DOCKETED	
Docket Number:	18-MISC-04
Project Title:	Vehicle Grid Integration Roadmap Update
TN #:	224780
Document Title:	CalETC Preliminary Comments on VGI Roadmap Update Webinar Attachment 1
Description:	N/A
Filer:	System
Organization:	Hannah Goldsmith/CalETC
Submitter Role:	Public
Submission Date:	9/21/2018 9:28:41 PM
Docketed Date:	9/24/2018

Comment Received From: Hannah Goldsmith
Submitted On: 9/21/2018
Docket Number: 18-MISC-04

CalETC Preliminary Comments on VGI Roadmap Update Webinar Attachment 1

Attachment 1

Additional submitted attachment is included below.

Number (G.P/I.A) E=Economic; C=Customer; T=Technical; P=Policy	Goal	CalETC Comments	Problem/Issue	CalETC Comments	
E1.1	Estimate the economic potential for Vehicle-Grid Integration under medium (2030) and long term (2050) scenarios.	We believe that VGI is potentially an important factor for mass EV adoption. Given California's ambitious goal of reaching 5 million zero-emission vehicles by 2030, we recommend that the VGI Roadmap focuses the assessment of economic potential on that period. If time and resources allow, the assessment of economic potential can be extended to 2050. We recommend that both costs and benefits be accounted for in the assessment of economic potential. Furthermore, we strongly recommends that the economic assessment cover a collectively exhaustive list of the various use-cases of VGI, consistent with the recommendations from the 2014 VGI Roadmap. This includes, but is not limited to, the costs and benefits of VGI associated with all: - User sectors: residential, commercial (i.e. fleet, workplace, and public), and ride-share; - Types (Managed): V1G (including TOU), and V2G including V2B; - Applications: customer load management, distribution and transmission reliability services, wholesale energy and resource adequacy services. Here, we recommend that the VGI applications be framed and catergorized based on CPUC's ongoing effort addressing Multi Use Applications (MUA) for battery storage. For a full list of these applications, we refer to "Table 1: CPUC's MUA Decision's List of Domains and Services" on page 3 of Appendix A; Multiple-Use Applications for Energy Storage: Final Working Group Report (R.15-03-011). - Control approaches: indirect control (e.g. price signaling), direct control (e.g. dispatching); - Grid-to-EV communication pathways; - Vehicle classes: LDV, MDV, and HDV, including non-road classes; - Charging levels: AC (L1 and L2) and DC; and, as appropriate, the kW level (e.g. 6.6, 10 or 19 kW for L2, and 50, 125 or 350 KW for DC). Finally, we note that the VGI use-case solutions should include options for achieving VGI beyond smart-charging or V2G; e.g., publishing TOU rates, demand charges, earning LCFS TOU credits, creating rebates or other incentives to encourage certain technologies or protocols. Therefore, we recommend that this goal be updated to: "Assess and quantify the costs and benefits for the various Vehicle-Grid Integration use-cases under short- (2022), medium- (2025), and long-term (2030) 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.	We agree that the charging-load shapes of EVs may become increasingly important for effective resouce planning. However, the problem is not the lack of action on integration of EV load shapes but rather the scarcity and/or limited sharing of available data, as well as the uncertainty around what those load shapes (both managed and unmanaged charging) will look like and how important they will be to overall load planning. Realistic and statistically relevant assessments of EV charging profiles is limited and is still in early stages. For example, utilities currently use very limited data on EVs charging on isolated meters; some researchers have published publicly-available studies on ideal load shapes; and the few broad real-data assessments are relatively outdated. The limited availability of load data is an issue especially in the MD/HD sector. Therefore, we recommend rephrasing this problem/issue to: "Scarcity, uncertainty, and/or limited sharing of data on the electric vehicle charging load shapes (system wide and disaggregated), which are needed for effective utility resource planning."	
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.	We suggest adding more clarity around the definition and specifics of the "supply push," and we note the need to analyze demand as well. In addition, the information provided by suppliers and consumers will likely help inform both the costs as well as the benefits of VGI. Therefore, we suggest that this problem/issue be rephrased as: "Difficulty of finding, tracking, and synthesizing market supply data and implementation concerns from solution providers (e.g., automakers, equipment manufacturers, electric vehicle service providers, aggregators, and infrastructure installers) as well as data on projected demand, all of which is needed to effectively forecast smart-charging and quantify VGI costs and benefits."	
