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Siemens 18-09-21 Comments on VGI Roadmap

Additional submitted attachment is included below.

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Sep 21, 2018

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Siemens Comments on Vehicle-Grid Roadmap Update: Proposed Approach, Framework and Topics

On September 6, 2018, the California Energy Commission (CEC) held a webinar on the process to update the Vehicle-Grid Roadmap. CEC presented a four-track framework including proposed roadmap goals and issues/barriers and requested for public comments.

Siemens offers the attached comments on the proposed CEC framework matrix. **The comments are inserted and highlighted in the matrix.**

Siemens, a global technology powerhouse, is committed to sustainability, including achieving zero net carbon emissions by 2030 – the first major industrial corporation to make such a commitment. Siemens strongly supports the state's target and offers its global expertise to achieve the same. Siemens's transport electrification portfolio encompasses *plug to grid*, ranging from EV charging hardware and software, grid integration to specific technologies for electric buses and freight transport.

Siemens appreciates the opportunity to comment.

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Number (G.P/I.A) E=Economic; C=Customer; T=Technical; P=Policy	Goal	Problem/Issue
E1.1	Estimate the economic potential for Vehicle-Grid Integration under medium (2030) and long term (2050) scenarios.	Various scenarios of electric vehicle charging load shapes (system wide and disaggregated) are needed for effective utility resource planning. Planning frameworks must value grid integration and smart charging to minimize the costs of electrification. Electrical distribution make ready equipment must be designed as a future proof solution allowing for additonal capacity of chargers and potential integration of a second energy source.
		Need to identify exact use cases that will be quantified as part of economic potential analysis
E1.2		Analyzing the supply push from solutions providers (i.e., automakers, equipment manufacturers, electric vehicle service providers, aggregators, and infrastructure installers) is needed to forecast the smart charging market and holistically assess the benefits of VGI to the state.The topic of dynamic rates/time-varying rates is a missing consideration given its ability to impact smart charging
E1.3		There is limited information on value to customers and ratepayers from V1G, V2G, and/or V2B. Some pilots have been completed and others are underway, however analysis is needed across user segments, across infrastructure design types, and under various policy scenarios for both direct beneficiaries and ratepayers at large. The issue of vehicle OEMs "allowing" for V2G is amiss here -- high end EV OEMs consider it to be a customer inconvenience & therefore do not support the potential.

E1.4		There are various valuation tools for estimating how future energy scenarios, including those with high rates of PEV adoption, achieve equity/societal and decarbonization goals, however the effectiveness of such tools require a high-level assessment of how VGI is characterized.
E2.1	Identify promising business models for self-sustaining private development of infrastructure and markets for VGI	A lack of seamless grid integration of mobile resources across utility service territories and their different rate structures and policies may hinder the interoperability of PEVs and the large scale adoption of PEVs. Analysis of this seamless integration is needed including the range of cost for the different ways of communicating utility schedules with vehicle charging schedules. Do "utility schedules" mean rate periods ?
		Lack of implementation of existing technical standards (communications and networking) have inhibited smart charging and data access for new services provision.
E2.2		Limited aggregation models available to third-parties across the load serving entities (IOU, CCE, POUs) have inhibited the scale-up of managed charging.The issue is not about the aggregation models rather its about the access to markets.
E2.3		There is limited understanding of "unbundling" (or the separate-purchase of) charging equipment and charging services, and the impact unbundling may have on the grid and market.This misses the issue that publicly-funded rebates are allowing for the purchase of "dumb" chargers especially at residential level which further dampens the understanding or need for managed charging services. Also, in a construction project apart from installation of chargers, electrical distribution make ready equipment, conduit, and trenching etc need to be considered as significant cost savings can be attained by scoping the projects correctly without sole focus on just the chargers themselves.
E3.1		Autonomous, Connected, Electric, Shared (ACES) vehicles have unverified impacts on future electricity demand, traffic flow, and greenhouse gas emissions.

