

Decision PROPOSED DECISION OF COMMISSIONER RECHTSCHAFFEN  
(Mailed 11/13/2020)

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to  
Continue the Development of Rates  
and Infrastructure for Vehicle  
Electrification.

Rulemaking 18-12-006

**DECISION CONCERNING IMPLEMENTATION OF SENATE BILL 676 AND  
VEHICLE- GRID INTEGRATION STRATEGIES**

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## **DECISION CONCERNING IMPLEMENTATION OF SENATE BILL 676 AND VEHICLE- GRID INTEGRATION STRATEGIES**

### **Summary**

This decision adopts strategies and metrics to further the integration of electric vehicles as electrical grid resources, and fulfills obligations imposed on the Commission by Senate Bill 676 (Ch. 484, Stats. 2019). This proceeding remains open.

### **1. Background**

Senate Bill 676 (Ch. 484, Stats. 2019) (SB 676) requires the Commission to establish strategies and quantifiable metrics to maximize the use of feasible and cost-effective electric vehicle (EV) integration into the electrical grid by January 1, 2030. Prior to the enactment of SB 676, the Commission helped to create a vehicle-grid integration working group (VGI WG) that sought to identify recommendations for further EV integration into the electrical grid generally.

The oversight of the VGI WG is part of Rulemaking (R.) 18-12-006. The instant rulemaking was established by the Commission on its own motion by an Order Instituting Rulemaking (OIR) issued on December 19, 2018. This proceeding is intended to provide a framework for the Commission to consider utility applications for investments and rates related to zero emission vehicles, and also includes issues held over from the predecessor transportation electrification proceeding –R.13-11-007.

A recent decision (D.) in the instant proceeding– D.20-09-025 – summarizes the procedural background and is incorporated by reference.

On July 20, 2020 an assigned Administrative Law Judge (ALJ) issued an email ruling seeking party comment on issues related to VGI to allow the Commission to fulfill its obligations under SB 676. The email ruling also attached the final report of the VGI WG and invited parties to use the report as a

basis for their SB 676 proposals. Opening comments were filed on August 17, 2020 and reply comments were filed on August 31, 2020. This decision is based on the record provided by party comments on the SB 676 email ruling as well as on the contents of the VGI WG final report and party comments on VGI-related topics in the draft Transportation Electrification Framework.

Specifically, the SB 676 email ruling sought party feedback on the following questions in light of the VGI WG final report:

1) Should the Commission adopt a revised definition for “electric vehicle grid integration” to replace the definition in Public Utilities Code Section 740.16(b)(1)? If so, what should it be?

2) Which strategies should the Commission adopt by the end of 2020 pursuant to Public Utilities Code Section 740.16(c) to maximize the use of feasible and cost-effective electric vehicle grid integration by January 1, 2030? Parties should explain how each recommended strategy is feasible and cost-effective.

3) For each strategy recommended, what quantifiable metric or metrics should be adopted to measure progress in furthering the strategy under Public Utilities Code Section 740.16(j)?

4) For each strategy recommended, parties should specify how the strategy: a) accounts for the effect of time-of-use rates on electricity demand from electric vehicle charging, b) is in the best interests of ratepayers, as defined in Public Utilities Code Section 740.8, and consistent with Public Utilities Code Section 451, c) reflects electrical demand attributable to electric vehicle charging, including from existing approved rates and programs, d) is consistent with the transportation electrification goals described in Public Utilities Code Section 740.12, and e) incorporates the National Institute of Standards and

Technology's reliability and cybersecurity protocols, or other equally protective or more protective cybersecurity protocols.

On August 10, 2020 one of the assigned ALJs issued an email ruling attaching a proposal from the Commission's Energy Division staff (VGI staff paper) regarding VGI issues. The VGI staff paper was intended to supplement the original VGI proposals and questions posed in the draft Transportation Electrification Framework (TEF) attached to an ALJ ruling of February 3, 2020. Parties were invited to comment on the VGI staff paper in order to develop a record for decisions on VGI issues more broadly.

The following parties served and filed opening comments on the SB 676 ruling on August 17, 2020: San Diego Gas & Electric Company (SDG&E), Southern California Edison Company (SCE), PacifiCorp, Small Business Utility Advocates (SBUA), Joint Commenters,<sup>1</sup> Union of Concerned Scientists (UCS), the Public Advocates Office at the California Public Utilities Commission (Cal Advocates), and Pacific Gas and Electric Company (PG&E). Reply comments were served and filed by the following parties by August 31, 2020: PG&E, SDG&E, Plug In America, Tesla, Inc., Utility Consumers' Action Network (UCAN), Joint Commenters, SBUA, UCS, Fermata, LLC (Fermata), and SCE.

### **1.1. Background on the VGI Working Group**

The VGI WG worked collaboratively between August 2019 and June 2020, held seven workshops, and was made up of diverse representatives of 85 VGI stakeholders, including state agencies, utilities, community choice aggregators, the California Independent System Operator (CAISO), EV manufacturers, battery

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<sup>1</sup> Consisting of Advanced Energy Economy, ChargePoint, Inc., Siemens, Enel X North America, Inc., California Energy Storage Alliance, Environmental Defense Fund, Vehicle-Grid Integration Council, Greenlots, and Natural Resources Defense Council.

manufacturers, charging network and energy service providers, advocacy and research groups, industry associations, and ratepayer interest groups.

The VGI WG focused on answering three core questions:

1. What VGI use cases can provide value now, and how can that value be captured?
2. What policies need to be changed or adopted to allow additional use cases to be deployed in the future?
3. How does the value of VGI use cases compare to other storage or distributed energy resources (DERs)?

As a part of its work, the VGI WG developed a final report on strategies and recommendations to further EV integration into the electrical grid generally and also identified certain recommendations that the VGI WG believed were consistent with SB 676. The final report was served on the parties to this proceeding on June 30, 2020 and was attached to the SB 676 email ruling.

The VGI WG final report identified a number of potential benefits as motivations for pursuing VGI:<sup>2</sup>

- Accelerating the adoption of EVs by providing additional revenue streams that lower the total cost of vehicle ownership for individual owners and fleet operators.
- Reducing costs to electricity ratepayers by reducing congestion on existing power distribution infrastructure and costly distribution system upgrades, as well as reducing the need to invest in new fossil-fuel electricity generation.
- Supporting further decarbonization of the electric sector by avoiding curtailment of renewables and providing grid services.
- Accelerating reduction of carbon and criteria pollutant emissions in the transportation sector.

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<sup>2</sup> VGI WG Final Report at 6.

- Improving grid resiliency and security, including for public safety power shutoff (PSPS) events.

## 2. Issues Before the Commission

Per the Assigned Commissioner’s Scoping Memo and Ruling (scoping memo) filed May 2, 2019 in this proceeding, the development and adoption of VGI policy and technologies is within the scope of this proceeding.<sup>3</sup> The scoping memo also determined that implementation of legislatively-mandated statewide transportation electrification goals, including legislation adopted after the issuance of the scoping memo, was within scope.

As a result, consideration of the Commission’s implementation of SB 676 is properly within the scope of this proceeding, as is the more general establishment of non-SB 676<sup>4</sup> strategies related to VGI. This decision is a first step toward maximizing VGI. Future Commission decisions may adopt additional VGI strategies or modify those adopted in this decision.

## 3. Executing SB 676

SB 676 imposes several duties on the Commission, electrical corporations, and community choice aggregators. In this decision, the Commission executes the following mandates imposed on it by SB 676:

- Consider whether to adopt a revised definition for “electric vehicle grid integration” to replace the definition in Public Utilities Code Section<sup>5</sup> 740.16(b)(1).<sup>6</sup>

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<sup>3</sup> Scoping memo at 6.

<sup>4</sup> Non-SB 676 VGI strategies are those adopted pursuant to the Commission’s authority to promote VGI, but that do not necessarily meet the cost-effectiveness and feasibility requirements of SB 676 due to, for instance, of a lack of data.

<sup>5</sup> All further references to “Section” are to sections of the Public Utilities Code unless otherwise specified.

<sup>6</sup> Section 740.16(b)(4).



- Establish strategies and quantifiable metrics to maximize the use of feasible and cost-effective electric vehicle grid integration by January 1, 2030 consistent with all of the following:
  - The electric vehicle grid integration strategies shall account for the effect of time-of-use rates on electricity demand from electric vehicle charging.
  - Expenditures on electric vehicle grid integration shall be in the best interests of ratepayers, as defined in Section 740.8, and consistent with Section 451.
  - The electric vehicle grid integration strategies shall reflect electrical demand attributable to electric vehicle charging, including from existing approved rates and programs.
  - Electric vehicle grid integration shall be consistent with the transportation electrification goals described in Section 740.12.<sup>7</sup>
- Consider incorporating the National Institute of Standards and Technology's reliability and cybersecurity protocols, or other equally protective or more protective cybersecurity protocols, into the electric vehicle grid integration strategies.<sup>8</sup>

Each of these mandates is considered in turn below.

#### **4. Revising the Definition of Electric Vehicle Grid Integration**

Section 740.16(b)(1) states “[f]or purposes of this section, ‘electric vehicle grid integration’ means any method of altering the time, charging level, or location at which grid-connected electric vehicles charge or discharge, in a manner that optimizes plug-in electric vehicle interaction with the electrical grid and provides net benefits to ratepayers by doing any of the following:

- (A) Increasing electrical grid asset utilization.
- (B) Avoiding otherwise necessary distribution infrastructure upgrades.

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<sup>7</sup> Section 740.16(c).

<sup>8</sup> Section 740.16(c)(5).

(C) Integrating renewable energy resources.

(D) Reducing the cost of electricity supply.

(E) Offering reliability services consistent with Section 380 or the Independent System Operator tariff.”

Section 740.16(b)(4) grants the Commission the authority to alter the statutory definition of VGI. Several parties recommend potential changes to the definition in the comments on the SB 676 ruling. For example, PG&E suggests several additions to the definition:

- adding the term “cost-effective” to define the conforming methods in the first sentence,
- adding a term to ensure that any methods are “consistent with grid safety and reliability,”
- refining the term “ratepayers” to mean “participating and non-participating ratepayers,”
- adding the term “and operational flexibility” to condition (A),
- adding the term “the resources adequacy requirements established by” before the words “Section 380” in condition (E), and
- adding two additional use cases to the end of the definition, namely:
  - (F) Enabling resilience and customer services.
  - (G) Increase the economic, social, or environmental benefits associated with transportation electrification.<sup>9</sup>

SDG&E suggests adding “resiliency services” to the terms of condition (E).<sup>10</sup> They also argue that any revised definition should emphasize that VGI strategies should not require the use of any specific technology and that

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<sup>9</sup> PG&E opening comments at 1,2.

<sup>10</sup> SDG&E opening comments at 7.

VGI may be achieved using multiple strategies, including, but not limited to, the adoption of an electrical rate design, a technology, or a customer service.<sup>11</sup>

SCE also suggests explicitly including resiliency in a revised definition, noting the support for the application of VGI for resiliency purposes in the final report of the VGI WG.<sup>12</sup> SCE suggests including a new condition with the following language: “Offering resiliency services which could provide system wide, local or customer-level energy solutions if the grid undergoes an accidental or intentional outage and is not available.”

UCS recommends adding “electric vehicle freight equipment” as a technology that charges or discharges under the VGI definition. They also propose an amendment that would codify the desirability of EV driver and fleet operator benefits alongside ratepayer benefits. Tesla, Inc. (Tesla) concurs that codification of a driver benefit is desirable.<sup>13</sup> Finally, UCS seeks the inclusion of a new condition (F), “Reduction of health and environmental impacts from air pollution.”<sup>14</sup>

The Joint Commenters seek the inclusion of a new condition (F), “Increase the economic, social or environmental benefits associated with transportation electrification.”<sup>15</sup> Fermata supports this inclusion in addition to the addition of a resiliency use-case to the definition.<sup>16</sup>

SBUA supports the following additions to the definition:

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<sup>11</sup> SDG&E reply comments at 2.

<sup>12</sup> SCE opening comments at 2.

<sup>13</sup> Tesla reply comments at 2-3.

<sup>14</sup> UCS opening comments at 2-4.

<sup>15</sup> Joint Commenters opening comments at 7.

<sup>16</sup> Fermata reply comments at 7-8.

- adding the term “and operational flexibility” to condition (A),
- adding the term “the resources adequacy requirements established by” before the words “Section 380” in condition (E), and
- adding a new condition (F), “Enable services for customers including resiliency and avoiding public safety power shutoffs.”<sup>17</sup>

SBUA asserts that the above proposed additions are relatively non-controversial and enjoyed support from VGI WG members. However, SBUA also offers for consideration certain additional conditions to include at the end of the definition:

(G) Enabling reduction of peak demand during peak load periods through modifiable charging rates and charging times.

(H) Providing energy storage to facilitate integration of intermittent sources of energy.

(I) Varying the rate of charging or discharging so as to provide ancillary services for the grid, such as reactive power optimization, operating reserves, and frequency regulation.

(J) Varying the rate of charging or discharging so as to diminish transmission system requirements.<sup>18</sup>

PacifiCorp does not support any changes to the definition at this time, but noted the need for definitional flexibility in the future.<sup>19</sup>

There is widespread support amongst the parties for some modifications to the definition of VGI, but there is some dispute about the particular changes to be made. One modification supported by many parties is the addition of a reference to the ability of VGI systems to provide resiliency in the face of disruptions to electricity supplies.

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<sup>17</sup> SBUA opening comments at 3; SBUA reply comments at 3.

<sup>18</sup> SBUA opening comments at 4.

<sup>19</sup> PacifiCorp opening comments at 2-3.

Because VGI can provide resiliency services, and because it is desirable to advance resiliency in electrical systems as a matter of policy, the addition of resiliency to the statutory definition of VGI is reasonable and should be approved. This decision therefore modifies the definition of VGI appearing in Section 740.16(b)(1) to add language to the end of subsection (B) that reads “and supporting resiliency.”

PG&E’s recommendation that the language of Section 740.16(b)(1)(A) – “Increasing electrical grid asset utilization” – be modified to include the term “operational flexibility” is also reasonable and should be approved. This is because the term “grid asset utilization” has several different meanings that may not include operational flexibility. Including the term “operational flexibility” clarifies that VGI can provide this specific service to electrical grid operators in the event electrical resources are constrained. Section 740.16(b)(1)(A) should now read “Increasing electrical grid asset utilization and operational flexibility.”

As alluded to by UCS in their comments, it may be necessary to clarify that various forms of electrified transportation may be considered as VGI resources. A recent Commission decision, D.20-09-025, in this proceeding specifically defined the various types of electrified transportation that the Commission seeks to promote in accordance with Section 740.12. These types of electrified transportation are: light-duty electric vehicles, medium-duty electric vehicles, heavy-duty electric vehicles, off-road electric vehicles, and off-road electric equipment.<sup>20</sup> Because Section 740.16(b)(1) only refers to “grid-connected electric vehicles,” it is possible, as UCS suggests, that this term could be misconstrued in the future and read as not including some of the forms of electric transportation

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<sup>20</sup> As defined in D.20-09-025 at 9/-10, 24.

recently defined by D.20-09-025. In order to avoid any future confusion, the definition of VGI is modified so that “grid-connected electric vehicles” is changed to read “grid-connected light-duty electric vehicles, medium-duty electric vehicles, heavy-duty electric vehicles, off-road electric vehicles, or off-road electric equipment.” These terms should be assumed to have the meanings described in D.20-09-025.

