processes that have not yet been finalized. Rather than waiting for final standards, which would only serve to slow the much-needed development of MHD ZEV infrastructure to support scaled adoption, the CEC should instead require commitments and demonstrations of interoperability, to ensure that infrastructure funded today will support a wide array of vehicles in the future.

As a general principle, the CEC should also aim to maximize the reach and benefit of public dollars invested in MHD charging infrastructure by aiming to achieve the greatest and most cost-effective utilization of individual charging stations, rather than simply boosting charger counts or other arbitrary metrics, which may serve to reward more affordable, lower power solutions that result in longer charge times, lower utilization and are more costly to maintain. For example, a smaller number of in-route, high-powered, wireless chargers may be able to serve a greater number of vehicles at lower cost than a larger number of lower-powered depot chargers. CEC should carefully evaluate the ability to maximize kWh delivered – and therefore ZEV market reach and emissions benefits – as it implements its programs, with a goal of maximizing kWh delivered to ZEVs with available funding. This may lead to a need to support larger, more expensive projects, but which can also serve larger fleets or sets of fleets all at once. CEC can do this by prioritizing metrics besides number of chargers built, but rather the number of vehicles served, energy throughput, emissions reductions, utilization, or others.

Comments on Specific Questions

We additionally offer the following suggestions on specific concepts and questions posed at the workshop:

Truck Parking EV Charging and Hydrogen Refueling

Targeting the needs of independent owner-operators and long-haul and regional-haul drivers is especially compelling, since owner-operators represent the vast majority of drayage and other regional and long-haul trucks. However, this draft concept assumes that vehicles need – or will be best served – by overnight charging, and that infrastructure will have to be developed that essentially serves one vehicle with one

charger. As discussed above, this assumption deserves to be tested, and may not be true. High-power charging that is fast, easily-accessible, automated and available in-route can be utilized by more vehicles than a single, manually operated plug-in charger in a depot. The system provides more kWh throughput-per-CEC-dollar-invested than other options. The solution also serves to overcome other barriers identified in the concept presentation, including parking and traffic restrictions associated with plug-in chargers and concerns over handling high-power cables.

Accordingly, rather than pursuing a pre-determined solution to serve owner-operators, we urge the CEC to adjust this concept to be a broader "owner-operator ZEV infrastructure" solicitation that would allow many different solutions to serve the diversity of needs inherent to the tens of thousands of owner operators that constitute this segment of the market. We urge you to allow a wide array of entities to apply, including owner-operators, charging providers, and third-party financiers, to allow competition and a wide array of solutions that will likely be needed to address this sector to potentially emerge.

Designed correctly – to be broad-based and avoid picking one solution for this market segment – this could be one of CEC's most important MHD ZEV infrastructure programs, and deserves to be prioritized accordingly. Similarly, if designed to support a wide array of solutions that will enable projects to be quickly developed, the CEC need not limit the geographic scope of this proposal. Naturally, projects will be developed that serve the regions, freight corridors, and communities with the highest need. However, there may be unique solutions elsewhere in the State that deserve to be supported as well, and a broadly designed program will allow these solutions to emerge to accelerate ZEV adoption throughout the state.

Warehouse and Regional Trucking

This proposed concept may be similarly attractive for owner-operator models, and may be well served by opportunity in-route charging those wireless solutions can provide. Fleets operating on dedicated short-haul or regional routes may benefit from in-route charging, which can allow them to extend their range or utilize smaller battery packs, reducing the cost of the vehicle and the total cost of ownership.

Infrastructure to serve last-mile delivery options from warehouses or otherwise connecting to regional trucking operations, may also come to serve automated vehicles, to the extent early applications for those vehicles may be these types of applications. Wireless charging could be especially valuable for those vehicles, and the opportunity to share infrastructure at these locations to serve multiple fleets is worth exploring.

Similar to our comments above, we encourage the CEC to avoid picking winners or assuming single solutions to serve a diverse and complex market. This solicitation should be open to depot charging and opportunity charging alike, and should support the use of shared or dedicated infrastructure, both of which may make sense in different circumstances. A flexible, compelling program design that works well to accelerate ZEV infrastructure will naturally support projects along busy freight corridors. However, CEC should avoid limiting the geographic reach of this opportunity.

Innovative EV Charging & Hydrogen Refueling Technologies

While we agree that wireless charging is an innovative solution, we hope that CEC will broadly support a wide array of technologies, including wireless charging and other potentially "innovative" solutions, in all of its programs and avoid limiting the opportunities for any compelling technology to help the state meet its ZEV goals. Broad eligibility in all programs is better than small carve-outs for specific technologies.

To the extent new solutions pose unknown questions or are in an earlier stage of market development that still deserves support through standards development or other activities, we encourage CEC to dedicate its resources to advancing those activities and improving understanding of the opportunities these technologies may offer – through workshops, modeling, and other research activities.

Demonstration projects may still help, and this concept may be worth pursuing, but we feel that it should be given lower priority and funding than other categories focused on reaching the broad market – again, provided that all technologies, solutions, and interested parties are able to compete fairly. Should that not be the case, or further demonstrations and technology-specific categories be funded, we encourage the CEC to support new, dedicated projects for hands-free, wireless, inductive MHD electric vehicle charging – given its tremendous promise to serve as an effective strategy to address common barriers to MHD electric vehicles.

