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RFI for Electric Vehicle Supply Equipment Responses answers

Additional submitted attachment is included below.

1. I'm interested to know why automated connection is excluded. Propose including Charge Management Systems (CMS), local and cloud-based, as well as hardware, software and electrical equipment required to integrate charging with site loads and control them holistically to achieve the maximum load flexibility possible behind the meter.
2. Gridtractor (and previously Polaris Energy Services) have focused on the agriculture industry. Customers in this industry are very attuned to their energy usage and needs. For this group, they usually schedule their energy usage/water usage (energy used for irrigation pumps) on a weekly basis. Given that ~1,600 MW of installed grid capacity for irrigation pumping that has ~25% load factor represents the best opportunity to add charging in rural areas without significant upgrades, considering customer requirements across pumping and charging is necessary to realize latent load flexibility. Being able to provide estimated pricing a week ahead, along with technology to set scheduled usage, promotes changes in the customer behavior. Sending a pricing alert for unexpected change also produces behavior change but not to the same extent since customers have other factors to consider in the moment.
3.
    a. The customer inputs guidelines for the EVSE to follow. I.E.: need 80% charge by 8am, always leave at least a 20% charge on the EV during export, etc.
    b. Unknown
    c. Various types are used.
    d. Early adopters are often more interested than the general public in trying new technologies and features and making adjustments. Most general customers will likely set parameters when the EVSE is installed and may not update them after use. If customers are prompted after a specified window (i.e. after 30 days) to reevaluate their charging parameters, this could lead to a greater number of customers making adjustments to their parameters.
4. N/A to our use case
5. DERMS or software developed by EV charging companies could be utilized to manage the charging of vehicles within their charging deployments (or even along with other EV chargers with certain integrations) to prevent power surges of the size that would affect the grid by controlling the charging start up time and limit the power during charging depending on the time available to the customer. Price signals are the "universal language" into which most grid requirements can be incorporated and which any automation or user-facing software can translate to actions or options. Control signals that parallel price signals are inevitably confusing to implement and operate from the charge management perspective. For public EVSEs, publishing not only the charger's max capacity but currently available capacity (net of load management decisions made automatically or manually by the charging system operator), would provide more useful, actionable information than what is available to drivers now.
6. Smart chargers and smart panels are already capable of doing this. There are also DERMS, EV manufacturers, and other companies all currently capable of providing this service. As noted, price signals are the universal language that all technology providers can build solutions around. One flaw that could be addressed by the grid operator is that a price signal for a distribution circuit could cause many charge sessions to start

simultaneously if all chargers follow the same signal; working with technology providers on a “soft start” functionality could alleviate this.

7. The EV’s Onboard Charging System does not need any changes to enable load shifting in certain situations. As a charge management provider, our approach is to manage load through the chargers instead of the vehicles. There are many benefits to this approach, but it only applies to situations where fleets are owned and/or controlled by the property owner, not public charging.
8. Unknown
9. MDHD vehicles often work on schedules that permit load shifting, either through V1G/smart charging or V2G. Technologies that increase operating range or charging speed, and deployment of EVSE as close as possible to where these EVs are typically stationary (e.g. to load/unload), increase the potential to charge and discharge at times that are optimal for the grid. Key to realizing this potential is sufficiently incentivizing operators to shift and incorporating the grid signal in their operational planning processes. For example, industrial and agricultural operations that are planned on a weekly basis need to have prices (or other grid signals) available a week ahead in order to respond optimally.
10. Yes. Farm vehicles, an example of off-road vehicle, have fairly well defined use-cycles that allow for load shifting. In most cases it is feasible to charge overnight, operate during the day, plug in, and defer charging until after ramp hours. In many cases, it is possible to also complete some charging during peak solar hours (e.g. a lunch break) and export during ramp hours. Schedules also vary seasonally so there are times of the year that equipment can operate almost as a stationary battery. There are approximately 108,000 tractors in California of which approximately two thirds can feasibly be replaced by commercially available electric tractors. EVSE for charging them represents ~1,400 MW of capacity.
11. N/A for our company
12. Agricultural fleets are in the early stages of electrification. So far, they use primarily Level 2 chargers for overnight charging but are encountering operational and infrastructure limitations, which Gridtractor addresses by using additional infrastructure (e.g. services for large irrigation pumps). Because the fleets operate primarily within a defined geographical area, it is possible to optimize charging and operations by tailoring the charging infrastructure to the fleet. As more of a given operation’s fleet is electrified, more electrical services around the farm will be used for charging which creates greater opportunities for partial charges during the day. Gridtractor’s software is designed to optimize both the infrastructure selection and operational decisions. Many farms have multiple electrical services of sufficient capacity to deploy DC Fast Chargers.
13. The current standard of using OCPP provides monitor and control opportunities. OpenADR 3.0 is used to provide pricing information in the IOUs’ dynamic pricing pilots. ISO 15118-20 is utilized for communication between the electric vehicle (EV), including battery electric vehicle (BEV) and plug-in hybrid electric vehicle (PHEV), and the electric vehicle supply equipment (EVSE). Each of these standards has versioning which only adds to the number of standards needing to be met. Finally, even with the current standards in place, many implementations (especially for OCPP) are NOT standard.

