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Landis+Gyr - Response to Flexible Demand Standards for EVSE RFI

Additional submitted attachment is included below.

Landis+Gyr

December 20, 2024
California Energy Commission
Docket Unit
Re: Docket No. 24-FDAS-02
California Energy Commission
715 P Street
Sacramento, CA 95814docket@energy.ca.gov

Re: Docket No. 24-FDAS-04, Flexible Demand Appliance Standards for EVSE

Dear Commissioners:

Landis+Gyr is pleased to provide comments on the California Energy Commission (CEC)'s Flexible Demand Appliance Standards for Electric Vehicle Supply Equipment (EVSE) docket. Landis+Gyr supports the CEC's incremental efforts to expand demand flexibility, especially 1 EVSE. The release of the October 18, 2024, *Request for Information (RFI) Flexible Demand and Load Shifting in California for Electric Vehicle Support Equipment ("RFI")* is part of this effort. The development of Flexible Demand Appliance Standards (FDAS) will advance California's clean energy and affordability goals by improving the coordination of assets on the distribution grid equitably. The following comments address some of the RFI's questions on the EVSE market in four key categories: Charging Preferences and Options, Relieving Grid Congestion Through Smart Charging and Load Shifting, Data and Communication Protocols, and Fleet Charging Management.

Company Background

Landis+Gyr is a leading global provider of integrated energy management solutions for the utility sector. As part of Landis+Gyr's Flexibility Solution, True Energy supports the Flexible Demand Appliance Standards (FDAS) for Electric Vehicle management by optimizing electric vehicle (EV) charging, ensuring grid stability, enhancing energy efficiency, and contributing to the reduction of greenhouse gas emissions. Leveraging Landis+Gyr's extensive expertise in smart grid technologies and flexibility management, True Energy offers a unique approach by focusing on vehicle-centric solutions that optimize charging schedules and energy consumption. Landis+Gyr also specializes in fleet electrification transition planning, electricity management, and resilient energy systems using the Microgrid Labs energy modeling platform EVopt to right size electric fleet vehicles, charging infrastructure, and charging depots for fleet operators, their engineering firms, and their electric utility. These solutions enable us to deliver highly flexible, grid-friendly charging strategies that align with California's clean energy goals while supporting the widespread adoption of electric vehicles.

Throughout these comments, we have provided examples of ***Technology in Action*** in green boxes to highlight how our solutions meet the capabilities described in the RFI.

Marguerite Behringer
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I. Key Point: Managed Charging Meets the Need

Managed charging programs are essential to supporting California's energy and environmental goals, especially as peak loads are projected to grow. Managed charging programs for residential customers are an important piece of the puzzle, especially to provide consumers with options to optimize their charging according to time of departure, greenhouse gas emissions, and dynamic pricing programs. Utility integration of, and managed charging software will be an essential tool to achieving California's goals. As the FDAS dockets progress, efforts to simplify communications and regulations may support broader adoption of the demand response programs envisioned. Landis+Gyr has experience in flexible energy management and would be willing to share more details on our successful deployments.

As California expands managed charging programs, regulatory cost recovery will be crucial for their success. Clear cost recovery mechanisms will allow utilities and stakeholders to recover expenses associated with deploying smart charging infrastructure and demand response programs, helping to achieve the state's energy and environmental goals.

II. Charging Preferences and Options (Q2, Q3, Q5, Q6)

California's regulatory environment seeks to prioritize solutions that support emissions reductions, financial savings, and other factors that can be supported by charging management solutions. The RFI seeks information on both the landscape of options available and consumer uptake today. In brief, many industry stakeholders agree that "cars are getting smarter, and chargers are not," which highlights an important need for smart, efficient EV charging. While some EV owners will choose "immediate charging" or "charge-by-departure" options, **smart charging** optimizes charge times based on real-time prices, grid demand (peak vs. off-peak), and renewable energy availability. Utilities and providers like True Energy are driving beneficial charging behaviors through software controls, education, and incentives.

According to the U.S. Department of Energy (DOE)[1], 64% of EV charging occurs at home, emphasizing the importance of residential charging programs to optimize grid impacts and cost savings. This complicates utility planning, as home charging doubles the energy load of the home. Distribution transformers are not typically sized to accommodate the growing shift toward electrification. Additionally, EVs tend to cluster in certain parts of the utility service area, adding to congestion and putting undue strain on distribution assets such as transformers. When DC fast chargers (DCFC) and public Level 2 (L2) chargers are installed, these loads are typically planned for, and there is adequate distribution capacity. Public-facing chargers are often installed through private investments, and owners earn more revenue while they are in operation, making them a less suitable option as a flexible load.