Several other potential modifications to the statutory definition of VGI were offered by parties but are not adopted by this decision. Parties should not assume that this decision’s rejection of certain proposals constitutes a rejection of those ideas in the abstract. This decision’s modification of the statutory definition of VGI is non-prejudicial with respect to other features of VGI advanced by the parties that may be considered by the Commission.

The final definition of VGI appearing in Section 740.16, and as modified by this decision, is as follows:

“Electric vehicle grid integration” means any method of altering the time, charging level, or location at which grid-connected light-duty electric vehicles, medium-duty electric vehicles, heavy-duty electric vehicles, off-road electric vehicles, or off-road electric equipment charge or discharge, in a manner that optimizes plug-in electric vehicle or equipment interaction with the electrical grid and provides net benefits to ratepayers by doing any of the following:

- (A) Increasing electrical grid asset utilization and operational flexibility.
- (B) Avoiding otherwise necessary distribution infrastructure upgrades and supporting resiliency.
- (C) Integrating renewable energy resources.
- (D) Reducing the cost of electricity supply.

- (E) Offering reliability services consistent with the resource adequacy requirements established by Section 380 or the Independent System Operator tariff.

## 5. Strategies

At the heart of SB 676 is the requirement that the Commission adopt strategies that promote VGI by January 1, 2030. Parties proposed a variety of strategies for adoption by the Commission, and many of these were discussed in detail in the VGI WG final report. In general, parties relied on the discussion and findings of the VGI WG final report to confirm that certain VGI strategies had value and should be pursued. This decision incorporates by reference the discussion surrounding adopted strategies in the VGI WG final report, and the report is attached to this decision at Appendix A.

Many parties referred to the VGI WG's agreed upon categories of policy priorities for advancing VGI. These 11 policy areas are:

1. Reform retail rates.
2. Develop and fund government and load-serving entity (LSE) customer programs, incentives, and DER procurements.<sup>21</sup>
3. Design wholesale market rules and access.
4. Understand and transform VGI markets by funding and launching data programs, studies, and task forces.
5. Accelerate use of EVs for bi-directional non-grid-export power and public safety power shut-off resiliency and backup.
6. Develop EV bi-directional grid-export power including interconnection rules.
7. Fund and launch demonstrations and other activities to accelerate and validate commercialization.

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<sup>21</sup> Load serving entities include investor-owned utilities, community choice aggregators, publicly owned utilities, and others.

8. Develop, approve, and support adoption of technical standards not related to interconnection.
9. Fund and launch market education & coordination.
10. Enhance coordination and consistency between agencies and state goals.
11. Conduct other non-VGI-specific programs and activities to increase EV adoption.<sup>22</sup>

The VGI staff paper asserted that these 11 categories of policies will collectively support five objectives leading to increased VGI:

1. Market signals to create market demand.
2. Demonstrate early stage technology development and evaluate data to show market readiness.
3. Adopt standards to enable VGI services.
4. Overcome capital costs, infrastructure, information, and other barriers to scaling VGI services.
5. Continue agency coordination.<sup>23</sup>

The 11 categories of policy priorities support laudable policy objectives and the Commission agrees that these are a useful foundation for the promotion of VGI.<sup>24</sup>

In this decision, the Commission adopts strategies for the promotion of VGI that are shown to be cost-effective and feasible, and therefore adopted pursuant to SB 676. This decision also adopts VGI strategies that may not have been shown to be cost-effective and feasible at this time, with the understanding that additional information would be needed to determine cost-effectiveness

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<sup>22</sup> VGI WG Final Report at 9; PG&E reply comments at 2-3.

<sup>23</sup> Vehicle Grid Integration Implementation and the Draft Transportation Electrification Framework Energy Division Staff Paper at 3.

<sup>24</sup> PG&E states that these categories are a useful foundation for determining policy actions for the promotion of VGI (PG&E reply comments at 3).



and/or feasibility. While those additional VGI strategies are not, strictly speaking, adopted pursuant to SB 676,<sup>25</sup> this decision nonetheless orders the large electrical corporations to pursue those strategies using the Commission's authority to promote VGI.<sup>26</sup> The rationale for this determination and hybrid approach to VGI strategy selection is described in more detail later in this decision.

### **5.1. Reform Retail Rates**

This first policy objective recommended by the VGI WG is to reform retail rates. The VGI WG reports that reforming retail rates “can support both ‘indirect’ use cases, for which charging decisions can be based on time-varying price signals (such as [time-of-use (TOU)] rates), and ‘direct’ use cases where new rates can improve cost-effectiveness or provide new incentives for managed charging.”<sup>27</sup>

Parties were broadly supportive of adopting a VGI strategy of reforming retail rates to help advance VGI, noting that retail rates are inherently cost-effective.<sup>28</sup> Joint Commenters sought specific reforms to retail rates including dynamic commercial and residential EV rates.<sup>29</sup> UCS argued that using retail rates to advance VGI would be low-cost and lead to a “tremendous amount of

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<sup>25</sup> Joint Commenters reply comments at 7-8 (“...the [VGI] WG’s efforts should be seen a useful effort to inform, not prescribe, the path forward for SB 676 implementation,” arguing that Commission adoption of VGI strategies related to rates, programs, and market mechanisms would fulfill the requirements of SB 676). *See also* Pub. Util. Code § 701.

<sup>26</sup> Large electrical corporations refers to the large electric investor-owned utilities: PG&E, SCE and SDG&E.

<sup>27</sup> VGI WG Final Report at 34.

<sup>28</sup> *See, e.g.*, UCAN reply comments at 5-7; Tesla reply comments at 3-4.

<sup>29</sup> Joint Commenters opening comments at 10-11.

potential value.”<sup>30</sup> SDG&E asserted that time-varying rates are “a proven approach for minimizing the cost and maximizing the benefits of serving [EV] load.”<sup>31</sup> PG&E referred to managed EV charging based on price signals as a “low-cost integration solution[]” that should be explored further.<sup>32</sup>

In addition, SB 676 itself finds that TOU rates can reduce costs or mitigate costs increases for all ratepayers, which is inherently cost effective.<sup>33</sup>

Reforming retail rates as a VGI strategy pursuant to SB 676 is reasonable. This is because reforming retail rates is feasible and low-cost with high potential benefit, as demonstrated by the parties. While there are a variety of approaches to reforming retail rates in a manner that may assist VGI, some parties focused on the development of optional dynamic pricing rates. Given that the Commission is currently reviewing potential dynamic pricing rates for SDG&E and PG&E EV customers,<sup>34</sup> it is reasonable and efficient to pursue optional dynamic pricing structures for EV customers to promote VGI.

The strategy of reforming retail rates applicable to EVs, with a particular focus on optional dynamic pricing structures, is hereby adopted by the Commission pursuant to SB 676. A future Commission decision regarding the rates section 9.1 of the draft TEF (Electric Vehicle Rate Evolution Plan

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<sup>30</sup> UCS opening comments at 7.

<sup>31</sup> SDG&E opening comments at 1.

<sup>32</sup> PG&E opening comments at 3.

<sup>33</sup> Section 740.16(a)(1)(D) (“Time-of-use rates for customers with electric vehicles can reduce costs or mitigate cost increases for all ratepayers due to increased usage of electric vehicles by incentivizing electric vehicle charging at periods of low demand and low grid congestion”).

<sup>34</sup> PG&E opening comments at 4. *See also* A.20-10-011.

Development Guidance) and/or other decisions may provide additional direction regarding rate reforms applicable to EVs.<sup>35</sup>

**5.2. Develop and Fund Government and Load-Serving Entity Customer Programs, Incentives, and Distributed Energy Resource Procurements**

The VGI WG stated that developing and funding customer programs and incentives can support scale-up and cost reduction of already-commercial VGI solutions for most existing use cases.<sup>36</sup> Clearly, providing incentives for the deployment of VGI technology will encourage the development and deployment of VGI technology. It is uncertain, however, whether the creation of stand-alone incentive programs or expansion of existing programs by the Commission in this decision would be cost-effective. Without particular budgets or program goals to consider – and none were offered by the parties in their responses to the SB 676 ruling – it is impossible to judge cost-effectiveness under SB 676 in this decision.

However, it is appropriate for the Commission to adopt this policy objective as a non-SB 676 VGI strategy given its ability to advance VGI more generally. The large electrical corporations shall report on their policy actions such as customer programs and incentives related to VGI. The reports shall not be limited to programs and incentives that are required by this decision<sup>37</sup> when reporting on VGI strategies adopted by this decision pursuant to SB 676. These

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<sup>35</sup> We also note that the California Energy Commission (Energy Commission) has proposed a “Load Management Tariff” under Energy Commission 19-OIR-01 that would, if finalized, impose requirements regarding TOU rates.

<sup>36</sup> VGI WG Final Report at 34.

<sup>37</sup> A number of programs and incentives or potential programs and incentives that are not required by this decision are identified in the VGI staff paper at Appendix B, and in Party comments as described in section 15.1 of this decision.

reporting requirements are discussed in more detail in section 15.1 of this decision.

### **5.3. Design Wholesale Market Rules and Access**

The VGI WG reports that designing wholesale market rules and access would support VGI “use cases for system applications, including a wide variety of grid services, from day-ahead and real-time energy to resource adequacy, renewable energy integration, and grid upgrade deferrals.”<sup>38</sup> As noted by the report, CAISO is the lead agency for determining wholesale electricity market rules and access, with the Commission and large electrical corporations playing a supporting role.

Because the Commission and large electrical corporations cannot independently set wholesale market rules and access for VGI applications, the Commission does not adopt this strategy pursuant to SB 676. However, the Commission notes the VGI WG’s interest in this area and confirms that the strategy should be adopted as a non-SB 676 VGI strategy given its ability to align wholesale market signals with VGI applications (similar to the way in which retail rates can be modified to advance VGI goals). Therefore, the large electrical corporations shall collaborate with CAISO where beneficial and report on reforms to wholesale market rules and access that advance VGI strategies. These reporting requirements are discussed in more detail in section 15.1 of this decision.

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<sup>38</sup> *Id.*

#### **5.4. Pilots, Demonstrations, Emerging Technology, and Studies**

Two of the 11 categories of policies enumerated by the VGI WG concern VGI pilots, demonstrations, emerging technology, and studies.<sup>39</sup> Many parties agreed that further pilots, demonstrations, an emerging technology program and studies would be helpful in refining some VGI strategies for the future; while some also cautioned against the risk of “over-piloting” strategies ready for scale deployment.<sup>40</sup>

This decision finds that pursuit of VGI pilots, demonstrations, emerging technologies, and studies is a reasonable VGI strategy and should be adopted as a non-SB 676 VGI strategy. While these activities will support the development of cost-effective and feasible technology, they may not provide immediately quantifiable cost-effective benefits. The pursuit of these activities will advance VGI, as defined by this decision, by ensuring that proven VGI technologies can be scaled and by expanding the technology required to advance VGI.<sup>41</sup>

For the purpose of clarity, VGI pilots are intended to establish that proven VGI technologies can be effectively scaled up. VGI demonstrations are intended to prove that VGI technologies that have been effective in small-scale research projects are effective in “real-world” circumstances. VGI emerging technologies are those that have not yet been demonstrated in the real world, or where specific research (not including field demonstrations or pilots) is needed to determine the ability to apply the technology in programs. VGI studies may

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<sup>39</sup> VGI WG Final Report at 9, policy recommendation categories #4 and #7.

<sup>40</sup> See, e.g., SCE opening comments at 3; PG&E opening comments at 5; SBUA opening comments at 4; Joint Commenters reply comments at 9 (conditioning support on mitigating the risk of “over-piloting”).

<sup>41</sup> See PG&E opening comments at 4.

relate to and augment any of these three categories, particularly around the topic of cost-effectiveness data that the VGI WG identified as a priority data gap.

The large electrical corporations are authorized to propose a variety of VGI pilots and an emerging technologies program to address needs that fall outside of the scope of other state programs as described in sections 6.4 and 6.8. These activities shall facilitate the development of VGI strategies (or novel use cases for a given strategy) where pilots are needed. As noted by Joint Commenters reply comments,<sup>42</sup> these activities should not delay the implementation of VGI strategies ready for deployment at scale now.

In addition, the large electrical corporations shall report on the use the Electric Program Investment Charge (EPIC) and/or other sources of funding for VGI technology demonstration projects. Future priorities for EPIC are under consideration in R.19-10-005. If future VGI technology demonstrations are not funded by EPIC, or some other funding source, the Commission may revisit the need for additional action in order to implement this strategy.

#### **5.5. Accelerate Use of EVs for Bi-Directional Non-Grid-Export Power and PSPS Resiliency and Backup**

The VGI WG reports that accelerating the use of EVs for bi-directional non-grid-export power and PSPS resiliency and backup would support broader goals around customer resiliency.<sup>43</sup> This strategy would allow customers to use their EVs to power their homes or facilities during outages and potentially support other use cases by removing non-EV load from the grid. Many parties support

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<sup>42</sup> Joint Commenters reply comments at 9.

<sup>43</sup> VGI WG Final Report at 34.

this VGI strategy in principle,<sup>44</sup> even as some parties argue that more pilots and demonstrations in this area are necessary to demonstrate cost-effectiveness and potentially other attributes.<sup>45</sup>

Given broad party support for this VGI strategy in principle, and this decision's inclusion of the enhancement of resiliency as part of VGI's defined attributes (see Section 4 above), it is reasonable to adopt the VGI WG's resiliency objective as a non-SB 676 VGI strategy. Due to the lack of data concerning cost-effectiveness, it cannot be adopted as a SB 676 strategy at this time.

The large electrical corporations shall report on their efforts to accelerate the use of VGI for resiliency purposes when reporting on VGI strategies adopted by this decision pursuant to SB 676 (including but not limited to reporting on pilots and technology demonstrations where necessary, and potential programs outside of the DRIVE OIR identified in the VGI staff paper (Appendix B)). These reporting requirements are discussed in more detail in section 15.1 of this decision.

A proposed decision in this proceeding on authorized expenditures of low carbon fuel standard revenues also addresses the potential of EVs to support enhanced resiliency. The large electrical corporations are encouraged to integrate the holdings of that decision related to the definition and policy importance of resiliency when designing their pilots and technology demonstrations pursuant to this VGI strategy.

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<sup>44</sup> Joint Commenters opening comments at 10; UCAN reply comments at 4; SBUA opening comments at 5.

<sup>45</sup> PG&E opening comments at 3 ("PG&E also recommends evaluating enabling resiliency services for customers (*i.e.*, electric vehicles as backup power during PSPS events) once determined that these services are cost-effective, reliable and compliant with safety and cybersecurity standards").

