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Pacific Gas and Electric Company comments on Vehicle Grid Integration Roadmap Update

Additional submitted attachment is included below.

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September 21, 2018

California Energy Commission
Docket Office, MS-4
1516 Ninth Street
Sacramento, CA 95814
Docket No: 18-MISC-04
Project Title: Vehicle Grid Integration Roadmap Update

Submitted via online docket

RE: Staff Webinar on the California Vehicle-Grid Integration Roadmap Update

Pacific Gas and Electric Company (PG&E) appreciates the opportunity to provide feedback on the California Energy Commission's (CEC's) Staff Webinar on the California Vehicle-Grid Integration (VGI) Roadmap Update.

In addition to our attached detailed comments on the California Vehicle-Grid Integration Roadmap Matrix of Goals and Problems/Issues (Attachment 1), we submit for your consideration the following brief higher-level comments on the VGI Roadmap Update:

- We support the emphasis on determining the value of VGI benefits and costs.
- We recommend the VGI Roadmap Update encompass all aspects and use-cases of EV integration with the grid. Particularly, we request that residential charging be included, and not de-emphasized, in this VGI Roadmap Update.
- We support the CEC's stated objectives to (1) prioritize actions to overcome barriers to advancing VGI and (2) leverage agency and stakeholder relationships.
- We support the emphasis on cybersecurity for the VGI Roadmap Update.
- We recommend the CEC release the Oct. 29-30 Workshop Discussion Document at least two weeks before the Workshop, so that all stakeholders have sufficient time to review and prepare.

Thank you for your consideration of our comments.

Sincerely,

Stephanie Greene
Director, Clean Transportation
Pacific Gas and Electric Company

Attachment 1: PG&E Comments on Vehicle Grid Integration Roadmap Update, Matrix of Goals and Issues

09/21/2018

PG&E Comments on Vehicle Grid Integration Roadmap Update, Matrix of Goals and Issues

	Goal	PG&E Comments on Goal	Problem/Issue	PG&E Comments on Problem/Issue
E1.1	Estimate the economic potential for Vehicle-Grid Integration under medium (2030) and long term (2050) scenarios.	PG&E believes that VGI is potentially an important factor for mass EV adoption. Given California's ambitious goal of reaching 5 million zero-emission vehicles (ZEV) by 2030, we recommend that this VGI Roadmap focuses the assessment of economic and market potential on that more near-term period. If time and resources allow, the assessment of economic potential can be extended to 2050. In addition, PG&E strongly recommends that both costs and benefits be accounted for in the assessment of economic potential. Furthermore, PG&E 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: V1G, and V2G including V2B - Applications: customer load management, distribution and transmission reliability services, wholesale energy and resource adequacy services. Here, PG&E recommends that the VGI applications be framed and categorized 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). - Approaches: indirect control (price signaling), direct control (dispatching) - Vehicle classes: LDV, MDV, and HDV, including non-road classes - Charging types: AC (L1 and L2) and DC 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.	PG&E agrees that the charging load shapes of EVs may become increasingly important for effective resource planning, but the extent of importance is yet undetermined. The problem is not the lack of action on integration of EV load shapes but rather the scarcity of available data and uncertainty around what those load shapes 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 stage. For example, utilities currently use very limited data on EV's 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. This lack of load data is a significant issue, especially in the MD/HD sector. Therefore, we recommend rephrasing this problem/issue to: "Data scarcity and uncertainty around 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.	PG&E suggests 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, PG&E suggests that this problem/issue be rephrased as: "Difficulty of finding, tracking, and synthesizing market supply data 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.	PG&E agrees 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 (i.e. fleet, workplace, and public), and ride-share - Types: V1G, and V2G including V2B - Applications: customer load management, distribution and transmission reliability services, wholesale energy and resource adequacy services - Approaches: indirect control (price signaling), direct control (dispatching) - Vehicle classes, MDV, and HDV, including non-road classes - Charging types: AC (L1 and L2) and DC" (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."
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.	PG&E agrees that there is a need to clarify the methodology (or methodologies) used to valuate VGI costs and benefits, and to ensure that this methodology is used and applied consistently. In addition, PG&E believes that VGI valuation methodologies should be consistent and easily integratable with existing efforts on valuation methods of other DERs. Accordingly, PG&E recommends rephrasing the issue as follows: "Lack of clarity and consistency on the proper valuation methodologies for VGI costs and benefits, and lack of guidance to ensure that VGI valuation methodologies are consistent with those of other DERs."

PG&E Comments on Vehicle Grid Integration Roadmap Update, Matrix of Goals and Issues

	Goal	PG&E Comments on Goal	Problem/Issue	PG&E Comments on Problem/Issue
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.	PG&E makes two comments here. First, it is not clear what "seamless grid integration of mobile resources" refers to specifically, or how it can be characterized. Second, the integration of mobile resources is a challenge that extends beyond the utilities' service territories in California, and even beyond the State's borders, which makes it hard to address in this VGI Roadmap. Does the CEC staff have evidence that supports the statement that "different rate structures … may hinder the interoperability of PEVs…"? Therefore, PG&E does not support the current phrasing of this problem/issue. Instead, PG&E recommends 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, 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, PG&E disagrees 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 entities" 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.	PG&E agrees that this is an important issue to address. In addition, there is a need to understand how "unbundling" charging devices from charging services may affect VGI hardware and software.
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 PG&E broadly agrees that it is useful to evaluate whether 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, PG&E considers this topic out-of-scope for this VGI Roadmap, and recommends removing this problem/issue.
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 relabeling this problem/issue to T.6.1, and including it under a separate Goal T.6 "Quantify the grid impacts."

