



# GRIDWORKS

WORKSHOP NOTES

VGI WORKING GROUP

November 14 & 15, 2019 WORKSHOP

*These notes summarize the discussion and comments from the workshop of the Joint Interagency Vehicle-Grid Integration Working Group, which took place at the California Public Utilities Commission in San Francisco on November 14 & 15, 2019. Materials from this meeting are available at the [Gridworks VGI Working Group Landing Page](#).*

## Action Items:

- Gridworks to apply screening adjustments to all screening results based on rules and comments agreed in workshop and diagrammed on white board during workshop wrap-up session (done on 11/19)
- Gridworks to provide online templates for parties to begin to provide “source and baseline materials and for providing policy insights (done on 11/19)
- Gridworks to post scoring templates with all use cases to be scored organized into subsets (done on 11/22)
- Parties to provide first round of “source and baseline materials” for review during WG call, based on white-board brainstorming (done on 11/20)
- Parties to indicate in advance which subsets of screening results they plan to score (requested by 11/27)
- Parties to complete all scoring results (deadline 12/19)
- Parties to develop proposals for methods of “grouping or patterns” (formerly ranking) of scoring results (deadline set on 11/21 call to be 1/17)
- Parties to develop proposals for how to answer PUC Question 1 based on compiled scoring results (deadline set on 11/21 call to be 1/17)
- Gridworks to provide compiled scoring results to parties based on all scoring results submissions (by 12/23)
- Parties to post any policy-relevant insights from screening, scoring, or grouping to OneDrive (deadline set on 11/21 call to be 1/17)
- Gridworks to issue final version of Stage 2 Report based on comments received (by 11/21)
- Gridworks to revise scoring template with new LDV EV Population ranges agreed (done on 11/20)
- Subgroup B hold first call (done on 11/22)

## Working Group Materials:

[One Drive](#)

[Action Items](#)

**Agenda (November 14)**



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<i>Start Time</i>	<i>Duration</i>	<i>Item</i>
10:00	20 Minutes	Introductions, agenda, and objectives of workshop
10:20	20 Minutes	Update on Working Group extension and revised work plan
10:40	45 Minutes	Report on methodology updates and review of draft Stage 2 Report
11:40	20 Minutes	Subgroup B report on use case intake, screening, and scoring
11:40	60 Minutes	Address by Commissioner Rechtschaffen
12:00	60 Minutes	Lunch
1:00	180 Minutes	Screening (Step 3) results review and confirmation
4:00	10 Minutes	Break
4:10	80 Minutes	Pilot scoring process review, insights, and recommendations
<b>Agenda (November 15)</b>		
9:00	60 Minutes	Scoring (Step 4) process design and plan for completing
10:00	120 Minutes	Exercise on ranking and prioritization (Step 5) and design and plan for completing
12:00	30 Minutes	Conclusion, action items, going forward with revised work plan

### Meeting Notes:

#### [Update on Working Group extension and revised work plan](#)

The Working Group extension to June 30 was announced and Gridworks presented an updated work plan that now goes to June 30.

During discussion of the updated work plan PG&E suggested that the Working Group consider if it makes sense to alter the order of PUC Questions 2 and 3 for the consideration of future workshops. The CPUC agreed that this was worth considering how to best structure future discussion in this area for the DER comparison and policy change questions.

- Gridworks scheduled further discussion on this point for the Working Group 11/21 follow-up call

#### [Report on methodology updates and review of draft Stage 2 Report](#)



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PG&E provided an overview of updates made to the Joint IOU Proposal on methodology between Workshop #2 (9/26) and the issuance of the “V2” version (10/11). The “V2” version of the proposal was issued for Working Group comments on 10/17 and comments were received in writing from three parties.

