October 6, 2022

Email to: IRPDataRequest@cpuc.ca.gov
Subject: VGIC's Informal Comments regarding the Inputs and Assumptions ("I&A") Modeling Advisory Group ("MAG") meeting

Re: Informal Comments of the Vehicle Grid Integration Council Regarding the September 22nd Modeling Advisory Group Meeting on Input and Assumptions

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The Vehicle Grid Integration Council ("VGIC") appreciates the opportunity to comment on the September 22, 2022, Modeling Advisory Group ("MAG") meeting ("Workshop"), where California Public Utilities Commission ("CPUC") Energy Division ("ED") staff presented proposed updates to the inputs and assumptions for the 2022-2023 Integrated Resource Planning ("IRP") cycle. VGIC appreciates the ED staff's commitment and efforts to engage stakeholders on this critical initiative.

VGIC is a 501(c)6 membership-based advocacy group committed to advancing the role of electric vehicles ("EV") and vehicle-grid integration ("VGI") through policy development, education, outreach, and research. VGIC supports the transition to a decarbonized transportation and electric sector by ensuring the value from flexible EV charging and discharging is recognized and compensated to achieve a more reliable, affordable, and efficient electric grid. VGIC has actively engaged in policy and research efforts to better understand the need and opportunity for VGI. As such, we offer the below recommendations for ED staff's consideration.

I. INTRODUCTION & SUMMARY.

VGIC commends the ED for its efforts to evolve the treatment of EVs within the IRP from rudimentary load assumptions to modeling incremental VGI within the IRP. EVs are unlike any other modifiable load or dispatchable resource type because individual EVs represent a more significant potential load shift and energy storage capacity than the typical customer-sited distributed energy resource ("DER"). Moreover, the deployment of EVs and flexible EV charging and discharging solutions is expected to grow at an extraordinary rate due to underlying policy drivers and regulations like the California Air Resources Board's ("CARB") Advanced Clean Cars II regulation.

While VGIC commends this critical improvement to the IRP process, we recommend that the ED staff take additional steps to better model VGI within the IRP. VGIC's comments can be summarized as follows:

- ED correctly seeks to consider VGI resources in IRP modeling.

- To maintain a manageable scope, VGIC generally agrees with limiting modeling to light-duty vehicles ("LDVs") but offers two crucial, reasonable, and well-defined areas of scope expansion: (1) electric school buses ("ESBs") with Level 3 direct current fast chargers ("DCFC") and (2) Level 1 ("L1") charging.

- The weighted average Level 2 ("L2") charging capability of 5 kW is overly conservative and should be modified.

- The assumption that V2G-capable vehicles will reach 50% of V1G-capable vehicles by 2050 is overly conservative and should be modified.

- NREL's air conditioning program participation tranches provide a useful starting point but are overly conservative representations of VGI participation rates.

- Certain fixed O&M costs should not be assumed constant through the study horizon as they are likely to decline over time.

- To avoid confusion, ED should shift from "passive" and "active" terminology to "base case" and "incremental."

- ED staff should notice the DRIVE OIR service list to engage the appropriate stakeholders for future opportunities related to VGI.

II. COMMENTS.

A. ED correctly seeks to consider VGI resources in IRP modeling.

VGIC appreciates the ED staff's focus on applying appropriate treatment to EVs within the IRP modeling effort. Specifically, VGIC supports modeling the benefits of incremental load reduction and exports from EVs beyond what is assumed in the Integrated Energy Policy Report ("IEPR") base case. EV charging is a uniquely flexible load as EVs, on average, spend most of the day parked. For many vehicle duty cycles, it is possible to shift charging load away from peak hours to reduce peak demand. EV charging load can also be moved to hours when the grid supplies relatively clean electricity. ED staff correctly defines this set of managed charging behavior as "V1G." ED staff also refers to Vehicle-to-Grid or "V2G" resources that can support the grid by discharging from the vehicle battery.

VGIC believes EVs are unique in that they represent a much more significant potential load shift and energy storage capacity than the typical customer-sited distributed energy resource ("DER"). Meanwhile, since the cost of the battery is embedded into the cost of purchasing or leasing the vehicle, which is purchased primarily for mobility purposes, V2G customers may be satisfied with a lower compensation level relative to stationary energy storage customers, who likely seek to recover the upfront costs associated with purchasing and installing a stationary battery.