## 5.6. Interconnection Reform

The VGI WG reports that the use of EVs to provide bi-directional grid-export power, including development of necessary interconnection rules, is a desirable policy objective. In this strategy, customers use EVs to provide power directly to the grid. The final report states that this objective would support grid-facing use cases, such as system renewable energy integration, system resource adequacy, and system ancillary services like frequency regulation.<sup>46</sup>

Practically speaking, this objective seeks to reform interconnection rules to allow for integration of EVs into the grid for the purpose of providing grid-related services. Such services were adopted earlier in this decision as non-SB 676 VGI strategies, such as the advancement of VGI to provide resiliency and back-up power services. Adopting this strategy is therefore complementary to, and as suggested by some parties in many cases a condition precedent for, achieving other VGI strategies.<sup>47</sup>

Because the reform of interconnection rules related to VGI services is low cost and feasible to pursue, this strategy is adopted by this decision as a VGI strategy pursuant to SB 676. Most of these reforms should be addressed in the Commission's dedicated proceeding on interconnection and Electric Rule 21 – R.17-07-007.

Pursuant to SB 676, the large electrical corporations shall report on progress to reform interconnection to facilitate VGI in annual reporting. The large electrical corporations may, if they choose, fulfill this order by

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<sup>46</sup> VGI WG Final Report at 34.

<sup>47</sup> Fermata reply comments at 8-10 (noting the interconnection needs for certain forms of vehicle-to-grid technology); PG&E opening comments at 3 (“[a]ll of the [VGI WG’s 11 policy] objectives require more concrete, practical analysis and evaluation...as well as basic grid interconnection”).



cross-referencing to any Rule 21 reports that they may file in other proceedings. The large electrical corporations shall also report on progress to reform interconnection rules to advance VGI in their annual VGI reporting ordered by this decision. These reporting requirements are discussed in more detail in section 15.1 of this decision.

### **5.7. Develop, Approve, and Support Adoption of Technical Standards Not Related to Interconnection**

The VGI WG reports that the development, approval, and adoption of technical standards not related to interconnection are important policy goals to advance VGI.<sup>48</sup> This decision finds that development of such standards should be an SB 676 VGI strategy given that the development of new technology typically requires the adoption or revision of one or more technical standards.

Because the development, support and approval of non-interconnection technical standards related to VGI services is generally low cost and is feasible to pursue, this strategy is adopted by this decision as a VGI strategy pursuant to SB 676.<sup>49</sup> Pursuant to SB 676, the large electrical corporations shall report on support and adoption of non-interconnection technical standards in annual reporting. These reporting requirements are discussed in more detail in section 15.1 of this decision.

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<sup>48</sup> VGI WG Final Report at 9.

<sup>49</sup> Technical standards are generally developed by an official national or international standards-making body (UL, NIST, etc) prior to approval and adoption in California. The large electrical corporations can potentially engage with these organizations for standards development when such engagement can encourage the development of standards that are beneficial to California ratepayers. The EV submetering protocol is an example of filling a gap not addressed by standards-making bodies.

### **5.8. Marketing, Education and Outreach**

The VGI WG reports that a policy objective of funding and launching market education and coordination would help to advance VGI.<sup>50</sup> Several parties argued in their comments that enhancing VGI customer outreach and education would benefit VGI by encouraging more EV drivers to participate in VGI programs.<sup>51</sup>

Increasing the number of customers participating in VGI would increase the amount of electricity available to provide grid services and benefit VGI implementation. Reaching out to EV drivers and encouraging their participation would therefore help to advance VGI and its broader goals.

While customer outreach and education are doubtlessly feasible, the cost-effectiveness of such outreach cannot be established without more detail on the particular outreach proposed and the aim of the outreach.<sup>52</sup> In addition, this topic largely overlaps with the draft TEF Section 11.2 on ME&O and should be considered in any future Commission decision on this portion of the draft TEF. This decision therefore adopts VGI customer outreach and education as a non-SB 676 VGI strategy. The large electrical corporations shall report on their efforts to fund and launch VGI customer outreach and education when reporting on VGI strategies adopted by this decision pursuant to SB 676. These reporting requirements are discussed in more detail in section 15.1 of this decision.

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<sup>50</sup> *Id.*

<sup>51</sup> Joint Commenters opening comments at 13; UCS opening comments at 12 (“[customer outreach] is so critical that it merits its own strategy”).

<sup>52</sup> *See, e.g.*, PG&E opening comments at 3.

### **5.9. VGI WG Policy Recommendations not Adopted as VGI Strategies**

The final two categories of policy recommendations by the VGI WG are not adopted by this decision as VGI strategies. These two categories of recommendations are: 1) enhance coordination and consistency between agencies and state goals, and 2) conduct other non-VGI-specific programs and activities to increase EV adoption.

Although the Commission intends to coordinate with other agencies on VGI strategies, this decision does not designate such cooperation as a formal VGI strategy as the Commission does not have the authority to order other state agencies to pursue these activities. Nevertheless, this decision encourages Commission staff to continue working with sister state agencies in pursuing VGI strategies, including but not limited to the Energy Commission's development of the VGI Roadmap Update, and attempt to harmonize VGI regulations where feasible.

The second of the two categories of recommendations is not adopted as a formal VGI strategy because, by definition, the individual recommendations in this category are primarily aimed at promoting broader EV and TE infrastructure adoption and not VGI-specific actions. As noted in the VGI staff paper (Appendix B), these recommendations could generally be addressed (at least in part) in the context of a final decision on the TEF. Therefore, while these recommendations could increase VGI by increasing the pool of available resources, these issues are best deferred for future consideration in any future decision(s) on the TEF.

### **6. Near-Term Policy Actions**

While the VGI strategies discussed above and adopted by this decision constitute important guidance for stakeholders and the large electrical

corporations, party comments on the SB 676 ruling and in the VGI WG report identified a number of near-term policy actions that enjoyed broad stakeholder support and should be pursued as soon as possible to advance the VGI strategies.<sup>53</sup> Each of these near-term policy actions will support at least one of the categories of VGI strategies adopted to comply with SB 676. The VGI WG has in many cases also identified specific use cases that these near-term policy actions will support.

Several parties including Joint Commenters, SBUA, UCAN, and UCS proposed the adoption of near-term action plans for VGI. For example, Joint Commenters and Fermata proposed that the Commission adopt a “Model VGI Portfolio” and direct the large electrical corporations to develop their own VGI portfolios and begin implementation in 2021.<sup>54</sup>

UCS proposed that the large electrical corporations and other LSEs should begin to act on VGI strategies in the 2021 timeframe.<sup>55</sup>

The Commission agrees that the record demonstrates that the time is ripe to pursue these near-term objectives and adopts several such objectives below.

### **6.1. Avoiding Electrical Infrastructure Upgrades**

As noted in the VGI WG report and VGI staff paper,<sup>56</sup> VGI can reduce congestion on existing power distribution infrastructure and reduce ratepayer costs by avoiding costly distribution system upgrades. Automated or Active Load Management (ALM) is software-based technology to manage EV charging

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<sup>53</sup> VGI WG Final Report at 10.

<sup>54</sup> Joint Commenters opening comments at 4; Fermata reply comments at 3.

<sup>55</sup> UCS comments at 4.

<sup>56</sup> VGI staff paper at 3.

load, also known as EV Energy Management Systems<sup>57</sup> or load management. Some parties proposed adopting ALM as a VGI policy action. This action would advance the “Develop and Fund Government and Load-Serving Entity Customer Programs, Incentives, and Distributed Energy Resource Procurements” category described in section 5.2 above.

Because ALM has the potential to vary the charging of grid-connected EVs in a way that optimizes grid performance, this decision adopts the following near-term VGI policy actions.

#### **6.1.1. Use of ALM in Large Electrical Corporations’ TE Programs, Rules, and Tariffs**

Joint Commenters propose that the Commission adopt an ALM tariff or incentive that would enable utility customers to use ALM to reduce local demand and corresponding distribution upgrade costs (including “make ready” investments as noted earlier). Customers could either be incentivized to use ALM by way of a rebate or rate discount, which may be a “revenue neutral” approach compared to a non-ALM approach that requires distribution upgrades.<sup>58</sup> In addition, the VGI Work Group stakeholder recommendations broadly support the use of ALM to avoid utility-side upgrades (VGI Work Group recommendations 2.04 and 2.17). No party expressly objected to adoption of an ALM strategy for VGI.

In addition, PG&E has demonstrated, in an existing TE light duty program, that deployment of ALM products will reduce costs at suitable host

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<sup>57</sup> This term is often used interchangeably with ALM.

<sup>58</sup> Joint Commenters opening comments at 8-9.

sites.<sup>59</sup> Once installed, the technology typically provides the capacity to support other potential VGI strategies as well (such as, for example, demand charge management).

Therefore, the large electrical corporations shall identify in all future applications for TE programs how they will deploy customer-side ALM at host sites where this technology will support TE installation at equal or lesser costs than hardware-based electrical capacity while meeting TE charging needs.<sup>60</sup> In addition, any future tariff or rule filed by a large electrical corporation for service line and/or distribution line upgrades to support transportation electrification shall provide an option for customer-side ALM where beneficial to ratepayers while meeting TE charging needs. The large electrical corporations shall develop standard evaluation criteria to determine host sites where ALM would benefit ratepayers by reducing costs while meeting host site needs for EV charging. The authority created in this decision to apply criteria for ALM deployment is limited to customers who voluntarily participate in ratepayer subsidized programs, rates, and tariffs.

The Energy Division shall host a workshop by January 30, 2021 regarding standard evaluation criteria and may host or direct the large electrical corporations to host additional workshop(s) if needed as determined by Energy Division staff. The large electrical corporations shall participate with Energy Division staff to develop an agenda and Energy Division staff shall serve the

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<sup>59</sup> PG&E provided this information in a document titled “Pacific Gas and Electric Company Electric Vehicle Infrastructure OIR Rulemaking 18-12-006 Data Response” dated October 13, 2020 (Appendix D to this decision). PG&E also noted that in some cases the technology will allow installation of TE infrastructure in areas that lack space for physical infrastructure upgrades.

<sup>60</sup> This decision does not address whether investing ratepayer funding to achieve other VGI services is cost-effective or desirable.

agenda for the workshop no less than 10 days before the workshop. The workshop may address the following topics and/or others:

- potential criteria for identifying sites where ALM should be deployed as part of utility programs, tariffs or rules;
- whether these criteria should be applied to customer-side TE infrastructure that is customer-owned if the customer receives a rebate or other incentive funded by ratepayers;
- definitions and technical criteria for such deployments such as certification(s) and performance requirements;
- estimated ALM costs and avoided customer electrical infrastructure costs and Rule 15 (distribution line extensions) and Rule 16 (service extensions) electrical infrastructure costs;
- program design to facilitate ALM deployment such as incentives, performance criteria, and/or customer engagement;
- whether further exploration is desirable regarding the ability of ALM installed to support TE infrastructure installations to also support additional VGI services as a co-benefit.

In addition, the large electrical corporations shall describe criteria for ALM deployment in their applications for TE programs, rules, or tariffs. Furthermore, they shall provide customer education and evaluate customer acceptance once ALM systems are installed. In addition, they shall identify any complementary policies, including but not limited to education of local building officials, needed to support this technology during annual reporting.<sup>61</sup>

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<sup>61</sup> For instance, some party comments (Joint Commenters' opening comments on the SB 676 ruling at 8 reference Nuuve Corporation and Enel X North American reply comments on the draft TEF section 8 at 8) raised concerns that Rule 2 adopted by the large electrical corporations may be written or implemented in a way that restricts some of the potential benefits of ALM. These parties are concerned that the large electrical corporations will calculate load from connected equipment based on the nameplate capacity of each EVSE rather than the capacity of the facility as a whole, creating a barrier to using ALM to avoid upgrades to utility-side infrastructure.

Consideration of this technology may also benefit existing TE programs where a significant number of projects have not yet reached the design phase. For instance, D.20-08-045 issued September 2, 2020 approved SCE's ChargeReady 2 program. SCE shall submit a Tier 2 advice letter within 90 days of this decision with a study of the potential for deployment of this technology and recommendations regarding deployment in the ChargeReady 2 program. SCE may file a stand-alone advice letter or address this requirement within any other appropriate advice letter filing required by D.20-08-045.

As noted by CALSTART, deployment of VGI for medium and heavy-duty charging offers a large opportunity to avoid distribution upgrades and TE program "make-ready" costs for the large electrical corporations.<sup>62</sup> Therefore, the large electrical corporations shall identify in annual VGI reporting the number of ALM technologies installed for any medium and heavy-duty vehicle segment(s) under currently approved TE programs as well as the expected avoided distribution and customer-side cost savings.<sup>63</sup>

The large electrical corporations shall report on ALM deployment (in both existing and any future TE programs) in their annual VGI reporting required by this decision. These reporting requirements are discussed in more detail in section 15.1 of this decision.

### **6.1.2 Additional Potential Opportunities for Distribution Upgrade Deferrals**

ALM and/or other VGI technologies could potentially also support the distribution grid by reducing demand from a host site and/or exporting power

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<sup>62</sup> CALSTART Opening Comments on the Draft Transportation Electrification Framework Section 11 - Vehicle Grid Integrate and the Vehicle Grid Integration Working Group Report 4.

<sup>63</sup> The large electrical corporations shall provide this information where available for customers receiving a rebate for electrical infrastructure owned by the customer.



to the grid (as discussed further in the subsequent subsection) at times of peak demand to offset other distribution system load. The large electrical corporations should consider opportunities to advance distribution deferral in any pilots or other policy actions under this decision, as well as other venues related to distribution infrastructure planning (such as distribution resources plans). In addition, integrating VGI across all relevant business activities (see section 6.6) is particularly relevant for avoiding distribution upgrades as noted in the draft TEF (at 23) including any future solicitations for distribution deferral projects. A future decision, such as any future decision on the draft TEF, may further consider opportunities to avoid distribution system upgrades.

## **6.2. Credit-for-Export**

Joint Commenters suggested creating a tariff or form of compensation for EVs that export electricity to the grid in times of need, or potentially expanding eligibility under the net energy metering (NEM) program for credited exports.<sup>64</sup> The NEM program credits customers who export power produced by on-site renewable generation onto the grid. By directly incenting the export of energy from an EV to the grid, this strategy would provide incentives for the deployment of technologies and programs that would allow EV drivers to sell their stored electricity to grid operators in times of need. It is therefore reasonable to adopt consideration of this kind of compensation as a near-term policy action to advance the VGI strategy category “Reform Retail Rates” as noted above in Section 5.2 and/or “Develop and Fund Government and Load-

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<sup>64</sup> Joint Commenters opening comments at 9 (“[t]his would provide a bill credit to EV customers who are able to export to the grid during peak times. The credit would be linked to the on-peak retail rate and would be analogous to the Commission’s existing policy for net energy metering”).

Serving Entity Customer Programs, Incentives, and Distributed Energy Resource Procurements” as noted above in Section 5.3.

Several VGI WG recommendations (1.09, 1.16, 6.04) indicate that export of power from EV batteries connected to renewable facilities may not be eligible, or that eligibility may be unclear, for current utility net energy metering successor tariffs, informally known as NEM 2.0 tariffs.<sup>65</sup> Parties may address eligibility issues within the current NEM proceeding, R.20-08-020, although this decision does not prejudice the determination under R.20-08-020 regarding whether the issue should be included within its scope.

In addition, parties have advocated for a Commission program that would compensate EV drivers for electricity exports more broadly, including exports from EVs charged from the grid. Exploring the concept of credit-for-export from EVs that are grid-connected would further VGI strategies noted earlier. It would be useful for such consideration to occur in a Commission proceeding that also considers credit for exports from other types of energy storage systems.<sup>66</sup>

To avoid any ambiguity, this decision expressly declines to find that the creation of any credit-for-export scheme is reasonable, but rather that the exploration of such a scheme should be pursued.

### **6.3. Demand Response**

Several parties recommended considering EV participation in demand response as a near-term VGI policy action. Joint Commenters proposed that EV charging load’s demand responsiveness could be a “source of local or system capacity (e.g. as demand response resources)” through either a tariff-based

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<sup>65</sup> See VGI staff report at 13, 15 and 24.

<sup>66</sup> See PG&E reply comments at 2-3.

mechanism or by allowing EVs to bid into resource adequacy markets.<sup>67</sup> UCS also promoted the ability of EVs to provide demand response through retail rate design and other measures.<sup>68</sup>

The concept of utilizing EVs to provide demand response comports with the definition of VGI adopted by this decision as it would allow EVs to provide grid services during times of critical strain on the grid. The ability of EVs to supply demand response is a VGI policy action supported by parties<sup>69</sup> and is adopted by this decision to further the category of VGI strategies “Develop and Fund Government and Load-Serving Entity Customer Programs, Incentives, and Distributed Energy Resource Procurements” in section 5.2.

The Commission has already established at least one venue for potential deployment of VGI to provide demand response. D.17-12-003 requires the large electrical corporations to submit a third-party aggregator supply-based demand response program by the fourth quarter of 2021 to cover the period of 2023-2027. However, incorporating VGI strategies into any existing program may require education for potential market participants and consideration of whether the program design could accommodate VGI strategies if they meet the program objectives.

To ensure that large electrical corporations and potential VGI market actors understand program requirements and the potential for VGI to provide demand response services, the large electrical corporations shall jointly host a workshop in the first quarter of 2021 to educate potential VGI demand response providers on demand response opportunities and identify any barriers to

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<sup>67</sup> Joint Commenters opening comments at 13.

<sup>68</sup> UCS opening comments at 10.

<sup>69</sup> *See, e.g.*, Joint Commenters opening comments at 10; PG&E opening comments at 3.

participation for VGI resources. The large electrical corporations shall develop the agenda in collaboration with the Commission's Energy Division staff and shall serve notice of the workshop's date, time, and location not less than 10 days in advance to the service list of this proceeding and the service list for Application 17-01-012.<sup>70</sup> The large electrical corporations shall serve to the service list of this proceeding and the service list for Application 17-01-012 a post-workshop report within 30 days of the workshop that identifies any barriers to VGI participation in this demand response program, or any other programs such as bids for resource adequacy services to be delivered in 2022 under D.19-07-009.

The large electrical corporations shall report on VGI participation in their demand response programs in their annual VGI reporting required by this decision. These reporting requirements are discussed in more detail in section 15 of this decision.

#### **6.4. Emerging Technology and Interim Studies**

##### **6.4.1. Emerging Technology**

Energy Division staff proposed that the large electrical corporations implement an emerging technology program for Transportation Electrification in section 8.5 of the draft TEF. The staff proposal in the draft TEF<sup>71</sup> would authorize laboratory testing, development of testing standards, paper studies and small-scale field trials (not full demonstration). These activities would help

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<sup>70</sup> The large electrical corporations should consider issues raised in party comments such as baselining, submetering, and telemetry as well as large electrical corporation research and studies into technical potential, consumer engagement, potential barriers and solutions, and/or other relevant information from parties or other organizations.

<sup>71</sup> Draft TEF at 94.

facilitate the development of pre-commercial technologies and/or evaluate their potential for future application in large electrical corporation programs.

Two of the large electrical corporations as well as Cal Advocates and the VGI Council (VGIC) agreed with this proposal in their comments on sections 7 and 8 of the draft TEF.<sup>72</sup> Cal Advocates and SCE noted that the program will fill gaps in existing programs around market development, evaluating consumer acceptance, and communication between the large electrical corporations and potential program providers (they also provided additional details regarding potential scope). EDF stated in opening comments that existing efforts are sufficient without the need for a new program. SCE disagreed in reply comments and stated that the program will fill a gap in EPIC and other programs.<sup>73</sup> SCE reply comments also recommended disseminating results from the program via the Emerging Technology Coordinating Council.<sup>74</sup>

In addition, VGI WG recommendation 7.13 supports the creation of an emerging technology program.<sup>75</sup> The VGI staff paper (Appendix B) suggested that parties comment on an appropriate budget level. No party proposed a specific budget.

The Commission finds that an emerging technology program is a necessary policy action to support the VGI strategy category “Pilots, Demonstrations, Emerging Technology, and Studies” described in section 5.5.

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<sup>72</sup> Opening comments from Public Advocates Office (Cal Advocates) at 6, SCE at 13, VGIC at 20 and reply comments from SCE at 2 and SDG&E at 9.

<sup>73</sup> EDF opening comments at 12 and SCE reply comments at 3.

<sup>74</sup> SCE noted that the Emerging Technology Coordinating Council is used by the Energy Efficiency Emerging Technology and Demand Response Emerging Markets and Technology programs to share interim progress, reports, and lessons learned on tests and demonstrations.

<sup>75</sup> <https://airtable.com/shr9JBvC2bAofuJpj/tblnhdgV5jGZjCmhh/viwoJnPy7PknfuvPQ>

The large electrical corporations shall jointly file a Tier 3 implementation advice letter within 150 days of this decision requesting approval of a proposed scope and budget for a VGI/TE Emerging Technology program as described further below. The large electrical corporations must consult with the California Energy Commission and other state agencies; other LSEs conducting technology development activities; and other experts and stakeholders including Program Advisory Councils to help develop the proposed program structure and scope. The advice letter shall also contain a proposed process to annually refine the program scope in consultation with these same entities.

The large electrical corporations shall consider the following topics, if not already addressed through other activities, when developing the program scope and may also include others:

- Providing research on customer needs and specifications that might help new products reach the market and testing facilities for potential new products.
- Providing opportunities to test emerging technologies and provide consultation for new TE technologies in the development stage (including providing information about market readiness and large electrical corporation program standards and requirements) and communication between utilities and providers.
- Filling gaps in data for VGI costs and benefits and thus market viability.

In the advice letter requesting approval of a VGI Emerging Technology Program, the large electrical corporations shall propose and provide justification for a reasonable budget that reflects priority unfunded needs. This budget should also reflect opportunities to leverage and not duplicate technology development funding from existing Energy Commission (*see* Appendix C) and other programs. As the program may be similar in function to the Demand

Response Emerging Technology program, authorized by D.17-12-003 with a \$5.2 million budget, the proposed program budget should not exceed \$5 million annually combined for all of the large electrical corporations for an initial period of two years. Allocation of the maximum budget among the large electrical corporations shall be the same as for pilots described below. Large electrical corporations may include a request to extend the program in TEPs and applications filed pursuant to their TEPs. If it becomes necessary to bridge between the initial two-year program period and Commission decisions on future applications, the large electrical corporations may file up to two Tier 2 advice letters with requests for a one-year extension.

The large electrical corporations shall report semi-annually to the Commission on program status, results to date, budget, challenges, and lessons learned. The first program report will be due eight months after program approval. The large electrical corporations may propose to combine this reporting with other types of reporting after obtaining agreement from the Commission's Energy Division. The large electrical corporations shall also disseminate research and program reports and other results via the Emerging Technologies Coordinating Council and potentially other avenues.

#### **6.4.2. Interim Studies**

In comments to the proposed decision, Plug In America recommended that the large electrical corporations be directed to "collectively spend up to \$2 million for the paper studies and working groups recommended by the [VGI WG] (e.g., from the next steps section, the strong and good agreement policies, and additional equity-focused analysis to the understanding of the up-front and

on-going cost of charging and how to reduce these costs, especially for low and moderate income EV drivers).”<sup>76</sup>

The record of this proceeding supports the recommendation of Plug In America. The VGI Working Group identified further studies as one of a number of near-term action items with strongest agreement with proposed funding of \$2-\$4 million from ratepayers and/or other sources.<sup>77</sup> The Commission expects the large electrical corporations to address these activities, to the extent needed, as a component of the Emerging Technology program, and/or other any other demonstrations, pilots and/or programs that are available in the future. In the short term, this Decision authorizes the large electrical corporations to propose separate funding for studies needed to further the Next Steps listed in the VGI WG final report.

Each large electrical corporation may request approval of interim studies via a Tier 2 advice letter no later than 150 days after this decision. Prior to filing any advice letter it must meet with the California Energy Commission and the Commission’s Energy Division staff to determine how to avoid duplication with other state agency efforts; and must request stakeholder feedback via one or more VGI WG meetings and/or workshops. Any such advice letter should:

- contain a detailed description of each interim study and how it will further the Next Steps recommended by the VGI WG;
- identify a specific gap in knowledge needed to advance priority VGI technologies or use case(s);
- propose a specific budget for each study or activity and justify the proposed budget based on benefits to ratepayers;
- propose a schedule and tangible deliverables for each study;

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<sup>76</sup> Plug In America opening comments on the proposed decision at 4.

<sup>77</sup> VGI WG report at 31. See stakeholder policy recommendation 4.06.



- describe how feedback from VGI WG stakeholders and the California Energy Commission was addressed; and
- describe efforts to leverage funding source identified by the VGI WG and any other potential funding sources to the extent practical.

The large electrical corporations may propose to spend no more than \$2 million jointly. The maximum budget for each large electrical corporation shall be determined on the same basis as the budget for the Emerging Technology program.

#### **6.5. Integration of VGI Across All Relevant Business Activities**

The VGI WG found in its final report that a wide-ranging effort is needed to integrate VGI in utility business activities and provided over 60 recommendations related to utilities or Commission regulation of utilities. The VGI WG also identified 17 applications for VGI, mostly utility system-facing as well as several customer-facing applications with implications for the utility system.<sup>78</sup> In addition, the VGI section of the draft TEF (at 138) recommends integrating VGI across all business activities. This decision therefore adopts as a VGI policy action that the large electrical corporations identify how they integrate VGI across their relevant business activities, including but not limited to distribution upgrade deferrals as noted earlier. This policy action could potentially support any or all of the VGI strategy categories described in section 5.

The large electrical corporations shall include this information in their annual VGI reporting required by this decision. These reporting requirements are discussed in more detail in section 15 of this decision.

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<sup>78</sup> VGI WG report at 18.

## 6.6. Site Load Management

Parties commented<sup>79</sup> that the large electrical corporations should establish load management templates for participants in their programs. The template would list different strategies and steps such as curtailing charging during critical peak pricing periods and educating the site host on how load management could reduce their electric bill. This decision adopts a site load management policy action to support the VGI strategy category “Develop and Fund Government and Load-Serving Entity Customer Programs, Incentives, and Distributed Energy Resource Procurements” as described in section 5.3.

D.20-08-045 (at 93 and 138) has established specific requirements for SCE’s Charge Ready 2 Infrastructure and Market Education Programs that provide a precedent for how these requirements should be applied to all future customer-facing TE programs unless a large electrical corporation justifies a different approach due to different circumstances.

First, all future TE applications by each of the large electrical corporations shall contain strategies for educating host sites on the benefits of passing TOU rate-signals to drivers and participating in any demand response program(s) for which they are eligible, and where appropriate. These strategies may be tailored to the EV charging needs of different types of host sites.<sup>80</sup> Reporting will be addressed in any future decisions regarding such programs. In addition, the large electrical corporations shall establish outreach materials and load management tactics to reduce any grid impacts from sites that opt out of the

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<sup>79</sup> Cal Advocates opening comments at 4, UCAN reply comments at 8, UCS reply comments at 2.

<sup>80</sup> For instance, the needs of EV drivers using public DC fast charging, as well as medium- and heavy-duty applications can vary from the needs of EV drivers parked for extended periods of time at a workplace or residence.

default agreement to pass on TOU pricing. The large electrical corporations shall report on the tactics used and the number of sites (by location type) that opt out of passing through TOU signals. In addition, the large electrical corporations should annually report on the peak load of sites that have elected to opt out of the default TOU pricing arrangement.

The Commission recognizes the importance of providing more general education to host sites and intends to provide any necessary guidance via a future decision on the ME&O section of the draft TEF.

### **6.7. Enabling “Vehicle to Load” Options in TE Programs**

Fermata stated that VGI solutions provide back-up power to buildings and other on-site load at lesser incremental costs than systems based on separate storage batteries.<sup>81</sup> A number of companies offer this capability now, and others have announced plans to enter the market. Fermata also stated that some TE electrical infrastructure design choices prevent the use of VGI for on-site back up power for buildings or other load and should be avoided in the large electrical corporation’s TE programs.<sup>82</sup>

This decision adopts a policy action to enable “vehicle to load” options in TE programs (other future decisions may further address VGI and resiliency). This policy action will support VGI strategy category “Accelerate Use of EVs for Bi-Directional Non-Grid-Export Power and PSPS Resiliency and Backup” (*see* section 5). The large electrical corporations shall address in all future TE

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<sup>81</sup> Fermata reply comments at 9.

<sup>82</sup> Fermata reply comments at 7. Fermata noted that installing a separate electrical service for EV charging will prevent EVs from providing back-up power to a building or other load and provide back-up power because the EVSE charging is physically separated from the electrical system for the building (or other load).

program applications how TE programs will maximize the potential use of VGI for on-site backup power where practical.<sup>83</sup>

### **6.8. Pilots**

As noted in section 5, many parties support pilots that advance VGI commercialization and this decision finds that pilots are a policy action to support the VGI strategy category “Pilots, Demonstrations, Emerging Technology, and Studies” as described in section 5.5.

The forthcoming pilots should address practical barriers to VGI-enabling technologies that have already been demonstrated and develop pathways to scale implementation through existing or potential new large electrical corporation programs that would further the goals of SB 676.

The large electrical corporations shall begin the planning process by jointly completing a stocktake<sup>84</sup> to determine existing or planned pilots related to VGI funded by themselves, other LSEs, the Energy Commission, or any other organization. They shall provide a draft stocktake to ED staff for review within 30 days of this decision and then provide this stocktake to the DRIVE OIR service list within 60 days of this decision. The large electrical corporations shall also jointly conduct a public workshop on the purpose and budgets of proposed pilots within 90 days of the effective date of this decision and provide notice to, at a minimum, the service list for this decision and R.19-10-005.

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<sup>83</sup> For instance, a separate service may be appropriate based on the distance of parking spaces from a building or other load (which would likely increase trenching and conduit costs); or for other reasons.

<sup>84</sup> The word “stocktake” as used by this decision means a review of existing or planned programs in a given TE area, in this case VGI pilots. This review would allow Commission staff and stakeholders to understand the current breadth of TE programs such that new programs can be planned to maximize administrative efficiency.