- Toyota questioned how the aggregation of cost/benefits will be identified and worked through in this framework
  - PG&E: Discussion this afternoon on the pilot scoring process will outline how this has been approached so far and what, if any, additional updates may be needed
- PG&E: The IOUs are unlikely to submit another update to the Joint Proposal. PG&E has worked to resolve existing questions and issues that have come up and have them reflected in the current update. Suggested report formatting to reflect these changes would be “IOU proposal” “Documented updates” “IOU approval for these updates” - Primarily outlined in the Stage 2 Report
- CPUC: Comments by parties on the “V2” methodology version that are not directly related to the process of Subgroup B (i.e., screening and scoring) have been noted - These are noted in the slide deck from today (Slide 10), and considered for additional resolution as the Working Group begins to address areas in future stages of the workplan

CalSTART provided an overview of the white paper submitted by CalSTART and others in the additional materials for this workshop:

- A critical need is to determine how vouchers and other forms of market entry will be viewed by MHDV manufacturers. This would also include how the fleet <-> manufacturer needs are being understood.
- Electrify America: Will the impact of aggregation and the consideration of how it happens between MHDV and LDV need to be considered?
  - UCS: Siloing and structure of usage for many of the M/HDV will likely aggregate into more substantial grid impacts than LDV.
- CPUC: Did the survey included in this white paper identify a potential comparison of availability and compliance for the manufacturers?
  - CalSTART: Mostly focused on existing regulatory requirements with the assumption that the manufacturers would meet those requirements.
- PG&E: Process question - Is the objective for the white paper to be read and considered, or for WG participants to comment on content? Any specific recommendations within the paper that may impact the Working Group?
  - CalSTART: No recommendations included in this paper, but those comments would likely be included for the January workshop.
- Honda: Establishing a duty cycle that represents a vocation or class of vehicles would be an exemplary use of time in the future of the Working Group.

**Draft Stage 2 Report Discussion:**



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- Honda: EV population has yet to be defined by the Working Group/Subgroups regarding what would constitute a minimum population for participation.
  - PG&E: Existing ranges in the framework are quite coarse and should consider this part of the conversation as being included
  - SCE: Marketing expenditures to bring in population should be considered
- PG&E: Process suggestion - Update the “Reflected in Updated methodology” column to reflect that the IOUs are unlikely to issue another update to the methodology. Move to 3rd column and then insert a 5th column re: current status as well
  - CPUC: Also useful to include outstanding comments in Table 1, even if they are not anticipated to be resolved in Step 2
- Nuvve: Was there any consideration of the deployment of use cases within a microgrid?
  - CPUC: Microgrid proceeding has just initiated, so it is unlikely to provide any insight into the VGI WG. In all likelihood this Working Group will provide information to that proceeding rather than receive information from it.
  - UC: The microgrid discussion did come up in some of the M/HDV discussions. Holistically evaluating use cases in an islanding situation for a depot or apartment building would likely require a more complex analysis that the WG has yet to work towards. Some customer elements may impact use case stacking for future consideration.
  - Olivine: System resiliency use cases were typically considered to be a part of a microgrid. The value wasn't considered to be significantly different in those cases. Subgroup B did include a question of grid-exporting for consideration
- PG&E requested that the final Stage 2 report be shared in advance of the follow-up call. Gridworks noted that this will be feasible, but comments close at the conclusion of Day 2 of this workshop.

### Subgroup B report on use case intake, screening, and scoring

- Subgroup B has processed, screened, and provided feedback on the use case set.
  - The heuristics developed over the course of subgroup B by the different teams will be considered this afternoon for further discussion. Some included definitions relate to specific use cases.
- Some outstanding questions from Subgroup B are focused around the “disputed” use case set (“Pile C”) that will be discussed further this afternoon

--Lunch--

### Screening (Step 3) results review and confirmation

PG&E to discuss the PG&E/SCE/Enel X rules (slide)

- CalSTART: Why can't transit buses offer V2G direct grid services?



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- PG&E: Transit buses are unlikely to be able to provide duration services
- CalSTART: Likely these rules are focused around a small subset of the population and not indicative of all transit bus use cases.
- Olivine: Some CAISO regulatory questions around discharging to the grid
- Electrify America: R&D use case certainly, but commercial viability in the next 3 years is uncertain
  - CalSTART: Currently several installations being built focused around localized V2G implementations
- UCI: Ancillary services were largely failed for CAISO existing CAISO rules
- CalSTART: Assumed that potential customers wouldn't want to expose themselves to wholesale prices in order to participate in the CAISO market, hence getting screened out.
  - CAISO: There are some rules that exist and some regulatory rules on rates/interconnection. Market risk probably shouldn't invalidate an entire use case. The expectation is for resolution for the 2022-2030 time frame.
  - CPUC: Participation in the wholesale market doesn't include EV rates

Can any V2G provide a grid service in the near term?