VGI-capable vehicles and chargers are anticipated to experience significant growth in the coming years due to underlying policy drivers, regulations, and customer interest in EVs and VGI. In the case of V1G, many EV manufacturers already embed the underlying vehicle telematics capabilities to measure and manage EV charging load. Several charger manufacturers embed this same capability in the charger. With the CPUC's recent submetering decision (D.22-08-024), both vehicle and charger-based V1G approaches are well-positioned for future growth as more customers gain access to compelling VGI rates and programs. Meanwhile, the CPUC has been gradually increasing the suite of available VGI rates, including SDG&E's Power Your Drive VGI Rate, PG&E's optional Day-Ahead Hourly Real-Time Pricing ("DAHRTP") for commercial customers, and several technology-agnostic real-time pricing pilots that EVs may participate in. Meanwhile, available V1G programs include the Emergency Load Reduction Program ("ELRP"), PG&E's evPulse, PG&E's BMW ChargeForward Phase 3, the CEC Demand Side Grid Support ("DSGS"), offerings from community choice aggregators like East Bay Community Energy and Peninsula Clean Energy, and several pending VGI and EV Demand Response ("DR") Pilots.[1]

Meanwhile, the list of bidirectional charging products available to customers today has rapidly expanded in just the past year, with over 25,000 Nissan LEAFs in California that can pair with Fermata chargers, the Ford F-150 Lightning Electric and Ford Charge Station Pro, electric school buses from BlueBird, Thomas Built, Proterra, and BYD, and direct current fast chargers ("DCFC") from Nuvve and Rhombus. Additionally, the Chevrolet Silverado EV will have bidirectional charging capabilities, and announcements from Hyundai, Kia, Volkswagen, Lucid, Audi, and Volvo indicate upcoming bidirectional EV offerings. Meanwhile, new bidirectional charging products, such as those from dcbel and Wallbox, are expected to be available soon.[2]

Regarding V2G compensation, VGIC expects PG&E's DAHRTP export compensation rate to be implemented in Q4 2023[3] and SDG&E's Export Rate Pilot to be available to commercial EV customers in Q4 2024.[4] In the interim, PG&E's $11.7 million Residential,Commercial, and Microgrid VGI Pilots, ELRP, and DSGS will provide programmatic support for V2G.

VGIC believes these recent and upcoming developments in policy and product offerings represent a distinct turning point for the VGI market, and we are optimistic that

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[1] *See* SCE's pending Residential V1G Pilot and SDG&E's proposed EV DR Pilot.

[2] For VGIC's complete stocktake of available bidirectional chargers, vehicles, and product announcements, see https://static1.squarespace.com/static/5dcde7af8ed96b403d8aeb70/t/6137a2f643f8bc74a42af9ae/1631036151186/2021-09-01+VGIC%27s+Opening+Testimony+on+Phase+2+Emergency+Reliability+Proposals+-+FINAL.pdf at page 7.

[3] Proposed Decision Adopting Settlement on Export Compensation for Certain Pacific Gas and Electric Company Customers. September 14, 2022. http://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=496924142

[4] *Prepared Supplemental Direct Testimony of Jeff DeTuri (Chapter 1) on Behalf of San Diego Gas & Electric Company.* August 15, 2022. https://www.sdge.com/sites/default/files/regulatory/A2212016%20and%20RM_SDGE%20RTP%20Supplemental%20JDTuri%20Chpt%201%20-%20Policy.pdf

EVs will be capable of offering significant contributions to grid reliability as a part of California's resource portfolio.

B. To maintain a manageable scope, VGIC generally agrees with limiting modeling to light-duty vehicles ("LDVs") but offers two crucial, reasonable, and well-defined areas of scope expansion: (1) electric school buses ("ESBs") with DCFC and (2) Level 1 ("L1") charging.

VGIC recognizes that considering VGI resources in this IRP cycle is no small feat and reiterates its appreciation for the thoughtful proposal shared during the Workshop. We believe modeling LDV with access to L2 chargers, as proposed, represents a strong foundation for modeling the potential of VGI resources. However, electric school buses ("ESBs") should also be modeled as they represent an ideal V2G use case due to their predictable duty cycles and dwell times that consistently overlap with system peaks. As a result of these characteristics, a majority of recently delivered ESBs in California are V2G-capable.[5] Based on VGIC's understanding of the industry, most ESB orders that have not yet been delivered will also be V2G capable. ESB with V2G provides the first commercial opportunity for V2G that are fully UL 1741 SA-certified and approved for interconnection through Rule 21. For example, VGIC member Nuvve has deployed the first operational ESB V2G project in California at Cajon Valley Union School District operating 8 bidirectional Nuvve chargers with 8 V2G capable Lion Electric school buses. This project is actively participated in SDG&E's ELRP during the 2022 season. Nuvve has several other ESB V2G projects under development across California with nameplate capacity in excess of 1.3 MW.