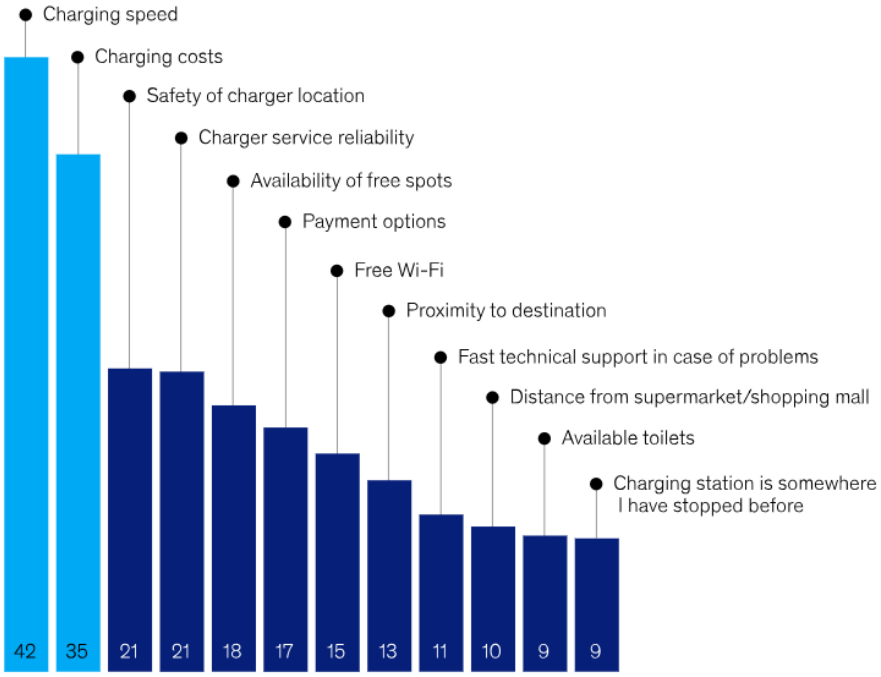
A survey released by McKinsey & Company in January 2024[2] found that customers reported that charging speed and cost are the most important factors for consumers in public charging scenarios,

[1] EVGrid Assist: Charts and Figures | Department of Energy
[2] https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/our-insights/exploring-consumer-sentiment-on-electric-vehicle-charging

which leaves less opportunity for demand response programs to manage EV impacts, prioritize renewable energy dispatch, and ultimately reduce costs to consumers.

Charging speed and costs are key considerations during public charge point selection.

Key factors for public charge point selection by those who charge in public or would consider doing so, % of respondents



Source: McKinsey Center for Future Mobility (MCFM) Insights; MCFM Consumer Pulse Survey, December 2022; based on detailed information available for Brazil, China, France, Germany, Italy, Japan, Norway, South Africa, and the United States (n = 27,869)

McKinsey & Company

III. Software and Hardware to Support Smart Charging and Load Shifting

The RFI inquiries about software and hardware capabilities that could enable public and residential EVSEs to relieve/eliminate grid congestion at the distribution level. At a high level, the following components are required to support **residential** smart managed charging:

Hardware

Electric Vehicle with open API for telematics support.

EVSE Hardware compliant with SAE J1772 or SAE J3400 standards. The EVSE can be networked, which provides additional functionality and capabilities for the owner. It can also be a low-cost, easily attainable appliance which depends on the vehicle for communications and takes the home network out of the equation.

Advanced Metering Infrastructure to communicate real-time electricity usage data.

Optional hardware includes bidirectional charging capabilities embedded in their hardware, inverters for EVs collocated with solar panels, inductive charging hardware, and other variations.

Software

Smart Control Systems Edge-to-enterprise control systems are essential for the success of any flexible load-shifting program. Sensing systems, such as AMI, provide demand data from the edge, support overall demand response, and can precisely target congestion relief on specific transformers or feeders. Effective control systems that communicate with various vehicle head-end systems—often relying on reliable cellular communications—enable the dispatch of start and stop charging messages to vehicles. This capability supports a wide range of EV energy management initiatives, enhancing grid stability and flexibility.

Analytics and Algorithms to evaluate wholesale market data, utility rate plans, and gird congestion information.