PG&E Comments on Vehicle Grid Integration Roadmap Update, Matrix of Goals and Issues

	Goal	PG&E Comments on Goal	Problem/Issue	PG&E Comments on Problem/Issue
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.	PG&E disagrees. 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. PG&E agrees that additional modeling of managed charging may be beneficial to assess the impacts of expanding charging infrastructure near low-income and disadvantaged communities. However, we caution against the assumption that managed 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.
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.	PG&E notes 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, PG&E suggests 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.		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.	While broadly expressing a reasonable concern related to EV adoption, it is not clear how this problem/issue statement is directly related to VGI.
C2.2			All makes of PEVs and charging equipment are not interoperable.	It would be useful to clarify the definition of "interoperability", in order to focus the scope and more effectively address this problem/issue.
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.	PG&E believes that this problem/issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore, PG&E considers this problem/issue out-of-scope for and recommends 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, PG&E recommends rephrasing this goal to: "Optimize the potential number and allocation of future EVSE sites."	Standardized "make ready" infrastructure plans are not part of new construction and not all customers are aware of the possibility of EVSE integration.	PG&E believes that this problem/issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore, PG&E considers this problem/issue out-of-scope for and recommends 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.
C3.2			EVSE integration can be challenging and cost-prohibitive at existing buildings.	PG&E believes that this problem/issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore, PG&E considers this problem/issue out-of-scope for and recommends 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.
C3.3			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.	PG&E believes that this problem/issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore, PG&E considers this problem/issue out-of-scope for and recommends 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.
C3.4			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.	PG&E believes that this problem/issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore, PG&E considers this problem/issue out-of-scope for and recommends 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.

PG&E Comments on Vehicle Grid Integration Roadmap Update, Matrix of Goals and Issues

	Goal	PG&E Comments on Goal	Problem/Issue	PG&E Comments on Problem/Issue
T1.1.1	Improve cybersecurity	PG&E agrees with this goal, and emphasizes its importance. To add more clarity, PG&E suggests 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.	PG&E agrees with and emphasizes the importance of this problem/issue.
T2.1.1	Advance communication and hardware technology standardization and interoperability	PG&E believes that the goals related to VGI communication hardware, software, standards, and solutions should be consistent with and based on the findings of the Interagency VGI Communication Protocol Working Group, as documented and made publicly available in the draft final report. Similarly, PG&E believes that advancing interoperability should be consistent with current regulatory efforts in that domain, including CARB's rulemaking on SB 454. Therefore, PG&E recommends 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.	PG&E agrees that interoperability capabilities are needed to unlock the full potential of VGI. Instead of limiting this need to select vehicle classes and charging types, PG&E recommends 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 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.	PG&E notes that this statement may be inconsistent with the findings of the Interagency 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, PG&E believes that communication standards 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, especially those short-listed in the Interagency VGI Communication Protocol Working Group draft final report." (2) "The lack of industry consensus on whether and when uniform VGI communication standards are needed, for different vehicle classes and charging types."
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.	PG&E notes the importance of "highly accurate metering and communications necessary to provide accurate reporting and settlement." In addition, this problem/issue statement may not hold true in every scenario. In some service territories, some 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.
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 independent 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, PG&E believes 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.

PG&E Comments on Vehicle Grid Integration Roadmap Update, Matrix of Goals and Issues

	Goal	PG&E Comments on Goal	Problem/Issue	PG&E Comments on Problem/Issue
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.	It is unclear what exactly the problem/issue addressed in this statement is.
T3.2.1			Users need to understand the relationships between battery life, range, operations and their overall impact on total cost of ownership.	PG&E believes that this problem/issue, while relevant to the broader topic of transportation electrification and EV adoption, is not directly related to VGI. Therefore, PG&E considers this problem/issue out-of-scope for and recommends 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 relabeling this problem/issue to T.6.2, and including it under a separate Goal T.6 "Quantify the grid impacts."
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.	PG&E recommends 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	PG&E notes 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.	

PG&E Comments on Vehicle Grid Integration Roadmap Update, Matrix of Goals and Issues

	Goal	PG&E Comments on Goal	Problem/Issue	PG&E Comments on Problem/Issue
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.	PG&E recommends 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, legislations, regulations, and programs." (2) "Ensure all stakeholders are aware of, and have the opportunity to access and engage on, 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.	PG&E recommends 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 the problem/issue : “Need to identify, clarify, and frame potential interactions, including any potential overlaps and conflicts, between VGI-related policies, legislations, regulations, and programs among the various state agencies.”
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 resource 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.	
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)	We believe this problem/issue is already addressed in P1.1 and P1.6
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.	PG&E notes 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, PG&E recommends 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."

PG&E Comments on Vehicle Grid Integration Roadmap Update, Matrix of Goals and Issues

	Goal	PG&E Comments on Goal	Problem/Issue	PG&E Comments on Problem/Issue
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 potentially deleting or narrowing this Goal, to address how current policy-related activities are considering how to enable 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 accordance and consistent 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.	PG&E agrees that EVs have the potential to offer 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 commercial ability of existing DERs, including EVs, to cost-effectively provide commercial scale grid services to utilities in compliance with utility reliability and safety standards, particularly where the DERs, including EVs, are used for multiple-purposes by customers behind the meter. Therefore, PG&E recommends rephrasing this problem/issue to: "Current regulatory frameworks, especially those governing DR and DER programs, require improvements to incorporate, 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 therefore recommend deleting P.2.2.
P3.1	Align stakeholders' interests in robust open markets for smart infrastructure investment	PG&E recommends rephrasing this Goal to: "Align stakeholders' interests through robust market mechanisms and coordinated policy and regulatory efforts, to facilitate 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.	It is not clear whether there is evidence to support the validity of this problem/issue .
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.	PG&E disagrees 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.