DOCKETED	
Docket Number:	24-FDAS-04
Project Title:	Flexible Demand Appliance Standards for Electric Vehicle Supply Equipment
TN #:	260753
Document Title:	Candace O'Melia Comments - GM Comments on RFI for Flexible Demand Appliance Standards for EVSE
Description:	N/A
Filer:	System
Organization:	Candace O'Melia
Submitter Role:	Public
Submission Date:	12/20/2024 8:22:30 AM
Docketed Date:	12/20/2024

Comment Received From: Candace O'Melia
Submitted On: 12/20/2024
Docket Number: 24-FDAS-04

GM Comments on RFI for Flexible Demand Appliance Standards for EVSE

Additional submitted attachment is included below.

December 20, 2024

California Energy Commission
715 P Street
Sacramento, CA 95814
(Submitted electronically via Docket No. 24-FDAS-04)

RE: Request for Information (RFI) on Flexible Demand and Load Shifting in California for Electric Vehicle Support Equipment

General Motors LLC (GM) appreciates the opportunity to offer comments in response to the California Energy Commission's Request for Information (RFI) for a potential Flexible Demand Appliance Standard (FDAS) for Electric Vehicle Supply Equipment (EVSE).

EXECUTIVE SUMMARY

GM, headquartered in Detroit, MI, is a global automotive manufacturer focused on advancing toward a zero emissions future that is inclusive and accessible to all. GM is driving the future of transportation, leveraging advanced technology to build safer, smarter, and lower emission cars, trucks, and SUVs. GM's Buick, Cadillac, Chevrolet, and GMC brands offer a broad portfolio and one of the industry's widest range of electric vehicles, as we move to an all-electric future. Battery Electric Vehicles ("BEVs") are key enablers of our vision for a world with Zero Crashes, Zero Emissions, and Zero Congestion.[1] Electric Vehicle (EV) charging infrastructure is an important contributor to the growth of EVs across all sectors, particularly the medium-duty, and heavy-duty sectors.

GM thanks the California Energy Commission (CEC) for the opportunity to provide comments on the RFI that will inform staff development of a potential FDAS for EVSE. In the following pages GM submits comments to questions relevant to our area of expertise.

[1] https://news.gm.com/company/about-us

Below, we provide responses to a subset of the questions in the CEC's RFI.

Question 1. Please provide information to assist the CEC in determining whether the scope of devices in Table 1 meets the needs of FDAS or if the CEC needs to consider revisions to the scope.

Table 1: Examples of In and Out-of-Scope Electric Vehicle Supply Equipment

Potential In-Scope Devices	**Potential Out-of-Scope Devices**
•Level 1 Electric Vehicle Supply Equipment •Level 2 Electric Vehicle Supply Equipment •DC-output Electric Vehicle Supply Equipment •Wireless Electric Vehicle Supply Equipment •Medium voltage AC input supply Electric Vehicle Supply Equipment •Power electronic components inside the vehicle	•Pantograph Electric Vehicle Supply Equipment •Equipment with an automated connection system

Source: California Energy Commission

GM supports the CEC's proposal for potential in-scope and out-of-scope devices outlined in Table 1 and requests clarification on charging use case for whether the CEC define EVSEs for residential or commercial charging or both. We are seeking additional clarity on CEC's vision for FDAS for EVSE and the specific power electronic components inside the EV related to offboard power transfer.

Question 2. What is the current landscape of options for charging schedules that prioritize the driver experience, emissions reductions, financial savings, and/or other factors? Please provide information or data on customer receptiveness to various charging schedules, such as charge immediately, charge by departure, etc. and the entity who possesses such information.

GM Energy, a business unit within GM, has 3 types of managed charging programs in operation which include demand response, static time-of-use, and dynamic hourly management. These programs have the main utility administrator goal of maintaining a healthy grid as EV adoption increases. Cost savings and carbon emission reductions may also be priorities depending on the utility program and encouraged user behaviors. To operate managed charging programs GM combines daily or event-based utility peak signals with charging preference data provided by the participating customer. Achieving customer EV readiness (desired target charge level, departure time, etc.) is typically prioritized over utility program participation when there is a conflict.