- PG&E: Rideshare, public commute, and fleet (transit buses) are unlikely to provide grid services under V2G

CalSTART objects to the transit bus aspect of the PG&E/SCE Rules

VGI Council: A loose definition of resiliency was used for one of the groups. Could use a wider Working Group definition to better formalize some of the heuristics

Gridworks: A reminder that the remainder of Subgroup B will be focused on scoring use cases under the "now" (2019-2022) timeframe

No agreement on V2G direct for RA flex/local

CAISO: V1G-Direct spinning/non-spinning is potentially viable under CAISO rules

- PG&E - This also failed under screens 4A and 3B

To close the discussion of the PG&E/SCE/Enel X rules, Gridworks would provide to the Working Group confirmation of which of these rules have been agreed in the discussion, and would apply the agreed-up rules to adjust the screening results. (Confirmation was provided the next morning in the workshop.)



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The Working Group then reviewed and discussed the remaining slides on “rules” from the other teams that had been provided to Subgroup B. Participants were given an opportunity round-robin to highlight or make comments on any of these rules:

- E3: Team 3 - considering system upgrade deferral didn't seem likely to have a sufficient concentration of light duty vehicles to avoid an upgrade. Seems more likely for M/HDV. Customer side upgrades may also be deferrable. Potential for system RA without all of the CAISO rules
  - Enel X: Distribution upgrade deferral - Potentially being met by the delivery/distribution adder. Not necessarily a deferral, but passes through a distribution price signal. Renewable integration may focus on avoided curtailment as well.
- Electrify America: Low adoption of many use cases for the zoom plaza model. A large portion of the population may not have access to home/mud/workplace charging and the likelihood of maintaining views on EV adoption as penetration increases
- CalSTART/UCI: Team 9 - Probably eliminate the fleets unlikely to engage in fragmented resource alignment. Potential to add a few cases back in that case.
- PG&E: Continue to advocate the V2G back-up for resiliency due to the current issue sin CA.
- Taylor Marvin: Consider Team 3 one that includes the MUD suggestions that limits the small penetration restrictions.
- CAISO: CAISO market rules aren't necessarily technically prohibited. The PDR on system, real-time energy, indirect/direct. Team 8 frequency regulation details aren't necessarily true and can be more minutely adjusted than indicated on the comment. Team 9 - EV chargers are likely to be able to meet system spinning reserve requirements for frequency thresholds
- Nuvve: On providing frequency regulation - Nuvve has done it in the Netherlands on the market with 13k cars. V2G/Storage should be considered comparable.
- SCE: V2H and V2B are both going to be important for resiliency details.
  - Nuvve: Need to acknowledge that this is currently happening and there needs to be a regulatory/supporting framework for this
- Gridworks: Current RA rules would require that if a resources provides flex RA it also needs to provide system RA - Would require some adjustments to current policy. Distribution upgrade deferral for LDV, the PUC and others have been working to publish information to try and encourage DER providers to go and try to provide distribution deferral services.

### [Pilot scoring process review, insights, and recommendations](#)

The pilot scoring process results (34 use cases scored) were provided and presented to participants on printed handouts, including the scoring template used and the mechanics of the process. Comments and insights from participants in that process were then solicited:



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- SCE: Once the general calculations happened on benefits it was hard to get traction to discuss costs
- PG&E: Going to assume mixed participation of both those who are able to and want to. The baseline assumption is going to be unmanaged charging responding to a price signal. The use case scoring process was time consuming with up to an hour being needed for some. Follow similar use cases for ease of scoring.
- CalSTART: CalSTART is working with CARB and other groups that are trying to estimate upcoming EV populations, particularly in the MHDV planning process. There may be pent up demand waiting for incentive alignment

PG&E: The working definition used by PG&E for renewable energy integration → trying to avoid renewable curtailment. Based on this PG&E does not endorse combining the GHG and renewable integration metrics more broadly.