Moreover, ESBs, including V2G ESBs, receive significant funding support from federal, state, and utility programs.[6] While VGIC recognizes ED staff's limited resources, we believe the addition of ESBs to IRP modeling may be relatively straightforward due to the highly predictable load shape and reasonable expectation that California will very likely electrify its entire school bus fleet by 2035 based on current trends in ESB funding support. As such, VGIC respectfully requests this scope addition as a no-regrets addition to the IRP model and offers itself as a resource to surface additional assumptions and inputs as needed.

Additionally, VGIC recommends that L1 charging be added to the modeling effort. While L1 typically occurs at only around 1.44 kW, VGIC expects a significant portion of drivers to charge using L1 charging. Aggregated across the forecasted 12 million LDVs by 2035, L1 charging may represent a considerable opportunity for V1G load reductions. Tenants and residents in old building stock with aging electrical infrastructure, which is common in many disadvantaged communities, may not be able to install L2 charging. These customers will use L1 charging at home but may still be interested in participating in VGI offerings to support the grid. For these customers, vehicle-based VGI using telematics

[5] *Medium- and Heavy-Duty Zero-Emission Vehicles in California.* Visited October 6, 2022. https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/medium-and-heavy

[6] See, for example, the EPA Clean School Bus Program, California Proposition 90 General Fund $1.125 billion for ESBs, $400 million HVIP carveout for school buses, $75 million CEC School Bus Replacement Program, the CEC Bidirectional Electric School Bus Charging Infrastructure funding concept, and CEC Bidirectional Charging Infrastructure Rebate funding concept.

provides an opportunity to manage charging and support the grid without an L2 charger. As such, VGIC recommends that ED staff refer to CEC data on the L1 charging vehicle population and charging profiles contained in the AB 2127 assessment and use this as the basis for adding L1 charging to the IRP modeling. Since the remaining key assumptions and parameters (i.e., propensity scores, scaling factor) are identical to L2 LDV charging, VGIC expects that adding L1 charging, in addition to LDV L2 charging and ESBs, will not add significant complexity to the modeling effort but could more accurately reflect the potential of VGI resources.

C. The weighted average L2 charging capability of 5 kW is overly conservative and should be modified.

As detailed in the Workshop slides, the 5 kW weighted average L2 charging capability assumes that 70% of EVs will be battery EVs ("BEVs") charging at 6 kW and cites the AB 2127 report as the basis for this data. However, L2 chargers typically offer more than 6 kW of power, and Table 1 of the AB 2127 details the "typical added range per hour of charging" using a 7.2 kW power assumption for L2 charging.[7] VGIC could not find a reference to 6 kW L2 charging within AB 2127. Notably, new L2 products, including bidirectional chargers from Ford and Fermata, offer higher power levels.[8] VGIC strongly recommends calculating the weighted average L2 charging power based on an L2 charging assumption of at least 7.2 kW rather than 6 kW.

D. The assumption that V2G-capable vehicles will reach 50% of V1G-capable vehicles by 2050 is overly conservative and should be modified.

VGIC understands that V2G deployment is minimal today and is still in the nascent stages of market development. However, the critical near- and mid-term policy drivers noted in Section II-A have resulted in the accelerated development and deployment of V2G-capable vehicles and chargers, such as those highlighted in Section II-A. As V2G continues to scale, VGIC expects that the costs of bidirectional chargers, customer education, installation, and interconnection will decrease. Notably, the Ford Charge Station Pro is at cost parity with unidirectional chargers.[9]

Additionally, today's commercially available V2G products are capable of V2G-Direct Current ("V2G-DC"), where the inverter is in the charger. Meanwhile, critical standards development work to unlock V2G-Alternating Current ("V2G-AC"), where the inverter functions are onboard the vehicle, is nearing completion.[10] EVs already contain several key components that can be configured to function like an inverter, so unlocking such capability would likely incur lower incremental V2G system costs than a V2G-DC system. With this

[7] AB 2127 Report at page 12. https://efiling.energy.ca.gov/getdocument.aspx?tn=238853