Distributed Energy Resources Management System (DERMS) software platforms may be utilized to manage large numbers of distributed energy resources (DER).

Control Systems

Demand Response Programs: Utilities may offer one-time or ongoing incentives to incentivize EV owners to shift charging to desirable and beneficial times. This may be executed by sending automatic signals to the car, EVSE or by promoting behavioral programs that prompt manual curtailment.

Technology in Action: EV Hardware and Software

True Energy's load-shifting technologies are designed to help manage EV charging demand in a way that relieves grid congestion. By integrating directly with EVs, we can optimize charging schedules sed on real-time grid conditions, ensuring that the timing and rate of charging support grid stability.

How We Do It:

1. Our system communicates directly with the vehicle, adjusting charging behavior based on grid signals such as electricity prices, greenhouse gas emissions, and Flex Alerts from California ISO.

2. While our service is independent of EVSE hardware, we can integrate with specific select chargers if necessary to enhance the flexibility of the solution.

Aggregator Coordination: With consent from the EV owner, a certified aggregator may coordinate signals and charging dispatch with EV chargers to manage multiple EVSEs to balance grid load.

Real-Time Monitoring and Control: EVSE owners may enroll in time-varying rate programs or adjust charging rates dynamically to charge during lowest-cost timeframes.

IV. Data and Communication Protocols

The RFI seeks information on the hardware and software needed to enable load shifting, and what communication protocols are being utilized. As California considers creating regulations and/or standards for EVSE management, it is critical to consider what protocols are already being used by the end users across the U.S. California's intention to evolve the Market Informed Demand Automation Server (MIDAS) platform and integrate a variety of Flexible Demand Appliance Standard dockets presents the potential for a complex, California-specific approach to managing demand response. While this could set a precedent for other states to follow, as a leader the approach should also accommodate consumers operating their devices when crossing state borders. A simplified approach will ensure that programs are adopted more readily. Additionally, given the importance of residential charging, integration with smart electric panels, smart metering platforms, battery storage systems, DERMS, and other smart devices should be considered.

Today, most communication protocols occur over ISO/IEC 15118 (EV-EVSE communication, enabling plug and charge and bidirectional charging) or OCPP (interoperability between EVSE and networks). A known gap in enabling load shifting capabilities across different EVs is the lack of interoperability across chargers and charging management platforms as widely experienced recently with the dissolution of Enel X Way leaving many of their networked chargers stranded. To mitigate this risk, Landis+Gyr supports telematics as a more reliable and robust way to schedule, shift, or curtail EV operations given consumer consent. All chargers, even un-networked, low cost, chargers start and stop energy flow based on signals from the vehicle via the Control Pilot Port of a SAE J1772 compliant charging cable. If utility energy management control signals reach the vehicle through the telematic API, even a dumb charger can have smart, energy efficient output.

Technology in Action: Communications

The True Energy telematics platform goes beyond simple charging schedules, offering advanced automated intelligence that enhances the flexibility and efficiency of EV charging.

How We Do It:

- Our system communicates directly with the EV to manage when to start and stop charging throughout a single session. This allows the vehicle's battery to be fully utilized while maintaining grid balance and optimizing cost savings.
- Rather than a one-time charging session, our solution can interrupt and restart the charging process multiple times as needed,
- By leveraging the full flexibility of the car battery, we allow for more granular control of the charging process, providing superior energy efficiency and reducing the strain on the grid without compromising the driver's needs.

Integration into the CEC's MIDAS is critical to achieving California's policy goals. **Dynamic pricing** for EV charging enables EVSE to adjust charging schedules based on real-time electricity rates from MIDAS, allowing EV owners to save costs by charging during off-peak hours. Automated systems ensure charging is optimized without manual input. **GHG emission signals** can allow EVSE to prioritize charging when the grid is powered by cleaner energy, reducing the carbon footprint of EV charging. User notifications can further encourage sustainable charging behaviors. **Flex Alerts** can support demand response by shifting or reducing charging loads during California ISO peak demand periods, helping to alleviate grid stress. Pre-emptive charging before Flex Alerts ensures vehicles are ready for use while avoiding high-demand times, supporting both grid stability and user convenience.'

Technology in Action: Environmental Charging

True Energy can provide environmental charging services, where the charging of EVs is dynamically aligned with the availability of green energy. This concept is based on the Streymoy Eysturoy and Vaagar (Sev) utility project in the Faroe Islands, where EV charging is prioritized when renewable energy from sources like wind and solar is abundant. This can include dynamic pricing schemes and incentives for "green charging."