### Day 1 In-Person Participants:

- Mauro Dresti (SCE)
- Jigar Shah (Electrify America)
- Eric Martinot (Gridworks)
- Stephanie Palmer (CARB)
- Matthew Tisdale (Gridworks)
- Carrie Sisto (CPUC)
- Marc Monbouquette (Enel X)
- Sam Houston (UCS)
- Meredith Alexander (CALSTART)
- Taylor Marvin (SDG&E)
- Christopher Michelbacher (Audi)
- Fidel Leon Diaz (Public Advocate's Office)
- Wendy Fong (LeHigh University)
- Karim Farhat (PG&E)
- Zach Woogen (Strategen)
- Eric Cutter (E3)
- John Holme (Honda)
- Dan Bauer (Auto Alliance)
- Hannah Goldsmith (GOBiz)
- Sarah Woogen (Mobility House)
- Zach (Vehicle Grid Integration Council)
- Hiba Abedrabo (Toyota)
- Max Parness (Toyota)
- Peter Klauer (CAISO)
- Jackie Piero (Nuvve)
- David Mintzer (Starboard Energy Advisors)
- John Wheeler (Fermata Energy)
- Anne Smart (Chargepoint)
- James Mader
- Christina Jaworski (Santa Clara Valley Transportation Authority)
- Sarah Piedmens (CPUC)
- Dean Taylor (CalETC)
- Nancy Ryan (E3)
- Naor Deleanu (Olivine)
- Messay Betru (CEC)

### Day 1 Remote Participants:

- Melodee Black (SCE)
- Jim Tarchinski (GM)
- Danielle Dooley (CPUC)
- Clay Collier (Kisensum)
- Christa Heavey
- Lance Atkins (Nissan)



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- Mike Coop (ThinkSmartGrid)
- Eric Ritter (CEC)
- Francesca Wahl (Tesla)
- Dave Hurst (Ford)
- John Cruz (Mercedes)
- Adam Mohabbat (EVGo)
- Mehdi Ganji (IEEE)
- Jessie Denver (EBCE)
- Jacob Mathews (Ford)
- Jason Bobruk (SolarEdge)
- Erick Karlan (Greenlots)
- Megha Lakhchaura (EVBox)
- Philip Kobernick (PCE)
- Paul Chernick (Resource Insights)
- Charles Botsford (CWB Solutions)
- Dan McCreddie (Ford)
- Ed Pike (CPUC)
- Shiv Mani (FERC)
- Jordan Smith (SCE)
- Marissa Williams (CARB)
- Ron Freund (Electric Auto Association)

Day 2:

Agenda (November 15)		
9:00	60 Minutes	Scoring (Step 4) process design and plan for completing
10:00	120 Minutes	Exercise on ranking and prioritization (Step 5) and design and plan for completing
12:00	30 Minutes	Conclusion, action items, going forward with revised work plan

Any remaining comments from yesterday

- PG&E: Ranges on the LDV EV Population - new ranges were provided and agreed.

### [Scoring \(Step 4\) process design and plan for completing](#)

Returned to the pilot scoring exercise from yesterday

- Comments from PG&E on the results of the scoring pilot: Attempt to consistently capture the scores to provide reasonable insight into the context of the scores. Discussion needed around the partial scoring of some use cases that needs to be resolved. In addition to the averages we should also review the min/max scoring to see where there may be consensus. Discussion for use cases probably needs to focus on the use cases that have a wide gap between the min/max

PG&E provided a proposal for a scoring process that focuses on self-selection into scoring areas with back end analysis by Gridworks to help resolve primary areas of contention





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- GM: Blind results is a good plan, when you're discussing that companies can jointly file do we weigh their results according to their participation or just the number of submissions?
- Nuvve: Does it make sense to have the blind/reconciliation steps?
  - PG&E: Optionality approach, potential to consult with other experts to determine how they want to submit scores

Gridworks: This is not a statistically rigorous process and we should not consider it as such! Participants can submit partial results.