E3.2	Reduce cost of electrification by measuring how emerging opportunities can utilize vehicle-grid integration technologies	Electrification and charging infrastructure operations can positively impact the development of sustainable communities and smart cities, but viable models are unproven or developing.
E3.3		Characterizing the grid impacts of large scale transportation electrification for medium-duty and heavy-duty vehicles is needed to provide reliable service and minimize grid upgrade costs.This issue misses the reality that the current grid without substantial upgrades is not in a position to sustain TE at scale. Also, adequately designed electrial distribution make ready equipment should be considered from the start for future-porrofing sites and have provisions for a second energy source to substitute grid capacity, such as distributed generation or battery storage.
C1.1	Prioritize and track the benefits of managed PEV charging to low-income consumers and disadvantaged communities.	Current utility resource planning does not take into account the environmental and air quality outcomes from shifting how power plants operate (in response to managed PEV charging) near low-income and disadvantaged communities.
C1.2		Current metrics, such as those in the SB 350 Equity Indicators, do not report all charging infrastructure investment or smart charging customer enrollment.
C2.1	Enhance the consumer experience.	Important consumer information, such as optimal times for charging and managed charging methods, incentives, and utility bill savings, is not disseminated at the scale necessary to achieve PEV goals. The issue is not about dissemination, rather its about the ease of access, convenience and understanding for the customer.
		Lack of a centralized state-wide information resource that provides relevant and up to date information on EV charging infrastructure including available smart chargers for the various customer segments. This is in spite of the hundreds of millions of dollars being spent on ME&O currently utilizing public funds (majority) and some private funds

C2.2		All makes of PEVs and charging equipment are not interoperable. The lack of EVSE standards raises the risk of stranded assets and prevents data access especially in case of publicly funded infrastructure.
C2.3		The charging and payment process for workplace and public charging is evolving, but needs to simplify for drivers as PEV infrastructure is deployed.This misses the problem/issue that universal payment standard of credit card as a minimum for customer experience transfer based on today's experience at gas stations.
C3.1	Increase the potential number of and readiness of future EVSE site hosts.	Standardized "make ready" infrastructure plans are not part of new construction and not all customers are aware of the possibility of EVSE integration.
C3.2		EVSE integration can be challenging and cost-prohibitive at existing buildings. This is not a universal scenario -- cost efficiencies exist based on the technologies being made available and selected by the customer.
C3.3		Large scale EVSE installations across the state may be challenging for installers that operate in multiple locations due to development codes that can vary across cities and counties.
C3.4		Dense deployment of EVSE in specific locations can be challenging for utilities to integrate with the electric grid.
C3.5		Information describing best practices for operating and maintaining EVSE from site hosts and EVSPs participating in publically funded programs is not readily available.
T1.1.1	Improve cybersecurity	Low cost and robust cyber security measures between the PEV-charger and charger-aggregator may not be readily deployed in today's charging market, and commercialization of smart chargers must continue to ensure safe data transfers from malicious attacks. The issue is not only which level of security to use today but also how to provide for updating the security methods (hardware and software) in the future, as new threats appear. Which again raises the issue of open technical standards to enable these updates cost effectively.

T2.1.1	Advance communication and hardware technology standardization and interoperability	Wireless, V2G discharge, DC Fast Charging for light vehicles, and medium- and heavy-duty vehicle charging need to be prepared for advanced interoperability capabilities to enable the robust development of the charging network.
T2.2.1		The lack of communication standardization for light-, medium, and heavy duty vehicle charging may inhibit the maximization of smart charging benefits and underutilize smart chargers and PEVs as grid resources. The issue should consider whether extending the use of existing open standards and protocols such as ISO15118 to MD/HD so as to have at least a starting point.
T2.3.1		PEVs are unable to participate in charging-specific tariffs and/or monetary compensation programs without highly accurate metering and communications necessary to provide accurate reporting and settlement and knowledge about the availability of integrated low-cost metering and communication solutions is incomplete. The issue actually is the lack of uniform meter requirements by the utilities -- and hesitance in accepting sub-metering capabilities. There are several EVSEs with revenue-grade internal meters available in the market including from Siemens that have passed the "meter-test" that some utilities already have in place for this level of accuracy.
T2.4.1		Integrated solutions providing advanced communication and control functions that connect the PEV and/or charger with grid operators are needed to reduce implementation costs. This is NOT an issue as the solutions are available today from technology providers including Siemens. The use of standards-based infrastructure will reduce the implementation costs.
T3.1.1	Develop advanced battery and charging	Manufacturers of solutions for MD/HD EVs need to accommodate high-voltage battery and charging systems to meet applicable vocational duty cycles.
T3.2.1		Users need to understand the relationships between battery life, range, operations and their overall impact on total cost of ownership.