Prior to this workshop, the large electrical corporations shall collaborate with staff from the Commission's Energy Division, the Energy Commission, other California LSEs and other stakeholders as needed to 1) develop a list of priority needs for pilots, 2) ensure that the list avoids overlap with scope of the EPIC program or other programs including those administered by the Energy Commission (*see* Appendix C), and 3) ensure that the pilots will not delay the implementation of strategies at scale that do not require piloting.

The large electrical corporations may file Tier 3 advice letters requesting approval of VGI pilots within 210 days of this decision.<sup>85</sup> Each advice letter for a VGI pilot must contain an evaluation plan that identifies a process to determine the success of each pilot and the feasibility and desirability of scaling the pilot to a full-scale program or utilize the results to revise an existing program.

At a minimum, the large electrical corporations must consider the following when choosing pilot proposals:

- Pilots listed in the final report of the VGI WG as “near term priorities with strongest agreement”,<sup>86</sup> many of which were also identified in party comments;
- Both passenger vehicle and medium and heavy-duty vehicle opportunities including medium and heavy-duty recommendations by CALSTART; and<sup>87</sup>
- Pilots that include model-based simulation to provide a broader understanding of expected operations, including potential to provide

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<sup>85</sup> A future decision on the draft TEF may provide direction on how to include additional future potential pilots in TEPs and applications filed under TEPs.

<sup>86</sup> VGI WG Final Report at 31.

<sup>87</sup> CALSTART Opening Comments on the Draft Transportation Electrification Framework Section 11 - Vehicle Grid Integration and the Vehicle Grid Integration Working Group Report August 21, 2020 at 6.

VGI-services, and strategies to optimize between potential VGI services while still meeting transportation-related needs.

The Vehicle Grid Integration WG provided a recommendation for \$50 million in total funding for a variety of pilots and demonstrations from ratepayers and other sources including EPIC. Thus, a lesser amount is needed specifically for pilots. For instance, EPIC has historically funded VGI-specific projects and projects that contribute to VGI goals over the prior two EPIC cycles.<sup>88</sup> Therefore, the large electrical corporations shall identify any non-ratepayer potential funding sources and shall not request, in their combined applications, more than \$35 million for VGI pilots authorized by this decision. Each large electrical corporation shall be limited to their pro-rata share, based on combined electrical and distribution annual load in kilowatt-hours (kWh), unless the electrical corporations jointly request an alternative means of apportioning this combined budget. ED staff should reduce proposed budgets if other funding sources are identified and/or a lower total funding need is identified.

### **6.9. Identification of VGI Use Cases**

The VGI WG Final Report<sup>89</sup> identified a large number of use cases. While the WG provided a significant amount of information about these use cases, this information is far from complete. Therefore, this decision adopts as a near-term VGI policy action a requirement that the large electrical corporations identify the use cases or categories of use cases addressed by each VGI policy action identified in this decision while filing any applications or advice letters. This data will support the VGI strategy category “Pilots, Demonstrations, Emerging

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<sup>88</sup> Some projects address multiple topics and the TE share cannot necessarily be determined exactly.

<sup>89</sup> VGI WG Final Report at 28.

Technology, and Studies” described in section 5.5 by linking new data generated by VGI strategies to relevant use cases.

## **7. Equity Considerations**

Several parties pointed to the need to ensure that the benefits of VGI and SB 676-related strategies were equitably distributed among communities in California. SBUA argued that disadvantaged communities and hard-to-reach customers, including small businesses, should receive higher subsidies in the VGI context than middle and upper income drivers because incentives targeting these groups are more likely to result in behavior change than for middle and upper income customers.<sup>90</sup>

UCS recommended that VGI demonstration projects should serve environmental and social justice communities, where appropriate, to bring benefits and build capacity in those areas.<sup>91</sup>

Joint Commenters supported UCS’s comment that environmental and social justice (ESJ) communities, in particular, need thorough ME&O on VGI opportunities to ensure they are aware of and have access to the benefits of VGI; and UCS’s recommendation that the Commission facilitate utility coordination with other agencies to provide VGI educational materials to low-income drivers under existing Energy Commission and California Air Resources Board programs.

In light of the party interest in this issue and the need to support the Commission’s Environmental and Social Justice Action Plan (ESJ Action Plan),<sup>92</sup> it is reasonable for this decision to adopt certain equity requirements that should

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<sup>90</sup> SBUA opening comments at 15.

<sup>91</sup> UCS opening comments at 12.

<sup>92</sup> Adopted February 21, 2019.

be included in the adopted VGI strategies and metrics. The Commission's ESJ Action Plan contains a number of relevant goals including but not limited to: increasing investment in clean energy resources to benefit ESJ communities; improving local air quality and public health; enhancing meaningful outreach and public participations opportunities for ESJ communities; increasing climate resiliency; and promoting economic and workforce development opportunities.<sup>93</sup>

First, the large electrical corporations shall develop and implement strategies to prioritize ESJ communities in siting and benefits of SB 676 pilots including working with community-based organizations (CBOs) as described in the VGI staff paper. The large electrical corporations shall also include equity strategies as a topic in the SB 676 pilots workshop ordered by this decision.

Any VGI programs proposed by the large electrical corporations in future TE applications and all VGI pilots proposed via advice letters must consider the Commission's ESJ Action Plan, and any future TEF equity guidance once available; as well as the guidance issued in the VGI staff paper with respect to equity.

Any VGI programs proposed by the large electrical corporations in their future TE applications that include proposals for rebates to encourage VGI implementation shall include increased incentive levels for ESJ communities. The large electrical corporations must also document in their applications effective strategies for engagement with CBOs to seek their advice on program design and implementation such that ESJ communities are appropriately prioritized.

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<sup>93</sup> Commission's ESJ Action Plan at 6, 7.



The large electrical corporations should also cooperate with other agencies to evaluate the potential to leverage EVs deployed by state and local equity programs as a VGI resource. Furthermore, the large electrical corporations should recognize that customer engagement in disadvantaged communities and low-income communities is an essential component of implementing ME&O strategies for VGI programs.

**8. Do the VGI Strategies Adopted Pursuant to SB 676 Account for the Effect of Time-of-Use Rates on Electricity Demand from Electric Vehicle Charging?**

One of the statutory conditions for any VGI strategy adopted by the Commission pursuant to SB 676 is that it accounts for the effect of TOU rates on electricity demand from EV charging.

The VGI strategies adopted by this decision pursuant to SB 676 include reform of retail rates and interconnection reform. Reform of retail rates expressly accounts for the effect of TOU rates as the intent of the strategy is to reform TOU rates to advance VGI. In addition, other VGI strategies adopted in this decision that are intended to further the development and deployment of VGI technologies and use cases generally will also increase the potential for customers to respond to TOU rates.

**9. Are the VGI Strategies Adopted Pursuant to SB 676 in the Best Interests of Ratepayers, as Defined in Section 740.8, and Consistent with Section 451?**

One of the statutory conditions for any VGI strategy adopted by the Commission in accordance with SB 676 is that it be in the best interests of ratepayers as defined by Section 740.8 and consistent with Section 451.<sup>94</sup>

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<sup>94</sup> Section 740.16(c)(2).

Section 740.8 states that the “interests” of ratepayers mean direct benefits that are specific to ratepayers, consistent with both of the following: a) safer, more reliable, or less costly gas or electrical service, consistent with Section 451, including electrical service that is safer, more reliable, or less costly due to either improved use of the electric system or improved integration of renewable energy generation; and b) any one of the following: 1) improvement in energy efficiency of travel, 2) reduction of health and environmental impacts from air pollution, 3) reduction of greenhouse gas emissions related to electricity and natural gas production and use, 4) increased use of alternative fuels, or 5) creating high-quality jobs or other economic benefits, including in disadvantaged communities identified pursuant to Section 39711 of the Health and Safety Code.

Section 451 generally holds that rates and utility charges shall be just and reasonable.

There are three VGI strategies adopted by this decision pursuant to SB 676: reformation of retail rates, interconnection reform, and other technical standards. Each of these strategies is in the best interests of ratepayers as defined by Section 740.8 because they seek to make electrical service more reliable by allowing EVs to manage their use of the grid and potentially direct energy to the grid in times of need. Furthermore, the promotion of VGI in general is intended to promote EV ownership, which will reduce the health and environmental impacts of air pollution and increase the use of alternative fuels (*i.e.*, electricity). Because no particular rate or charge is being approved by this decision, there also is no inconsistency with Section 451.

**10. Do the VGI Strategies Adopted Pursuant to SB 676 Reflect Electrical Demand Attributable to EV Charging, Including from Existing Approved Rates and Programs?**

One of the statutory conditions for any VGI strategy adopted by the Commission in accordance with SB 676 is that it reflect electrical demand attributable to EV charging, including from existing approved rates and programs.<sup>95</sup> Each of the three VGI strategies adopted under SB 676 reflects electrical demand attributable to EV charging.

Reform of retail rates considers the electrical demand attributable to EVs by seeking to modify the pattern of that demand by using TOU rates. Interconnection reform and other technical standards also consider the electrical demand attributable to EV charging by seeking to advance the interconnection of VGI to the grid and the provision of grid services by EVs that, by definition, utilize the demand attributable to EVs.

For the sake of clarity, and as defined previously in the decision, this decision holds that any use of VGI is intended to manage electrical demand from EVs in a way that provides grid benefits.

**11. Consistency with the Transportation Electrification Goals Described in Section 740.12**

One of the statutory conditions for any VGI strategy adopted by the Commission in accordance with SB 676 is consistency with the transportation electrification goals established by the Legislature in Section 740.12, namely the promotion of transportation electrification.<sup>96</sup>

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<sup>95</sup> Section 740.16(c)(3).

<sup>96</sup> Section 740.16(c)(4).

Each of the three SB 676 strategies promotes EV ownership and transportation electrification by advancing the ability of EVs to provide grid benefits, and thereby potentially providing financial and/or other benefits to EV operators. Therefore, each of these three strategies are consistent with the transportation electrification goals established by the Legislature in Section 740.12.

**12. Adoption and Promotion of Strategies are not Dependent on SB 676**

As described above, the Commission currently lacks information about whether several of the VGI strategies adopted by this decision would specifically meet some of the criteria established by SB 676. This does not affect the duty placed on the large electrical corporations to promote the strategies, as ordered by the decision. All of the adopted VGI strategies are valuable and applicable.

**13. Some VGI Issues Will be Addressed More Broadly as the Commission Considers the Draft TEF**

The VGI WG provided many additional recommendations related to recommendations in the draft TEF to supporting TE broadly. These recommendations should be deferred for consideration as part of any future decisions on topics such as: EV supply equipment (EVSE) communications standards (draft TEF section 8.1); local partnerships (draft TEF sections 10.2 and 10.3); ME&O (draft TEF section 11.2); and Community Choice Aggregator (CCA) roles and relationships with the large electrical corporations, aside from the collaboration role described below in section 17 (draft TEF section 10.4).

**14. Cost-Effectiveness**

VGI strategies adopted by this decision pursuant to SB 676 must be shown to be cost-effective. While Joint Commenters argued that cost-effectiveness need not be strictly considered, and only evaluated during the implementation of VGI

strategies,<sup>97</sup> this approach does not comply with the language of SB 676. The drafters of SB 676 clearly intended that the Commission conduct this evaluation *ex ante* and at the time the Commission adopts VGI strategies pursuant to SB 676. The relevant language states that the Commission shall “[e]stablish strategies and quantifiable metrics to maximize the use of feasible and cost-effective electric vehicle grid integration.”<sup>98</sup> The verb “establish” refers to the act taken by this decision to establish VGI strategies pursuant to SB 676. The strategies adopted by this decision pursuant to SB 676 must therefore maximize the use of “cost-effective” VGI, meaning that reasonable, supporting information must be available when strategies are established to show that they will lead to cost-effective VGI. The Commission therefore rejects Joint Commenter’s argument that a cost-effectiveness evaluation may be delayed until some years in the future.

Because of the need to show *ex ante* that VGI strategies adopted by this decision pursuant to SB 676 must be cost-effective, this decision only adopts three VGI strategies pursuant to SB 676. All other VGI strategies adopted by this decision are not adopted pursuant to SB 676 and are instead adopted pursuant to the Commission’s authority to advance VGI generally under the terms of this rulemaking and SB 350. They are intended to support the development of technology and/or business models that can further the goals of SB 676; and provide additional information such as costs and benefits that could show cost-effectiveness in the future.

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<sup>97</sup> Joint Commenters opening comments at 15-16; SCE opening comments at 3-4.

<sup>98</sup> Section 740.16(c).

## 15. Metrics

One of the statutory conditions for any VGI strategy adopted by the Commission in accordance with SB 676 is that the Commission also adopt “quantifiable metrics” that can be used to determine whether the implementation of the strategy is effective.<sup>99</sup> In addition, metrics are essential for determining progress towards the statutory goal of maximizing the use of feasible and cost-effective electric vehicle grid integration by January 1, 2030. Robust VGI metrics and reporting are essential for the following practical purposes in addition to statutory compliance:

- determining progress holistically towards achieving VGI goals;
- providing information to evaluate current and future programs and policies that contribute to VGI goals regardless of whether they are established under this decision or through separate authority;
- providing data to all interested parties and stakeholders seeking to advance VGI technologies, policies and/or markets.

The VGI staff paper proposed establishing activity, program, and outcome metrics based on informal VGI WG discussions based on input from the VGI Working Group. Activity metrics would track adoption of VGI policy actions; program metrics would track the success of program implementation against program goals; and outcome metrics would track aggregate progress towards end goals (i.e. load shift, GHG reductions, etc.) across all programs and activities. The VGI staff paper listed examples to illustrate the categories. No party filed comments explicitly opposing the metric framework proposed by the VGI staff

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<sup>99</sup> Section 740.16(c). Arguably this subsection could also be interpreted to mean that the Commission should adopt metrics to quantify the advancement of VGI generally, but this decision chooses to interpret the requirement for quantifiable metrics to relate to VGI strategies adopted pursuant to SB 676. This is consistent with the subsection’s focus on Commission adoption of specific VGI strategies that meet a specific set of criteria.

paper. SDG&E did argue that some existing metrics were sufficient. UCS proposed some potential revisions to illustrative examples listed in VGI staff paper.

### **15.1. Activity Metrics**

This decision imposes numerous action items and reporting requirements on the large electrical corporations to advance VGI in California. In order to consolidate these requirements, this decision adopts as an activity metric for VGI strategies generally the reporting obligations on each of the large electrical corporations already established by this decision.

Each of the large electrical corporations shall report on the status of each activity ordered by this decision, based on a template discussed below under reporting. The template will include costs and adoption status of any VGI pilots, technology demonstrations, emerging technology programs, or implementation of strategies to reduce utility-side or customer-side electrical capacity upgrades as well as other policy actions ordered by this decision.

The large electrical corporations shall also provide an annual stocktake on actions outside of this decision that will facilitate VGI strategies.<sup>100</sup> The VGI staff

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<sup>100</sup> PG&E (opening comments at 2,3) states that VGI issues also arise and could get addressed in numerous existing Commission proceedings, decisions, and tariffs. These actions fall outside of the DRIVE OIR. They include Rule 21 interconnection standards; energy storage RFOs and multi-use criteria; demand response programs under Rule 24; integrated resource plans under SB 350; the Self-Generation Incentive Program; distributed energy resources distribution deferral projects under the Commission's Distribution Resources Plan proceedings; and EV and non-EV rate design reform proceedings, including time-variant and dynamic rate design proposals that price electricity used by EV customers as well as other customers. The VGI staff paper at Appendix B identifies additional potential VGI strategies such as credit for export and access to wholesale markets.

While this decision does not require that the large electrical corporations implement these strategies, it requires reporting on implementation of these actions because they are related to the VGI strategies established in this decision and the goals of SB 676.

paper (Appendix B) identifies that the stocktake should address actions under the jurisdiction of the Commission as well as actions by other agencies and organizations that would help realize VGI strategies. This holistic stocktake will inform the need for actions to implement VGI strategies, and provide lessons learned that will help inform the design, implementation, and oversight of these strategies.

### **15.2. Program Metrics**

Parties recommended using a variety of program metrics to evaluate the adopted VGI strategies. SCE, PG&E, UCS, and Tesla each recommended evaluating how many eligible customers are participating in VGI programs and services.<sup>101</sup>

UCS further commented on metrics for avoided distribution upgrades or avoided greenhouse gas emissions avoided.<sup>102</sup> UCS also suggested that there was a need to sub-categorize metrics for VGI related to medium-duty and heavy-duty EVs.<sup>103</sup> Finally, UCS believed that it would be useful to track the number and breadth of VGI pilots.<sup>104</sup>

Joint Commenters recommended examining the total number of participants in various VGI portfolio components, broken down by EV customers and EVSE providers, as well as the number of light-duty and medium-duty/heavy-duty EVs served by each participant.<sup>105</sup>

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<sup>101</sup> SCE opening comments at 4, PG&E opening comments at 5, UCS opening comments at 13, Tesla reply comments at 4 and 5.

<sup>102</sup> UCS opening comments at 13.

<sup>103</sup> UCS reply comments at 4.

<sup>104</sup> UCS opening comments at 13.

<sup>105</sup> Joint Commenters opening comments at 16.



SCE and PG&E suggested examining the load shift attributable to each VGI program, cost to execute the VGI programs, actual benefits derived by the VGI programs and comparison to benefits provided by DERs.<sup>106</sup>

With respect to VGI ME&O, PG&E recommended examining the quantity of customers engaged through ME&O conducted by each LSE, and the effectiveness of market outreach initiatives. UCS suggested disaggregated reporting on ME&O to reflect the kind of educational activities conducted.

UCS argued that the Commission should adopt sub-metrics specific to ESJ concerns, and that the large electrical corporations and other LSEs should report on VGI progress in ESJ communities.

Based on the staff proposals on this issue and the party responses, it is reasonable to adopt certain metrics to measure the progress toward achieving certain VGI strategies. Note that the Commission is not obligated to adopt program metrics for the VGI strategies that are not adopted pursuant to SB 676 (reform of retail rates, interconnection reform, and other technical standards). However, this decision also adopts program metrics for certain other VGI strategies to provide a holistic view of progress towards SB 676 goals.

Due to the need to tailor metrics for particular programs, this decision orders the large electrical corporations to develop the following metrics in consultation with the Commission's Energy Division staff on a program-by-program basis:

- Program metrics to gauge VGI enrollment and participation in demand response programs. These metrics should include the number of EVs enrolled in demand response programs, including customer retention and experience, and the total capacity and quantity of energy delivered for each demand response program that enrolls EV customers. The

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<sup>106</sup> SCE opening comments at 4, PG&E opening comments at 5.

- method used to collect data should also be reported, and data collected through methods that could lead to different results should be disaggregated. The large electrical corporations shall identify any data that cannot be reported for third-party demand response programs, or other programs where they lack visibility into the specific resources that are dispatched and provide a justification. They shall also explain what efforts were made to obtain the data including from third parties.
- Program metrics for ALM deployment that include the number of sites and ports served by passenger vehicles and each medium and heavy-duty vehicle segment type and estimated distribution and customer-side infrastructure cost savings. The large electrical corporations shall report this information for ALM deployments via their programs, rates, and tariffs. They shall also provide data for other installations if available through voluntary agreements with solution providers, customers, or other means. These metrics shall also include any challenges to deployment of this technology and actions taken to overcome these challenges.
  - Program metrics for pilots and technology demonstrations that assess the implementation status of each approved pilot, lessons learned, a brief narrative description, and a cross-reference to a more detailed report where available.
  - Program metrics for emerging technologies including fiscal metrics such as budget allocated, committed, and expended. The utilities shall also disseminate these results via the Emerging Technologies Coordinating Council.
  - Program metrics for reforming retail rates which shall include continuing to collect data on load shifting and load profiles for the TE programs of the large electrical corporations and a disaggregation of “rate-to-host” and “rate-to-driver” customers. The metric shall also include a report on the adoption of dynamic rates including customer retention, EV owner participation in static TOU and dynamic rates (to the extent the large electrical corporations can identify such customers), and resulting load-shift from participation in such rates.
  - Program metrics for interconnection reform that include a report on the progress of reforming interconnection rules to facilitate and advance VGI deployment.

- Program metrics for evaluating the load management performance of various TE programs including, 1) the success rate of strategies for encouraging host sites to participate in rate-to-driver and any demand response program for which they are eligible, including feedback from host sites on barriers to participation, and 2) the peak load and total average daily load of a) sites participating in the default TOU pricing arrangement or demand response; and b) sites that have elected to opt out of the default TOU pricing arrangement and did not enroll in a demand response program.
- Program metrics: identify the status of any type(s) of credit-for-export available for VGI, and if any such strategy is adopted, number of participants and annual kWh by customer class.
- Program metrics: barriers identified and removed to allow vehicle-to-building or vehicle-to-load back-up power for participates in TE programs.

Where feasible, the large electrical corporations shall also report the contribution of each program to the broader, system territory-wide outcome metrics that is related to the program.

### **15.3. Outcome Metrics**

Parties recommended a variety of outcome metrics. SCE suggested examining whether and how policy actions influenced manufacturers to increase the availability of products that can participate in VGI. Joint Commenters and SDG&E each sought measurement of the total number of utility customers with backup power options provided by EVs. SDG&E, PG&E and Joint Commenters also recommended examining load shifting in a variety of ways, including an evaluation of the percentage of megawatt-hours (MWh) consumed off-peak, total renewable generation used, and an evaluation of the megawatts (MW) of demand reduction that VGI provides relative to a non-managed charging approach.

UCS recommended assessing the marginal greenhouse gas emissions rate during VGI charging hours, similar to what is presently used to measure emissions attributable to energy storage utilization in the Self Generation Incentive Program.

With respect to the potential grid benefits provided by VGI, Joint Commenters suggested assessing the gross benefits of any grid services provided (*e.g.*, ancillary services, capacity), while SDG&E sought to focus on existing grid reliability. Joint Commenters and UCS also believed it was worth examining the total reduction in distribution system upgrade costs through VGI active load management. However, UCS noted that attribution for avoided distribution upgrades can be uncertain, particularly in the residential sector, and that this metric should be reported separately for residential and commercial sectors.

Based on party comments on staff proposals for outcome metrics related to VGI strategies, this decision finds that it is reasonable to adopt the following outcome metrics. The large electrical corporations shall begin tracking these metrics beginning with January 1, 2021 (or continue to track this data where they are already collecting it for other purposes). This data will establish a baseline for evaluation of future progress. Data collection shall continue through December 31, 2030.

- Load profile for managed EV charging as opposed to unmanaged EV charging (*i.e.* drivers who do not receive TOU rates or participate in some type of program to manage their load). Managing charging may include participants in large electrical corporation TE programs or “rate-to-driver” schemes; and participants outside of TE programs on TOU rates. The large electrical corporations should disaggregate this data where strategies or different data collection methods are used if these differences could affect the results (for instance, whole-house metering will yield a different result than separately metered or sub-

metered EVs and any data collected from vehicle telemetry may yield different results than data collected from a stationary meter).

- Estimated GHG reductions and, to the extent practical, estimated air pollution reductions using emission factors developed by the California Air Resources Board and other relevant data.
- Total customers with EVSE capable of providing bi-directional power on-site, broken down by rate class.
- A running list updated at least quarterly and available on one electrical corporations website of EV charging equipment with “V2X” functionality, i.e. ability to export load from an EV to a host site or to the grid, including relevant technical capabilities and certifications.
- A running list updated at least quarterly of utility-side upgrades (both the customer service and other distribution infrastructure) avoided/mitigated for EV charging sites as a result of utilization of behind-the-meter VGI services such as ALM, and net avoided costs.

#### **15.4. Sub-Categories for Program and Outcome Metrics**

In order to more granularly analyze progress toward achieving the VGI strategies and near-term priorities outlined in this decision, the Commission finds that it is reasonable to order collection of sub-categories for each of the program and outcome metrics adopted. For each of these metrics, the large electrical corporations shall:

- Break-out residential and commercial customers.
- For residential customer VGI programs, the large electrical corporations shall propose ESJ sub-categories for reporting program and outcome metrics and consider sub-categories for commercial customers after consultation with the Commission’s Energy Division staff.
- Break-out medium-duty and heavy-duty use cases from light-duty use cases, and determine whether additional segments are necessary after consultation with the Commission’s Energy Division staff.
- Commercial customers may be sub-divided on a case-by-case basis for each large electrical corporation after consultation with the Commission’s Energy Division staff.

For those sub-category definitions that require consultation with the Commission's Energy Division staff, the large electrical corporations shall ensure that such consultation is completed no later than 90 days after the effective date of this decision, and that the results of the consultation are reflected as soon as is practicable in VGI metric reporting.

### **15.5. Data Collection and Reporting**

This decision imposes numerous action items and reporting requirements on the large electrical corporations in order to advance VGI in California. Each of the large electrical corporations shall consult with the Commission's Energy Division staff to create a reporting template for "mid-term" and annual reports. This decision establishes September 15, 2021 as the initial deadline for the first "mid-term" report required by this decision and March 15, 2022 as the deadline for the first full annual report. The initial "mid-term" report shall be limited to activity metrics and program metrics to allow time to phase-in reporting for outcome metrics. The final annual report shall be filed on March 15, 2031. Future Commission decisions may propose a different reporting frequency for some data elements that is no less than annual. The large electrical corporations may eliminate certain data from their report, if it becomes irrelevant, with the concurrence of the Commission's Energy Division staff. Energy Division staff may also require additional data or revise the required data as necessary due to future VGI trends by revising the VGI data reporting template.

Each report shall summarize the data collection efforts that were used by the large electrical corporation and/or third parties. Each report shall also identify any barriers to data collection and potential solutions to access data available directly to the large electrical corporations; or through voluntary

agreements with third parties including but not limited to automakers and/or EV charging service providers.

Energy Division staff may order the large electrical corporations to present the results of their annual reports at a workshop open to all interested stakeholders.

A future Commission decision may identify a different timeline for reporting and may consider revisions to the schedule adopted in this decision for such data.

This decision holds that, as proposed by Cal Advocates,<sup>107</sup> the SB 350 reporting template should be a model and the large electrical corporations shall work with the Commission's Energy Division staff to review and revise existing templates and if necessary create any additional template(s) for VGI reporting.

The large electrical corporations must develop templates for the data to be included in the "mid-term" and annual report, in consultation with the Commission's Energy Division staff, and serve a draft of the data templates on the service list of this proceeding by February 28, 2021. The large electrical corporations shall jointly hold a workshop no later than March 20, 2021 to solicit feedback from interested parties before finalizing the templates. The large electrical corporations shall post the final data template, after receiving concurrence from the Commission's Energy Division staff, no later than April 20, 2021.

The Commission may consider revising this structure in the future, including in any decision on the draft TEF, to align with other TE reporting requirements.

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<sup>107</sup> CalAdvocates opening comments on sections 6 and 11 of the draft TEF at 12.

**16. Consideration of the National Institute of Standards and Technology's Reliability and Cybersecurity Protocols**

For each of the VGI protocols adopted pursuant to SB 676, the Commission must consider whether to incorporate the National Institute of Standards and Technology's reliability and cybersecurity protocols, or other equally protective or more protective cybersecurity protocols, into the adopted VGI strategies.<sup>108</sup> This decision holds that SB 676 requires that the Commission consider whether to order the large electrical corporations to apply the National Institute of Standards and Technology's reliability and cybersecurity protocols, or other equally protective or more protective cybersecurity protocols, to any technology that is deployed in pursuit of the VGI strategies adopted pursuant to SB 676.

No party commented on this issue in response to the SB 676 ruling, though several parties provided comments acknowledging the importance of this topic in response to the cybersecurity section 8.2 of the draft TEF. SCE noted current on-going efforts in collaboration with the Department of Energy and the Electric Power Institute.<sup>109</sup>

As a result, the Commission requires more information to determine if the specification of additional cybersecurity protocols for VGI technology is necessary, and if so, what existing protocols should be specified or whether additional protocols are needed. For that reason, this decision orders SCE to prepare a workplan for a cybersecurity gap-analysis that would consider EV charging equipment products used for TE programs, including distributed and cloud computing, networking, and communications. SCE should coordinate

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<sup>108</sup> Section 740.12(c)(5).

<sup>109</sup> SCE opening comments on sections 8 and 9 of the draft TEF at 8.



with federal and other organizations with expertise in this field when developing the workplan. SCE should consider equipment and systems owned by a large electrical corporation; and collaborate with EVSE manufacturers and EV charging service providers to evaluate equipment and systems connected to a large electrical corporation's systems including the existing standards listed by ChargePoint.<sup>110</sup> SCE shall prepare a public version with non-confidential information and a confidential version for review by the Commission's Energy Division. SCE shall propose its workplan and work schedule via a Tier 2 advice letter filed no later than 180 days after the effective date of this decision.

While this review of cybersecurity issues is ongoing at the Commission, it is necessary to ensure that current best practices are being followed. All future TE applications filed by the large electrical corporations shall document that the large electrical corporations follow cybersecurity best practices for all the TE equipment they fund, such as those identified in *California Energy Systems for the 21<sup>st</sup> Century* and the National Institute of Standards and Technology's (NIST) *Framework for Improving Critical Infrastructure Cybersecurity*.

## **17. Community Choice Aggregators**

This decision addresses two topics regarding CCAs and VGI: SB 676 statutory reporting obligations and collaboration between large electrical corporations and CCAs. Some parties provided comments on other issues in response to both the draft TEF and the SB 676 ruling, including whether CCAs are eligible to apply to the Commission for TE program funding. This decision does not address these other topics, which can be considered in a future Commission decision on the TEF.

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<sup>110</sup> ChargePoint's opening comments on sections 7 and 8 of the draft TEF at 10 and 11.

### **17.1. Statutory reporting**

Section 740.16(g) requires that “[e]ach community choice aggregator shall, one year after the commission establishes electric vehicle grid integration strategies pursuant to subdivision (c), report annually to the commission describing how its current and planned programs, rates, and investments in transportation electrification are expected to further the electric vehicle grid integration strategies.” The Commission has not previously requested comments on how reporting requirements should be implemented by CCAs.