Ogilvie: for our Working Group Final Report, please underline that just because we are scoring an EV population that could provide value, doesn't mean that we are guaranteeing that that population will exist -- make sure to explain that there is a major gap in our understanding of how to recruit customers.

Include an example methodology, fundamental values, populating folders with basic sourcing, baseline, and reference information for all to use:

- Gridworks: Focus on bringing upfront source and baseline information on benefits and hopefully costs
- For example, can we all agree on day-ahead energy prices?
- E3: energy prices, capacity prices in 2022, GHG and RE Integration and curtailment, etc., applications can be simplified to day-ahead prices, behave in a way that gets the day-ahead prices

Electrify America: There are some aspects of this that are tricky since there are several organizations that are subsidiaries to others in the room. How do we want to address this (Gridworks will return to this discussion for the call next week)

UCI: The structure of this has sectoral buckets for costs/benefits that need to be addressed.

There were no objections to using the PG&E proposal for the scoring process.

### [Exercise on ranking and prioritization \(Step 5\) and design and plan for completing](#)

How are we addressing system versus customer benefits?

- UCI: The Working Group needs to continue to keep system and customer benefits separated throughout this process for clarity

Utilize grouping at certain benefit ranges? Separately plot grid and customer benefits

- Subset the groupings by cost and then potentially further breakdown by implementability?



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- Identifying the high per vehicle value but low expected population? Or low per vehicle value but high penetration

If we are endorsing the idea that we aren't strictly "ranking" and instead the final goal is policy suggestions. If so, let's get the scoring done and then each team can basically provide a portfolio of policy recommendations and the supported use cases

### Conclusion, action items, going forward with revised work plan

PG&E proposed delaying the January workshop by a week, which will be considered on the next Working Group call on 11/21.

Updated LDV EV Population ranges (now going to 900,000) adopted.

The Working Group reviewed a summary of the screening rules and screening adjustments agreed on the previous day, and accepted these rules and adjustments. The slide presented by Gridworks based on the "PG&E/SCE/Enel X rules" from the previous day shows the "green rules" that are agreed by all parties, and the "brown" and "red" rules that are not agreed by all parties. Only the green rules will be applied to screening adjustments to screen out disputed use cases (they become consensus fails); use cases fitting into the brown and red rules will remain disputed pass results and will be scored. (Reference to a white-board diagram showing the screening adjustments process.)

PG&E: Need clear documentation on what passes with updates to the current rules being considered. Should be clearly documented.

- Gridworks: Yes, this will be documented clearly. However, use cases that pass, whether by consensus or disputed, will be included for scoring and included in the scoring templates to be sent out next week. Use cases that fail or remain disputed after application of the agreed rules can be documented after that.

All adjustments to the screening results leading to the final set of use cases to be scored during Step 4 of the methodology will be clearly documented and put into the Stage 3 Report.

Other adjustments to the screening results:

- Pass results by Fermata as listed on the slides
- Pass results by CalETC as listed on the slides
- PG&E: For V1G direct, ancillary services, PG&E is going to withdraw the filter 2A (No CAISO pathway) and would like to resubmit use cases based on reevaluation on those specific issues.
- V2G-Backup cases will no longer be disputed passes, they will be consensus passes (except 35 and 442).



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- Small truck V2G cases will be failed.
- CalETC to do a quick review of use cases and submit screening adjustments for the application System Upgrades and provide any adjustments to Gridworks

### Day 2 In-Person Participants:

- Eric Cutter (E3)
- Taylor Marvin (SDG&E)
- Marc Monbouquette (Enel X)
- Mauro Dresti (SCE)
- Stephanie Palmer (CARB)
- Dean Taylor (CalETC)
- Carrie Sisto (CPUC)
- Andrew Spreen (Gridworks)
- Sam Houston (UCI)
- Zach Woogen (VGI Council)
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- Hannah Goldsmith (GOBiz)
- Charles Botsford (CWB Solutions)
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- Philip Kobernick (PCE)
- Jessie Denver (EBCE)
- Nicholas Connell (APTIM)
- John Holmes (Fermata Energy)
- Jordan Smith (SCE)
- Anthony Brunello (Calstrat)

### Day 2 Remote Participants: