

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

**ENERGY DIVISION**

**Item #2 (Rev. 1)  
Agenda ID #20421  
RESOLUTION E-5192  
May 5, 2022**

**R E S O L U T I O N**

Resolution E-5192. Pacific Gas and Electric Company Advice Letter 6259-E requests approval of four vehicle-grid integration pilots pursuant to Decision 20-12-029.

**PROPOSED OUTCOME:**

- Pacific Gas and Electric Company (PG&E) filed Advice Letter 6259-E on July 15, 2021 to request funding for four vehicle-grid integration pilots. This Resolution approves the vehicle-to-grid residential and commercial pilots (pilots #1 and #2) and vehicle-to-microgrid Public Safety Power Shutoff pilot (pilot #3) with modifications to ensure that each pilot is reasonable and complies with the requirements of Decision (D.) 20-12-029. This Resolution denies funding for the proposed exploring vehicle-to-grid export value pilot (pilot #4) and allows PG&E to correct deficiencies and file a new Tier 2 Advice Letter within 60 days.

**SAFETY CONSIDERATIONS:**

- VGI pilots #1, #2 and #3 would provide back-up power options and potentially improve safety. Commercial customer equipment must comply with the Safety Requirements Checklist that the California Public Utilities Commission adopted in D.18-05-040. Residential customer equipment must comply with safety requirements focused on residential customers.

**ESTIMATED COST:**

- The approved pilots will cost \$11,700,000 in total.

By Advice Letter 6259-E filed on July 15, 2021.

## **SUMMARY**

This Resolution approves, with modifications, three vehicle-grid integration (VGI) pilots proposed by Pacific Gas and Electric Company (PG&E) Advice Letter (AL) 6259-E. This Resolution approves these modified proposed pilots based on Decision (D.) 20-12-029<sup>1</sup> Ordering Paragraphs (OPs) 13, 14 and 15. Specifically, this Resolution approves a total budget of \$11,700,00 for PG&E to implement three short-term pilots to address specific barriers to VGI:

- Pilot #1: Vehicle-to-grid Residential Pilot Program (residential pilot) is approved as modified in this Resolution at \$7.5 million.
- Pilot #2: Vehicle-to-grid Commercial Pilot Program (commercial fleets pilot) is approved as modified in this Resolution at \$2.7 million.
- Pilot #3: Vehicle-to-microgrid Public Safety Power Shutoff Microgrid Pilot (microgrids pilot) is approved as modified in this resolution at \$1.5 million.

This Resolution also denies the proposed budget of \$2.3 million for pilot #4 to explore vehicle-to-grid export value because AL 6259-E does not fully comply with D.20-12-029 requirements regarding budget, scope and reporting. This Resolution does, however, authorize PG&E to refile a new Tier 2 AL within 60 days to correct these deficiencies, if it chooses.

## **BACKGROUND**

This Resolution disposes of PG&E AL 6259-E.

### **1. Senate Bill 676 and Decision 20-12-029**

Senate Bill 676 (Ch. 484, Stats. 2019) (SB 676) enacted Public Utilities Code Section 740.16, which requires the CPUC 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 California Public Utilities Commission (CPUC) helped to create a VGI working group including multiple state agencies and a range of

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<sup>1</sup> DECISION CONCERNING IMPLEMENTATION OF SENATE BILL 676 AND VEHICLE- GRID INTEGRATION STRATEGIES issued December 21, 2020.

stakeholders. The VGI working group evaluated potential VGI use cases and provided policy recommendation in a June 30, 2020, report.

On December 21, 2020, the CPUC issued D.20-12-029 to provide direction on implementation of SB 676.<sup>2</sup> The CPUC found, based in part on the final VGI working group report, that VGI pilots “will advance VGI...by ensuring that proven VGI technologies can be scaled and by expanding the technology required to advance VGI.” Therefore, D.20-12-029 authorized PG&E, Southern California Edison Company (SCE) and San Diego Gas & Electric Company (SDG&E) (collectively, the “IOUs”) to propose VGI pilots.<sup>3</sup> The decision requires that proposed pilots “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.”

D.20-12-029 also set other requirements that apply to AL 6259-E:<sup>4</sup>

- Develop a list of priority needs for these VGI pilots including a stocktake of existing VGI pilots.
- Ensure that proposed pilots do not overlap with the scope of other programs such as Electric Program Investment Charge (EPIC) and other California Energy Commission programs.
- Ensure that the pilots would not delay implementation of VGI strategies currently ready for deployment at scale.
- Consider recommendations from the VGI working group and CALSTART.<sup>5</sup>
- Provide 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.

D.20-12-029 authorized the IOUs to request in total up to \$35 million in ratepayer funding, which Energy Division staff may reduce. Applications must identify any non-ratepayer potential funding sources.

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<sup>2</sup> The CPUC issued this decision under Rulemaking 18-06-012.

<sup>3</sup> D.20-12-029 section 6.8 and Ordering Paragraph (OP) 14.

<sup>4</sup> D.20-12-029, pp.42, 43.

<sup>5</sup> D.20-12-029 includes the VGI Working Group final report and cites 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, p.6.

## 2. PG&E AL 6259-E Procedural Background

PG&E, SCE and SDG&E jointly filed a VGI pilots stocktake in March 2021 and held public workshops on March 16, 2021, and June 4, 2021.<sup>6</sup>

Following the stocktake, PG&E filed AL 6259-E on July 15, 2021. PG&E also provided a data response with additional information on the pilots and proposed budget on October 15, 2021, as noted in the Attachment, and an additional data response on November 18, 2021.

## 3. Summary of PG&E Proposed Pilots

The four tables below summarize the four proposed pilots described in AL 6259-E. These tables reflect PG&E's proposal and not the CPUC's evaluation of the pilots. These pilots address EV exports to the electrical grid (V2X) and vehicle exports to a micro-grid (V2M) as noted earlier.

*Table 1: Summary of Proposed Pilot #1: V2X Residential Pilot*

V2X Residential Pilot (\$7.5 million) <sup>7</sup>	
Objective	<ul style="list-style-type: none"><li>PG&amp;E proposes a three-year V2X Residential Pilot focused on spurring adoption of V2X (bidirectional technologies) for 1,000 single-family residential customers with light-duty EVs by 2023.<sup>8</sup></li><li>The pilot would seek to demonstrate V2X light-duty EVs and show how this technology can reduce the total cost of EV ownership once barriers are overcome.</li><li>The pilots would seek to prove out five value-streams: backup power in 2022; followed by customer bill management, system real-time energy, system renewable integration and EV export for grid services (such as system resource adequacy, system capacity) in 2023.<sup>9</sup></li></ul>
Barriers addressed	<ul style="list-style-type: none"><li>The pilot would address barriers such as lack of real-world experience with the technology; incremental costs for electric vehicle supply equipment (EVSE) with V2X capabilities; unaffordability for customers in disadvantaged communities; lack of market signals for deployment; lack of information about costs; programs/rules that incentivize stationary</li></ul>

<sup>6</sup> The VGI pilots stocktake is available at [www.cpuc.ca.gov/vgi/](http://www.cpuc.ca.gov/vgi/)

<sup>7</sup> AL 6259-E p.10. Note that page numbers refer to the PDF page number of the AL. The attachment does not contain page numbers.

<sup>8</sup> *ibid* p.10.

<sup>9</sup> *ibid* p.14, 25.

	storage but not EVs that export to the grid; lack of customer education; and need for a system to aggregate pricing signals and communicate them to market actors. <sup>10</sup>
Success metrics	<ul style="list-style-type: none"><li>PG&amp;E proposed the following: reaching the customer sign-up target of 1,000 participants by the end of the second year (2023); implementing value-streams on an on-going basis; determining the value of bidirectional technology to customers and the electricity grid; achieving cost transparency of VGI technology deployments; and creating sustainable pathways for bidirectional vehicles to participate in vehicle-grid integration services.<sup>11</sup></li></ul>
Customer engagement	<ul style="list-style-type: none"><li>PG&amp;E would work closely with local Community Based Organization (CBOs) to help educate Environmental and Social Justice (ESJ) communities.<sup>12</sup></li></ul>
Timeline	<ul style="list-style-type: none"><li>The pilot would start in 2022 and end in 2024.</li></ul>
Customer incentives	<ul style="list-style-type: none"><li>Participants would receive rebates starting at \$2,500 to partially offset the up-front the costs of bidirectional or V2X EVSE with an additional \$500 upfront incentive for customers in ESJ communities. Participants could also receive participation incentives of up to \$2,000.<sup>13</sup></li></ul>
Technology requirements	<ul style="list-style-type: none"><li>PG&amp;E would verify that technology providers meet interoperability, safety and functionality requirements including ability to receive event signals via standardized protocols such as Open ADR or Institute of Electrical and Electronics Engineers (IEEE) 2030.5.<sup>14</sup></li></ul>
Reporting	<ul style="list-style-type: none"><li>PG&amp;E proposes to report on the following metrics:<ul style="list-style-type: none"><li>Customer enrollment and attrition rates;</li><li>V2X incremental deployments costs;</li><li>Influence of the pilot incentives to motivate V2X purchase decisions;</li><li>Value (revenue and other benefits) to customers and to the electricity grid for each V2X application tested in the pilot;</li><li>Total cost of ownership savings due to V2X; and</li><li>Pathways (existing rules and regulations) that currently inhibit V2X value creation for customers and/or the electricity grid.<sup>15</sup></li></ul></li></ul>

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<sup>10</sup> ibid pp.11-13, 19.

<sup>11</sup> ibid pp.10-11.

<sup>12</sup> ibid p.21.

<sup>13</sup> ibid p.15.

<sup>14</sup> ibid p.15. PG&E also discussed ISO 15118.

<sup>15</sup> ibid p.31.

Table 2: Summary of Proposed Pilot #2: V2X Commercial Pilot

V2X Commercial Pilot (\$2.7 million)	
Objective	<ul style="list-style-type: none"> <li>PG&amp;E proposed a three-year V2X pilot focused on spurring adoption of bidirectional charging fleets of medium- and heavy-duty (MD/HD) EVs that are interconnected and charge at commercial buildings.<sup>16</sup></li> <li>PG&amp;E intends to sign up 200+ bidirectional MD/HD EVs and charging stations to demonstrate the value of V2X MD/HD technology and show how this technology can reduce the total cost of EV ownership once barriers are overcome.<sup>17</sup></li> <li>The pilot would prove out five value-streams: backup power in 2022; followed by customer bill management, system real-time energy, grid upgrade deferral and EV export for grid services (such as system resource adequacy, system capacity) in 2023.<sup>18</sup></li> </ul>
Barriers addressed	<ul style="list-style-type: none"> <li>The pilot would address barriers such as lack of real-world experience; incremental costs for EVSE with V2X capabilities; lack of market signals for deployment; lack of information about costs; programs/rules that incentivize stationary storage but not EVs that export to the grid; lack of customer education and need for a system to aggregate pricing signals and communicate them to market actors.<sup>19</sup></li> </ul>
Success metrics	<ul style="list-style-type: none"> <li>PG&amp;E proposed the following: reaching the sign-up target of 200 participating fleet EVs and EVSEs; implementing value-streams on an on-going basis; achieving cost transparency of VGI technology deployments; determining the value to the electricity grid of bidirectional MD/HD EVs and creating sustainable pathways for these EVs to participate in VGI services.<sup>20</sup></li> </ul>
Customer engagement	<ul style="list-style-type: none"> <li>PG&amp;E would work closely with local CBOs and East Bay Community Energy to help educate ESJ communities.<sup>21</sup></li> </ul>
Timeline	<ul style="list-style-type: none"> <li>The pilot would begin in 2022 and end in 2024.<sup>22</sup></li> </ul>
Customer incentives	<ul style="list-style-type: none"> <li>The pilot would pay up-front incentives of \$2,500-\$3,000 and on-going participant incentive levels of approximate \$151 per EV per month (or \$1,812 per year).<sup>23</sup> PG&amp;E would increase upfront incentives by 20% in ESJ communities.<sup>24</sup></li> </ul>

<sup>16</sup> *ibid* p.35.

<sup>17</sup> *ibid* p.35.

<sup>18</sup> *ibid* p.35.

<sup>19</sup> *ibid* p.36, 40.

<sup>20</sup> *ibid* p.35.

<sup>21</sup> *ibid* p.44.

<sup>22</sup> *ibid* pp.49, 50.

<sup>23</sup> PG&E's October 15, 2021, data response: ElectricVehicleInfrastructure\_DR\_ED\_029-Q01-13Atch01.

<sup>24</sup> AL 6259-E p.44.

Technology requirements	<ul style="list-style-type: none"> <li>Technology providers must meet minimum interoperability, safety and functionality requirements. For instance, technology providers must be capable of receiving signals (for example, via OpenADR or IEEE 2030.5) from the central software platform.<sup>25</sup></li> </ul>
Reporting	<ul style="list-style-type: none"> <li>PG&amp;E proposes to report on the following metrics: <ul style="list-style-type: none"> <li>Customer enrollment (number of vehicles) and attrition rates;</li> <li>V2X incremental deployments costs;</li> <li>Influence of the pilot incentives to motivate V2X purchase decisions;</li> <li>Value (revenue and other benefits) to customers and to the electricity grid for each V2X application tested in the pilot;</li> <li>Total cost of ownership savings due to V2X; and</li> <li>Pathways (existing rules and regulations) that currently inhibit V2X value creation for customers and/or the electricity grid.<sup>26</sup></li> </ul> </li> </ul>

Table 3: Summary of Proposed Pilot #3: V2M Public Safety Power Shutoff Microgrid Pilot

V2M Public Safety Power Shutoff Microgrid Pilot (\$1.5 million)	
Objective	<ul style="list-style-type: none"> <li>PG&amp;E proposes that up to 200 EVs (residential and commercial) on the customer side of the meter will charge/discharge in a multi-customer microgrid to support community resiliency by 2023.<sup>27</sup> The microgrid would also include solar as well as resources on the utility-side of the meter and would energize an isolated distribution line segment during a Public Safety Power Shutoff event and reduce or displace fossil generation.</li> <li>The pilot would demonstrate 1) customer adoption of Vehicle-to-Grid (V2G) technology for community resiliency; 2) value to a microgrid used during a Public Safety Power Shutoffs; and 3) integration of EVs into an existing microgrid funded under Electric Program Investment Charge (EPIC) pilot 3.11B.<sup>28</sup></li> </ul>
Barriers addressed	<ul style="list-style-type: none"> <li>The pilot would address a number of barriers such as developing controls and other operational procedures to integrate EV resources into the micro-grid; technical capabilities; cost; and customer convenience.<sup>29</sup></li> </ul>
Success metrics	<ul style="list-style-type: none"> <li>PG&amp;E proposed the following: developing operational processes for multi-customer microgrids that utilize EVs to support balancing generation and load; demonstrating five to 10 bi-directional EVs; and</li> </ul>

<sup>25</sup> *ibid* p.48. PG&E also discussed ISO 15118.

<sup>26</sup> *ibid* p.56.

<sup>27</sup> *ibid* pp.60, 64.

<sup>28</sup> *ibid* p.60, 70.