This decision establishes specific CCA reporting requirements. These requirements differ from requirements for large electrical corporations because the statute does not require that CCAs implement the VGI strategies required of large electrical corporations.

Each CCA shall describe how its current and planned activities (i.e. programs, rates, and investments in transportation electrification) are expected to further electric vehicle grid integration strategies. At a minimum, each CCA shall report on its activities and programs using relevant section(s) of the reporting template developed for large electrical corporation reporting. CCAs shall also provide outcome-based metrics related to their role providing energy (some metrics are not relevant to energy utilities), including but not limited to load profiles for EV charging and participation, any CCA demand response programs, and avoided GHG. A CCA may request the creation of a template for use by CCAs, including any refinement needed to the metrics reported by CCAs, with the agreement of the Commission’s Energy Division staff. CCAs may jointly report on any output metrics or other metrics with a large electrical corporation in their service territory.

CCAs shall report by March 15, 2022 and annually through March 15, 2031.

This decision also recognizes that some CCAs have fewer resources, and therefore defers some requirement for smaller CCAs so that they can learn from the experience of other CCAs. The SB 676 legislative digest states that the bill establishes requirements for public utilities with greater than 700 gigawatt-hours (GWh) of annual electrical demand. While the legislature did not apply this distinction to CCAs, this decision finds that the same threshold is also appropriate to define smaller CCAs of equal to or less than 700 GWh of annual electrical demand that will be deferred from full reporting until March 15, 2023. During the deferral period, the annual reporting required of these CCAs by March 15, 2022 is limited to activity-based metrics for their specific VGI strategies.

### **17.2. Collaboration between large electrical corporations and CCAs**

The final VGI WG Final Report<sup>111</sup> states that “coordination and planning between CCAs and [large electrical corporations] on VGI will be essential.” In addition, the draft TEF<sup>112</sup> requested party comments regarding the appropriate role of CCAs to advance VGI. In response, AEE, PG&E, and SBUA provided opening comments agreeing with the VGI WG Final Report and some mentioned specific topics such as rates and incentives. PG&E recommended that the large

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<sup>111</sup> VGI WG Final Report at 12.

<sup>112</sup> Draft TEF (at 134)

electrical corporations collaborate with CCAs and other LSEs.<sup>113</sup> No parties opposed collaboration.

Accordingly, this decision orders that each large electrical corporation host a meeting with CCAs that overlap with their service territory and interested LSEs within 60 days of the effective date of this decision. Topics shall be determined by the participants and may include, but are not limited to, 1) coordination topics identified in party comments; 2) policy recommendations from the VGI Working Group that identify both investor owned utilities (i.e. large electrical corporations) and other LSEs as lead or support organizations; 3) opportunities to collaborate on mandatory SB 676 reporting by CCAs and large electrical corporations; and 4) future frequency of collaboration meetings.

### **17.3. Authority for CCA Orders**

In order to preemptively address any concerns by the CCAs that they should not be subject to the reporting orders of this decision, we note that the Commission asserted similar authority over CCAs in D.19-09-007. In that decision the Commission considered and rejected a jurisdictional argument concerning the authority of the Commission to order CCAs to submit to reporting requirements. That decision's rejection of the argument stated that the inability of the Commission to set CCA prices does not interfere with the Commission's duty to collect CCA price information. This decision adopts and reasserts those jurisdictional findings.

## **18. Role of Small and Multi-Jurisdictional Utilities**

SB 676 requires that all "electrical corporations that are required to file an integrated resource plan pursuant to Section 454.52" comply with the

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<sup>113</sup> PG&E opening comments on draft TEF section 11.1 at 12; AEE opening comments on draft TEF section 11.1 at 5; SBUA opening comments on draft TEF section 11.1 at 7.

requirements of Section 740.16.<sup>114</sup> PacifiCorp recommended that the Commission design any regulatory strategies or metrics with sufficient flexibility to allow utilities to tailor them to individual utilities and service areas.<sup>115</sup> We agree. This decision finds that providing additional flexibility for small and multi-jurisdictional utilities (SMJUs)<sup>116</sup> when implementing the requirements of this decision is reasonable. Specifically, SMJUs are only required to address VGI strategies in each application for transportation electrification programs and investments filed pursuant to Section 740.12 and to comply with limited reporting requirements. SMJUs shall quantify how the investments described in an application are expected to further the electric vehicle grid integration strategies adopted by the Commission in this and any subsequent decisions. This should allow these smaller utilities to learn from the experience of large electrical corporations, including pilots and deployment of VGI in TE programs, and to tailor strategies to their service territories.

In addition, the initial annual reporting of VGI metrics by each SMJU on March 15, 2022 is limited to activity-based metrics for any VGI strategies that the SMJU has adopted. After that date, they shall report annually on activity, program, and outcome metrics related to their VGI implementation strategies and policy actions. SMJUs need not participate in the large electrical corporations' annual stocktake of VGI implementation strategies and policies by other organizations as described in section **Error! Reference source not found.** of

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<sup>114</sup> D. 20-03-028 at 56 requires that all load-serving entities file an Integrated Resources Plan.

<sup>115</sup> PacifiCorp at p2.

<sup>116</sup> The SMJUs are Bear Valley Electric Services, PacifiCorp, and Liberty Utilities.

this decision. A SMJU may propose a reporting template with the agreement of the Commission's Energy Division staff.

### **19. Third Party Evaluation**

The VGI staff paper proposed that one large electrical corporation issue a request for proposals (RFP) for third party evaluation of the large electrical corporations VGI implementation. This evaluation would complement large electrical corporation annual reports required under Section 740.16(i). The evaluation report would provide a holistic qualitative evaluation of progress to date; identify the latest best practices; and identify other lessons learned such as areas for improvement based on initial experience and/or market or technology changes. This information would inform the Commission and others of potential policy revisions or areas where additional information is needed to evaluate current policies.

The VGI staff paper proposed that one large electrical corporation would lead development of an RFP scope of work (SOW) in consultation and coordinate with the Commission's Energy Division and the other large electrical corporations and include the Commission's Energy Division in the evaluation of bidders in response to the RFP. In addition, the evaluator would provide a draft report to the Commission's Energy Division staff for review prior to release. The final report would be due four months after the release of the large electrical corporations' second annual report under SB 676. In the longer term, as VGI markets and technologies are better understood, evaluation would primarily occur through mid-term and annual VGI metrics reporting and could be addressed by future TEF evaluation processes if appropriate.

The VGI staff paper also requested that parties provide any comments on this topic with their comments on draft TEF section 11.1 and EDF, PG&E,

SDG&E, and Tesla provided comments on this topic. Tesla agreed that identifying best practices, lessons learned and market or technology changes could be useful for future program implementation and that future evaluations could occur via the TEF and TEP updates.<sup>117</sup> SDG&E expressed openness to a third-party evaluator and proposed that it consider efforts by all relevant load serving entities.<sup>118</sup>

PG&E disagreed, saying that the evaluation would not be necessary or timely during the development of use cases and pilots.<sup>119</sup> EDF also disagreed and recommended that the Commission focus on integrating VGI into existing reporting requirements such as load management reports. EDF also stated that the process for hiring a Third-Party evaluator could cause delays.<sup>120</sup>

This decision finds that a third-party evaluation is necessary and orders that the large electrical corporations implement the VGI staff paper proposed third-party evaluation process. PG&E's assertion that the market is still evolving is correct but does not negate the need for evaluation of market development and large electrical corporation activities. In addition, the evaluation will serve a different purpose than the load management reports cited by EDF and will evaluate not just individual near term actions but wholistic progress on SB 676 and non-SB 676 VGI strategies adopted in this decision.

Therefore, one large electrical corporation shall lead development of an RFP SOW in consultation and coordination with the Commission's Energy Division and the other large electrical corporations. The lead large electrical

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<sup>117</sup> Tesla opening comments on draft TEF sections 6 and 11 at 3 and 4.

<sup>118</sup> SDG&E opening comments on draft TEF sections 6 and 11 at 12.

<sup>119</sup> PG&E opening comments on draft TEF sections 6 and 11 at 14.

<sup>120</sup> EDF opening comments on draft TEF sections 6 and 11 at 11 and 12.

corporation shall share a draft SOW with the Commission's Energy Division staff by June 15, 2022 and release the RFP by July 15, 2022. The lead electrical corporation shall include the Commission's Energy Division in the evaluation of bidders in response to the RFP. The evaluator will provide a draft report to the Commission's Energy Division staff for review by June 15, 2023. The final report will be due August 15, 2023, which is four months after the release of the large electrical corporations' second annual report under SB 676. The dates for the evaluation can be revised by the large electrical corporations in consultation with Energy Division staff if needed to allow more time to implement VGI efforts and provide enough data for the evaluation.

## **20. Comments on Proposed Decision**

The proposed decision in this matter was mailed to the parties in accordance with Section 311 of the Public Utilities Code and comments were allowed under Rule 14.3 of the CPUC's Rules of Practice and Procedure. Comments were filed on December 3, 2020 by SCE, Tesla, Plug In America, PG&E, SBUA, SDG&E, ChargePoint Inc., EDF Renewables, Inc., TURN, Cal Advocates, Green Power Institute, jointly by Natural Resources Defense Council, Environmental Defense Fund, Advanced Energy Economy, EVBox, North America, Inc., Siemens, Vehicle-Grid Integration Council, American Honda Motor Co., Inc., California Energy Storage Alliance, Greenlots, and Enel X North America, Inc., and jointly by Silicon Valley Clean Energy Authority, Marin Clean Energy, Sonoma Clean Power Authority, California Choice Energy Authority, East Bay Community Energy, City of San José, and Peninsula Clean Energy. Reply comments were filed on December 8, 2020 by SCE, PG&E, SBUA, Cal Advocates, Tesla, TURN, ChargePoint, Inc., EDF Renewables, Inc., SDG&E, jointly by Natural Resources Defense Council, Environmental Defense Fund,



Advanced Energy Economy, EVBox, North America, Inc., Siemens, Vehicle-Grid Integration Council, American Honda Motor Co., Inc., California Energy Storage Alliance, Greenlots, and Enel X North America, Inc., and jointly by Silicon Valley Clean Energy Authority, Marin Clean Energy, Sonoma Clean Power Authority, California Choice Energy Authority, East Bay Community Energy, City of San José, and Peninsula Clean Energy. Changes have been made throughout the decision in response to party comments.

In response to comments from the large electrical corporation seeking cost recovery for the reporting requirements imposed by this decision, the request is denied. The large electrical corporations are expected to utilize their existing budgets for regulatory and operational needs, as approved as a part of each large electrical corporation's General Rate Case, to fulfill the reporting requirements of this decision.

## **21. Assignment of Proceeding**

Clifford Rechtschaffen is the assigned Commissioner and Patrick Doherty and Sasha Goldberg are the assigned Administrative Law Judges in this proceeding.

### **Findings of Fact**

1. VGI can provide resiliency services, and a variety of other potential services are identified in the VGI WG report
2. The reference in Section 740.16(b)(1) to "grid-connected electric vehicles" could be misconstrued in the future and read as not including some of the forms of electric transportation recently defined by D.20-09-025.
3. Reforming retail rates is feasible and low-cost with high potential benefit.
4. CAISO is the lead agency for determining wholesale electricity market rules and access, with the Commission playing a supporting role.

5. Designing wholesale market rules and access has the ability to align wholesale market signals with VGI applications (similar to the way in which retail rates can be modified to advance VGI goals).

6. Pursuit of VGI pilots, demonstrations, emerging technologies, and studies will advance VGI, as defined by this decision, by ensuring that proven VGI technologies can be scaled and by expanding the technology required to advance VGI.

7. Accelerating the use of EVs for bi-directional non-grid-export power and PSPS resiliency and backup would support broader goals around customer resiliency.

8. Reforming interconnection rules to allow for more efficient integration of EVs into the grid for the purpose of provide grid-related services is complementary to, and a condition precedent for, achieving other VGI strategies.

9. Reforming interconnection rules related to VGI services is low cost and is entirely feasible to pursue.

10. The development, approval, and supported adoption of technical standards not related to interconnection are important policy goals to advance VGI.

11. Funding and launching market education and coordination would help to advance VGI.

12. A benefit of VGI is that it allows EVs to respond to signals and provide grid services, and therefore a larger number of customers participating in VGI would be beneficial as it would increase the amount of electricity to provide grid services.

13. ALM has the potential to vary the charging of grid-connected EVs in a way that optimizes grid performance.

14. Directly incenting the export of energy from an EV to the grid would provide incentives for the development of technologies and programs that would allow EV drivers to sell their stored electricity to grid operators during times of need.

15. The concept of utilizing EVs to provide demand response would allow EVs to provide grid services during times of critical strain on the grid.

16. Each of the VGI strategies adopted pursuant to SB 676 account for the effect of TOU rates on electricity demand from EV charging.

17. Each of the VGI strategies adopted pursuant to SB 676 reflects electrical demand attributable to EV charging.

18. Each of the VGI strategies adopted pursuant to SB 676 promotes EV ownership and transportation electrification by advancing the ability of EVs to provide grid benefits, and thereby potentially providing financial benefits to EV operators.

19. The Commission requires more information to determine if the application of certain cybersecurity protocols to VGI technology is necessary, and if so what those protocols should be.

20. It is reasonable to provide small and multi-jurisdictional utilities (SMJUs) additional flexibility when implementing the requirements of this decision.

### **Conclusions of Law**

1. Section 740.16(b)(4) grants the Commission the authority to alter the statutory definition of VGI.

2. Promotion of resiliency is an important policy objective that the Commission should seek to advance.

3. The addition of resiliency to the statutory definition of VGI is reasonable and should be approved.

4. Including the term “operational flexibility” to the language of Section 740.16(b)(1)(A) clarifies that VGI can provide this specific service to electrical grid operators in the event electrical resources are constrained.

5. Modification of the language of Section 740.16(b)(1)(A) to include the term “operational flexibility” is reasonable and should be approved.

6. To ensure consistency with D.20-09-025, the definition of VGI should be modified so that “grid-connected electric vehicles” is changed to read “grid-connected light-duty electric vehicles, medium-duty electric vehicles, heavy-duty electric vehicles, off-road electric vehicles, or off-road electric equipment.”

7. Adopting the reform of retail rates as a VGI strategy pursuant to SB 676 is reasonable.

8. It is reasonable and efficient to pursue optional dynamic pricing structures for EV customers to promote VGI.

9. It is appropriate for the Commission to adopt the development and funding of government and LSE customer programs, incentives, and DER procurements as a non-SB 676 VGI strategy.

10. Designing wholesale market rules and access should be adopted as a non-SB 676 VGI strategy.

11. Pursuit of VGI pilots, demonstrations, emerging technologies, and studies is a reasonable VGI strategy and should be adopted as a non-SB 676 VGI strategy.

12. VGI pilots, demonstrations, and studies should accelerate and not delay implementation of VGI strategies.

13. It is reasonable to adopt accelerating the use of EVs for bi-directional non-grid-export power and PSPS resiliency and backup as a non-SB 676 VGI strategy.

14. Reforming interconnection rules to allow for more efficient integration of EVs into the grid to provide grid-related services should be adopted as a VGI strategy pursuant to SB 676.