[8] *See,* for example, Ford Charge Station Pro https://chargers.ford.com/products/ford-charge-station-pro and Fermata FE-20 https://static1.squarespace.com/static/5e56d477d1250b6238d371f3/t/633dae8436c55e7cf3bff085/1664986756407/FE-20-Datasheet-web+%281%29.pdf

[9] *Ford Charge Station Pro https://chargers.ford.com/products/ford-charge-station-pro . Currently listed at $1,310.*

[10] A key enabling standard, UL 1741 SC, may be completed as early as Q1 2023. Once completed, an update to SAE J3072 will likely be required.

cost reduction in mind, VGIC anticipates V2G AC to scale quickly once available and further reduce the incremental cost to layer V2G functionality onto V1G-capable EVs.

As noted above in Sections II-A, V2G-capable vehicles have already been deployed in California. VGIC estimates the 25,000 V2G-capable Nissan LEAFs currently on California's roads represents over 469 MW in total technical potential. Meanwhile, as noted above in Section II-B, in-progress V2G ESB system deployment (i.e., charger and vehicle) from just one aggregator represents over 1.3 MW in nameplate capacity.

Falling costs of V2G relative to V1G, increased options for V2G compensation, and existing deployments of V2G will result in a penetration of V2G products by 2025 that exceeds 0%. Moreover, VGIC anticipates the difference between a V1G and V2G-capable product will be minimal and, perhaps, non-existent. As a result, VGIC believes V2G potential as a function of V1G potential will far exceed 50% by 2050 and will likely be close to 100%. However, VGIC recognizes that there is value in providing conservative estimates given the impact the IRP process has on resource procurement and grid reliability. VGIC offers that 10% in 2025 and 90% in 2050 are more appropriate estimates for V2G potential as a function of V1G potential. While this is likely still conservative, VGIC believes it reflects more accurately the anticipated V2G potential in the year 2050.

E. LBNL's propensity scores for air conditioning ("AC") programs offer a valuable starting point but are overly conservative representations of VGI participation rates.

LBNL's propensity scores for air conditioning programs were cited during the Workshop as the basis for VGI participation rates. VGIC commends ED staff and E3 for employing this approach but believes that air conditioning and VGI program participation rates will differ due to the impacts each have on customer experience. Firstly, air conditioning or "smart thermostat" programs can struggle to retain customer participation due to perceived or actual inconvenience.[11] For example, pre-cooling or being unable to turn down the thermostat during intense heat waves can lead to material impacts on customer comfort and well-being that may, unfortunately, lead to customer attrition from a valuable demand response program. Additionally, smart thermostat programs are often marketed or offered through utilities that customers may not trust due to outages, wildfires, or other reasons related to brand perception.

In stark contrast, the fundamental operating assumption of VGI is that customers will achieve a desired state of charge ("SOC") at the end of their charging session. Whether this SOC is reached through unmanaged or managed charging has no material impact on the driver's charging experience. Basic VGI programs, for example, off-peak charging rebates and static TOU rates that rely on customers' understanding and manual response to price signals, can meaningfully reduce load. However, these "low-hanging fruit" VGI capabilities

[11] *A utility company locked thousands of customers out of their smart thermostats in Colorado.* September 5, 2022. https://www.theverge.com/2022/9/5/23337864/xcel-locked-out-customers-smart-thermostats-colorado-heatwave

are embedded into the load forecast and are not considered incremental VGI resources in IRP modeling. The incremental VGI capabilities considered for IRP modeling are those unlocked through customers partnering with a trusted automotive OEM, EV service provider, or another third-party aggregator to manage charging or discharging. For example, dynamic rates (i.e., real-time equivalent pricing), DR program participation, and V2G export are most likely to be coordinated by one of these entities rather than the driver alone responding to a utility signal. In this case, with the driver's consent, VGI will likely be performed "behind the scenes" with no inconvenience to the driver and will be done in partnership with a trusted brand. In this way, VGI programs are fundamentally different from air conditioning programs. Incremental VGI resources are unlocked with little to no impact on customer comfort and experience. As a result, VGIC expects customer participation rates to be much higher for VGI programs than for air conditioning programs.

Moreover, VGI technologies generally offer a more significant value proposition when compared to air conditioning programs. The higher kW load and export capability of EVs relative to air conditioners can yield more significant monetary benefits. Additionally, VGI technologies can deliver important non-monetary benefits, including providing backup power to a home or business, which may bolster the deployment of VGI solutions and, in turn, VGI program participation.

LBNL's propensity score would assume between 14% and 25% cumulative enrollment in 2030. California's most prominent VGI program is SDG&E's PYD VGI rate, which has already enrolled over 3,000 customers.[12] The next phase of PG&E's BMW ChargeForward[13], the PG&E's VGI pilots launching in 2022[14], Peninsula Clean Energy's telematics managed charging pilot[15], and PG&E's recently-launched evPulse pilot[16] expect to enroll anywhere between 13,200 to 22,200 total customers by the end of 2023. Participation data in the new ELRP VGI Aggregation group, which launched in the second half of 2022, and the CEC's new DSGS program is unavailable at this time; however, VGIC anticipates significant participation from VGI aggregators across both programs. VGIC estimates these programs will achieve a collective 3% enrollment rate among California's total EV fleet by the end of 2023.[17] We believe there is a high likelihood of achieving this enrollment rate despite the minimal set of VGI offerings available to customers, lack of a cohesive marketing, education, and outreach strategy, inability to submeter through the charger or vehicle for participation in dynamic rates, and significant supply chain

[12] See *San Diego Gas & Electric Company (U 902 M) Vehicle Grid Integration Activities Mid-Term Report for 2022* filed September 15, 2022 in R.18-12-006.

[13] *PG&E, BMW smart-charging pilot highlights potential for electric vehicles as grid resource*. June 1, 2021. https://www.utilitydive.com/news/pge-bmw-smart-charging-pilot-highlights-potential-for-electric-vehicles-a/600958/

[14] *Resolution E-5192* approving PG&E's VGI Pilots, issued May 6, 2022 at page 4. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M474/K369/474369017.PDF

[15] *Request for Proposals for Telematics-Based Electric Vehicle Managed Charging Pilot*. Peninsula Clean Energy. August 30, 2021. Page 2. https://www.peninsulacleanenergy.com/wp-content/uploads/2021/08/RFP-Telematics-Based-Electric-Vehicle-Managed-Charging-Pilot.pdf

[16] *A better way to do smart EV charging: Talk to the car.* September 6, 2022. https://www.canarymedia.com/articles/ev-charging/a-better-way-to-do-smart-ev-charging-talk-to-the-car

[17] *Light-Duty Vehicle Population California.* Visited October 6, 2022. https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/light-duty-vehicle

constraints. Considering the CPUC is addressing all but one of these barriers (i.e., supply chain constraints) by authorizing new programs and rates (e.g., PG&E's DAHRTP), the submetering protocol (i.e., D.22-08-024), and the proposed Transportation Electrification Framework (i.e., to address marketing, education, and outreach), it is reasonable to expect the participation rate to surpass the 25% participation rate much earlier than 2030.

As such, VGIC strongly recommends that ED staff consider much higher participation rates for VGI programs than air conditioning programs. Additionally, based on the Workshop and Workshop slides, it is unclear whether the LBNL propensity score data are assumed to be constant throughout the study, such that real customer enrollment will increase at the same rate as the LDV population over time. VGIC posits that the enrollment rates may also grow each year, such that a higher percentage of LDV customers participate in each tranche year-over-year. VGIC believes this is a reasonable expectation as today's nascent VGI programs and rates mature. Customer education, enrollment, and participation will likely become streamlined and less expensive to the customer over time, leading to increased participation. Once the VGI market is mature, the growth in enrollment rates may taper off.

It isn't easy at this time to quantify precisely how much greater VGI participation rates will be relative to air conditioning programs and how those participation rates will evolve throughout the planning horizon. VGIC looks forward to working with ED staff and other stakeholders to establish more accurate enrollment assumptions.

F. Certain fixed O&M costs may decline over time and should not be assumed constant through the study horizon.

VGIC generally supports the cost assumptions detailed during the Workshop, which will be critical for constructing the VGI supply curve for IRP modeling. Specifically, the fixed O&M costs are meant to reflect only the costs of incentivizing participation in VGI programs and, therefore, appropriately exclude incremental technology costs to enable VGI.

However, the Workshop slides state, "Fixed O&M costs are tentatively assumed to be constant in real terms through the study horizon." As with the enrollment rates covered in Section II.E above, VGIC does not believe these costs will be constant throughout the modeling horizon. Specifically, as the market evolves, administration and marketing expenses may decrease over time. From the customer perspective, VGI offerings will become better understood and therefore require less marketing and outreach. Meanwhile, from the utility perspective, VGI programs will become a more standardized set of offerings that can be more easily administered and managed by either the utility or a third-party administrator. As such, VGIC respectfully requests that ED staff consider reducing the administration and marketing costs throughout the study horizon. VGIC offers itself as a resource to further explore the rate at which these fixed O&M costs should decline over time.

G. To avoid confusion, ED should shift from using the terms "passive" and "active" to the words "base case," "incremental V1G," and "incremental V1G+V2G."

VGIC appreciates the ED staff's intent to distinguish between responding to TOU rates through *passive* VGI and unlocking unlock additional V1G load reductions through *active*

VGI. However, this may be confusing based on the existing definitions found in the 2020 VGI Working Group Final Report, which defines each term as follows:[18]

> "*Passive*: control of charging involves adjusting the EV charge/discharge based on time-varying price signals or grid conditions. Charging behavior in response to such signals is not prescribed or commanded, and can occur passively without any response required by an individual customer.
>
> *Active*: control of charging involves adjusting the EV charge/discharge in response to active external "dispatching instructions" that prescribe or command charging behavior. EV participation in Demand Response Auction Mechanism (DRAM) would be a good example of active aggregated charging."

The IRP modeling effort aims to define a *base case* in which customers respond to TOU rates, as determined by the CEC IEPR forecast, a sensitivity in which some incremental V1G resource is unlocked, and a sensitivity in which both incremental V1G and V2G resources are available. The terms *passive* and *active* may overlap with the base case and sensitivities, but this is not always true. VGIC offers two common examples below:

- A commercial LDV fleet uses a third-party fleet management company to optimize charging to support the business's needs and reduce costs under a static TOU rate. In this case, charging will be controlled in response to "external dispatch instructions" from a third party "that prescribes or commands charging behavior." Since these EVs are responding to a rate, this may fall within the IEPR TOU base case for IRP purposes, but due to the "external dispatch instructions," this would be considered *active* under the VGI Working Group definition.

- A customer enrolls in a voluntary DR program that sends text alerts reminding them to shift or reduce charging during certain hours. This incremental VGI capability exists outside the IEPR TOU base case but is unlocked through an entirely voluntary program that does not "prescribe or command" response.

VGIC recommends that ED staff and stakeholders depart from the terms *passive* and *active* and instead use the terms *base case EV load, incremental V1G,* and *incremental V1G+V2G* to define the IRP modeling scenarios. This subtle but important change will more correctly capture the intended meaning, promote clarity, and avoid misinterpretation over what is considered base or incremental VGI in the future.

Additionally, the Workshop slides suggest continuing to run an unmanaged charging sensitivity that has been conducted in previous IRP cycles. The unmanaged charging sensitivity should represent charging sessions that begin when the vehicle is plugged in and proceed at full nameplate power until the desired state of charge is reached. VGIC supports running this analysis for this IRP cycle and believes it will continue to develop valuable findings to broadly support the evolution of the VGI market in California and the rest of the country. For example, the 2021 IRP Proposed Preferred System Plan Analysis revealed a

[18] *Final VGI Working Group Report.* June 30, 2020. Page 8. https://gridworks.org/wp-content/uploads/2020/07/VGI-Working-Group-Final-Report-6.30.20.pdf

nearly $2 billion difference in 2032 present value total resource cost from the LSE plan scenario.[19]

H. ED staff should notice the DRIVE OIR service list for future opportunities related to VGI to engage the appropriate stakeholders

VGIC appreciates the opportunity to engage in the MAG Workshop and submit these informal comments. VGIC was informed of this opportunity because the Workshop meeting notice was circulated to the service list of the Integrated Distributed Energy Resources proceeding (R.14-10-003). We worked to alert our members and network of the comment period. However, ED staff should notify the DRIVE OIR (R.18-12-006) service list for future opportunities, such as the draft input assumptions that will be shared in late November/early December. The DRIVE OIR is the primary venue for VGI topics. Notifying its service list will likely yield valuable stakeholder feedback on inputs and assumptions from VGI aggregators, customers, and other experts.

III. CONCLUSION.

VGIC appreciates the opportunity to provide these informal comments on the September 22, 2022 Workshop. We look forward to further collaboration with the Energy Division and other stakeholders in this docket.

Respectfully submitted,

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[19] *Integrated Resource Planning (IRP) Proposed Preferred System Plan Analysis.* September 1, 2021. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2019-2020-irp-events-and-materials/psp-workshop-slides.pdf Page 32.