<sup>29</sup> *ibid* p.60.

	launching a program with incentives for a maximum of 200 vehicles with the follow-on ability for EVs to participate in the future. <sup>30</sup>
Customer engagement	<ul style="list-style-type: none"><li>• PG&amp;E prefers low income or medical baseline customers.</li><li>• Customers may opt out of individual events.<sup>31</sup></li><li>• PG&amp;E will engage CBOs to inform pilot efforts in reaching ESJ communities and help develop incentive level.<sup>32</sup></li></ul>
Timeline	<ul style="list-style-type: none"><li>• The pilot would begin in early 2022 with phase I. Phase II, with enrolment by up to 200 participants, would conclude by the end of 2023.<sup>33</sup></li></ul>
Customer incentives	<ul style="list-style-type: none"><li>• Incentives would cover part or all of the costs of bi-directional charging equipment, home isolation devices, and communications. The budget implies an incentive of \$3,750 to \$5,000.<sup>34</sup></li></ul>
Technology requirements	<ul style="list-style-type: none"><li>• Resources that comply with Rule 21 and support advanced inverter functions would be eligible to participate.<sup>35</sup></li></ul>
Reporting	<ul style="list-style-type: none"><li>• PG&amp;E proposes to report:<ul style="list-style-type: none"><li>○ Number of customers who enroll in the pilot and attrition rate;</li><li>○ Incentives required (value and structure) to induce participation;</li><li>○ Reduction in greenhouse gas emissions and fuel costs within the Public Safety Power Shutoff microgrid;</li><li>○ Reduction in equipment or nameplate capacity required to serve the microgrid;</li><li>○ Cost to serve the microgrid using conventional generation versus incentives and compensation to EVs participants;</li><li>○ Operational time and complexity; and</li><li>○ Reliability and consistency of bi-directional EVs and potential to scale bi-directional EVs as a community micro-grid resource.</li></ul></li></ul>

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<sup>30</sup> *ibid* p.60.

<sup>31</sup> PG&E has stated in response to stakeholder comments that they will allow “opt-outs” in pilots #3 and #4 when creating program rules. (Advise Letter 6259-E already states that PG&E would allow opt-outs for pilots #1 and #2).

<sup>32</sup> *ibid* p.66.

<sup>33</sup> *ibid* p.69.

<sup>34</sup> *ibid* pp.64, 70.

<sup>35</sup> *ibid* pp.63, 64.



Table 4: Summary of Proposed Pilot #4: Exploring V2X Export Value Pilot

Exploring V2X Export Value Pilot (\$2.3 million)	
Objective	<ul style="list-style-type: none"><li>PG&amp;E proposes to create pathways for EVs that export to participate in CAISO markets and identify ways to capture the value of 1) participation in CAISO markets for ancillary services including frequency regulation and 2) meeting utility distribution service needs.<sup>36</sup> The pilot will also explore ways to synchronize EV export with the grid, support policy updates to access these value streams, study customer responsiveness and appropriate incentive levels.<sup>37</sup></li><li>The pilot would enroll Class 2B-8 school buses in Disadvantaged Communities (DACs) with electricity export capabilities.<sup>38</sup></li></ul>
Barriers addressed	<ul style="list-style-type: none"><li>Current barriers include IOU programs and tariffs that do not compensate power exports from EVs; lack of cost and benefit data; lack of systems to integrate buses that export with CAISO markets and PG&amp;E grid services; rules that require purchase of electricity at retail and sale at wholesale prices; and lack of business models.<sup>39</sup></li></ul>
Success metrics	<ul style="list-style-type: none"><li>PG&amp;E proposed the following: participation of an EV bus fleet with sufficient energy storage capacity to allow the measurement of participation in a simulated CAISO market; successful collection and analysis of data showing how the fleet would participate in the market and the amount of revenues that would be returned to the participant; establishing the level of incentive necessary to encourage significant participation; and creating a sustainable pathway for bidirectional EVs to participate in VGI and in the CAISO market.<sup>40</sup></li></ul>
Customer engagement	<ul style="list-style-type: none"><li>PG&amp;E would allow customers to opt-out of specific events.<sup>41</sup></li><li>PG&amp;E will engage with CBOs to assist outreach to ESJ communities and development of incentive levels.<sup>42</sup></li></ul>
Timeline	<ul style="list-style-type: none"><li>The pilot would begin in 2022 and end in 2024.<sup>43</sup></li></ul>
Customer incentives	<ul style="list-style-type: none"><li>The pilot would provide incentives based on CAISO revenues.<sup>44</sup> AL 6259-E did not identify the amount of incentives that would be provided to</li></ul>

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<sup>36</sup> *ibid* p.81.

<sup>37</sup> *ibid* p.76.

<sup>38</sup> *ibid* p.76, 97, 98.

<sup>39</sup> *ibid* p.79.

<sup>40</sup> *ibid* p.77.

<sup>41</sup> PG&E has stated in response to stakeholder comments that they will allow “opt-outs” in pilots #3 and #4 when creating program rules.

<sup>42</sup> AL 6259-E p.86.

<sup>43</sup> *ibid* pp.89, 90.

<sup>44</sup> *ibid* p.81.

	<p>participants or would be needed to encourage participation; nor the total budget needed to achieve the pilot objectives.</p> <ul style="list-style-type: none"><li>• Participant(s) would be required to finance a portion of the costs.<sup>45</sup></li></ul>
Technology requirements	<ul style="list-style-type: none"><li>• PG&amp;E expects participant(s) to use DC interconnected bidirectional chargers that offer a greater amount of energy export compared to AC interconnected bidirectional chargers.<sup>46</sup></li><li>• PG&amp;E is targeting partners that can implement the ISO (International Standards Organization) 15118-2018 standard for communication between EVs and charging stations and the IEEE 2030.5 standard for communication between grid operators during the pilot.<sup>47</sup></li></ul>
Reporting	<ul style="list-style-type: none"><li>• PG&amp;E proposes to report on the following metrics:<ul style="list-style-type: none"><li>○ Value (revenue and other benefits) to customers and to the electricity grid for each V2X application tested in the pilot (i.e., customer bill management, system-level real-time energy, and EV export for grid services);</li><li>○ Reduced total cost of ownership; and</li><li>○ Creation of pathways (existing rules &amp; regulations) that currently inhibit positive or increased value of V2G to customers and/or the electricity grid.<sup>48</sup></li></ul></li></ul>

## **NOTICE**

Notice of PG&E's AL 6259-E was made by publication in the CPUC's Daily Calendar. PG&E states that a copy of AL 6259-E was sent electronically and via U.S. mail in accordance with Section IV of General Order 96-B.

## **PROTESTS**

PG&E's AL 6259-E was not protested.

A number of stakeholders submitted comments generally supporting the proposed pilots and making some recommendations. For instance, Ford submitted a letter on July 20, 2021, and Fermata and GM submitted letters on August 4, 2021 supporting all four proposed pilots. East Bay Community Energy submitted a letter on August 4, 2021, supporting the commercial fleets pilot.

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<sup>45</sup> ibid p.82.

<sup>46</sup> ibid p.89.

<sup>47</sup> ibid p.81.

<sup>48</sup> ibid pp.97, 98.

The Vehicle-Grid Integration Council (VGIC) submitted comments on August 4, 2021 that support all four proposed pilots and recommend the following:

- The portion of the VGI pilot budget ceiling in D.20-12-029 that SDG&E will not use (because SDG&E did not propose any pilots) should be applied to 1) fund an independent analysis of the pilot results such as cost-effectiveness similar to the Distribution Investment Deferral Framework (in addition to the IOU-hired evaluator) and/or 2) to increase the scale of PG&E's proposed pilot program activities.<sup>49</sup>
- PG&E's proposed VGI pilots should be approved expeditiously in parallel with, and without causing delay to, other efforts to address resiliency and reliability needs.<sup>50</sup>
- VGIC supports PG&E's goal "to partner with as many technology providers as possible" and recommends that PG&E institute a fair and competitive process to leverage pilot partners.<sup>51</sup>
- VGIC recommends that PG&E confirm that customers in the microgrid and exploring export value pilots may opt-out of events or otherwise ensure their transportation needs are met.<sup>52</sup>
- VGIC noted that the proposed residential and commercial fleets pilots may create a gap for the V2X light duty commercial EVs, in which case the gap should be addressed as programs scale up.<sup>53</sup>
- VGIC recommends that PG&E explore options for V2G Export Compensation such as a dynamic export compensation rate modeled after PG&E's proposed Day Ahead Hourly Real Time Pricing rate.<sup>54</sup>

CALSTART submitted a letter on August 4, 2021, supporting the commercial fleets and exploring export value pilots and providing a number of recommendations. CALSTART recommended that PG&E include public fleets and transit fleets in the commercial fleets pilot because these heavy-duty vehicles are most likely to be used to provide building back-up power during a Public Safety Power Shutoff or power outage. CALSTART also commented that AL 6259-E does not demonstrate how barriers to participation in

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<sup>49</sup> VGIC "Response of the Vehicle-Grid Integration Council to Advice Letter 6259-E of Pacific Gas and Electric Company" August 4, 2021, pp.3-5.

<sup>50</sup> *ibid* p.5. VGIC also stated that EVs are likely to provide resiliency at lower cost than stationary storage in cases where a customer has already purchased a battery as part of an EV.

<sup>51</sup> *ibid* p.6.

<sup>52</sup> *ibid* p.6.

<sup>53</sup> *ibid* p.7.

<sup>54</sup> *ibid* p.7.

wholesale demand response markets would be overcome.<sup>55</sup> Furthermore, CALSTART recommended that PG&E aim to include customers using a wide range of medium and heavy-duty vehicles in the commercial fleets pilot and focus on vehicle types that were highlighted in the VGI working group as a good fit for V2X and V2G use cases. In addition, CALSTART commented that heavy-duty vehicles are typically well suited for bi-directional charging because they will be equipped with a DC fast charging port.

CALSTART also commented on the exploring export value pilot. CALSTART recommended that PG&E expand the pilot to allow commuter buses (which are often parked during the day and in the later evening hours) and regional delivery trucks.<sup>56</sup> In addition, CALSTART recommended combining the commercial fleets and exploring export value pilots for efficiency.

CALSTART also stated that PG&E's discussion of ISO 2030.5 (i.e., SEP 2.0) and ISO 15118 technical standards does not reflect the current status of the marketplace.

## **DISCUSSION**

This section of the Resolution explains which D.20-12-029 requirements are satisfied by AL 6259-E as submitted and also lists modifications that are necessary to ensure that the residential, commercial fleets and microgrids pilots meet all D.20-12-029 requirements. This section also explains why AL 6259-E does not fully meet the requirements of D.20-12-029 with regards to the proposed exploring export value pilot.

### **1. The proposed pilots' scope and objectives comply with the D.20-12-029 definition of VGI and objectives.**

The CPUC, as authorized by SB 676, established the following VGI definition in D. 20-12-029:<sup>57</sup>

"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

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<sup>55</sup> CALSTART, Comments of CALSTART on PG&E Advice Letter 6259-E Request for Approval of PG&E's VGI Pilots in Compliance with Decision 20-12-029, August 4, 2021, pp.5, 6.

<sup>56</sup> *ibid* pp.6, 7.

<sup>57</sup> D. 20-12-029 pp.12, 13.

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.

The residential pilot and commercial fleets pilot meet this definition and would, if successful, address several CPUC objectives. These pilots would offer participants technology that enables back-up power consistent with the “resiliency” aspect of the VGI decision and the D.20-12-029 VGI strategy “Accelerate Use of EVs for Bi-Directional Non Grid-Export Power and [Public Safety Power Shutoff (PSPS)] Resiliency and Backup.”<sup>58</sup> In addition, the pilots would explore opportunities for EVs that export to participate in markets for reliability services consistent with the VGI definition and the D.20-12-029 near-term policy action of exploring options for credit for export from EVs that are grid-connected.<sup>59</sup> The proposed residential pilot would also increase renewable energy uptake and the proposed commercial fleets pilot would avoid distribution upgrades. These goals are consistent with the VGI definition and, in the latter case, the near-term policy action of avoiding distribution infrastructure upgrades.<sup>60</sup>

The microgrids pilot would, if successful, increase resiliency during Public Safety Power Shut-off events consistent with the CPUC’s definition of VGI. The pilot would also support the near-term policy action of “Integration of VGI Across All Relevant Business Activities” by integrating VGI strategies into a planned micro-grid project.<sup>61</sup>

The exploring export value pilot would explore wholesale market participation consistent with the D.20-12-029 VGI strategy “Design Wholesale Market Rules and Access” as well as distribution upgrade deferral opportunities.<sup>62</sup>

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<sup>58</sup> *ibid* p.20.

<sup>59</sup> *ibid* p.31.

<sup>60</sup> D. 20-12-029 (pp.30, 31) notes that ALM and/or other VGI technologies (i.e., V2X) could avoid distribution upgrades.

<sup>61</sup> D. 20-12-029 p.39.

<sup>62</sup> *ibid* p.18.

## **2. The proposed pilots comply with equity requirements.**

D.20-12-029 requires that 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.<sup>63</sup>

The proposed PG&E pilots would comply with this requirement. As noted in Tables 1 and 2 above, the residential and commercial fleets pilot would increase upfront incentive levels by 20% for ESJ communities. In addition, the microgrids and exploring export value pilots would focus on recruiting customers and providing incentives in ESJ communities as noted Tables 3 and 4. Table 4 PG&E has also stated that they will work with CBOs to address customer engagement strategies and, as noted below, hold quarterly meetings with other agencies and interested stakeholders.

## **3. The proposed pilots avoid overlap with EPIC and other California Energy Commission programs.**

AL 6259-E would avoid duplication with EPIC and other California Energy Commission programs in several ways. First, as noted earlier, PG&E participated in a stocktake so that the pilots can build on and not duplicate existing VGI pilots.

Second, the residential, commercial fleets and exploring export value pilots will generally not overlap with the California Energy Commission's EPIC program because these pilots would focus on commercially ready technology. The EPIC program is focused on facilitating commercialization of technology not yet ready for at scale market deployment.<sup>64</sup> The microgrids pilot will explicitly align with and build upon the EPIC 3.11B pilot to pilot a V2X use case at the least cost to ratepayers.<sup>65</sup>

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<sup>63</sup> D.20-12-029, p.46

<sup>64</sup> AL 6259-E pp.18, 42, 85. See also Decision 12-05-037 "PHASE 2 DECISION ESTABLISHING PURPOSES AND GOVERNANCE FOR ELECTRIC PROGRAM INVESTMENT CHARGE AND ESTABLISHING FUNDING COLLECTIONS FOR 2013-2020" (D.12-05-37) p.39. EPIC funds applied research and development and technology demonstration & deployment of technology at the pre-commercialization stage. The Commission has defined the EPIC technology demonstration category as "the installation and operation of pre-commercial technologies at a scale sufficiently large and in conditions sufficiently reflective of anticipated actual operating environments, to enable the financial community to effectively appraise the operational and performance characteristics of a given technology and the financial risks it presents."

<sup>65</sup> AL 6259-E p.66.

Third, PG&E will host quarterly meetings and provide updates on pilot status, progress towards meeting pilot objectives and solicit feedback on data evaluation and current outcomes.<sup>66</sup> These meetings would provide an opportunity to coordinate with the California Energy Commission to avoid overlap and identify any additional efforts that are needed to avoid some limited potential overlap regarding consumer education and/or other coordination as needed.<sup>67</sup>

**4. The proposed pilots do not delay the implementation of strategies at scale that do not require piloting.**

AL 6259-E states that PG&E has ensured that their proposed pilots would not delay the implementation of VGI strategies currently ready for deployment at scale as required by D.20-12-029.<sup>68</sup> In addition, PG&E has noted that each strategy addressed by the proposed pilots faces a number of barriers that prevent implementation at scale as described in Tables 1 through 4.

**5. PG&E considered VGI Working Group recommendations and CALSTART recommendations identified in D.20-12-029.**

AL 6259-E proposes to address the following VGI Working Group near term priorities with strongest agreement (2.02, 2.12, 6.07) and one medium-term recommendation with good agreement (1.17):<sup>69</sup>

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<sup>66</sup> *ibid* pp.22, 46, 88. While PG&E specifically mentioned pilots #1, #2, and #4, and not pilot #3, the scope of the quarterly meetings will be sufficiently broad to also address pilot #3.

<sup>67</sup> Limited aspects of the PG&E VGI pilots such as developing consumer engagement and outreach strategies could, at least in theory, potentially overlap with some aspects of future California Energy Commission EPIC market facilitation funding. The market facilitation category can include activities such as market research, program tracking, education and outreach, regulatory assistance/streamlining, and workforce development to facilitate commercial deployment of technologies to deliver real-world benefits to customers. See D.12-05-037 p.61. However, PG&E's activities are limited to successful implementation of their proposed pilots and PG&E is not authorized to implement broader market-education efforts, reducing the potential for overlap.

<sup>68</sup> AL 6259-E (p.2) states that PG&E made this finding in collaboration with California Energy Commission, Energy Division staff, other California load-serving entities and stakeholders.

<sup>69</sup> AL 6259-E (p.84) also states that one additional recommendation would be relevant to proposed pilot #4: 2.17 Enable customers, via Rules 15/16 or any new EV tariff, to employ load management technologies to avoid distribution upgrades, and focus capacity assessments on the Point of Common Coupling.

- Recommendation 2.02: V2G systems become eligible for some form of Small Generation Incentive Program (SGIP) incentives;<sup>70</sup>
- Recommendation 2.12: Allow Smart Unidirectional Charging (V1G) and V2G to qualify for SGIP to level the playing field with incentives for other Distributed Energy Resources (DERs), but V1G would get less incentive compared to V2G based on permanent load shift logic;<sup>71</sup>
- Recommendation 6.07: Pilot funding for V1G and V2G for microgrid and V2M solutions, including a statewide near-term goal; and utilities' PSPS plans and microgrid frameworks should consider EVs for front-of-the-meter (FTM) grid services; and<sup>72</sup>
- Recommendation 1.17: In addition to an EV export bill credit (under NEM or another framework), a supplemental credit should be considered for environmental components, e.g., based on SGIP GHG signal to determine marginal emissions rate.<sup>73</sup>

AL 6259-E also shows that PG&E considered VGI Working Group recommendations by prioritizing VGI applications (i.e., value streams) identified in the VGI Working Group final report.<sup>74</sup>

In addition, PG&E will allow several vehicle segments identified by CALSTART to participate in the pilots and PG&E's proposed quarterly meetings will provide CALSTART and other stakeholders with on-going opportunities to track the pilots and provide feedback.

**6. This Resolution rejects PG&E's request to use Low Carbon Fuel Standard funding without prejudice to any future filing that meets the requirements of the relevant Low Carbon Fuel Standard decisions.**

AL 6259-E states that PG&E intends to use Low Carbon Fuel Standard funding for the pilots in preference to ratepayer funding but did not address the requirements of

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<sup>70</sup> AL 6259-E p.83. We note that AL 6259-E pp.16, 17 and 40 also explains that pilots #1 and #2 would inform potential future rules or programs providing incentives similar to the SGIP program.

<sup>71</sup> *ibid*.

<sup>72</sup> *ibid* p.65.

<sup>73</sup> *ibid* p.84.

<sup>74</sup> *ibid* pp. 15, 16, 21, 39, 40, 45, 67, 81, 82, 87 addresses applications and use cases recommended by the VGI Working Group. In addition, Pilot #1 would also address two topics recommended by the VGI Working Group for further analysis: Assessing customer interest, acceptance, and retention, and what is required (and associated costs) to get customers to participate in VGI programs (e.g., incentives, marketing, dealership education); and identifying and obtaining publicly available data on VGI costs, as well as baseline data on driving and charging patterns relevant to different use cases. (AL 6259-E p.16.)



D.20-12-027, D.14-12-083 and D.14-05-021 regarding the use of revenue generated from Low Carbon Fuel Standard credits. This Resolution does not authorize PG&E to utilize Low Carbon Fuel Standard funding for these pilots because PG&E has not addressed the relevant decisions. This Resolution does not prejudice the outcome of any future PG&E filing that does meet the requirements of these decisions.

- 7. The proposed budget of \$14 million for the four pilots complies with the overall ceiling in D. 20-12-029 but AL 6259-E does not justify the proposed exploring export value pilot budget nor the customer enrollment budget line item for the commercial fleets pilot.**

The AL 6259-E proposed budget does not exceed the D.20-12-029 ceiling of \$35 million for all Investor-Owned Utility (IOU) pilots because PG&E proposed a budget of \$14 million and Southern California Edison proposed a budget of \$14.7 million for a total proposed funding level of \$28.7 million.<sup>75</sup> San Diego Gas and Electric did not request VGI pilot funding under this decision.

However, PG&E did not justify the proposed exploring export value pilot budget. For instance, PG&E did not justify the need for the proposed central software platform for this pilot. AL 6259-E states that “The centralized software provider will be responsible for developing a centralized software platform that can aggregate utility signals and communicate via standardized protocols to multiple EV and EVSE brands. The centralized software provider may (on behalf of the technology providers) communicate application testing notifications (either via short message service, i.e. text, or app) to the end customers (fleet managers).<sup>76</sup> However, the exploring export value pilot may consist of a single fleet, or at most a few participants rather than multiple EV and EVSE brands.<sup>77</sup> PG&E also did not justify the requested incentive budget of \$1.21 million. PG&E did not explain the level of funding needed for each EV or fleet of EVs nor the overall level of participation needed to achieve the results of the pilot. This Resolution denies the proposed exploring export value pilot as explained below, in part, due to the lack of justification for the proposed budget.

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<sup>75</sup> *ibid* p.4.

<sup>76</sup> *ibid* p.84.

<sup>77</sup> The centralized software provider would fall under the \$700,000 proposed for “contracted goods.” AL 6259-E p.92, 93.

Furthermore, PG&E did not provide an explanation for the customer enrollment budget for the commercial fleets pilot.<sup>78</sup> Therefore, this Resolution modifies the commercial fleets pilot to require additional justification as described below.

- 8. This Resolution denies funding for the proposed exploring export value pilot because PG&E did not justify the budget and did not justify splitting value streams between the commercial fleets pilot and exploring export value pilot. PG&E may file a new Tier 2 AL within 60 days of the issuance of this Resolution to address these deficiencies.**

PG&E has proposed to split value streams between the commercial fleets pilot and the exploring export value pilot but did not justify this decision. The commercial fleets pilot would address CAISO-facing resource adequacy and real-time energy (in addition to distribution services and a number of other value streams as noted above in Table 2). The exploring export value pilot would address CAISO-facing ancillary services including frequency regulation in addition to distribution services as noted above in Table 4. Table 4 Participating in one or more CAISO market services will require expenses such as technology capable of supporting bi-directional charging and typically also metering, telemetry and controls. As noted by CALSTART, allowing fleet(s) of MD/HD EVs to participate in all CAISO-facing markets addressed in a single pilot may be more efficient than enrolling different fleets in separate pilots covering different sub-sets of CAISO facing market services.

In addition, PG&E has not explained whether splitting some CAISO-facing market services into separate pilots would hinder PG&E's ability to determine total revenue available for participating in CAISO-facing markets. Determining total revenue would help inform whether implementing this strategy at scale would be cost-effective. Therefore, this Resolution denies funding for the proposed exploring export value pilot.

PG&E may choose to correct the deficiencies noted in this Resolution regarding the exploring export value pilot by filing a new Tier 2 AL. If PG&E chooses to file a new AL, PG&E must file the AL within 60 days to allow coordinated implementation of the various VGI pilots; must explain how the budget and scope deficiencies in the original AL were corrected; and must include additional reporting as discussed below. The AL may not request a budget greater than the original request of \$2.3 million.

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<sup>78</sup> See Attachment B of this Resolution.

**9. The proposed residential and commercial fleets pilots, as modified by this Resolution, address practical barriers to scaling implementation of VGI technologies through existing or potential new large electrical corporation programs that would further the goals of SB 676.**

AL 6259-E identified potential pathways to scale these pilots and would, with modifications to evaluation and reporting discussed below, provide timely results.<sup>79</sup> PG&E will leverage experience gained from the pilots to consider revisions to existing programs and/or establishing new programs to support these technologies. For instance, PG&E has noted that various programs could be revised and/or new programs could be established.<sup>80</sup>

**10. This Resolution modifies PG&E's proposed rate structures and implementation schedule for the residential and commercial fleets pilots in the following ways.**

Table 5 below summarizes PG&E's proposed rates structures and implementation schedule as well as the modifications to these aspects of the pilots that PG&E must implement to better achieve the goals of D. 20-12-029.

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<sup>79</sup> AL 6259-E also identifies how pilot #4 could scale by supporting policy updates that both the IOUs and CPUC as well as CAISO would need to implement by overcoming information and technical barriers noted earlier. PG&E would work with the CPUC and CAISO in May 2023 to establish market changes/tariffs and in March 2024 to establish a path to rules allowing ongoing market participation.<sup>79</sup> AL 6259-E pp.90, 91.

<sup>80</sup> AL 6259-E pp.19, 42. In addition, PG&E's application for the Transportation Electrification program EV Charge 2 states that PG&E will consider future revisions to this proposed program based on these pilots to support adoption of V2X. PACIFIC GAS AND ELECTRIC COMPANY ELECTRIC VEHICLE CHARGE 2 PREPARED TESTIMONY, October 26, 2021, pp.5-6. This application is currently under consideration at the CPUC and the CPUC has not taken any action to approve or deny EV Charge 2.

*Table 5: Proposed scope of PG&E proposed residential and commercial fleets pilots and required modifications to timing and rate structures*

Pilot	Phase I – 2022	Phase II – 2023	Modifications
#1: Residential	<ul style="list-style-type: none"><li>back-up power</li></ul>	<ul style="list-style-type: none"><li>add four value streams: customer bill management, system real-time energy, system renewable integration and EV export for grid services</li></ul>	<ul style="list-style-type: none"><li>PG&amp;E must enroll customers in the Emergency Load Reduction Program (ELRP).</li><li>PG&amp;E shall file an AL with rate structures (see section 10.1).</li></ul>
#2: Commercial Fleets	<ul style="list-style-type: none"><li>back-up power</li></ul>	<ul style="list-style-type: none"><li>add four value streams: customer bill management, system real-time energy, grid upgrade deferral and EV export for grid services</li></ul>	<ul style="list-style-type: none"><li>PG&amp;E must enroll customers in the ELRP.</li><li>PG&amp;E shall file an AL with rate structures (see section 10.1) and a revised date for the start of phase II.</li></ul>

**10.1 PG&E shall file a Tier 2 AL within 120 days of this Resolution to offer residential and commercial customers a dynamic rate structure as well as a static time-of-use (TOU) rate.**

AL 6259-E did not state how rate structures would be determined. PG&E shall, in consultation with Energy Division lead staff, implement a dynamic, marginal cost-based rate structure based on details outlined in Attachment 1 to D.21-12-015.<sup>81</sup> PG&E may use a “shadow billing” approach as described in Attachment 1.

As specified in Attachment 1 to D.21-12-015, the rate structure should include the following elements:

- 1) This rate shall be bidirectional. All consumption and exports shall be billed or credited based on marginal costs;
- 2) Energy costs shall be determined based on the CAISO wholesale day-ahead or CAISO same day prices;

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<sup>81</sup> D. 21-12-015 requires PG&E, in coordination with the Valley Clean Energy (a Community Choice Aggregator that operates in PG&E’s service territory), to administer and evaluate such a dynamic transactive pilot rate for agricultural pumping loads for Valley Clean Energy customers. See pp. 7-12 of Attachment 1 of D. 21-12-015 for implementation details.

- 3) Generation capacity costs shall be determined on an hourly basis using the scarcity pricing concept so that more fixed costs are recovered when system utilization is higher relative to the system capacity limit;
- 4) Line loss costs shall be determined based on volumetric consumption;
- 5) Distribution capacity costs shall be determined on an hourly volumetric basis in lieu of monthly or annual demand charges.

PG&E shall use the scarcity pricing concept<sup>82</sup> as described in Attachment 1 of D.21-12-015 for the capacity cost recovery functions.<sup>83,84</sup> The capacity cost recovery functions (hourly price vs. system utilization) for all components (generation capacity and distribution capacity) should be calibrated to fully recover annual PG&E generation and distribution capacity costs. Other costs, including billing/metering and customer marginal costs, public purpose program costs, and transmission costs may either be recovered through the existing rate structures or through a monthly load-shape subscription.<sup>85</sup>

D.20-12-029 establishes a near-term policy action of avoiding distribution system upgrades and offering customers a dynamic distribution rate option in this pilot will align with D.20-12-029. PG&E may use the distribution rate design principles and methodology to be employed in the Agricultural Pumping Pilot authorized in D.21-12-015, which also requires PG&E to develop a volumetric, utilization-based distribution rate. PG&E may also use any alternative methods that could reduce the complexity of this exercise but still strive to meet the objectives of the dynamic rate component. For instance, PG&E may reduce complexity of the distribution component by proposing a rate structure that is not unique to each distribution circuit.

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<sup>82</sup> Scarcity pricing concept means that more fixed costs are recovered when system/circuit utilization is higher relative to system/circuit capacity limits.

<sup>83</sup> See D.21-12-015 Attachment 1 pp. 7-8.

<sup>84</sup> These concepts are also illustrated in the 6-step Distributed Energy Resource (DER) & Demand Flexibility roadmap described by Energy Division Staff at the May 25, 2021, workshop on Advance DER and Demand Flexibility Management, available at <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-costs/demand-response-dr/demand-response-workshops/advanced-der-and-demand-flexibility-management-workshop>

<sup>85</sup> See Valley Clean Energy 's AL 11-E pages pp. 5-6, for additional details regarding how the subscription component of a customer's bill will be implemented in the Valley Clean Energy/PG&E Agricultural pumping dynamic rate pilot that was authorized by D.21-12-015.

We encourage PG&E to provide at least day-ahead notice of the dynamic marginal cost-based rates and to offer week-ahead notice if feasible. We encourage PG&E to consider filings related to D. 21-12-015 approved dynamic rate pilots, or other filings related to dynamic rates and encourage PG&E to consult with Energy Division staff during the design of the pricing signal.

PG&E shall also offer residential and commercial customers the option to select a static TOU rate which must include energy, generation capacity, line losses, distribution and transmission components. Providing dynamic and TOU options will provide data on 1) customer preference for each option; and 2) level of customer activity for each option.

To avoid the need to integrate the pilot rate tariff with PG&E's billing systems, we encourage PG&E to use a "shadow bill" approach to provide participants with compensation for any load shift and/or exports by the participant in response to the pilot rate. Under a shadow bill, participants will continue to pay their current PG&E bill under the otherwise applicable tariff and will also receive a shadow bill, which they will not pay. The shadow bill would illustrate a customer's potential savings and/or revenue for exports under the dynamic pilot rate. Participants can receive payments from PG&E on either a monthly or annual basis.

PG&E shall submit a Tier 2 AL within 120 days of this Resolution to describe the rate structures and implementation details, including the following topics as well as any other relevant topics: (1) bill implementation, (2) pilot rate design, and (3) schedule for phase II as described below, (4) pilot price platform vendor, and (5) ELRP compensation strategy for dynamic rates as described below.

**10.2 This Resolution modifies AL-6269 to delay the start date and subsequent milestones for the residential, commercial fleets and microgrids pilots; but requires that PG&E identify the earliest possible start date for phase II of the commercial fleets pilot.**

This Resolution modifies the schedule for the residential and commercial fleet pilots to begin customer enrollment in August 2022, with the other deadlines originally proposed in AL 6259-E similarly adjusted by five months. This adjustment is

reasonable because of the five-month difference between the approval date and the date that PG&E originally anticipated. In addition, PG&E may adjust the start date of the microgrids pilot to June 2022 with other deadlines based on PG&E's June 23, 2022 comment letter.<sup>86</sup>

PG&E has proposed to implement only back-up power use cases in the commercial fleets pilot phase I and start phase II later once the cloud platform is developed. We agree with the approach. However, we require that PG&E investigate ways to expedite the beginning of phase II. Therefore, PG&E shall identify the earliest possible start date for phase II of the commercial fleets pilot in the Tier 2 rates structure AL identified above.<sup>87</sup>

**10.3 This Resolution modifies the residential and commercial pilots to require that participants enroll in the Emergency Load Reduction Program (ELRP) beginning with phase I.**

AL 6259-E was filed before the ELRP was created under R.20-11-003 to enhance summer electrical supply reliability and AL 6259-E did not encourage ELRP participation. However, the VGI pilots will provide valuable lessons learned regarding customer understanding, engagement and participation in ELRP as a potential VGI use case. Therefore, PG&E must require that residential and commercial pilot participants enroll in the ELRP. PG&E shall also educate pilot participants on the benefits of voluntary participation. VGI pilot participants shall have the same ability to opt-out of ELRP events as other customers enrolled in ELRP.

We expect that some pilot participants will select dynamic rates and these rates may contain a generation component that results in a price signal that is similar to ELRP incentive levels during ELRP event. Therefore, PG&E must propose in the rate structure AL described in section 10.1 a method to avoid compensating these participants twice for the generation component of rates for power exported to the grid during ELRP events.

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<sup>86</sup> The dates specified in section 17 supersede related dates in PG&E's proposed timeline.

<sup>87</sup> AL 6259-E contained phase II start date of April 2023, which would result in a September 2023 start date due to the five-month delay in the commercial fleets pilot start date approved in this Resolution.



**11. PG&E may expand the scope of the commercial fleets pilot in response to stakeholder comments as proposed in PG&E's November 18, 2021, data response.**

PG&E stated that it intends to increase the scope of the commercial fleets pilot to allow participation by light duty EV fleets in a response to a comment from VGIC on AL 6259-E.<sup>88</sup> This Resolution accepts PG&E's proposed modification to AL 6259-E and allows light duty EV fleets to participate in the commercial fleets pilot subject to limits proposed by PG&E. Light duty commercial fleets are a distinct use case and, as pointed out by VGIC, light duty commercial fleets would not be able to participate in any of the pilots without this change.

**12. PG&E shall file a Tier 2 AL regarding the commercial fleets pilot within 60 days of the issuance of this Resolution. First, PG&E shall justify or reduce the proposed customer enrollment budget. PG&E may propose to reduce this budget and increase the customer incentives budget. Second, PG&E shall justify up-front equipment purchase incentive levels. Third, PG&E shall address incentive stacking. In addition, PG&E shall explain the process for vendor qualification and how PG&E will support deployment of open standards that support interoperability and customer choice.**

First, AL 6259-E did not justify the up-front incentive levels for commercial EV fleets. PG&E proposes to set these incentive levels for all commercial EV fleet vehicles at the same levels as for passenger vehicles.<sup>89</sup> However, SCE's Transportation Electrification (TE) program indicates that MD/HD charging ports averaged 33-50 kW of capacity in 2020 compared to 6.6 kW for light duty vehicles.<sup>90</sup> PG&E has not explained the incremental cost of V2X capable MD/HD EVSE and the level of up-front incentive necessary to promote adoption.<sup>91</sup>

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<sup>88</sup> Pacific Gas and Electric Company Electric Vehicle Infrastructure OIR Rulemaking 18-12-006 Data Response Answer 2 (see Attachment to this Resolution.)

<sup>89</sup> PG&E's October 15, 2021, data response: ElectricVehicleInfrastructure\_DR\_ED\_029-Q01-13Atch01 and AL 6259-E p.15.

<sup>90</sup> JOINT COMPLIANCE FILING OF SOUTHERN CALIFORNIA EDISON COMPANY (U 338-E), SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E), AND PACIFIC GAS AND ELECTRIC COMPANY (U 93 E) PURSUANT TO ORDERING PARAGRAPH 2 OF DECISION 16-06-011 p.161. See lines for "Total number of charge ports installed" and "Amount of new capacity resulting from project (kW)." Available at [docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M377/K391/377391089.PDF](https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M377/K391/377391089.PDF)

<sup>91</sup> PG&E stated, in comments on the draft Resolution (as noted below) that PG&E will allow "stacking" of other PG&E incentives with incentives issued via these pilots but not other non-utility incentives but did not specifically identify the incremental costs for bi-directional EVSE.



Second, PG&E proposed a \$500,000 budget for the commercial fleets pilot enrollment process out of a total budget of \$2,700,000. PG&E provided information in comments on types of customer enrollment tasks but did not explain why the enrollment process for a limited number of fleets with a total of 200 EVs would require this amount of funding. PG&E must justify or reduce the proposed budget for this activity. PG&E may justify in its Tier 2 compliance AL the reallocation of excess enrollment budget to the incentive budget.

Third, regarding stacking of VGI pilot incentives with PG&E program incentives, our authorization of such a structure is contingent upon PG&E providing sufficient additional information to demonstrate the necessity of stacking and that stacking aligns with program and pilot objectives. In particular, PG&E must: 1) show the need for additional upfront pilot incentives to partially offset incremental costs of bi-directional chargers in view of available PG&E TE infrastructure incentives; and 2) explain whether the stacking of the pilot incentives with PG&E program incentives would affect the goals and policies of PG&E's existing TE infrastructure programs, and if so how. Approval of this structure is contingent upon PG&E's ability to provide sufficient information and ensure that any stacking of incentives would not unduly impact PG&E's existing TE programs.

We also reject PG&E's proposal to prevent commercial fleet pilot host sites that accept a non-utility incentive from participating in the commercial fleet pilot as stated in PG&E's March 23 comments on the draft Resolution. We generally support participation in non-utility incentives to reduce costs to ratepayers. In addition, the decision to stack this additional pilot incentive on top of a non-utility funding source should be deferred to the administrator of that non-utility funding. PG&E should instead require that pilot participants report to PG&E any additional funding they receive and verify that the upfront incentives collectively do not exceed the cost of what the participant paid.

In addition, PG&E shall include additional details on the process for identifying and partnering with qualified vendors to support program activities. PG&E shall also identify policies that will promote deployment of open standards that support interoperability and customer choice; including whether any phase-in period is necessary for requiring that EVSE can support ISO 15118-20, VGI communications and/or other open standards. The Tier 2 compliance AL shall address these topics for the commercial fleets pilot and explain whether the same policies should apply to the residential pilot or whether any adjustments are necessary.

**13. If PG&E does not request approval of the exploring export value pilot then PG&E may file a Tier 3 AL to request increases to specific budget categories for the residential and/or commercial pilots.**

If PG&E does not re-file for approval of the exploring export value pilot (as noted in section 8) then PG&E may file a Tier 3 AL to request approval to transfer some or all of the funds originally request for this pilot to the residential and/or commercial pilots. The request must be fully supported by evidence and detailed explanation of need for specific budget sub-categories. PG&E may not request a total budget for all VGI pilots that exceeds the \$14 million authorized in D.20-12-029.

**14. PG&E shall file a Tier 1 AL within 60 days to create a one-way balancing sub-account within the Transportation Electrification Balancing Account.**

This Resolution requires that PG&E file a Tier 1 AL within 60 days of the issuance of this Resolution to create a new one-way balancing subaccount within the Transportation Electrification Balancing Account to track and record the actual costs for the VGI pilot. A one-way balancing account is appropriate to allow PG&E to record costs while protecting ratepayers by limiting recorded costs to the amount approved by this Resolution.

**15. This Resolution modifies the proposed residential pilot to remove the requirement that residential customers hire an Electric Vehicle Infrastructure Training Program certified installer when installing bi-directional EVSE at an existing 208/240-volt outlet. This Resolution also makes other revisions to proposed safety requirements for residential customers.**

AL 6259-E would require EVITP certification for all installers hired by residential customers: "Installers must be fully licensed electricians and EVTTP certified and provide proof of a performance of a full site assessment."<sup>92</sup>

However, Public Utilities Code section 740.20(b)(3) does not require EVITP certification for installation of equipment at "Single-family home residential electric vehicle chargers that can use an existing 208/240-volt outlet." PG&E has not justified imposing this requirement on residential customers, which may limit pilot participation and/or scalability. Thus, this Resolution modifies AL 6259-E to remove the requirement that such customers hire an EVITP certified installer.

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<sup>92</sup> AL 6259-E p.29. PG&E's AL appears to contain a error and thus says "EVTTP" instead of "EVITP."

In addition, PG&E shall not require a licensed electrician for such installations unless required by an Authority Having Jurisdiction (AHJ) implementing local building codes. The Transportation Electrification Safety Requirements Checklist for IOU SB 350 Transportation Electrification programs requires use of a licensed electrician or IOU staff for “utility infrastructure work” on the customer-side of the meter.<sup>93</sup> However, PG&E has not shown that mounting an EVSE that plugs into an existing residential outlet requires “utility infrastructure work” and shall instead require that participants comply with any requirement of the local AHJ.

Furthermore, this decision modifies AL 6259-E based on PG&E’s request to remove the requirement for bollard equipment protection and concrete parking stops for residential customers.<sup>94</sup> This equipment shall not be required unless required by the AHJ.

**16. This Resolution modifies the proposed microgrids pilot. PG&E must file a Tier 2 AL within 60 days to show potential pathway(s) to scale implementation of the microgrids pilot through existing or potential new large electrical corporation program(s) that would further the goals of SB 676.**

AL 6259-E states that “If successful, the pilot would be scaled during the 200-vehicle incentive cohort (phase II) and would remain available without incentive during phase III. At that point in time, the Commission and PG&E could work together to determine if a follow-on incentive is needed or warranted.”<sup>95</sup> However, D.20-12-029 requires that PG&E show a pathway to scale up from a pilot to a program, which PG&E did not

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<sup>93</sup> Available at [www.cpuc.ca.gov/sb350te](http://www.cpuc.ca.gov/sb350te).

<sup>94</sup> AL 6259-E states “The EVSE installation must have ... bollard equipment protection and concrete parking stops.” (p.29) However, PG&E stated later in a November 18, 2021, data response (Pacific Gas and Electric Company Electric Vehicle Infrastructure OIR Rulemaking 18-12-006 Data Response) that “PG&E will not require bollard equipment protection and concrete parking stops for residential installations, as those do not apply.”

<sup>95</sup> PG&E later stated that “PG&E intends to implement the capabilities to integrate BTM resources into microgrids (CMEP, temp gen, etc.). PG&E is interested in the potential of these resources to meet such needs and expects that, following a successful pilot, these resources would be implemented at a larger scale. We do not have a specific date and scope at this time for how broad and by when each microgrid would support this capability, but we plan to have further guidance by the start of 2023.” (Pacific Gas and Electric Company Electric Vehicle Infrastructure OIR Rulemaking 18-12-006 Data Response) This response does not provide enough information about how PG&E would revise existing program(s) or adopt new program(s) based on the results of the pilot.

specifically address in this AL.<sup>96,97</sup>

Therefore, PG&E must file a Tier 2 AL within 60 days to show potential pathway(s) to scale implementation through existing or potential new large electrical corporation programs that would further the goals of SB 676 if the pilot overcomes practical barriers identified in AL 6259-E (see Table 3 above).

**17. This Resolution modifies AL 6259-E to require that PG&E must 1) report on additional metrics for each pilot and update the VGI reporting template; 2) file an interim report after phase I; and 3) obtain Energy Division lead staff concurrence by October 31, 2022 on the final evaluation report scope and deadline.**

As noted in D.20-12-029, metrics will provide essential information to gage progress towards the statutory goal of maximizing the use of feasible and cost-effective EV grid integration by January 1, 2030.<sup>98</sup> D.20-12-029 requires that PG&E report on VGI-related metrics in annual and semi-annual reports.<sup>99</sup> PG&E must also provide information on these metrics and lessons learned in a final evaluation report.<sup>100</sup>

#### **17.1 PG&E shall report on additional metrics.**

While PG&E has proposed substantive metrics and reporting requirements (as noted above in Tables 1 through 4), reporting on additional metrics will more effectively support strategies to scale implementation of VGI strategies and use cases through existing or potential new programs as described below. PG&E must report on the following metrics, including both narrative and quantitative data, to further address progress overcoming practical barriers listed in AL 6259-E and PG&E's October 15, 2021, data response related to the three pilots approved by this Resolution. PG&E must also propose additional metrics if PG&E files a new AL to implement the use cases related to the proposed exploring export value pilot.

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<sup>96</sup> The VGI pilots application template directs IOUs to specifically address this issue. Question V is titled "Scale Up: Analyze potential to scale to a full utility program" and question B asks: "How would the pilot be scaled if it is successful and on what timeframe?"

<sup>97</sup> AL 6259-E p.72.

<sup>98</sup> D.20-12-029 p.60. In addition to statutory compliance, robust VGI metrics and reporting are essential for a number of practical purposes such as determining towards VGI goals; evaluating current and potential future programs and policies that contribute to VGI goals; and providing data to all interested parties and stakeholders seeking to advance VGI technologies, policies and/or markets.

<sup>99</sup> D.20-12-029 p.60.

<sup>100</sup> AL 6259-E pp.25, 49, 50, 69, 91.

PG&E must prepare an update to the D.20-12-029 VGI reporting template to include both PG&E's proposed metrics and the additional metrics and topics listed below (except for evaluation topics that will be addressed in the final evaluation report and not in routine D.20-12-029 VGI reporting). PG&E shall provide a draft to Energy Division lead staff by February 28, 2023 and obtain Energy Division lead staff concurrence to allow consistent data collection and reporting throughout the pilots. PG&E may adjust this deadline with the concurrence of Energy Division.