Mobility-as-a-Service Models

It is encouraging to see the CEC acknowledge Charging-as-a-Service, Infrastructure-as-a-Service, Maintenance-as-a-Service, Trucking-as-a-Service, and Parking-as-a-Service as potential applications. Removing financial barriers will increase market proliferation of ZEVs and supporting infrastructure. We strongly support this concept, given it can support the large array of owner-operator trucks and fleets in the market. We urge CEC to give it top priority and funding, and directly collaborate with CARB to enable solutions to the owner-operator segment in order to quickly scale and move beyond pilot projects in the State's programs. This project can specifically target drayage vehicles by encouraging applications and projects at port and other drayage-related facilities. However, as discussed throughout this letter, CEC should avoid assuming solutions or biasing against individual technologies and should allow a wide array of mobility-as-a-service models and potential funders to be supported.

CEC funding could directly complement CARB ZEV vehicle incentives through HVIP or other programs to quickly leverage private sector investments and deploy MHD ZEVs in owner-operator models at scale. We encourage CEC to think big on this concept and develop a performance-based rebate program that can quickly scale and avoid a competitive solicitation process that would slow and limit ZEV deployment in this important segment. Such a rebate program could support infrastructure deployment but could be allocated on a vehicle-served basis, rather than charger-installed basis, to encourage high utilization of charging infrastructure and the most cost-effective charging solutions.

Zero-Emission Rural Small Transit Fleet Infrastructure Deployment

We do not oppose a dedicated program for small, rural transit fleets; however, this funding should support optimal charging solutions for these fleets, and not pre-suppose that will be depot charging. Many rural transit fleets have long routes that can be well supported by in-route wireless charging (or even hydrogen), and "innovative" technologies may be especially important in these cases. WAVE systems, for example, support AVTA's first and largest all-electric bus fleet in the U.S., which provides service in a region with relatively low population density and many long routes. AVTA utilizes in-route charging to enable the complete electrification of its fleet.

This program should be scoped based on the size of the opportunity and need for ZEV infrastructure and emissions reductions relative to other MHD applications, which likely would make it a relatively small component of CEC's set of MHD programs.

Large Scale Ultra-Fast Charging Stations

In general, we support large-scale charging stations that can serve the greatest number of vehicles and deliver the greatest level of emissions reduction at the low cost. We strongly agree with the background in the presentation that EnergIIZE is not designed to support large scale projects and that large-scale, ultra-fast charging will support economies of scale and more cost-effective deployment of ZEV infrastructure. This goes for public and non-public charging infrastructure, and we encourage the CEC to consider whether all charging infrastructure under this concept should be public, or whether such a concept applies to dedicated fleet solutions, as well. We also encourage CEC to avoid arbitrary project caps in all its programs moving forward.

To the extent it can be quantified, CEC should base funding and awards on the number of vehicles served, rather than number of chargers deployed, which will encourage higher-powered charging and strategies to improve utilization. As an initial target, we encourage CEC to establish 500kW as minimum threshold for ultra-fast MHD charging.

Collaboration with CARB

We support collaborating with CARB and supporting additional pilot projects to expand the applicability of ZEVs in transportation. We wish to emphasize, however, that the greatest collaborative need and near-term market segment to serve is owner-operators, and we encourage CEC to work directly with CARB to move beyond pilot-scale thinking and enable market-wide solutions for owner-operators, which is necessary to meet the State's MHD ZEV goals.

MHD Loan Pilot

Access to direct money is helpful to fleets, but often the benefits of private funds outweigh the slow nature of agency loans. Private funding increases the likelihood of higher funding amounts and facilitate larger deployments. Funding opportunities should aim for shorter approval periods and processes, to stimulate innovation faster, and therefore deploy quicker. We support exploring how loans may complement other state programs to transition to 100% MHD ZEVs. To the extent CEC does consider loans, they may be best deployed as a loan-loss mechanism to provide greater certainty to unknown revenue or cost streams, such as the value of Low Carbon Fuel Standard credits or electricity prices. CARB developed a concept for a pilot financial mechanism to provide greater certainty around the value of LCFS credits, specifically in the dairy sector, and CEC could consider applying it to the case of MHD ZEVs.

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For example, a contracts for differences program that would essentially guarantee some value of LCFS credits overtime, or loan to be paid off by LCFS credits, with contingencies in case LCFS credits drop below expected values, could further leverage the powerful LCFS market signal to accelerate MHD ZEV deployment. It may also provide an attractive alternative to capacity crediting for MHD charging infrastructure under the LCFS program, which serves to incentivize the underutilization of ZEV infrastructure, rather than maximum kWh throughput.

Overall, CEC should prioritize leveraging private sector investment and maximizing the benefits from its investments in all that it does, by:

- Enabling all technologies to compete and avoid presupposing solutions
- Where possible, avoid competitive solicitations and instead establish performance-based rebate programs with set criteria for receiving funding
- Allow an array of project developers and financiers to participate in CEC's funding programs, including fleets, charging providers, and third-party financiers
- Prioritize utilization and kWh/$ invested, by judging projects based on number of vehicles served, energy delivered, emissions reduced, or criteria other than the number of chargers deployed

Ultimately, many of the proposed concepts could be combined into a single program with these attributes to quickly and cost-effectively deploy MHD ZEV infrastructure across an array of applications and geographies.

Thank you for the opportunity to comment on this workshop and the proposed concepts. Please let us know if you have any questions regarding these thoughts.

Sincerely,

Aaron Gillmore

CEO, WAVE