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.	We agree that there is a need to quantify the value (both costs and benefits) associated with the various VGI use-cases, as well as how that value is distributed and captured by the various parties. For clarity, we recommend that this issue be split into two distinct issues: (1) "There is limited information on the value of the various VGI use-cases, each of which can be defined along multiple dimensions, including but not limited to: - User sectors: residential, commercial (e.g., fleet, workplace, and public), and ride-share; - Types (managed): V1G, and V2G including V2B; - Applications: customer load management, distribution and transmission reliability services, wholesale energy and resource adequacy services; - Control approaches: indirect control (price signaling), direct control (dispatching); - Vehicle classes: LDV, MDV, and HDV, including non-road classes; - Grid-to-EV communication pathways; - Charging types: AC (L1 and L2) and DC; and in some cases the kW level such as 6.6, 10 or 19 kW for level 2, and 50, 125 and 350 kW for DC; - Other VGI solutions: such as design of incentives and policies (e.g. charging station requirements and rebates, storage mandate credits, demand charge design, TOU rate design). " (2) "There is limited information on how the value of each VGI use-case is distributed among and captured by the various parties, including the participant, ratepayer-at-large, utility, service-provider, OEM, society, etc." Some examples of detailed questions that this Problem/Issue should also address include (but are not limited to): - What is the benefit and cost to the vehicle OEM to put bi-directional inverters on their vehicles? - What is the benefit and cost to the OEM to put a VGI communication protocol on their vehicles? - What are the different domains and what services are needed for each? - What are the type of benefits: competitive service, non-competitive service, policy change, behind-the meter investment/program, non-monetized benefit, etc.? Some of the work around defining concrete benefit items was initiated within the Interagecy VGI Communication Protocol Working Group benefits framework. - How to incorporate the value of the new LCFS TOU credits in each charging market segment?	
				Add a problem/issue here: We believe that in order to understand the economic potential of VGI, baseline scenarios for the different types of EVs and sectors of charging need to be understood. In other words, how big is the problem to be solved? This can help better identify high potential TE charging market segments for grid impacts if unmitigated in a macro sense (e.g. 2030 or 2050 large scale adoption of a type of EV) and in a micro sense (benefits per individual EV type) and should help us find high value market segments to target for VGI solutions (e.g., fleets with one-shift operations).	
				Add a problem/issue here: We believe that as a a first step in estimating the economic potential of VGI, that a common framework and common language must be used. The VGIWG made great progress on a glossary and also combined over 10 different VGI frameworks into a single consolidated framework that sought to categorize VGI solutions into who needs the benefit, what is the need, what meets the need and how is the need met and measured. See attachment 3 to our letter. However, since that time other frameworks have been published (e.g., the CPUC Storage Multi-Use Applications), and it is likely others have too. We recommend an updated glossary and VGI benefits framework be developed so that stakeholders can use a common,precise, nomenclature.	
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.	We agree that there is a need to clarify the methodology (or methodolodies) used to valuate VGI costs and benefits, and to ensure that this methodology is used and applied consistently. In addition, we believe that VGI valuation methodologies should be consistent and easily integratable with existing efforts on valuation methods of other DERs. Accordingly, we recommend rephrasing the issue as follows: "Lack of clarity and consistency on the proper valuation methodologies for VGI costs and benefits, and lack of guidance on whether and how VGI valuation methodologies can be consistent with those of other DERs."	

E2.1	Identify promising business models for self-sustaining private development of infrastructure and markets for VGI	See comment above.	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.	We make two comments here. First, it is not clear what "seamless grid integration of mobile resouces" refers to specifically, or how it can be characterized. Second, the integration of mobile resources is a challenge that extends beyond the utilities' service territoties in California, and even beyond the state's borders, which makes it hard to address in this VGI Roadmap Update. Does the CEC staff have evidence that supports the statement that "different rate structures ... may hinder the interoperability of PEVs..."? Therefore, we do not support the current phrasing of this Problem/Issue. Instead, we recommend focusing the scope of this Issue, and rephrasing as follows: "Limited availability of viable business models that enable the integration of grid availability and needs with vehicle charging schedules."	
E2.2			Limited aggregation models available to third-parties across the load serving entities (IOU, CCE [should be CCA], POUs) have inhibited the scale-up of managed charging.	There is a need to further understand what "aggregation" means here, and what the purpose / intent from developing additional models is. If this comment is targeted towards CAISO participation, we disagree that the model is limited. Efforts are underway to expand DR aggregation model (PDR) to be more accommodating and to provide most, if not all, of CAISO's services. In addition, it's unlikely that variation "across load serving entitites" is the primary inhibitor for managed charging at scale; is there an evidence to support this claim?	