T3.3.1	technologies	The load and grid upgrade requirements of fast charging to support long distance travel for light personal and light/medium/heavy commercial vehicles are unknown.This has long been a topic of research for organizations such as the IEEE PES, primarily through universities. The issue is potentially increasing investments in such R&D and bringing them to market.
T4.1.1	Improve technology transfer between stakeholders	Technology and knowledge transfer between local, state, and federal stakeholders (agencies, auto OEMs, charging technology providers, utilities etc.) is not yet occurring at a comprehensive scope or frequently enough to rapidly advance EV adoption.
T5.1.1*	Identify scenarios and cost targets for future technology research and development	State agencies and stakeholders need a focused roadmap to direct VGI technology development, specified with technology metrics and informed by industry product roadmaps.
P1.1		The interactions between the objectives and timelines of state transportation electrification and vehicle-grid integration policies and programs are unclear. The issue is the lack of a centralized strategy and plan for the state on how to achieve the cascading goals.
P1.2		Agencies or stakeholders may unknowingly develop policies, business processes, and market initiatives concerning EVs that counteract or contradict VGI resource certification efforts.
P1.3	Frame the interactions between policy initiatives, market push, and demand	Rapidly evolving renewable portfolio standards, rate designs, and infrastructure incentive policies influence the usefulness of VGI, but utilities need certainty in charging infrastructure procurement policy and private companies need certainty in charging infrastructure technical specifications to successfully co-invest in charging.

P1.4	initiatives, market push, and demand pull factors that are required for achieving widespread deployment of managed charging and grid reliability goals and propose changes to EV deployment plans and VGI policy to address gaps.	State agency units implementing VGI-related policy measures are independent, yet require improved awareness of related activities. E.g. ZEV and Infrastructure Targets (B-48-18), Utility Transportation Electrification and Integrated Resource Planning (SB 350), CA Energy Demand Forecast and Transportation Energy Demand Forecast (IEPR), CARB Climate Change Scoping Plan and Mobile Source Strategy (Medium and Heavy assessment, Sustainable Freight, Innovative Clean Transit, Advanced Clean Trucks), Research Assessments (EPIC, ARFVTP, CARB Research), Rulemakings (R.13-11-007, Title 20, Rule 21 Interconnection, Open Access, Low Carbon Fuel Standard). The issue is how to break-down the siloes and coalesce behind an overaching plan.
P1.5		Impacts of concentrated local and individual efforts related to smart EV charging (ZNE homes codes for EV and DR capability, Local Climate Action Planning, Fleet Procurements, Low-Income and Disadvantaged Community programs) are not readily transparent, which may result in poor estimates of charging demand and grid upgrades.
P2.1	Identify the current and emergent needs of the electric grid and where feasible, determine the potential benefits from managed electric vehicle charging	Utility programs, procurements, and tariffs could be served by the use of EVs as distributed energy and demand response resources, but requirements between utilities and service providers or participants may prevent robust participation in multiple markets.
P2.2		Some of the reliability needs of Balancing Authorities could be met by the use of EVs as distributed energy and demand response resources, but uncertain market size and pricing dampens market participant interest.
P3.1	Align stakeholders' interests in robust	The wide variety of terms to qualify charging technologies into different state, local, and utility charging or EV-related programs have fragmented equipment design and can inhibit the benefits of economies-of-scale production for charging equipment.

P3.2	Align stakeholders' interests in robust open markets for smart infrastructure investment	The traditional "rate of return" regulatory designs may cause utilities to underestimate the grid impact mitigation potential from smart charging infrastructure and grid upgrade planning methodologies may need to be updated. Regulatory changes that accommodate and encourage third party aggregation of charging may be needed.
P4	Future-proof infrastructure	Need to mandate policy that all publicly-funded EV charging infrastructure should be based on open technical and payment standards to remove the risk of stranded assets and allow ease of customer access.