Shifting to off-peak charging can deliver benefits to the grid and support load flexibility when EVs can be parked for longer dwells times. Customer preference for DC charging at the fastest charging speeds to reach a desired state of charge near the EV's departure time should be prioritized especially for public DC EVSE. Receptiveness to various charging schedules can differ depending on factors such as EV arrival state of charge, time to departure, and incentives available for customer-owned demand management technologies that may outweigh a customer's charging needs. GM is supportive of vehicle-grid integration and its associated benefits to both customers and the electric grid. A strong adoption of EVs, however, is a prerequisite to realize a widespread opportunity to export power from charging sites back to the grid, known as vehicle-to-grid (V2G). V2G also requires standards development and utility pilots, programs, processes, and/or rates that accommodate bidirectional flows of energy. Vehicles need to be plugged into an offboard EV charger or device to discharge energy or cease charging for V2G. Further, the technologies to enable V2G, such as EVSE and inverters, continue to evolve.

Question 4. When will DC charging equipment be available for residential installation? What are the expected use cases, penetration, price range and power level of DC equipment used in the residential sector? Would certain DC chargers installed at private residences require a Battery Energy Storage System to manage peak load?

Residential DC charging equipment is available but can be cost-prohibitive or impractical to install depending on the local utility provider. GM Energy's currently available residential bidirectional charging system is capable of AC charging and DC discharging. Expected use cases include scheduling charge times to take advantage of off-peak prices, store, and use power in the event of a power outage. The GM Energy Home System[2] includes the GM Energy PowerShift Charger, Inverter, Home Hub, and the GM Energy PowerBank (Battery Energy Storage) which can help customers save money on electricity by pulling energy from the grid during off hours to use during peak billing times. The GM Energy PowerBank enables storage of energy from the grid or compatible solar systems to extend backup capability or to use when energy costs are high. DC discharging is currently enabled for vehicle-to-home (V2H) backup power and can be leveraged to manage peak load. For mainstream residential home charging, power levels of less than 20 kW AC or DC based on service entrance constraints are expected.

For DC bidirectional charging, the more easily utilities adopt existing standards (IEEE 1547-2018 and UL 1741 SA and SB) and accept DC bidirectional equipment that meets these standards, the more quickly applicants can move through the interconnection processes. Examples and pilots will be important to demonstrate load management potential and ease adoption of these programs overall. Utilities will need to consider approving the point of common coupling (inverter or IEEE 2030.5 comms interface) than the actual batteries if they want to enable more V2G opportunities.

[2] https://gmenergy.gm.com/for-home/products/gm-energy-system

Question 7. What hardware and software are needed on the EV's Onboard Charging System to enable load shifting?

The hardware needs will depend on what is in scope related to AC or DC charging. ISO 15118-20 allows for EVSE led charging both for AC and DC charging. ISO 15118–20 for AC charging with an amendment is needed to enable load shifting to communicate mobility needs and EV energy requirements to the EVSE.

Question 9. How can medium-duty and heavy-duty (MDHD) EVs and their EVSE fit into the CEC's goal of load shifting to avoid GHG emissions?

Medium-duty and heavy-duty (MDHD) EVs and their EVSE could fit into the CEC's goal of load shifting if they are enrolled in managed charging programs appropriately and adhere to program guidelines. Demand response and/or managed charging offerings could provide benefits to select operators of MDHD vehicles such as cost savings for fleet operators while also moderating utility system demand and potentially defer electric infrastructure upgrades.

Managed charging could make sense for fleets and MDHD EVs with long dwell times, such as last-mile delivery fleets who return to depots overnight. Many MDHD vehicle operators, however, will likely not be able to participate in these strategies if it results in lower productivity or has the potential to negatively impact business operations. Similarly, demand response and/or managed charging may not be compatible with public charging stations. V2G, like managed charging, could make sense for some MDHD use cases, such as for fleets that travel short distances and have extra battery capacity, but likely would be difficult in most use cases, particularly for fleets that do not have extra idle time, and not well-suited to charging occurring at public sites.