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.	We agree that this is an important issue to address. In addition, there is a need to understand how "unbundling" may affect VGI hardware and software, and how it can tie to and be consistent with "unbundling" for other DERs.	
E2.4				Add problem/issue: "Lack of clear and effective market mechanisms to incentivize coordinated charging behavior at the local level, which can reduce the risk of concurrent charging and therefore the risk of overloaded distribution infrastructure."	
				Add a new row - While stakeholders agree on the need to move faster on VGI solutions, the most promising uses cases for large-scale demonstrations are not clear.	
E3.1	Reduce cost of electrification by measuring how emerging opportunities can utilize vehicle-grid integration technologies	For clarity, we recommend rephrasing this goal to: "Assess the effect of VGI in emerging opportunities on the economics of electrified transportation."	Autonomous, Connected, Electric, Shared (ACES) vehicles have unverified impacts on future electricity demand, traffic flow, and greenhouse gas emissions.	"Traffic flow" is likely out-of-scope for this VGI Roadmap. Therefore, for clarity, we recommend rephrasing this problem/issue to: "Autonomous, Connected, Electric, Shared (ACES) vehicles have unverified impacts on future electricity demand and greenhouse gas 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.	While we broadly agree that VGI may positively contribute to smart cities, it might be very challenging to untangle the economic effect of VGI specifically, especially in the near- and medium-terms. Therefore, to maintain focus, we consider this topic out-of-scope for this VGI Roadmap, and recommend removing this Issue/Problem.	
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.	We recommend relabelling this Problem / Issue to T.6.1, and including it under a separate Goal T.6 "Quantify the grid impacts."	
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.	Accounting for the environmental and air quality impacts of power plant operations in disadvantaged communities (DACs) is a focus of the Integrated Resource Plan (IRP) proceeding, including how those impacts are influenced by demand-side resources such as managed EV charging. Some limited modeling has occurred already by the CPUC and CPUC jurisdictional LSEs to forecast criteria pollutant emissions in DACs. We agree that additional modeling of managed charging may be beneficial to assess the impacts of expanding charging infrastructure near low-income and disadvantaged communities, as well as for all communities. However, we caution against the assumption that manged charging automatically impacts local air quality, since the impact of managed charging on power plant dispatch through CAISO is often uncertain (local load reduction does not necessarily reduce local power plant emissions). We also note the importance of accounting for the pollutant reduction for a disadvantaged community associated with avoided transportation sector emissions, and we suggest the goal be revised to take this into account all VGI solutions, not just "managed charging."	
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.	We note that, beyond EV-specific Time of Use (TOU) rates and VGI pilots that are limited in scope, few smart-charging programs are currently available for the public. As smart-charging programs expand, this issue might get automatically resolved. Therefore, we suggest that this issue focuses on the need for expanding smart-charging programs rather than on the reporting associated with these programs.	
C2.1	Enhance the consumer experience.	We note the need to further refine and focus the scope of this goal (e.g. clarify what aspects of the customer experience are included). We believe that addressing consumer experience issues such as charging access, payment options, accuracy, and labeling requirements are out of scope of this Update, but such issues could be tracked and monitored to understand cost implications. As related to VGI consumer experience issues, the challenge is more related to how to qualify the benefits and educate consumers.For example, what are the costs and what are the offsets in return on investment, subsidies, incentives, etc. needed?	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.	We recommend rephrasing this Problem/Issue to: "Consumers do not always have access to, are not always aware of, or may not understand important VGI-related information, such as optimal times for charging and managed charging methods, incentives, and utility bill savings."	
C2.2			All makes of PEVs and charging equipment are not interoperable.	It would be useful to clarify the definiton of "interoperability," in order to focus the scope and more effectively address this Problem/Issue. For example, interoperability can be for charging connectors, charging networks, for back-office billing, or for site hosts. See VGIWG glossary.	
C2.4				Add problem/issue: "Challenges related to interconnection may slow down or discourage the deployment and adoption of VGI technologies and capabilities."	
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.	We believe that this Problem/Issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore, we recommend removing from this VGI Roadmap. This topic is better addressed through efforts and initiatives focused on the broader topic of EV adoption, including for example the ZEV Action Plan.	

C3.1	Increase the potential number of and readiness of future EVSE site hosts.	Depending on the situation, increasing the number of sites may not always be necessary or needed.Therefore, for clarity, we recommend rephrasing this goal to: "Optimize the potential number and allocation of future EVSE sites." More broadly, this goal does not seem to be directly related to VGI. For example, it is likely a more appropriate topic for the proceedings at the CPUC on IOU infrastructure or incentive programs like the CEC's CALeVIP.	Standardized "make ready" infrastructure plans are not part of new construction and not all customers are aware of the possibility of EVSE integration.	We believe that this Problem/Issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI.We recommend removing G28 this VGI Roadmap. This topic is better addressed through efforts and initiatives focused on the broader topic of EV adoption, including for example the ZEV Action Plan. In addition, the green building code partially addresses this issue.	
C3.2			EVSE integration can be challenging and cost-prohibitive at existing buildings.	We believe that this Problem/Issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore,we recommend removing this from the VGI Roadmap. This topic is better addressed through efforts and initiatives focused on the broader topic of EV adoption, including for example the ZEV Action Plan.	
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.	We believe that this Problem/Issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore,we recommend removing from this VGI Roadmap. This topic is better addressed through efforts and initiatives focused on the broader topic of EV adoption, including for example the ZEV Action Plan. In addition, efforts within the California's Governor Office of Business and Economic Development (GO-Biz) are addressing this issue within the charging station guidebook process.	
C3.4			Dense deployment of EVSE in specific locations can be challenging for utilities to integrate with the electric grid.	Dense deployments of EVSE are not always manageable load, yet are still worthwhile because EVs bring large environmental and societal benefits. For example, electrification of the ports has been very worthwhile from an environmental and DAC perspective, but this required substational upgrades to the grid (e.g., new substations). Due to the demanding use cases, very little VGI could be done, yet this electrification was very important. However, in other examples, VGI solutions may be relevant to the management of the load.	
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.	We believe that this Problem/Issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore, we recommend removing from this VGI Roadmap. This topic is better addressed through efforts and initiatives focused on the broader topic of EV adoption, including for example the ZEV Action Plan.	
T1.1.1	Improve cybersecurity	We agree with this goal, and emphasize its importance. To add more clarity, we suggest rephrasing this goal to: "Ensure proper cybersecurity measures along the full chain of VGI assets."	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.	We agree with and emphasize the importance of this Problem/Issue. Recommend statement be broad enough to include all communication options, e.g., telematics.	
T2.1.1	Advance communication and hardware technology standardization and interoperability	We believe that the goals related to VGI communication hardware, software, standards, and solutions should be consistent with and based on the findings of the Interagecy VGI Communication Protocol Working Group, as documented and made publicly available in the draft final report.Similarly, we believe that advancing interoperability should be consistent with current regulatory efforts in that domain, including CARB's rulemaking on SB 454. Therefore, we recommend rephrasing this goal to: "Advance VGI communications and interoperability hardware, software, standards, and solutions based on and consistent with previous and ongoing interagency efforts."	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.	Reiterating the need to clearly define "interoperability," we agree that interoperability capabilities are needed to unlock the full potential of VGI. Instead of limiting this need to select vehicle classes and charging types, we recommend rephrasing this Problem/Issue to: "Interoperability capabilities are needed, yet are not fully developed across the various vehicle classes and charging types." The Assigned Actions can then propose how to categorize and prioritize the interoperability capabilities and need for the different vehicle classes and charging types, at the subsequent stages of this Roadmap process.	
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.	We note that this statement may be inconsistent with the findings of the Interagecy VGI Communication Protocol Working Group, whose draft final report states that "there is not one best path to communicate between the PFE and the EV that should be required at this time." That said, we believe that communication standards and solutions continue to be an important topic for the future of VGI. We recommend rephrasing this Problem/Issue into two distinct Issues: (1) "The lack of concrete next-steps, including large-scale programs and demos, to evaluate the applicability and favorability of VGI communication standards and solutions, especially those short-listed in the Interagecy VGI Communication Protocol Working Group draft final report." (2) "The lack of industry consensus on whether and when uniform VGI communication standards and/or solutions are needed, for different vehicle classes and charging types."	
				Add problem / use: "Need for large-scale demonstrations to better understand / validate the various promising VGI uses-cases, their net value, and implementation issues."	
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.	This Problem/Issue statement may not hold true in every scenario. In some service territories, EV drivers may be eligible for residential EV TOU rates that cover their full energy consumption at home, therefore not requiring a separate meter for EV charging. Therefore, we recommend rephrasing this Problem/Issue to: "Some EV customers may be unaware of or unable to participate in charging-specific tariffs and/or monetary compensation programs, and knowledge about the availability of integrated low-cost metering and communication solutions is incomplete."	
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.	As a DER, to fulfill a grid need, the PEV and/or EVSE need to be able to respond to a control/dispatch signal, which could be issued by the grid operator directly or through an indepdent EVSP/aggregator. While the technical feasibility of these solutions continue to be successfully demonstrated through pilots, the regulatory frameworks and business cases may not be mature yet. Therefore, we believe that this issue is less "Technical" and more "Economic" / "Policy" related. In that regard, it is unclear whether direct communication to the charger and/or EV is needed, or whether an architecture that relies more on cloud-based communication can be used instead. In addition, the Roadmap should consider all appropriate options for achieving the desired outcome of grid integration, not only communication and control options.	
T3.1.1	Develop advanced battery and charging technologies	We recommend clarifying what "advanced" means for charging technologies. In addition, we recommend striking the battery portion of the goal as this issue is more appropriately addressed in other venues, such as via DOE, SDOs, and OEM/industry stakeholder technology roadmaps. We view battery advancement as being focused on reducing cost and increasing range.	Manufacturers of solutions for MD/HD EVs need to accommodate high-voltage battery and charging systems to meet applicable vocational duty cycles.	This is a product development technical requirement. We are not sure this is necessarily an issue that would be relevant to VGI.	
T3.2.1			Users need to understand the relationships between battery life, range, operations and their overall impact on total cost of ownership.	We believe that this Problem/Issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore,we recommend removing from this VGI Roadmap. This topic is better addressed through efforts and initiatives focused on the broader topic of EV adoption, including for example the ZEV Action Plan.	
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.	We recommend relabelling this Problem / Issue to T.6.2, and including it under a separate Goal T.6 "Quantify the grid impacts"	

				Add problem / issue: "Improvement in charging technologies (AC and DC) are needed to futher reduce impact on the grid and improve customer experience (e.g., power sharing, power sequencing and similar technologies)."	
T3.4.1				Add problem/issue: "Onboard inverters for V2G are not able to get UL certification, which is normally required by utilities and Rule 21. More broadly, regulatory barriers to V2G- and V2H-enabling technologies may prevent widespread use, limiting their usefulness to the grid and society at large."	
T4.1.1	Improve technology transfer between stakeholders	We note the need to includea voluntary data / information sharing between stakeholders as part of this goal. We recommend a collaborative, on-going effort with other related CEC and CPUC proceedings, and stakeholders including researchers; local government, air district, and utility charging infrastructure program administrators; vehicle manufacturers, and others to share data and learnings about charging-infrastructure programs. This is also included in our letter. This was a primary focus of the EPIC 3 PD just released, so we also recommend working with/learning from the efforts to improve EPIC coordination and dissemination.	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.	We recommend rephrasing this Problem/Issue to: "Technology and knowledge transfer between local, state, and federal stakeholders, including regulatory agencies, auto OEMs, charging technology providers, and utilities, is not yet occurring at a comprehensive scope or frequently enough to rapidly advance VGI deployment."	
T5.1.1*	Identify scenarios and cost targets for future technology research and development	We note that the targets need not be limited to "cost" targets. Therefore, we recommend rephrasing this Goal to: "Identify scenarios and 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.	There is a need to further understand what "technology metrics" means here. This Problem/Issue statement may also need to define the desired outcome.	
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.	We recommend distinguishing between two distinct and important goals here: (1) "Identify, frame, and coordinate potential interactions, and resolve potential overlaps or conflicts, between the various state agencies and bodies on VGI-related policies, legislation, regulations, and programs." (2) "Ensure all stakeholders are aware of, and have the opportunity to access and engage on, mandated VGI-related policies, regulations, and programs."	The interactions between the objectives and timelines of state transportation electrification and vehicle-grid integration policies and programs are unclear.	We recommend distinguishing between two types of interactions, both of which are consequential to the progress of VGI: (1) interaction between the state's goals and objectives for transportation-electrification on one hand and vehicle-grid integration on the other hand; (2) interactions between VGI-related policies, legislations, regulations, and programs among the various state agencies. To add clarity, we recommend rephrasing this Problem/Issue to: "Need to identify, clarify, and frame potential interactions, including any potential overlaps and conflicts, between the state's goals and objectives for transportation-electrification on one hand and vehicle-grid integration on the other hand."	