Each OEM has created their own version of OCPP, so moving between vendors is not as simple as it is intended.

14. Unknown
15. Price is the universal signal that should enable response across all technologies and sectors. For most applications, price must be integrated with other information to enable users to make decisions so, in most cases, prices should be retrieved and consumed by a technology provider's central system and incorporated into the application provided to users.
16.
    a. kW needed by vehicle OR % charge needed OR miles of range needed
    b. Time vehicle is available for charging: start and end
    c. % of battery needed for reserve during an export
    d. For this data to be available across manufacturers and models, improved standards are needed.
17. The amount of energy consumption should not change by realizing demand flexibility alone because our goal is to match the timing of charging to grid conditions, not reduce the total energy used. With V2G, consumption increases because energy must be delivered, stored and returned to the grid that is additive to the energy needed for EV operation alone. With fast chargers and/or seasons with significant EV downtime during the day that can be used for energy arbitrage, we would expect energy consumption for V2G to more than double consumption for vehicles alone.
    In this example, we analyzed the seasonal operating requirements for 11 tractors at a large farming operation of sizes that can currently be replaced by available electric tractors, and assumed a 25 kW charger available at appropriate times for charging and export. Charging is assumed to be economical during 19 hours of the day and export during the five hours of the 4-9 PM peak. Fully exploiting the V2G opportunity adds 75% to total energy consumption (before accounting for losses).
18. The question should be reframed: "How can California's regulators and utilities provide grid signals to be most attractive to customers and third parties to access and respond to?" Currently, nine charging technology companies are REDWDS recipients and working to participate in dynamic rates as required by the scope. SCE and PG&E's dynamic rates pilots are using OpenADR 3.0 so we will integrate those signals. As it is, it seems that each utility will require two integrations, one for prices and one for subscriptions, which is quite burdensome. And, to get relevant historical data, Green Button integrations are needed (one for each utility) and this is needed to provide a complete solution. That is six integrations just for two California pilots. Hopefully, when the pilots conclude, permanent rates will use the technologies employed by the pilots so that we do not need to reinvent the wheel with MIDAS. But, static rates are only available from MIDAS or commercial third parties, e.g. Genability. All of this represents way too much effort and complexity just for California; most of this stack is not usable in other markets. Massive simplification and rationalization is needed to attract third parties to build solutions at any scale, keeping in mind that they need to make money and customers need to save money. Additionally, the rates themselves should be simplified and rationalized because the number of permutations is currently unmanageable. And,

providing multiple signals (price, GHG and flex alert) is overwhelming. Why would flex alerts be sent through one system and other DR events through other systems?

19. Signals should be publicly available and, therefore, eliminate the need for cybersecurity by receiving parties.
20. No. Realizing the most load shift possible at the lowest cost will provide system benefits, which accrue to all income levels. For the great majority of customers, participation is not a goal; saving money is.