15. The development, approval, and supported adoption of technical standards not related to interconnection should be adopted as an SB 676 VGI strategy.

16. VGI customer outreach and education should be adopted as a non-SB 676 VGI strategy.

17. The record demonstrates that the time is ripe to pursue certain near-term VGI objectives.

18. ALM is a worthy near-term VGI objective and should be promoted.

19. It is reasonable to explore the possibility of credit-for-export compensation as a near-term objective to advance VGI.

20. The ability of EVs to supply demand response is a near-term VGI objective that should be adopted by this decision.

21. Identification of the use cases that each VGI strategy supports is a near-term VGI objective that should be adopted by this decision.

22. Identification of how the large electrical corporations are integrating VGI across their relevant business activities is a near-term VGI objective that should be adopted by this decision.

23. VGI strategies should be consistent with the Commission's ESJ Action Plan.

24. It is reasonable to adopt certain equity requirements that would apply to some of the adopted VGI strategies and metrics.

25. Each of the VGI strategies adopted pursuant to SB 676 is in the best interests of ratepayers as defined by Section 740.8 and consistent with Section 451.

26. The goal of Section 740.12 referred to in Section 740.16 is the promotion of transportation electrification.

27. Each of the VGI strategies that should be adopted by this decision pursuant to SB 676 is consistent with the transportation electrification goals established by the Legislature in Section 740.12.

28. Any strategies adopted by this decision pursuant to SB 676 must maximize the use of “cost-effective” VGI, meaning that the strategies themselves need to be shown to be cost-effective at the time of establishment.

29. All VGI strategies that are not adopted pursuant to SB 676 should be adopted pursuant to the Commission’s authority to advance VGI generally under the terms of this rulemaking and SB 350.

30. It is reasonable to adopt certain program metrics to measure the progress toward achievement of certain VGI strategies and near-term VGI objectives.

31. It is reasonable to adopt certain outcome metrics to measure the progress toward achievement of certain VGI strategies and near-term VGI objectives.

32. It is reasonable to order to collection of sub-categories for each of the program and outcome metrics adopted.

33. It is reasonable to adopt reporting obligations on each of the large electrical corporations as an VGI activity metric.

34. SB 676 requires the Commission to consider whether to order the large electrical corporations to apply the National Institute of Standards and Technology’s reliability and cybersecurity protocols, or other equally protective

or more protective cybersecurity protocols, to any technology that is deployed in pursuit of the VGI strategies adopted pursuant to SB 676.

35. Small and multi-jurisdictional utilities (SMJUs) should only be required to address VGI strategies in each application filed for transportation electrification programs and investments filed pursuant to Section 740.12 and to comply with limited reporting requirements.

## **O R D E R**

**IT IS ORDERED** that:

1. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall each report on its Vehicle Grid Integration (VGI) activities as required by this decision, including:

customer programs and incentives related to VGI;

adoption of rates that encourage VGI and adoption of any mechanism to provide credit for export.

efforts to collaborate with the California Independent System Operator to design wholesale market rules and access that support VGI as defined by this decision;

use of Electric Program Investment Charge (EPIC) and/or other sources of funding for VGI technology demonstration projects;

efforts to accelerate the use of VGI for resiliency purposes;

progress to reform interconnection rules to advance VGI;

support and adoption of non-interconnection technical standards to advance VGI;

efforts to fund and launch VGI customer education;

any complementary policies needed to support Automated Load Management (ALM) technology;

ALM deployment in its territory in the context of both existing and future transportation electrification programs, rules, and tariffs to the extent practical; including the number of ALM

installed for passenger vehicles and any medium and heavy-duty vehicle segment(s) under currently approved transportation electrification programs as well as the expected avoided distribution and customer-side cost savings attributable to such ALM installations;

VGI participation in its demand response programs, including customer retention (including data requested from 3<sup>rd</sup> party providers as needed);

implementation of any VGI pilots;

how it integrates VGI across its relevant business activities;

output-based metrics as described in this decision;

consult with the Commission's Energy Division staff and interested stakeholders to create a reporting template as described by this decision; and

file "mid-term" reports annually starting on September 15, 2021 (with the first report limited to activity and program metrics) and ending September 15, 2030; and shall file annual reports starting on March 2021 and ending March 15, 2031.

2. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly provide an annual stocktake on actions outside of those ordered by this decision that will facilitate Vehicle Grid Integration (VGI) strategies, which shall address actions under the jurisdiction of the Commission as well as actions by other agencies and/or organizations that would help realize a given VGI strategy adopted by this decision as part of their annual reporting.

3. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall each collaborate with the California Independent System Operator to design wholesale market rules and access that support Vehicle Grid Integration as defined by this decision.



4. The Commission's Energy Division shall host a workshop no later than January 30, 2021 regarding standard evaluation criteria for Automated Load Management (ALM) deployment by the large electrical corporations and may host additional workshops if needed as determined by Energy Division staff. The large electrical corporations shall participate with Energy Division staff to develop an agenda and Energy Division staff shall serve the agenda for the workshop no less than 10 days before the workshop.

5. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall, each, in all of its future applications for transportation electrification (TE) programs, or rule or tariff to support TE infrastructure installation:

identify how it will deploy customer-side Automated Load Management (ALM) at host sites through such programs, rule, and/or tariff where appropriate because this technology will support TE installation at equal or lesser costs than hardware-based electrical capacity while meeting TE charging needs; and

describe its standard evaluation criteria to determine host sites where ALM would benefit ratepayers by reducing costs while meeting host site needs for electric vehicle charging.

6. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall each provide customer education and evaluate customer acceptance once Automated Load Management is installed at a host site.

7. Southern California Edison Company shall file a Tier 2 advice letter within 90 days of the effective date of this decision describing the potential for deployment of Automated Load Management (ALM) technology and

recommendations regarding deployment of ALM in the ChargeReady 2 program as authorized by Decision 20-08-045.

8. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall, each, in all of its future applications for transportation electrification (TE) programs:

identify strategies and, where applicable and appropriate, identify marketing, education, and outreach (ME&O) budgets for educating host site customers on the benefits of 1) voluntarily passing time-of-use rate signals to electric vehicle drivers and, 2) participating in any demand response program(s) for which the host site customers are eligible and where appropriate;

identify how it will establish outreach materials and load management tactics to reduce any grid impacts from host site customers that opt out of a default agreement to pass on time-of-use pricing;

contain a report on the number of site host customers (by location type) that opt out of passing through time-of-use rate signals and the alternative pricing signals they use;

identify how the transportation electrification programs proposed in the application will maximize the potential use of Vehicle Grid Integration (VGI) for on-site backup power where practical;

identify relevant VGI use cases;

demonstrate that any VGI programs proposed consider the Commission's Environmental and Social Justice (ESJ) Action Plan;

provide increased incentive levels for ESJ communities if it proposes rebates to encourage VGI implementation;

document effective strategies for engagement with community-based organizations to seek their advice on VGI program design and implementation that appropriately prioritizes ESJ communities; and

document that it follows cybersecurity best practices for all TE equipment to be funded by the proposed application, such as those identified in *California Energy Systems for the 21<sup>st</sup> Century* and the National Institute of Standards and Technology's (NIST) *Framework for Improving Critical Infrastructure Cybersecurity*.

9. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly host a workshop in the first quarter of 2021 to educate potential Vehicle Grid Integration (VGI) demand response providers on demand response opportunities and identify any barriers to participation for VGI resources. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly develop the agenda for the workshop in collaboration with the Commission's Energy Division staff and shall serve notice of the workshop's date, time, and location not less than 10 days in advance to the service list of this proceeding and the service list for Application 17-01-012. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly serve to the service list of this proceeding and the service list for Application 17-01-012 a post-workshop report within 30 days of the workshop that identifies any barriers to VGI participation in demand response programs, or any other programs such as bids for resource adequacy services to be delivered in 2022 per Decision 19-07-009.

10. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company may request approval of interim studies, as described in this decision, via a Tier 2 advice letter. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall not propose to spend more than \$2 million jointly allocated on the same basis as the budget for the Emerging Technology program.

Prior to filing any advice letter the large electrical corporations must meet with California Energy Commission and the Commission's Energy Division staff to avoid duplication with other state agency efforts; and must request stakeholder feedback via one or more Vehicle Grid Integration Working Group meetings and/or workshops. Any such advice letter must be filed no later than 150 days after the effective date of this decision and comply with the requirements of this decision.

11. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly file a Tier 3 advice letter within 150 days of the effective date of this decision requesting approval of a proposed scope and budget for a Vehicle Grid Integration/Transportation Electrification Emerging Technology program as described in this decision. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly consult with the California Energy Commission and other state agencies, other load serving entities (LSEs) conducting technology development activities; and other experts and stakeholders including Program Advisory Councils to help develop the proposed program structure and scope. The advice letter shall also contain a proposed process to annually refine the program scope in consultation with these same entities. In the advice letter Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly propose and provide justification for a reasonable budget that reflects priority unfunded needs.

12. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly report semi-annually to the Commission on the status, results to date, budget, challenges and lessons learned

in the Vehicle Grid Integration/Transportation Electrification Emerging Technology program. The first report shall be due eight months after program approval. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company may jointly propose to combine this reporting with other types of reporting after obtaining agreement from the Commission's Energy Division. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly disseminate research and program reports and other results via the Emerging Technologies Coordinating Council.

13. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall begin the planning process for Vehicle Grid Integration (VGI) pilots by jointly completing a stocktake to identify existing or planned pilots related to VGI that are funded by Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company, other load-serving entities (LSEs), the California Energy Commission, or any other easily identifiable organization. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly provide a draft stocktake to the Commission's Energy Division staff for review within 30 days of the effective date of this decision and then serve the draft stocktake to the service list of this proceeding within 60 days of the effective date of this decision.

14. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly conduct a public workshop on the purpose and budgets of proposed Vehicle Grid Integration (VGI) pilots within 90 days of the effective date of this decision and provide notice to the service list for this proceeding and Rulemaking 19-10-005. Prior to the

workshop, Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly collaborate with staff from the Commission's Energy Division, the California Energy Commission, and other California load-serving entities (LSEs) to 1) develop a list of priority needs for pilots, 2) ensure that the list will avoid overlap with scope of the Electric Program Investment Charge program or other programs including programs administered by the California Energy Commission, and 3) ensure that the pilots will not delay the implementation of VGI strategies at scale that do not require piloting. Each of Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company may file a Tier 3 advice letter requesting approval of VGI pilots, as described in this decision, within 210 days of the effective date of this decision. The large electrical corporations shall identify any non-ratepayer potential funding sources and shall not request, in their combined applications, more than \$35 million.

15. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly develop and implement strategies to prioritize environmental and social justice communities in siting and realizing the benefits of the Vehicle Grid Integration (VGI) pilots ordered by this decision, including working with community-based organizations. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly include equity strategies as a topic in the VGI pilots workshop ordered by this decision.

16. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly develop certain Vehicle Grid Integration program metrics in consultation with the Commission's Energy Division staff on a program-by-program basis, as described in this decision.

17. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall jointly begin tracking the outcome metrics as described in this decision beginning March 1, 2021 (or continue to track this data from the date of this decision where they are already collecting it for other purposes) and continue this tracking through December 31, 2030.

18. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall each, when collecting data to use for metric reporting ordered by this decision: 1) differentiate between residential and commercial customers, 2) for residential customer Vehicle Grid Integration (VGI) programs, propose environmental and social justice sub-categories for reporting program and outcome metrics and consider sub-categories for commercial customers after consultation with the Commission's Energy Division staff, 3) differentiate medium-duty and heavy-duty VGI use cases from light-duty VGI use cases, and determine whether additional segments are necessary after consultation with the Commission's Energy Division staff. For those sub-category definitions that require consultation with the Commission's Energy Division staff, each of Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall ensure that such consultation is completed no later than 90 days after the effective date of this decision, and that the results of the consultation are reflected as soon as is practicable in VGI metric reporting.

19. Southern California Edison Company shall prepare a workplan for a cybersecurity gap-analysis, as described by this decision, including the preparation of a public version with non-confidential information and confidential version for review by the Commission's Energy Division. Southern California Edison Company shall propose its workplan and work schedule via a

Tier 2 advice letter filed no later than 180 days after the effective date of this decision.

20. Pursuant to the orders of Public Utilities Code Section 740.16(g), each of the Community Choice Aggregators (CCAs) operating in utility territories subject to the Commission's jurisdiction shall describe how its current and planned activities (i.e., programs, rates, and investments in transportation electrification) are expected to further electric vehicle grid integration strategies. Each CCA shall begin tracking the outcome metrics described in this decision no later than March 1, 2021. At a minimum, each CCA shall report on its activities and programs using relevant section(s) of the reporting template developed for large electrical corporation reporting. A CCA may request the creation of a separate template for use by CCAs with the agreement of the Commission's Energy Division staff. Each CCA shall also provide outcome-based metrics related to its role providing energy, including but not limited to load profiles for electric vehicle charging and participation, CCA demand response programs, and avoided greenhouse gases as determined by Energy Division staff after consultation with CCAs. CCAs may jointly report on any output metrics or other metrics with a large electrical corporation in their service territory. CCAs shall report by March 15, 2022 and annually through March 15, 2031.

21. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall each host a meeting with Community Choice Aggregators (CCAs) that overlap with its service territory and other interested load-serving entities (LSEs) within 60 days of the effective date this decision. The topics to be discussed at the meeting shall be determined by the participants and may include, but are not limited to: 1) coordination topics identified in party comments, 2) policy recommendations from the Vehicle Grid



Integration Working Group that identify both the large electrical corporation and other LSEs as lead or support organizations, 3) opportunities to collaborate on mandatory Senate Bill 676 reporting by CCAs and the large electrical corporation, and 4) future frequency of collaboration meetings.

22. Each of Bear Valley Electric Service, Liberty Utilities (formerly CalPeco Electric), and PacifiCorp (collectively the SMJUs) shall, in each application for transportation electrification programs and investments filed pursuant to Public Utilities Code Section 740.12, quantify how the investments described in the application are expected to further the electric vehicle grid integration (VGI) strategies adopted by the Commission. The initial annual reporting of VGI metrics by each SMJU on March 15, 2022 is limited to activity-based metrics for any VGI strategies that the SMJU has adopted. After that date, they shall report annually on activity, program, and outcome metrics related to their VGI implementation strategies and policy actions.

23. Southern California Edison Company, San Diego Gas & Electric Company, and Pacific Gas and Electric Company shall designate a lead electrical corporation to develop and issue a Request for Proposals (RFP) for third party evaluation in consultation and coordination with the Commission's Energy Division. The lead large electrical corporation shall share a draft scope of work consistent with the requirements of this decision with the Commission's Energy Division staff by June 15, 2022 and release the RFP by July 15, 2022.

The lead large electrical corporation shall include the Commission's Energy Division in the evaluation of bidders in response to the RFP. The evaluator will provide a draft report to the Commission's Energy Division staff for review by June 15, 2023. The final report is due August 15, 2023.

24. Rulemaking 18-12-006 remains open.

This order is effective today.

Dated \_\_\_\_\_, at San Francisco, California.