P1.6				Add problem/issue: "Need to identify, clarify, and frame potential interactions, including any potential overlaps and conflicts, between VGI-related and consumer-experience related policies, legislation, regulations, and programs among the various state agencies." We suggest including "consumer-experience related" policies in addition to "VGI-related" policies because we are concerned about the addition of up-front and operating costs to charging stations by the many different agency rulemakings or requirements to recieve public funding, and the effects these policies will have on the market when considered holistically.	
P1.2			Agencies or stakeholders may unknowingly develop policies, business processes, and market initiatives concerning EVs that counteract or contradict VGI resource certification efforts.	It is unclear what "VGI resouce certification efforts" refers to specifically. We recommend rephrasing this Problem/Issue to: "Agencies or stakeholders may unknowingly develop contradictory or conflicting policies, business processes, and/or market initiatives related to VGI"	
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.	We note that "certainty" should refer to the outcome to be achieved, not the method to get there. While we broadly agrre with this Problem/Issue statement, we note the importance of being consistent with the outcome of the Interagecy VGI Communication Protocol Working Group in terms of what is needed and appropriate at this time for charging infrastructure to facilitate VGI. Additional R&D, understanding of net value, and large scale demonstrations are needed to determine what the best solutions are.	
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)	Generally, we support better agency and stakeholder coordination. That said, this Problem/Issue may have already been addressed in P1.1 and P1.6.	
				Add a problem / issue: "Need to better understand the potential for CAISO market services to be saturated by non-EV resources and/or providers."	
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.	We note that another challenge associated with the local and individual efforts is related to predictability. Lack of certainty around the timeline and specifics of some local and individual programs make their impacts hard to predict. Therefore, we recommend rephrasing this Problem/Issue to: "Impacts of some concentrated local and individual efforts related to smart EV charging (e.g. ZNE homes codes for EV and DR capability, Local Climate Action Planning, Fleet Procurements, Low-Income and Disadvantaged Community programs) may not be readily transparent or predictable, which increases the difficulty and uncertainty of forecasting and estimating 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	Identifying current and emergent grid needs go well beyond the scope of VGI. Therefore, we recommend clarifying and and focusing this goal, to address how current policy-related activities can enable VGI solutions and EVs as a grid resource. Therefore, we recommend rephrasing this goal to: "Continue to develop policy and regulatory frameworks that can further enable EVs as a grid resource, in coordination with similar efforts on other DERs."	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.	We agree that EVs have the potential to offer several grid services as a DER. The issue in that regard is less related to "requirements between utilities and service providers or participants" and more related to the suitability of existing regulatory and market mechanisms to properly (1) incorporate, (2) track and account for, and (3) value, and (4) cost-effectively offer these services, both individually and collectively. Therefore, we recommend rephrasing this Problem/Issue to: "Current regulatory and market mechanisms, especially those govenring DR and DER programs, require improvements to incorpoate, account for, and/or value the full spectrum of grid services that can be offered by EVs through VGI, both individually and in-combination."	
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.	This Problem / Issue is addressed in our comment on P2.1, as well in earlier comments on E1. We recommend deleting P.2.2.	
P3.1			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.	We recommend rephrasing this Problem/Issue to: "The wide variety of terms used to describe charging technologies in different state, local, and utility charging or EV-related policies and programs can lead to confusion among stakeholders and may impact the ability to advance this market." We also recommend that this VGI Roadmap utilize, and update if necessary, the glossary of terms developed during the Interagecy VGI Communication Protocol Working Group. That said, it is unclear whether there is an evidence to support the assertion on "fragmented equipment design or an inhibition of the benefits of economies-of-scale production for charging equipment."	
P3.2	Align stakeholders' interests in robust open markets for smart infrastructure investment	We recommend rephrasing this goal to: "Align stakeholders' interests through robust market mechanisms and coordinated policy and regulatory efforts, to facilitate 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.	We disagree with this statement. The assertion that "the traditional 'rate of return' regulatory designs may cause utilities to underestimate the grid impact mitigation potential for smart charging" is inaccurate. As the record in the existing CPUC DRP, IDER, and EV proceedings indicates, current ratemaking for grid upgrades necessary to serve interconnected DER loads, including EVs, include and support procurement of distribution deferral services from DERs and support for time-variant rate designs to incent off-peak charging by EVs. We have also supported policy reforms such as the new LCFS smart charging credits and others.	