- PG&E must report on adoption of communication standards by technology providers participating in the pilots. AL 6259-E notes that communication standards including ISO 15118-2018 and IEEE 2030.5 are not fully adopted in the marketplace and in some circumstances PG&E may need to use other standards such as Open ADR as an alternative.<sup>101</sup> PG&E must report on these metrics in the interim and final VGI pilots evaluation and, to the extent that results are available, in routine VGI reporting. This reporting will provide transparency into implementation of V2X functionality and open standards that facilitate interoperability and consumer choice of service providers.
- PG&E must report on a number of additional metrics for the residential and commercial fleets pilot. PG&E must report on these metrics in the interim and final evaluation and, to the extent results are available, in the VGI data template and routine VGI reporting required by D.20-12-029:
  - Consumer understanding & participation in response to rate tariffs, ELRP, and/or other pricing structures;
  - Data for ESJ and non-ESJ customers on both participation levels, kWh delivered and incentives paid for each value stream. For the commercial fleets pilot, PG&E must disaggregate data for EVs with different battery capacities and EVs with different operational cycles;
  - Customer participation by zip code or other geographic regions; and by number of EVs that a residential or commercial customer operates.
  - Cost data for up-front and any on-going incremental costs for bi-directional EVSE of different power levels and, if available, costs for AC bi-directional EVSE compared to DC bi-directional EVSE;
  - Round-trip electrical losses for bi-directional charging by power level and type (DC and, if applicable, AC) and vehicle segment;

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<sup>101</sup> AL 6259-E pp.15, 48, 78.

- Maturity of business models for deployment of the use cases developed in the pilots; and
  - Number of customers reached and number of customers enrolled by market actor partners developing & deploying customer education and key lessons learned.
- PG&E must report in the final evaluation for the microgrids pilot and, if results are available, in routine VGI reporting and the interim report on progress and any additional efforts that will be needed to resolve each relevant barrier. These barriers include but are not limited to the technical barriers noted in PG&E's October 15, 2021, data response. PG&E shall also report on customer convenience as noted in AL 6259-E including whether participation conflicts with other priorities such as transportation needs.
- If PG&E chooses to file a new AL regarding the deficiencies in AL 6259-E regarding the proposed exploring export value pilot, PG&E must report on a number of additional metrics to help better understand progress overcoming barriers:
  - Success of customer engagement strategies and recommendations for customer engagement strategies in any future revised or new program(s) to enable EVs to participate in CAISO-facing markets;
  - Benefit of demonstrating a control system for EVSE charging;
  - Magnitude of potential EV services to wholesale markets and relationship to upfront and on-going costs of bi-directional charging;
  - Round-trip electrical losses;
  - Response to market signals during the pilot including actual energy exported in response to requests for various services and incentives provided for each value stream; and
  - Specific details of market rules that preclude or limit EV exports and potential participation levels if rules are revised to encourage participation by EVs that exports.

**17.2 PG&E shall provide an interim report within three months of completion of phase I of the residential and commercial pilots and no later than October 15, 2023. This interim report will provide timely phase I results.**

This Resolution modifies AL 6259-E and requires an interim report within three months of completion of phase I of the residential and commercial pilots and no later than October 15, 2023. This interim report will provide valuable information to VGI

market actors and decision makers, especially given that VGI is a rapidly evolving field, much sooner than PG&E's final evaluation report.<sup>102</sup> Therefore, PG&E shall provide an interim report on phase I implementation as well as an update regarding status of relevant policy and technical barriers and opportunities for the pilot to support policies that resolve those barriers. PG&E shall serve reports regarding these VGI pilots to the R.18-06-012 service list. PG&E may adjust the date of the SB 676 VGI pilots interim report with the concurrence of Energy Division lead staff if needed to collect additional data on phase I implementation. The interim report may be consolidated with a PG&E VGI report due under D.20-12-029 with the concurrence of Energy Division lead staff.<sup>103</sup>

**17.3 PG&E shall obtain, by October 31, 2022, Energy Division lead staff concurrence regarding the final VGI pilots evaluation scope and deadline.**

D.20-12-029 requires that PG&E provide 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 utilizing the results to revise an existing program.<sup>104</sup> AL 6259-E proposes to provide an evaluation of the proposed pilots in late 2023 for the microgrid pilot and late 2024 for the other pilots.<sup>105</sup>

This Resolution modifies AL 6259-E to require Energy Division lead staff concurrence on the evaluation scope and deadline for several reasons. First, the evaluation scope is critical for determining the effectiveness of the pilots and the potential to scale VGI strategies and use cases and should be determined as close to the project start date as possible. In addition, PG&E's proposed deadlines for conducting evaluations require revision. The proposed 11-month time between data collection and completion of a final evaluation report for the residential and commercial fleets pilots is too long given the need to implement lessons learned as soon as possible and maximize the availability of VGI resources.<sup>106</sup> This Resolution authorizes PG&E to make incremental updates to the evaluation scope of work after that date with the concurrence of Energy Division lead staff. Secondly, PG&E has requested a change to the deadline for

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<sup>102</sup> PG&E has proposed a evaluation deadline of November 2024. AL 6259-E p.25.

<sup>103</sup> D.20-12-029 p.60.

<sup>104</sup> D.20-12-029 p.42.

<sup>105</sup> AL 6259-E pp.25, 49, 50, 69, 91.

<sup>106</sup> *ibid* pp.25, 49, 50.



the final report for the microgrids pilot.<sup>107</sup> Thus, PG&E shall provide Energy Division lead staff with a draft evaluation scope document and obtain, by October 31 2022, Energy Division lead staff concurrence for the scope and deadline for the final evaluation.<sup>108</sup>

## **18. Summary of modifications to the residential, commercial and microgrids pilots.**

To summarize, this Resolution requires the following modifications to the residential, commercial fleets, and microgrids pilots:<sup>109</sup>

- PG&E shall file a Tier 2 AL within 60 days of the issuance of this Resolution to address the following commercial fleets pilot topics as specified in section 12 including: (1) PG&E shall justify or reduce the proposed customer enrollment budget, and may propose to reduce this budget and increase the customer incentives budget, (2) PG&E shall justify up-front equipment purchase incentive levels, (3) PG&E shall explain the process for vendor qualification and how PG&E will support deployment of open standards that support interoperability and customer choice, and (4) PG&E shall address incentive stacking.
- PG&E shall file a Tier 2 AL within 120 days of this Resolution to offer residential and commercial customers a dynamic rate structure as well as a static TOU rate including (1) bill implementation, (2) pilot rate design, and (3) schedule for phase II, (4) pilot price platform vendor, and (5) ELRP compensation strategy for dynamic rates.
- This Resolution delays the schedule for each pilot.
- PG&E shall enroll residential and commercial fleet pilot participants in the Emergency Load Reduction Program beginning with phase I.
- PG&E may expand the scope of the commercial fleets pilot as proposed in PG&E's November 18, 2021, data response to include passenger vehicle fleets.
- This Resolution modifies the proposed residential pilot to remove the requirement that residential customers hire an Electric Vehicle Infrastructure Training Program certified installer when installing bi-directional EVSE at an

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<sup>107</sup> AL 6259-E proposed a 2023 deadline for pilot #3. On November 18, 2021, PG&E requested a 2024 completion date similar to other proposed pilots (Pacific Gas and Electric Company Electric Vehicle Infrastructure OIR Rulemaking 18-12-006 Data Response).

<sup>108</sup> This requirement would also be relevant to pilot #4 if PG&E chooses to file a new AL. The timeline for pilot #4 does not clearly identify the deadline for a final evaluation report. AL 6259-E p.91 mentions an evaluation in February 2024 and a report in August 2024.

<sup>109</sup> This summary does not include additional optional ALs that PG&E may file to transfer budget between pilots or between budget categories.



existing 208/240-volt outlet. This Resolution also makes other revisions to proposed safety requirements for residential customers.

- PG&E shall file a Tier 2 AL within 60 days to demonstrate potential pathway(s) to scale implementation of the microgrids pilot through existing or potential new large electrical corporation program(s) that would further the goals of SB 676.
- This Resolution modifies AL 6259-E to require that PG&E (1) report on additional metrics for each pilot; (2) file an interim evaluation report within three months of completion of phase I of the residential and commercial fleet pilots and no later than October 15, 2023; and (3) obtain Energy Division lead staff concurrence by October 31, 2022 on the final evaluation report scope and deadline.
- PG&E shall file a Tier 1 AL within 60 days of this Resolution to create a one-way balancing sub-account within the Transportation Electrification Balancing Account.

## **COMMENTS**

Public Utilities Code section 311(g)(1) provides that this Resolution must be served on all parties and subject to at least 30 days public review. Section 311(g)(2) provides that this 30-day review period and a 20-day comment period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day review and 20-day comment period for the draft of this Resolution was neither waived nor reduced. Accordingly, this draft Resolution was mailed to parties for a 20 day comment period, and the Resolution was placed on the CPUC's agenda more than 30 days from the date that the draft Resolution was mailed.

Kaluza, PG&E, WeaveGrid and VGIC filed public comments on March 23, 2022. Kaluza supports the draft Resolution and requests one revision.<sup>110</sup> WeaveGrid supports the draft Resolution.<sup>111</sup> VGIC largely supports the draft Resolution.<sup>112</sup> Some comments were out of scope and only relevant comments are discussed below along with any revisions that we made to the Resolution in response to these comments. We also made minor editorial revisions for clarity and corrected typos.

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<sup>110</sup> Kaluza p.1.

<sup>111</sup> WeaveGrid p.1.

<sup>112</sup> VGIC p.1.

## **1. Reallocating Exploring Export Value Pilot Budget**

PG&E stated that some general development costs for the cloud platform to support the pilots were spread among all the proposed pilots. Since the draft Resolution would deny the exploring export value pilot, with an option to address deficiencies and refile this pilot, PG&E requests that we reallocate \$400,000 of the cloud platform portion of the exploring export pilot budget to either the residential or the commercial pilot.<sup>113</sup> VGIC recommended transferring \$500,000 to the incentives budget (from customer enrollment budget) and repurposing \$2.5 million that PG&E proposed to spend for the exploring export value to increase customer incentives for the commercial fleets pilot.

We acknowledge PG&E's request to reallocate a portion of the exploring export value pilot, if that pilot is not implemented, as well as VGIC's request to transfer the budget from this pilot to the commercial fleet pilot incentive budget. However, we do not have enough information to justify either request. Therefore, we have revised this Resolution to allow PG&E to file a Tier 3 AL. This AL may request reallocation of funding from the proposed exporting export value pilot to reallocate unused funds from the exploring export pilot to the residential and/or commercial fleet pilot. PG&E must include a detailed justification.<sup>114</sup>

## **2. Elimination of V2G from residential and commercial pilots**

PG&E requests removing V2G use cases from the residential and commercial pilots if the exploring export value pilot is denied because the loss of the CAISO module of the cloud platform will restrict V2G testing.<sup>115</sup>

We do not agree because PG&E is proposing to test priority V2G use cases in those pilots. As clarified above, PG&E may request additional budget to develop the necessary cloud platform in case the exploring export value pilot is not implemented.

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<sup>113</sup> PG&E p.12. PG&E would also reduce the exploring export value cloud platform budget by \$400,000 if PG&E resubmits a request to approve that pilot.

<sup>114</sup> For instance, in the case of the cloud platform PG&E must provide a detailed breakdown of additional costs for cloud platform development and a justification for those costs based on the needs of the remaining pilots

<sup>115</sup> PG&E p.14.

### 3. Residential and commercial pilot rates

PG&E and VGIC commented on the rate structures of the draft Resolution. First, PG&E and VGIC support using real-time pricing for the generation component of dynamic rates.

Second, PG&E requests extending a non-dynamic rate option to all participants because mandating that they accept a rate structure based on real-time prices may prohibitively reduce the pool of potential pilot participants.<sup>116</sup>

Third, VGIC supports including approved and pending rate structures in these pilots so that full-scale VGI programs and policies will be consistent with rate options that will be offered to a wider set of customers.<sup>117</sup> Thus, VGIC recommends removing section 11.2 of the draft Resolution, which would allow PG&E to propose alternatives to the rate structures in section 11.1 of the draft Resolution. Instead, the Commission should allow PG&E to request more time if needed.<sup>118</sup>

Fourth, VGIC supported the inclusion of a distribution component in the rate structures while PG&E recommends removing the distribution component from the real-time pricing signal.<sup>119</sup> PG&E states that including distribution rates based on real-time pricing will vastly increase the cost and complexity of a small pilot and could lead to cost-shifting; and stated that the draft Resolution would require creating specific rates for each of PG&E's 34,000 distribution circuits. PG&E recommends that the distribution component of rates should be determined through a specific proceeding - rather than these small pilots - to provide IOUs, stakeholders and the Commission the opportunity to review and discuss these rates.<sup>120</sup> PG&E states that the General Rate Case Real Time Price settling parties identified several issues with the design of a distribution component and decided against including a dynamic distribution component.<sup>121</sup> PG&E also states that the issues are not insurmountable but have not been addressed by parties and no opportunity for discussion has been provided.<sup>122</sup>

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<sup>116</sup> PG&E p.9.

<sup>117</sup> VGIC p.4.

<sup>118</sup> VGI p.5.

<sup>119</sup> PG&E p.7.

<sup>120</sup> PG&E p.9.

<sup>121</sup> See Application 19-11-019.

<sup>122</sup> PG&E p. 7

Regarding the first topic, we agree with comments and revised the Resolution to explicitly authorize the inclusion of a dynamic generation rate.<sup>123</sup>

Second, we agree with PG&E's request to extend a non-dynamic rate option to all participants and revised the Resolution to provide this option to all participants (in addition to a dynamic rate option).<sup>124</sup>

Third, we agree with VGIC that authorizing PG&E to file an alternative rate is counter to the broader objectives of this pilot. Therefore, we revised the Resolution to remove section 11.2 of the draft Resolution and also revised the Resolution to provide additional guidance regarding acceptable rate structures.<sup>125</sup> We also extended the deadline for submitting the rate structure AL from 60 days to 120 days.

Fourth, while we agree with PG&E that development of a generally applicable rate tariff must be litigated in a proceeding, we believe that this pilot should not be limited to implementing rate structures that have been previously litigated. Small scale pilots can test dynamic rate option(s) and collect data that will inform broader rate design efforts. (examples of pilots that include dynamic distribution rates include the PG&E and Valley Clean Energy agricultural water pumps pilot and SCE's dynamic rate pilot).<sup>126</sup> Also, D.20-12-029 establishes a near-term policy action of avoiding distribution system upgrades, as outlined in Section 1 of this Resolution, which we believe can best be achieved via a dynamic distribution rate. We believe that PG&E's residential and commercial V2X pilots should include a dynamic distribution component so customers can test them and we can evaluate their effectiveness for avoiding distribution system upgrades. In addition, we agree with PG&E's comments that barriers to developing these rates are not insurmountable.

Therefore, we revised this Resolution to offer additional clarification on the dynamic rate design for the residential and commercial pilots.<sup>127</sup> We encourage PG&E to balance pilot objectives and available resources; and to think creatively and innovatively when designing the rate structures, and in particular, the distribution component. We have clarified that PG&E may reduce complexity by proposing a rate structure that is not unique to each distribution circuit, in response to PG&E's

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<sup>123</sup> The draft Resolution authorized use of a rate structure containing this generation component. The revised Resolution is more explicit, see section 10.1, formerly 11.1 in the draft Resolution.

<sup>124</sup> See section 10.1, formerly section 11.1.

<sup>125</sup> *ibid.*

<sup>126</sup> Creation of these pilots was approved under D.21-12-015.