Question 13. Which communication protocols or components of existing communication protocols are used to enable load shifting capabilities for EVs and EVSE? What is the implementation status of these communication protocols? Are industry-wide standard communications and control protocols currently in use or planned? Are there remaining gaps to enabling load shifting capabilities?

ISO 15118 is an important industry standard for charging communication between EVs and EVSE. ISO 15118-20 provides the messaging structure and requirements to ensure that the driver's charging needs are not compromised. ISO 15118-2 and DIN 70121 do not have the messaging structure defined in ISO15118-20 to support cyber secure V2G. The implementation status of these communication protocols varies from ISO 15118-2, ISO 15118-20, and DIN 70121.

Open Charge Point Protocol (OCPP) is the widely used open-source protocol for interoperability, managing charging stations and supporting payment transactions. OCPP (both 1.6 and 2.0.1) is mainly focused on the public charger network. For residential settings the protocol, even in its latest edition, currently has limitations for home energy management customer use cases. As long as the utility communication to the back office is standardized, the protocols used from hardware to cloud are less relevant.

Gaps to enable load shifting capabilities include the interconnection process and how to account for electric vehicles as a grid-tied asset, as they are not stationary in the same way as solar or storage. Vehicles as a grid asset will be behind a grid-tied inverter serving as the point of common coupler, or the inverter may be on the vehicle and the charger will serve as the point of common coupling. There is also the complexity that two or more vehicles could be used for bi-directional charging behind a single point of common coupling. There are standard methods to communicate with the utility (OpenADR, IEEE 2030.5, etc.), but there is currently no provision for standardized data requirements or a common service architecture. GM recognizes and supports provisions designed to further enable load shifting capabilities for EVs and EVSE from the industry, specifically with utility communications to GM's back-office.

Question 16. What data or information is needed from the EV and/or EVSE to enable load shift while ensuring driver mobility and range needs are not compromised (for example, kWh needed by the vehicle)? How could this data or information be communicated across all vehicle and supply equipment models, regardless of the manufacturers' involvement?

The ISO 15118-20 standard is pointed towards allowing maximum EVSE flexibility while still meeting the consumer's mobility needs. All ISO 15118-20 sessions include a defined departure time, and a series of energy parameters that serve as limits, including target energy level (in the form of "kWh needed to be at target") which can be adjusted.

For managed charging, this sort of communication interface can be done with a modified version of DIN 70121, ISO 15118-2 and ISO 15118-20 and can enable interoperability. For managed discharging (V2G), this sort of interoperability is not possible with "on-standard" DIN 70121. It could be possible with ISO 15118-2 but will need to be built between EV-EVSE partners through a back-office, not through the charge cable communications. ISO 15118-20 will enable simpler and more "open" interoperability with Transport Layer Security (TLS) 1.3 encryption requirements for two-way authentication of all charging communication between EVs and EVSE. TLS 1.3 can strengthen cybersecurity associated with communication signals from the grid or a third party. Mutual authentication of the vehicle and the EVSE becomes even more important when sending energy back to the grid to securely identify the device before dissipating energy.

CONCLUSION
GM aims to prioritize the EV's battery health and maintain the battery warranty for EV customers when enabling any feature. To ensure bi-directional power transfer only operates with chargers that can be demonstrated to not harm the customer's vehicle battery health, GM approves the chargers that GM vehicles do bi-directional transfer with in the near-term and has protections on the vehicle software to block non-propulsion throughput. It is important for EV manufacturers like GM to have oversight on triggering the back-office signals for charging and discharging the EV in a safe manner.

GM appreciates the opportunity to provide our feedback to Docket No. 24-FDAS-04. We thank the CEC for their work to evaluate charging opportunities that prioritize the driver experience and deliver emissions reductions and financial savings to customers. As one of the key stakeholders in developing secure and flexible energy solutions, GM looks forward to continued collaboration on the development of the FDAS program for EVSE.

Sincerely,
Candace O'Melia
Strategist, EV Policy and Market Development
GM