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VGI Roadmap input - Grid Democracy

Additional submitted attachment is included below.

Grid
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September 21, 2018

California Energy Commission
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RE: Comments of Grid Democracy on VGI Roadmap

Grid Democracy would like to thank the CEC and related state agencies for the opportunity to provide input to the VGI Roadmap update process.

It is critical that the state agencies work closely in developing the roadmap and the actions to come out of it. In order to achieve the California State objectives of decarbonization and electrification, changes across policy, regulatory frameworks and the state's IOUs, POUs and CCAs will be required. Further, actively involving the vehicle manufacturers, EVSE manufacturers, and emerging grid operators, micro-grid operators and aggregators with very clear goals and data/integration requirements is needed.

Please see comments in the embedded table which follows.

Regards,

Rick Kubin

Number (G.P/I.A) E=Economic; C=Customer; T=Technical; P=Policy	Goal	Problem/Issue	Grid Democracy Comment /Feedback
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.	Smart Chargers that conform to ISO 15118 should be a requirement for all new installations.
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.	Utilization of EVs as battery/source available to grid operators/aggregators should be included.
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.	There is additional potential value to customers from access to their EV batteries for grid smoothing beyond DR.

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, howeve 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.	The current regulatory framwework and division particularly between IOUs and CCAs limits innovation and seamless integration. CCAs are increasingly acquiring the customer interaction, while IOUs continue to be required to support billing and distribution infrastructure. This inhibits integration and economic motivation.
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.	
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.	
E3.1	Reduce cost of electrification by measuring how emerging opportunities can utilize vehicle-grid integration technologies	Autonomous, Connected, Electric, Shared (ACES) vehicles have unverified impacts on future electricity demand, traffic flow, and greenhouse ga emissions.	

E3.2		Electrification and charging infrastructure operations can positively impact the development of sustainable communities and smart cities, but viable models are unproven or developing.	Need to support "sandbox" environments for testing new models and technologies. Emphasis on open standards and interoperability is key.
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.	Need to work closely with the IOUs and POUs to determine optimal locations to support large scale charging infrastructure.
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.	Policies should promote combined deployment of PV, stationary battery storage and EV charging in all communities. CARB LCFS programs along with CEC/CPUC programs should provide aligned incentives.
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.	Mandating Smart Chargers with the requisite capabilities, along with requiring LSEs to provide real-time rate and incentives will help.
C2.2		All makes of PEVs and charging equipment are not interoperable.	The state should mandate interoperability and data exchange standards.

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.	New technologies such as blockchain/DLT for vehicles, charging stations and payment systems should be a focus.
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.	
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.	Support for behind the meter integrated PV, stationary battery storage and EV charging should be established. This could incent property owners, investors while alleviating utility grid loads.
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.	Require report outs with consitent data for any programs receiving public funds.

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.	Support for new technologies such as blockchain/DLT should be promoted. Providing sandbox environments for rapid prototyping and interoperability testing should be a priority.
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.	
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.	Sufficient metering capabilities need to be required within all charging stations. EVSE operators should be required to provide data access to approved parties.

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.	Support for new technologies such as blockchain/DLT, AI/Machine Learning should be promoted. Providing sandbox environments for rapid prototyping and interoperability testing should be a priority.
T3.1.1	Develop advanced battery and charging technologies	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.	Need to identify and require data from vehicles, EVSE, grid operators that can support thedvanced analytics and ML in order to understand and optimize.
T3.3.1		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.	
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.	Need to require consistent information and data access for all parties. This should be a requirement to receive public funding. Need to establish sandbox environments for rapid prototyping and testing.
T5.1.1*	Identify scenarios and cos targets for future technology research and development	State agencies and stakeholder need a focused roadmap to direct VGI technology development, specified with technology metrics and informed by industry product roadmaps.	Data and interconnect standards need to be a priority. Technology roadmap objectives/milestones need to be clearly defined as to what outputs are required to satisfy.

P1.1	Frame the interactions between policy 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.	The interactions between the objectives and timelines of state transportation electrification and vehicle-grid integration policies and programs are unclear.	
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		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		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)	Policies should promote combined deployment of PV, stationary battery storage and EV charging in all communities. CARB LCFS programs along with CEC/CPUC programs should provide aligned incentives.
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.	Policies should promote combined deployment of PV, stationary battery storage and EV charging in all communities. CARB LCFS programs along with CEC/CPUC programs should provide aligned incentives.
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.	The current regulatory framwework and division particularly between IOUs and CCAs limits innovation and seamless integration. CCAs are increasingly acquiring the customer interaction, while IOUs continue to be required to support billing and distribution infrastructure. This inhibits

			integration and economic motivation.
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 open markets for smart infrastructure investment	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		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.	