<sup>127</sup> See section 10.1, formerly section 11.1.

comments, but PG&E must strive to meet the objective of the Resolution to offer rate structures with dynamic distribution components.<sup>128</sup> We encourage PG&E to consult with Energy Division lead staff during the development of the rate structure AL required by this Resolution.<sup>129</sup>

We also revised this Resolution to change the level of the rate structures AL from Tier 1 to Tier 2 to reflect the significance of these issues, as highlighted by comments, and the appropriate level of review.<sup>130</sup>

#### **4. Timing**

PG&E recommends revising the draft Resolution to delay the start date of the residential and commercial pilots because the approval date for PG&E's AL 6259-E will occur later than PG&E anticipated. PG&E also recommends revising the draft Resolution to allow PG&E to start the commercial pilot phase II later than phase I as proposed in AL 6259-E.

We generally agree. Therefore, we added a new section 10.2 to this Resolution to approve PG&E's proposed timing with the exception of the start date of the phase II of the commercial fleet pilot. While we acknowledge that PG&E will need time to implement commercial pilot phase II, some commercial fleets cannot implement vehicle-to-building use cases and therefore cannot participate in phase I. Thus, advancing the start date of phase II will allow them to participate in the pilot sooner so we direct PG&E to explore alternatives to meet this requirement. We have revised this Resolution to requirement that PG&E identify, in the Tier 2 AL proposing rate structures, the earliest possible date to implement phase II of the commercial fleets pilot.

#### **5. Emergency Load Reduction Program**

VGIC supports ELRP enrollment and recommends that customers should be allowed to choose between ELRP options A.5 and A.6. as the best option may vary from customer to customer.<sup>131</sup> PG&E recommends modifying the Resolution to allow dual enrollment in pilots and ELRP.<sup>132</sup> PG&E also recommends that residential pilot

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<sup>128</sup> *ibid.*

<sup>129</sup> *ibid.*

<sup>130</sup> *ibid.*

<sup>131</sup> VGI p.5, 6.

<sup>132</sup> PG&E p.7.

participants should only be required to enroll in ELRP during phase 1 because ELRP options could change after 2022.<sup>133</sup>

We agree with VGIC that customers may choose a specific ELRP group, which does not require modification to PG&E's pilots. We disagree with PG&E's request that we revise the Resolution to eliminate the requirement that residential customers participate in ELRP during phase II because PG&E's claims about possible future ELRP changes are speculative.

We generally agree with PG&E that VGI pilot participants may also participate in the ELRP. However, we have revised this Resolution to require that PG&E avoid double compensation for the generation component of dynamic rates for participants that select a dynamic rates and export power during ELRP events if those dynamic rates contain a price signal similar to ELRP incentive levels.<sup>134</sup>

We have also revised this Resolution to require enrollment of commercial customers in ELRP for two reasons.<sup>135</sup> First, as noted above, the revised Resolution allows a phase I that will not include V2G options. Second, the revised Resolution allows participants to select a static TOU rate structure, once rates for exports to the grid are available, that would not reflect ELRP price signals. These customers will potentially benefit from participation in ELRP.

## **6. Commercial Fleets Pilot Enrollment and Incentive Budgets**

First, PG&E requested that we revise section 10 of the draft Resolution to eliminate the requirement that PG&E file an AL to justify the proposed \$500,000 customer enrollment budget. PG&E proposed to reduce the enrollment budget to \$400,000 and noted several specific types of costs that would be covered by the enrollment budget and stated that the cost of enrolling commercial customers is higher than enrolling residential customers.<sup>136</sup>

Second, PG&E requested that we remove from section 13 of the draft Resolution the requirement to justify the commercial fleet pilot incentive levels via a Tier 1 AL.<sup>137</sup> PG&E proposes to transfer \$100,000 from the enrollment budget sub-category to the

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<sup>133</sup> *ibid.*

<sup>134</sup> See section 10.3.

<sup>135</sup> See section 10.

<sup>136</sup> PG&E p.11,12.

<sup>137</sup> PG&E p.12.

incentives budget category to increase proposed up-front incentives by \$500. VGIC noted that costs for high-powered EVSE are significantly different than costs for EVSE serving passenger vehicles.<sup>138</sup>

Third, PG&E recommends removing from section 13 of the draft Resolution a requirement that PG&E file a Tier 1 AL to explain whether PG&E will allow “stacking” of other incentives with incentives from this pilot.<sup>139</sup> PG&E states that commercial pilot participants may “stack” VGI pilot incentives with other PG&E programs offering up to \$25,000 or \$42,000 per EVSE and associated electrical infrastructure. PG&E considered the value of those incentives when determining the VGI pilots rebate levels.<sup>140</sup> However PG&E states that “stacking” of VGI pilot incentives with non-PG&E programs will not be allowed to avoid complexities with determining cost-effectiveness assessments.<sup>141</sup>

First, we acknowledge that PG&E described several activities that would be funded through the enrollment budget. However, the Resolution continues to require an AL as PG&E did not provide sufficient information to justify this proposed budget such as providing examples of budgets previously approved for similar activities.

Second, we do not see sufficient evidence to justify PG&E’s proposed revised incentive budget. PG&E has not yet shown whether this revised budget level is sufficient or necessary to partially offset incremental costs of bi-directional chargers as well as PG&E’s proposed expansion of the pilot to include passenger vehicle fleets.

Third, we are satisfied with PG&E’s approach regarding stacking of VGI pilots incentives with other incentives for the residential pilot. However, PG&E failed to provide sufficient information to demonstrate the level of incentives needed for commercial fleets in relation to incremental equipment costs and available PG&E TE Infrastructure incentives; and to address the alignment of program and pilot objectives. We revised the Resolution to clarify the information PG&E must provide in the Tier 2 AL to justify incentive proposal and stacking to obtain approval.

Finally, we reject PG&E's proposal to prevent commercial fleet pilot host sites that accept a non-utility incentive from participating in the commercial fleet pilot for two

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<sup>138</sup> VGIC p.3.

<sup>139</sup> PG&E p.12.

<sup>140</sup> PG&E p.11.

<sup>141</sup> PG&E p.12.

reasons. First, we generally support participation in non-utility incentives to reduce costs to ratepayers. Second, the decision to stack this additional pilot incentive on top of a non-utility funding source should be deferred to the administrator of that non-utility funding. PG&E should instead require that pilot participants report to PG&E any additional funding sources they receive and verify that the incentives collectively do not exceed the cost of what the participant paid.

The Resolution continues to require that PG&E file a Tier 2 AL within 60 days of the issuance of this Resolution to address the commercial fleets pilot enrollment and incentive budget topics as described above and in section 12 of this Resolution.<sup>142</sup>

However, we narrowed the requirement for an AL regarding incentive stacking to require that PG&E shall address incentive stacking for commercial pilot. In addition, we revised this Resolution to eliminate the requirement for a separate Tier 1 AL in the draft resolution. Instead, this topic will be addressed in the same Tier 2 AL required in section 12 regarding other commercial fleets pilot issues.

## **7. Reporting and evaluation**

PG&E requested a number of changes to the reporting and evaluation requirements in section 16 of the draft Resolution:

- Eliminate the interim report and instead rely on quarterly PAC meetings; or else shift the timing to the earlier of October 15, 2023 or completion of Phase I plus six months.<sup>143</sup>
- Revise the deadline for scoping the final evaluation from October 2022 to October 2023 so that the interim report is completed first.<sup>144</sup>
- Change the date for updating the VGI reporting template to February 28, 2023, to correct an apparent error.
- Eliminate reporting of round-trip efficiency. PG&E states that this task is outside the scope of the project and would require one utility meter per EVSE

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<sup>142</sup> Section 12 requires that PG&E file a Tier 2 AL to justify or reduce the proposed customer enrollment budget. PG&E may propose to transfer budget from the customer enrollment budget and increase the customer incentives budget. In addition, PG&E shall justify up-front equipment purchase incentive levels.

<sup>143</sup> PG&E p.5, 6. PG&E also requested further delay for the commercial pilot if CPUC eliminates phasing for the commercial pilot

<sup>144</sup> PG&E p.5, 6.



- at an additional cost of approximately \$2 million across the three pilots. PG&E suggests that this task should be conducted in a laboratory.<sup>145</sup>
- Eliminate reporting of ELRP participation so that separate ELRP and routine VGI reporting can address the full range of ELRP participants.<sup>146</sup>

In response to PG&E's comments, we have revised this Resolution to 1) require that PG&E complete the interim report three months after phase I completion but no later than October 15, 2023, to adjust for the change in the phase I schedule; and 2) correct the error regarding for the date for the VGI reporting template update.<sup>147</sup>

We do not agree to change the deadline for scoping the final evaluation because we wish to ensure that the evaluation scope is available from near the start date of the pilots to inform implementation and data collection. However, we revised this Resolution to delegate authority to the Energy Division to allow some future revisions based on implementation experience.

Finally, we do not agree to eliminate reporting of round-trip efficiency data. PG&E must collect through the pilots or otherwise obtain representative round-trip efficiency data for the models of EVs and EVSE participating in the pilot. The pilot goals of determining the value of V2G and potential reduction in the total cost of EV ownership depend on this data. In addition, PG&E did not justify the claim that collecting efficiency data would require a separate meter for every participant.

## 8. Cost recovery

PG&E requests that the Commission approve a two-way balancing account, or alternatively a one-way balancing account so that PG&E can track costs. PG&E does not recommend authorizing a memo account.<sup>148</sup>

We do not believe that a two-way balancing account is appropriate. A two-way balancing account is appropriate for tracking costs when a high degree of uncertainty justifies recovering costs that exceed approved budgets, but PG&E did not identify potential risks for exceeding budgets.

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<sup>145</sup> PG&E p.5.

<sup>146</sup> *ibid.*

<sup>147</sup> See section 17.3; formerly section 16.3 in the draft Resolution.

<sup>148</sup> PG&E pp.1-3.

On the other hand, we do agree that a one-way balancing account is appropriate because this type of account will allow PG&E to record costs while limiting the amount recorded to the amount approved by this Resolution to protect ratepayers. Thus, we have added a new section 14 to this Resolution to require that PG&E file a Tier 1 AL to establish a one-way balancing account.<sup>149</sup>

## **9. Vendor qualification process**

VGIC supports PG&E's intent to open pilot participation to the widest possible variety of potential vendors. Kaluza urges the Commission to ensure that customers can participate in future V2G programs and that such programs support a wide range of vendors, not a specific vehicle, charger brand or single system integrator.<sup>150</sup>

We agree and direct PG&E to outline its vendor selection process and how PG&E will support open standards that enable customer choice in a Tier 2 AL. These topics shall combine with other commercial pilots topics in the AL described in section 12 of this Resolution.<sup>151</sup>

## **FINDINGS**

1. Public Utilities Code Section 740.16 requires the CPUC to establish strategies and quantifiable metrics to maximize the use of feasible and cost-effective EV integration into the electrical grid (VGI) by January 1, 2030.
2. D.20-12-029 provides direction on implementation of SB 676. OPs 13, 14 and 15 authorized the large electrical corporations to propose VGI pilots as discussed further in sections 6.8, 7 and 15 of the decision.
3. D.20-12-029 authorizes the IOUs to request in total no more than \$35 million for all proposed VGI pilots authorized by this decision unless reduced by Energy Division staff.
4. The California IOUs jointly filed a stocktake in March 2021 and held two public workshops regarding their proposed VGI pilots.
5. PG&E filed AL 6259-E on July 15, 2021, requesting approval of four VGI pilots to overcome barriers to deployment of EVs and EV charging equipment capable of bi-directional charging.

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<sup>149</sup> We have renumbered the section included as section 14 in the draft Resolution.

<sup>150</sup> Kaluza p. 1.

<sup>151</sup> See section 12 of this Resolution.

6. Advice Letter 6259-E proposed to include residential customer EVs in the residential pilot and commercial fleets of MD/HD EV in the commercial pilot. PG&E proposed to expand the commercial vehicle fleets to include light duty vehicle fleets in an October 15, 2021, data response.
7. AL 6259-E proposed to integrate EVs into a micro-grid to address PSPS in the microgrids pilot.
8. AL 6259-E proposed to explore export market value with a focus on electric school buses in the exploring export value pilot.
9. PG&E requested \$14 million in total funding.
10. No stakeholder protested the AL.
11. PG&E provided additional information on October 15, 2021, and November 18, 2021.
12. PG&E has considered VGI Working Group and CALSTART recommendations.
13. PG&E has identified practical barriers that prevent scale-up of VGI technologies and use cases in IOU programs that would further the goals of SB 676.
14. PG&E proposed incentive levels and prioritization strategies to facilitate participation by ESJ communities.
15. AL 6259-E did not justify the proposed budget for the exploring export value pilot.
16. AL 6259-E did not justify splitting CAISO-facing value streams between the commercial fleets pilot and the exploring export value pilot.
17. Communication standards including ISO 15118-2018 are not fully adopted in the marketplace.
18. AL 6259-E did not propose to enroll residential pilot participants in ELRP in phase 1 and did not explain how PG&E would determine rate tariffs and/or other pricing structures for V2G use cases in phase 2.
19. AL 6259-E did not propose to include a V2G option in phase I of the commercial fleets pilot and did not explain how PG&E would determine rate tariffs and/or other pricing structures for V2G use cases address by the pilot.
20. Decision 21-11-017 approved the PG&E Commercial Electric Vehicle Day-Ahead Hourly Real Time Pricing Pilot rate.
21. AL 6259-E states that PG&E intends to use Low Carbon Fuel Standard funding for the pilots in preference to ratepayer funding but did not address in AL 6259-E the requirements of relevant decisions regarding Low Carbon Fuel Standard funding.
22. AL 6259-E did not justify the commercial fleets customer enrollment budget of \$500,000.
23. AL 6259-E proposed to provide the same up-front rebate levels to both residential customers with light duty EVs in the residential pilot and MD/HD commercial customers in the commercial fleets pilot. MD/HD EVs often require higher power

- levels than light duty EVs. PG&E also did not address coordination with other potential EVSE incentives.
24. AL 6259-E proposed to allow participants to opt-out of specific events in the residential and commercial fleets pilots. PG&E stated in an October 15, 2021, data response that they would allow customers to opt-outs of specific events in the microgrids and commercial fleets pilot.
  25. AL 6259-E proposed to require EVITP certification for all contractors hired by residential customers in the residential pilot.
  26. Public Utilities Code section 740.20(b)(3) does not require EVITP for installation of equipment at single-family homes that can use an existing 208/240-volt outlet.
  27. AL 6259-E did not show a pathway to scale proposed microgrids to a program.
  28. AL 6259-E proposed a number of reporting metrics related to barriers listed in AL 6259-E.
  29. AL 6259-E did not propose to report on the following metrics regarding the residential and commercial fleets pilots: effectiveness of increased incentives to increase participation by customers in ESJ communities; participation disaggregated by different vehicle types and operational cycles for the commercial fleets pilot; participation by geographic region such as zip code; round-trip electrical losses; potential for market actors to develop business cases; and effectiveness leveraging market actors to develop & deploy customer education.
  30. AL 6259-E did not propose reporting on each market barrier that the microgrids pilot would address.
  31. AL 6259-E did not propose sufficient reporting requirements for the exploring export value pilot.
  32. AL 6259-E did not propose to provide an interim report. An interim report would provide valuable information to policymakers and market actors.
  33. AL 6259-E proposed to provide an evaluation as required by D.20-12-029 but did not propose consistent evaluation dates for the pilots and proposed up to 11 months to complete the evaluation for proposed the residential and commercial fleets pilots.