How We Do It:

- By integrating with renewable energy sources, True Energy can schedule EV charging when there is an excess of green energy, allowing consumers to charge their vehicles with minimal environmental impact.
- This service can be incorporated into smart charging solutions, ensuring that EV owners are not only managing costs and grid stability but also minimizing their carbon footprint by charging during the times when clean energy is most available.
- Our pricing models can be integrated with time-of-use rates and real-time grid conditions, rewarding consumers who charge during periods of high renewable energy availability.

V. Fleet Charging Management

Electric vehicle fleets can range in size, but the aggregation of multiple electric vehicles loads in a single area will likely stress existing grid infrastructure. The electrification of fleets encounters various challenges throughout planning, design, deployment, and operation. The following comments describe categories of electric vehicle fleets and strategies to balance their load.

Light duty (LDV) fleets can exist in two geographic schemes:

- Dispersed and plugged-in / charging at workplace or residential locations.
- Concentrated and plugged-in at a single location, resulting in large peak loads (1 MW-2 MW)

Medium and Heavy Duty (MHD) fleets are always concentrated and plugged-in at a single location, generating large loads of 2 MW-10 MW managed by a charge management system (CMS) layer. MHD

fleets provide significant optionality to reduce peak load through managed charging load smoothing. Concentrated charging locations for fleets that have battery storage assets or other DER can provide significant benefit to real time pricing FDAS. These fleets can be included in various Demand Response programs.

Fleet Charging Strategies can be summarized by three basic preferences:

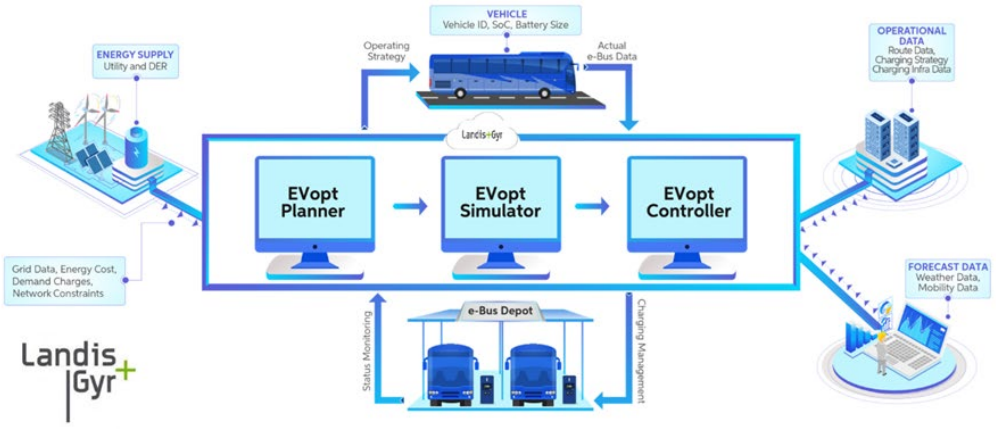
Overnight Depot Charging: Use high-power chargers to ensure buses are ready each day.

On-Route Charging: Top off batteries at specific stops using wireless or pantograph systems.

Sequential Charging: Charge buses sequentially to manage grid load.

Technology in Action: Fleet Managed Charging

Landis+Gyr's fleet Management Controller optimizes the charging and vehicle dispatch process in real time to minimize costs while guaranteeing operations and preventing any overload to the grid.



Its built-in operational planning module helps the operator to simulate any changes to the operating schedule (routes, timetable) and evaluate its impact before implementing the changes. Landis+Gyr depot management software helps customer involved at depo operations to streamline:

- Operations planning
- Charging schedule optimization
- Vehicle dispatch
- Manual Rotation
- Dynamic re-scheduling
- DER dispatch
- Grid constraint management
- V2B/V2G

VI. CONCLUSION

Landis+Gyr appreciates the opportunity to support the CEC's ongoing efforts to develop FDAS for EVSE. As California works to meet its clean energy and affordability goals, managed charging and demand response programs will be critical to ensuring grid stability, reducing emissions, and supporting equitable access to EV charging. Landis+Gyr's experience in flexible energy management and smart grid technologies positions us as a valuable partner in advancing these goals. By leveraging advanced communication technology, fleet electrification planning, and managed charging software, Landis+Gyr is committed to supporting California's transition to a more sustainable, resilient, and efficient energy future.