THEREFOR IT IS ORDERED THAT:

1. Pacific Gas and Electric Company Advice Letter 6259-E is approved with modifications as specified herein.
2. Pacific Gas and Electric Company's request for funding of the exploring vehicle-to-grid export value pilot is denied due to deficiencies in Advice Letter 6259-E. Pacific Gas and Electric Company may file a new Tier 2 advice letter within 60 days of the issuance of this Resolution to correct these deficiencies.

3. Pacific Gas and Electric Company may file a Tier 3 advice letter to request approval to transfer some or all of the funds originally requested for the exploring export value pilot to the residential and/or commercial pilots if Pacific Gas and Electric Company does not re-file for approval of the exploring export value pilot. Pacific Gas and Electric Company must fully support this request with evidence and detailed explanation of the need for this transfer. Pacific Gas and Electric Company's requested total budget for all vehicle-grid integration pilots shall not exceed \$14 million as authorized in Decision 20-12-029.
4. Pacific Gas and Electric Company shall file a Tier 2 advice letter that meets the requirements of section 12 of this Resolution regarding the commercial fleets pilot within 60 days of the issuance of this Resolution. First, Pacific Gas and Electric Company shall justify or reduce the proposed customer enrollment budget. Pacific Gas and Electric Company may propose to reduce this budget and increase the customer incentives budget. Second, Pacific Gas and Electric Company shall justify up-front equipment purchase incentive levels. Third, Pacific Gas and Electric Company shall address incentive stacking. In addition, Pacific Gas and Electric Company shall explain the process for vendor qualification and how Pacific Gas and Electric Company will support deployment of open standards that support interoperability and customer choice.
5. Pacific Gas and Electric Company shall file a Tier 2 advice letter within 60 days to demonstrate potential pathway(s) to scale implementation of the microgrids pilot through existing or potential new large electrical corporation program(s) that would further the goals of Senate Bill 676.
6. Pacific Gas and Electric Company shall file a Tier 2 advice letter within 120 days of the issuance of this Resolution with rate structures for phase II of the residential and commercial fleets pilots. This advice letter shall include both dynamic and static TOU rate structure as described in section 10. This advice letter shall also identify the earliest possible start date for phase II of the commercial fleets pilot.
7. Pacific Gas and Electric Company shall file a Tier 1 advice letter within 60 days of the issuance of this Resolution. This advice letter shall propose a new one-way balancing subaccount within the Transportation Electrification Balancing Account to track and record the actual costs for the vehicle-grid integration pilots and the amounts authorized by this Resolution.
8. Pacific Gas and Electric Company shall change the pilots start dates and subsequent dates as specified in section 10.2 of this Resolution.
9. Pacific Gas and Electric Company shall enroll residential and commercial pilot participants in the Emergency Load Reduction Program beginning with phase I.

10. Pacific Gas and Electric Company may expand the scope of the commercial fleets pilot to include passenger vehicle fleets as proposed in Pacific Gas and Electric Company's November 18, 2021, data response.
11. Pacific Gas and Electric Company shall remove the requirement that residential customers hire an Electric Vehicle Infrastructure Training Program certified installer when installing bi-directional electric vehicle supply equipment at an existing 208/240-volt outlet. This Resolution also makes other revisions to proposed safety requirements for residential customers.
12. Pacific Gas and Electric Company shall 1) report on additional metrics for each pilot as specified in section 17; 2) file an interim evaluation report within three months of the completion of phase I of the residential and commercial pilots and no later than October 15, 2023; and 3) obtain Energy Division lead staff concurrence by October 31, 2022 on the final evaluation report scope and deadline.

This Resolution is effective today.

I certify that the foregoing Resolution was duly introduced, passed, and adopted at a conference of the Public Utilities Commission of the State of California held on May 5, 2022 the following Commissioners voting favorably thereon:

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Rachel Peterson  
Executive Director

Attachment A – PG&E October 15, 2021, Data Response

**PACIFIC GAS AND ELECTRIC COMPANY  
Electric Vehicle Infrastructure OIR  
Rulemaking 18-12-006  
Data Response**

PG&E Data Request No.:	ED_029-Q01-13		
PG&E File Name:	ElectricVehicleInfrastructure_DR_ED_029-Q01-13		
Request Date:	August 27, 2021 (and other dates, see in-line below)	Requester DR No.:	029
Date Sent:	October 15, 2021	Requesting Party:	Energy Division
PG&E Witness:		Requester:	Ed Pike

**QUESTION 01 (REQUESTED VIA MEETING AND EMAIL ON 9/22)**

VGIC commented in their Response to PG&E's VGI Pilots Advice Letter that PG&E should confirm whether customers in proposed Pilots 3 and 4 can opt-out of events or ensure that their transportation needs are met.<sup>152</sup> Energy Division (ED) asked PG&E to provide the relevant citations in the VGI Pilots Advice Letter where PG&E's intention to not preclude opt-outs is mentioned.

**ANSWER 01**

The following statement is found in the VGI Pilots Advice Letter, "It is always an option for the customer to "opt-out" of participation to ensure transportation needs are always met and of highest priority."<sup>153</sup> This sentence appears in the narrative for proposed Pilots 1 and 2, but not in the narrative for proposed Pilots 3 and 4. However, PG&E intends to allow "opt outs" in all pilots.

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<sup>152</sup> Response of the Vehicle-Grid Integration Council to AL 6259-E of Pacific Gas and Electric Company. August 4, 2021.

<sup>153</sup> AL 6259-E Pacific Gas and Electric Company U 39 E (AL 6259-E), p. 22.

**QUESTION 02 (REQUESTED VIA EMAIL ON 9/22)**

CALSTART commented in their Response to PG&E's VGI Pilots Advice Letter that PG&E should expand Pilot 2 to include a broader set of medium- and heavy-duty vehicle (MHDV) segments.<sup>154</sup> ED asked PG&E how PG&E intends to respond to this comment.

**ANSWER 02**

In the narrative for Pilot 2 in PG&E's VGI Pilots Advice Letter, PG&E states, "PG&E's V2X Commercial Pilot Program is a three-year pilot focused on spurring adoption of V2X (bidirectional charging) medium- and heavy-duty (MHD) electric vehicles (EVs) that are interconnected and charge at commercial buildings."<sup>155</sup> Therefore, the intention is to allow any medium- and heavy-duty vehicle types so long as they meet the pilot's minimum technical requirements.

**QUESTION 03 (REQUESTED VIA MEETING AND EMAIL ON 9/22)**

CALSTART commented in their Response to PG&E's VGI Pilots Advice Letter that PG&E should expand Pilot 4 to include a broader set of medium- and heavy-duty vehicle types.<sup>156</sup> ED asked PG&E how PG&E intends to respond to this comment.

**ANSWER 03**

In the narrative for Pilot 4 in PG&E's VGI Pilots Advice Letter, PG&E states, "[t]his program aims to create revenue streams to capture value from V2X classes 2b-8 school electric buses."<sup>157</sup> While Pilot 4 is theoretically open to all medium & heavy-duty vehicle classes, it is limited in scope to a few particular sites that accommodate low duty-cycle, high-availability vehicles because of the limited budget and specific objective of Pilot 4 of exploring export compensation in the CAISO market. It would not be feasible under the budgetary constraints to run Pilot 4 multiple times for each medium- and heavy-duty electric vehicle segment.

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<sup>154</sup> Comments of CALSTART on PG&E AL 6259-E Request for Approval of PG&E's VGI Pilots in Compliance with Decision 20-12-029. August 4, 2021.

<sup>155</sup> AL 6259-E, p. 35.

<sup>156</sup> Comments of CALSTART on PG&E AL 6259-E Request for Approval of PG&E's VGI Pilots in Compliance with Decision 20-12-029. August 4, 2021.

<sup>157</sup> AL 6259-E, p. 76.



**QUESTION 04 (REQUESTED VIA MEETING AND EMAIL ON 9/22)**

VGIC commented in their Response to PG&E's VGI Pilots Advice Letter that PG&E should allow light duty electric vehicle fleets in Pilot 2. ED has asked PG&E to provide an outline on what our specific plan is for Pilot 2.

**ANSWER 04**

In the narrative of Pilot 2 in PG&E's VGI Pilots Advice Letter, PG&E states, "PG&E's V2X Commercial Pilot Program is a three-year pilot focused on spurring adoption of V2X (bidirectional charging) medium- and heavy-duty (MHD) electric vehicles that are interconnected at commercial buildings."<sup>158</sup> While PG&E's Advice Letter intends Pilot 2 to have a scope focused on medium- and heavy-duty vehicles, PG&E will allow any electric light-duty vehicle fleets to also apply for participation in Pilot 2. Because electric light-duty vehicle manufacturers will already benefit in Pilot 1, and due to the limited nature of the funding for PG&E's VGI Pilots, PG&E would propose implementing an LD fleet cap in Pilot 2. The LD fleet cap would not allow LD fleets to capture more than 50% of the incentives in Pilot 2.

**QUESTION 05 (REQUESTED VIA MEETING ON 8/27)**

ED asked PG&E if PG&E had the option of doing either a joint-IOU third-party evaluation on VGI Pilots or separate evaluations, what would PG&E's preference be.

**ANSWER 05**

In the CPUC VGI Decision at Ordering Paragraph 23, it states, "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."<sup>159</sup> While the VGI Decision orders a joint evaluation, if given the option, PG&E believes that a joint evaluation for the VGI Pilots could have logistical challenges and time-delays because the VGI Pilots are not statewide pilots or state-run programs. Southern California Edison (SCE) and PG&E are focused on different aspects of VGI. For example, SCE is focused on V1G while PG&E is focused on V2G. Additionally, the partners that SCE contracts with on their VGI Pilots and the partners that PG&E contracts with will likely be different and data acquisition and data collection protocols could be different leading to logistical challenges and time-delays. Therefore, PG&E's preference, *in alignment with SCE*, would be to do separate RFP and evaluation processes for the third-party evaluation of the VGI Pilots.

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<sup>158</sup> *Id.* at p. 38.

<sup>159</sup> Decision (D.) 20-12-029, Dec. 21, 2020, p. 87.

**QUESTION 06 (REQUESTED VIA EMAIL ON 8/20 AND MEETING ON 8/27)**

ED presented on VGI to CPUC's Disadvantaged Communities Advisory Group (DACAG) on 8/27. The DACAG asked about efforts to engage multi-family residents. ED asked PG&E to consider DACAG's feedback and respond with how PG&E will handle multi-family residents in PG&E's VGI Pilots and make sure that they don't get left behind.

**ANSWER 06**

Based on the current structure of the VGI Pilots, multi-family housing and multi-family residents are best suited to participate in Pilot 1. PG&E would propose allowing any multi-family home connected to single-phase power to be allowed to apply (assuming other technical requirements are met of the program) for participation in Pilot 1.

**QUESTION 07 (REQUESTED VIA MEETING ON 9/10)**

CALSTART commented on Pilot 4 in their Response to PG&E's VGI Pilots Advice Letter and "...highly encourage[d] the V2G elements of this pilot be combined with the V2G power export elements of pilot #2 into one V2G pilot program for all MHDVs. The efforts to change market rules will need to be undertaken in both pilots and this does not seem terribly efficient."<sup>160</sup> ED and PG&E discussed possible changes in a call on 9/10. If no changes are proposed by PG&E in response to CALSTART's comments, ED would like PG&E to provide informal feedback (diagram) on how Pilot 2 and Pilot 4 are linked.

**ANSWER 07**

PG&E does not recommend combining Pilot 2 with Pilot 4 into a single pilot because the scopes and objectives are highly differentiated. Moreover, combining Pilots 2 and 4 into a single pilot would cause challenges with timing and testing of different use cases and add undue complexity that would bottleneck the testing of use cases that do not require changes to regulation to implement. While PG&E had considered combining Pilots 2 and 4 during the pilot development process, the risks to both significantly outweighed any perceived benefits. Below is a table that summarizes the key aspects of each pilot, including objectives, scope, use cases, timing, and dependencies.

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<sup>160</sup> Comments of CALSTART on PG&E AL 6259-E Request for Approval of PG&E's VGI Pilots in Compliance with Decision 20-12-029. August 4, 2021.

*Table 1: Key Highlights of PG&E Proposed Pilot 2 and Pilot 4*

	Pilot 2	Pilot 4
<b>Objective(s)</b>	<ul style="list-style-type: none"> <li>• Demonstrate the value of V2X/bidirectional medium- and heavy-duty (MHD) EVs for customers and the electricity grid;</li> <li>• Reduce the total cost of EV ownership by understanding potential revenue streams from grid services and identifying potential barriers that inhibit access to these revenue streams.</li> </ul>	<ul style="list-style-type: none"> <li>• Enable revenue streams through CAISO market participation;</li> <li>• Determine pathways that would remove barriers to CAISO market participation; and</li> <li>• Demonstrate that bidirectional capabilities and participation of bidirectional EVs in grid services reduce the total cost of ownership of EVs.</li> </ul>
<b>Scope</b>	Large number of customers from varied vehicle segments	Small number of customers from single vehicle segment (e.g., electric school buses)
<b>Use cases &amp; Timeline</b>	<ul style="list-style-type: none"> <li>• Backup power (2022)</li> <li>• Energy arbitrage (2023)</li> <li>• Real-time pricing (2023)</li> <li>• Distribution upgrade deferral (2023)</li> <li>• CAISO market participation (2023 – <i>pending results of Pilot 4</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Simulation</i> of market participation in CAISO (e.g., voltage support, ancillary services) (2022-2023)</li> <li>• Capacity shortfall (2022-2023)</li> <li>• Grid reliability (2022-2023)</li> <li>• Resource adequacy (RA) (2022-2023)</li> </ul>
<b>No. of Pilot Participants</b>	200	10-25

**QUESTION 08 (REQUESTED VIA MEETING ON 9/17 AND 9/27)**

Can PG&E prepare annual interim reports (in addition to the final report) for each of its VGI Pilots proposed in AL 6259-E?<sup>161</sup>

**ANSWER 08**

PG&E believes that potential data of interest for an interim report will be reported via current workstreams and creating a new workstream would be redundant. The CPUC VGI

<sup>161</sup> PG&E AL 6259-E Request for Approval of PG&E's VGI Pilots in Compliance with Decision 20-12-029.

Decision requires incremental reporting on a semi-annual basis which would include interim progress on PG&E's VGI Pilots.<sup>162</sup> PG&E also plans to share status updates and progress on the VGI Pilots on PG&E microsite(s).

**QUESTION 09 (REQUESTED VIA MEETING ON 9/10)**

Do PG&E's pilot participant numbers lend themselves to assessing cost-effectiveness with statistical significance? How would expanding the number of vehicle segments in Pilot 2 effect cost-effectiveness?

**ANSWER 09**

PG&E believes that the values selected for Pilots 1 and 2 are sufficient to conduct a cost-effectiveness analysis. Based on other load management programs that PG&E has evaluated, 200 is a good minimum number of pilot participants to provide a representative sample.

Dividing the 200 pilot participants (Pilot 2) into smaller segments by vehicle class, could diminish the accuracy of the cost-effectiveness analysis. However, this is all caveated by the fact that bidirectional technology and large-scale V2X pilots are so new, that PG&E cannot predict the demand for adoption once the pilot is launched, whether the target number of pilot participants will be met and therefore, or whether achieving a representative sample from a single vehicle segment will be possible. There are many inputs that go into calculating cost-effectiveness (e.g., getting a representative sample of the population, finding counterfactuals, etc.) and a lot of these questions will need to be addressed as part of the independent evaluation process of each VGI Pilot.

**QUESTION 10 (REQUESTED VIA MEETING ON 9/10, 9/17 AND 9/22 AND EMAIL ON 9/22 AND 10/05)**

How soon can PG&E include UNIDE rate signals in PG&E's VGI Pilots, if available, and what, if any, challenges would need to be resolved in order to accommodate the UNIDE rate signals?

**ANSWER 10**

PG&E filed an application in response to CPUC D.19-10-055 on October 23, 2020, requesting approval for a DAHRTP-CEV rate pilot. This pilot is intended to address the "many uncertainties regarding CEV customer adoption and savings, the applicability to the CEV rate class as whole, and technology needs both to communicate a potentially

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<sup>162</sup> D.20-12-029, Dec. 21, 2020, Ordering Paragraph 12, pp. 82-83.

highly variable rate to customers on a timely basis and to assist with automated charging.”<sup>163</sup> PG&E believes that use of a mechanism such as UNIDE, while desirable, should be fully considered in the DAHRTP-CEV rate pilot before being trialed in any other PG&E efforts. PG&E recommends approval of the DAHRTP-CEV pilot to better understand the impacts of dynamic pricing and upon completion of said pilot, would be interested in considering use of UNIDE for a later phase of our VGI pilot efforts.

**QUESTION 11 (REQUESTED VIA MEETING ON 9/10)**

How will CEC and PG&E work together in the VGI space? ED asked PG&E to clearly articulate the role of PG&E in VGI versus the role of CEC/EPIC in VGI.

**ANSWER 11**

PG&E plans to collaborate closely with the CEC throughout implementation of its VGI Pilots, both via stakeholder meetings and bilaterally. In the VGI Pilots Advice Letter, PG&E states that,

In discussion with the California Energy Commission (CEC), this pilot will not overlap with the CEC’s Electric Program Investment Charge (EPIC) program because this pilot has a focus on commercially-ready technology, whereas the EPIC program is focused on facilitating commercialization of technology not yet ready for at-scale market deployment through funding of lab testing and/or small-scale research that ensures technologies meet existing communication protocols and safety standards.<sup>164</sup>

This statement is mentioned three times in the Advice Letter, and while it is not explicitly discussed in the narrative of Pilot 3, the intent and sentiment is meant for all four pilots.

In summary, PG&E plans to focus in its VGI Pilots on the demonstration and market deployment of commercially-available and fully-certified equipment. PG&E’s understanding of the EPIC program is that it is focused on R&D and technology development for products that are *not* yet commercially-available or those needing further areas of research before they are ready for customer deployment. PG&E looks forward to continuing to collaborate on identifying and clarifying roles and responsibilities in the VGI space to avoid areas of funding duplication and to complement each other in acceleration and advancement of VGI.

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<sup>163</sup> Application of PG&E for Approval of its Proposal for a Commercial Electric Vehicle Day-Ahead Hourly Real Time Pricing Pilot, Application (A.) 20-10-011, Oct. 23, 2020, at p. 2.

<sup>164</sup> AL 6259-E, Attachment 1.

**QUESTION 12 (REQUESTED VIA MEETING ON 9/17 AND VIA EMAIL ON 10/05)**

What practical and policy barriers is each VGI Pilot trying to overcome? What is the pathway to adopting new programs or policies?

**ANSWER 12**

Below is a table summarizing the practical and policy barriers each VGI Pilot will address, as well as the pathways to adopting new programs or changes in policy in order to address identified barriers.

*Table 2: Summary of Barriers and Pathways to Adoption*

Practical & Policy Barriers		Pathway to New Program(s) or Policies
<b>Pilot 1</b>	<ul style="list-style-type: none"> <li>Bidirectional EVs and/or equipment cannot obtain the same value and compensation for grid services as other distributed energy resources (DERs) (such as battery storage or solar) that are eligible to participate in the Net Energy Metering (NEM) tariff and/or the Self-Generation Incentive Program (SGIP) incentives</li> <li>Disincentives exist to participate in demand response (DR) programs, such as the capacity bidding program (CBP) due to a limitation on compensation against a baseline</li> <li>Lack of compensation for export capability</li> <li>EV ownership costs prohibitory for ESJ communities</li> <li>Higher cost for residential bidirectional DC chargers over residential AC Level 2 chargers</li> <li>Single replicable communication (digital) platform that aggregates</li> </ul>	<ul style="list-style-type: none"> <li>Internal PG&amp;E approval</li> <li>When filing new TE applications, PG&amp;E will include VGI elements per D.20-12-029 as well as any lessons learned from VGI Pilots</li> <li>File new Advice Letter(s) for modifications to existing regulations, tariffs, or programs to include VGI program elements (particularly V2X) based off on lessons learned from completed VGI Pilots</li> </ul>

	<p>multiple OEM and EVSE brands</p> <ul style="list-style-type: none"> <li>• Lack of cost data and quantification of benefits for a robust cost-benefit analysis</li> <li>• Lack of market signals to increase private-industry technology development, production and customer adoption</li> <li>• Low-power bidirectional DC chargers are not considered in existing utility make-ready infrastructure programs</li> </ul>	
<b>Pilot 2</b>	<ul style="list-style-type: none"> <li>• Bidirectional EVs and/or equipment cannot obtain the same value and compensation for grid services as other distributed energy resources (DERs) (such as battery storage or solar) that are eligible to participate in the Net Energy Metering (NEM) tariff and/or the Self-Generation Incentive Program (SGIP) incentives</li> <li>• Disincentives exist to participate in demand response (DR) programs, such as the capacity bidding program (CBP) due to a limitation on compensation against a baseline</li> <li>• Lack of compensation for export capability</li> <li>• EV ownership costs prohibitory for ESJ communities</li> <li>• Higher cost for 3-phase bidirectional DC chargers over 3-phase unidirectional DC chargers</li> <li>• Single replicable communication (digital) platform that aggregates</li> </ul>	<ul style="list-style-type: none"> <li>• Internal PG&amp;E approval</li> <li>• When filing new TE applications, PG&amp;E will include VGI elements per D.20-12-029 as well as any lessons learned from VGI Pilots</li> <li>• File new Advice Letter(s) for modifications to existing regulations, tariffs, or programs to include VGI program elements (particularly V2X) based off on lessons learned from completed VGI Pilots</li> </ul>

	<p>multiple OEM and EVSE brands</p> <ul style="list-style-type: none"> <li>• Lack of cost data and quantification of benefits for a robust cost-benefit analysis</li> <li>• Lack of market signals to increase private-industry technology development, production and customer adoption</li> <li>• 3-phase bidirectional DC chargers do not receive additional rebates for the incremental cost or additional functionality in existing utility make-ready infrastructure programs</li> </ul>	
<b>Pilot 3</b>	<ul style="list-style-type: none"> <li>• Lack of participation of behind-the-meter (BTM) DERs in coordination with front-of-the-meter (FTM) generation for resiliency</li> <li>• Scalable real-time controls for managing the balance of generation and load within a multi-customer microgrid</li> <li>• Protection schemes that support high penetration distributed generation</li> <li>• Lack of validation of bi-directional inverter hardware, in combination with vehicles operating in multi-customer microgrids</li> <li>• Lack of integration to operations and planning to effectively include BTM DER capacity when operating a multi-customer microgrid</li> <li>• Lack of BTM DERs that can accurately and reliably detect a utility-formed microgrid</li> <li>• Lack of BTM DERs that are able to respond in real time to</li> </ul>	<ul style="list-style-type: none"> <li>• Internal PG&amp;E approval</li> <li>• When filing new TE applications, PG&amp;E will include VGI elements per D.20-12-029 as well as any lessons learned from VGI Pilots</li> <li>• File new Advice Letter(s) for modifications to existing regulations, tariffs, or programs to include VGI program elements (particularly V2X) based off on lessons learned from completed VGI Pilots</li> </ul>



	<p>generation and load balance within the microgrid</p> <ul style="list-style-type: none"> <li>• Logistical challenges to implement direct connectivity to each individual DER, replacement of hardware or additional communication equipment, and other site level device upgrades across the entire network</li> <li>• Limited solutions that are low cost, require low to no customer involvement, and are universally applicable</li> <li>• Customer performance logging and remuneration for participation are not considered by utility programs</li> <li>• High cost of interconnection studies for customers without NEM</li> <li>• Customer concerns around mobility during a PSPS emergency</li> <li>• Higher cost of charging from the grid during times that customers may not normally have to prepare for PSPS events</li> </ul>	
<b>Pilot 4</b>	<ul style="list-style-type: none"> <li>• Exclusion of bidirectional EVs from participating in the NEM program</li> <li>• Exclusion of bidirectional EVs from receiving SGIP incentives</li> <li>• Scarcity of charging standards for bidirectional charging</li> <li>• Lack of mechanisms that allow EV Export to participate in the CAISO market</li> </ul>	<ul style="list-style-type: none"> <li>• Internal PG&amp;E approval</li> <li>• When filing new TE applications, PG&amp;E will include VGI elements per D.20-12-029 as well as any lessons learned from VGI Pilots</li> <li>• File new Advice Letter(s) for modifications to existing regulations, tariffs, or programs to include VGI program elements (particularly V2X) based off on lessons learned from completed VGI Pilots</li> </ul>

**QUESTION 13 (REQUESTED VIA MEETING ON 8/27)**

ED has requested PG&E provide a more detailed budget of its VGI Pilots than what was provided in AL 6259-E that PG&E submitted on July 15, 2021.

**ANSWER 13**

See Attachment 1: ElectricVehicleInfrastructure\_DR\_ED\_029-Q01-13Atch01.

Attachment B – PG&E October 15, 2021, Data Response Budget Attachment

Pilot #1	V2X - Residential	Budget Estimates	Estimated Budget for each year		
	Budget Category	Total Amount (\$)	2022	2023	2024
	<b>Contracted Goods &amp; Services</b>	<b>\$1,875,000</b>	<b>\$1,031,250</b>	<b>\$843,750</b>	<b>\$-</b>
	Digital Platform Development (*)	\$900,000	\$675,000	\$225,000	\$-
	Enrollment Process (*)	\$750,000	\$187,500	\$562,500	\$-
	ME&O (*)	\$225,000	\$168,750	\$56,250	\$-
	<b>Internal Labor (Project Manager)</b>	<b>\$200,000</b>	<b>\$75,000</b>	<b>\$75,000</b>	<b>\$50,000</b>
	<b>Incentives</b>	<b>\$5,175,000</b>	<b>\$517,500</b>	<b>\$4,657,500</b>	<b>\$-</b>
	Upfront Incentive	\$3,000,000	\$300,000	\$2,700,000	\$-
	Participation Incentive	\$2,175,000	\$217,500	\$1,957,500	\$-
	<b>Data Collection/Evaluation</b>	<b>\$250,000</b>	<b>\$-</b>	<b>\$-</b>	<b>\$250,000</b>
	<b>Total</b>	<b>\$7,500,000</b>	<b>\$1,623,750</b>	<b>\$5,576,250</b>	<b>\$300,000</b>
Pilot #2	V2X - Commercial		Estimated Budget for each year		
	Budget Category	Total Amount (\$)	2022	2023	2024
	<b>Contracted Goods &amp; Services</b>	<b>\$1,035,000</b>	<b>\$622,250</b>	<b>\$324,750</b>	<b>\$88,000</b>
	Digital Platform Development (*)	\$-	\$-	\$-	\$-
	Enrollment Process (*)	\$500,000	\$375,000	\$125,000	\$-
	ME&O (*)	\$95,000	\$71,250	\$23,750	\$-
	CCA Support (East Bay Community Energy)	\$440,000	\$176,000	\$176,000	\$88,000
	<b>Internal Labor</b>	<b>\$200,000</b>	<b>\$75,000</b>	<b>\$75,000</b>	<b>\$50,000</b>
	<b>Incentives</b>	<b>\$1,325,000</b>	<b>\$331,250</b>	<b>\$993,750</b>	<b>\$-</b>
	Upfront Incentive	\$600,000	\$150,000	\$450,000	\$-
	Participation Incentive	\$725,000	\$181,250	\$543,750	\$-
	<b>Data Collection/Evaluation</b>	<b>\$140,000</b>	<b>\$-</b>	<b>\$-</b>	<b>\$140,000</b>
	<b>Total</b>	<b>\$2,700,000</b>	<b>\$1,028,500</b>	<b>\$1,393,500</b>	<b>\$278,000</b>

Pilot #3	V2X - Microgrid (V2M)		Estimated Budget for each year		
	Budget Category	Total Amount (\$)	2022	2023	2024
	<b>Contracted Goods &amp; Services</b>	<b>\$500,000</b>	<b>\$80,000</b>	<b>\$420,000</b>	<b>\$-</b>
	Digital Platform Development (*)	\$-	\$-	\$-	\$-
	Enrollment Process (*)	\$50,000	\$15,000	\$35,000	\$-
	ME&O (*)	\$50,000	\$15,000	\$35,000	\$-
	Grid Study for Microgrid Operations	\$200,000	\$50,000	\$150,000	\$-
	Installation & Hardware	\$200,000	\$-	\$200,000	\$-
	<b>Internal Labor (Project Manager)</b>	<b>\$200,000</b>	<b>\$75,000</b>	<b>\$75,000</b>	<b>\$50,000</b>
	<b>Incentives</b>	<b>\$750,000</b>	<b>\$100,000</b>	<b>\$525,000</b>	<b>\$125,000</b>
	Upfront Incentive	\$500,000	\$100,000	\$400,000	\$-
	Participation Incentive	\$250,000	\$-	\$125,000	\$125,000
	<b>Data Collection/Evaluation</b>	<b>\$50,000</b>	<b>\$-</b>	<b>\$-</b>	<b>\$50,000</b>
	<b>Total</b>	<b>\$1,500,000</b>	<b>\$255,000</b>	<b>\$1,020,000</b>	<b>\$225,000</b>
Pilot #4	V2X - Market Simulation (SimV2X)		Estimated Budget for each year		
	Budget Category	Total Amount (\$)	2022	2023	2024
	<b>Contracted Goods &amp; Services</b>	<b>\$700,000</b>	<b>\$500,000</b>	<b>\$150,000</b>	<b>\$50,000</b>
	Digital Platform Development (*)	\$650,000	\$450,000	\$150,000	\$50,000
	Enrollment Process (*)	\$-	\$-	\$-	\$-
	ME&O (*)	\$50,000	\$50,000	\$-	\$-
	<b>Internal Labor (Project Manager)</b>	<b>\$275,000</b>	<b>\$100,000</b>	<b>\$100,000</b>	<b>\$75,000</b>
	<b>Incentives</b>	<b>\$1,210,000</b>	<b>\$600,000</b>	<b>\$465,000</b>	<b>\$145,000</b>
	Upfront Incentive	\$350,000	\$350,000	\$-	\$-
	Participation Incentive	\$860,000	\$250,000	\$465,000	\$145,000
	<b>Data Collection/Evaluation</b>	<b>\$115,000</b>	<b>\$-</b>	<b>\$-</b>	<b>\$115,000</b>
	<b>Total</b>	<b>\$2,300,000</b>	<b>\$1,800,000</b>	<b>\$1,180,000</b>	<b>\$530,000</b>