

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



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

Rulemaking 18-12-006

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**SAN DIEGO GAS & ELECTRIC COMPANY (U 902 M) VEHICLE GRID
INTEGRATION ACTIVITIES ANNUAL REPORT FOR 2021**

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March 15, 2022

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Pursuant to Ordering Paragraph (OP) 1 of Decision (D.) 20-12-029 (Decision), San Diego Gas & Electric Company (SDG&E) submits its Vehicle Grid Integration (VGI) activities annual report for 2021 (Report). The Report is set forth in Attachment A and outlines SDG&E's VGI activities through December 31, 2021.

Respectfully Submitted,

/s/ Ross Fulton

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ATTACHMENT A

**SAN DIEGO GAS & ELECTRIC COMPANY
VEHICLE GRID INTEGRATION STRATEGIES REPORT
ANNUAL REPORT**

**San Diego Gas & Electric Company's
Annual Report on Vehicle-Grid Integration
Strategies, Programs and Pilots Metrics**

March 15, 2022



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I. EXECUTIVE SUMMARY

Pursuant to Ordering Paragraph (OP) 1 of California Public Utilities Commission (CPUC or Commission) Decision (D.) 20-12-029,¹ San Diego Gas & Electric Company (SDG&E) submits this annual report, which among other things, details its Vehicle to Grid (VGI) activity and outcome metrics from the respective program/pilot inceptions through December 31, 2021. Specifically, SDG&E provides information regarding implementation of VGI pilots, customer programs, and incentives related to VGI. The Decision also requires the utilities to include VGI program data in the reporting template that was developed in consultation with Energy Division staff and upon which stakeholders commented during the Joint Utilities' VGI Pilots and Reporting Template Workshop on March 16, 2021.² The data collection template is provided as a separate excel document as Appendix A.

Currently, SDG&E does not have programs that include automated load management or electric vehicle related demand response (DR), and only has two programs on a VGI rate, as shown in Appendix B. As such, several of the requested fields within the data report are marked as zero. SDG&E does, however, provide data where possible to show how it is actively working to support VGI.

II. VEHICLE GRID INTEGRATION DEFINITIONS

Senate Bill (SB) 676 originally defined VGI and gave authority to the Commission to revise the definition. In the Decision, VGI's definition is revised to the following:

“Electric vehicle grid integration” means any method of altering the time, charging level, or location at which grid-connected light-duty electric vehicles, medium-duty electric vehicles, heavy-duty electric vehicles, off-road electric vehicles, or off-road electric equipment charge or discharge, in a manner that optimizes plug-in electric vehicle or equipment

¹ D.20-12-029, *Decision Concerning Implementation of Senate Bill 676 and Vehicle-Grid Integration Strategies* (Decision), orders the utilities to file annual and mid-term reports on metrics pertaining to pilots and programs related to Vehicle-Grid Integration (VGI).

² SDG&E, Southern California Edison Company (SCE), and Pacific Gas and Electric Company (PG&E) are collectively referred to as the Joint Utilities.

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.³

Based on this definition, VGI activities and programs can take many forms, broadly categorized as follows:

- V1G: Vehicle charging is managed to respond to grid requirements to improve reliability and reduce costs. SDG&E further breaks this down into direct and indirect forms:
 - Indirect V1G uses price signals and/or other mechanisms to optimize charging, including TOU rates and demand response
 - Direct V1G features the utility taking an active role in controlling timing and amount of vehicle charging, for example throttling charging load during peak periods
- V2B: Vehicle-to-building integration, under which an electric vehicle (EV) may provide power directly to a home or building
- V2G: Vehicle-to-grid bidirectional charging and discharging, under which EVs may discharge onto the grid in addition to characteristics offered by V1G.

III. VEHICLE GRID INTEGRATION REPORTING TEMPLATE STRUCTURE

The Decision determines that “[r]obust VGI metrics and reporting are essential” for statutory compliance as well as determining progress toward goals and providing information to

³ D.20-12-029, pp. 12-13.

various parties and to help evaluate the VGI programs.⁴ Additionally, the Decision adopts the VGI staff paper proposal to establish three categories, with numerous corresponding metrics:

- (1) activity – track adoption of VGI policy actions
- (2) program – track the success of program implementation against program goals
- (3) outcome – track aggregate progress toward end goals across all programs and activities.⁵

For reporting purposes, the Decision directed the large electrical corporations to consult with the Commission’s Energy Division staff to create a VGI reporting template that incorporated the required metrics. The utilities collaborated with Energy Division staff and served a draft copy of the VGI reporting template to the service list and other stakeholders on February 28, 2021, in order to allow time for review prior to the Joint Utilities’ workshop on March 16, 2021, in which stakeholders had an opportunity to provide feedback.

IV. SDG&E RESPONSES TO NARRATIVE QUESTIONS

The metrics reported below correspond to the row number in the VGI Reporting Template excel file, Narrative tab (starts with Row 3).

3. Customer program or pilot and incentives related to VGI

Description of each customer program or pilot and incentives related to VGI

SDG&E has the following programs and incentives related to VGI:

- **Power Your Drive (PYD) Pilot:** Installed approximately 3,000 chargers taking service on a unique VGI rate, which incorporates the California Independent System Operator (CAISO) day-ahead price and dynamic system and circuit adders. Offers Rate-to-Driver billing, where drivers are directly exposed to VGI rate and can set a maximum charging price threshold.
- **Vehicle-to-Grid (V2G) Pilot:** Pilot using six electric buses equipped with bidirectional electric chargers. The project has completed construction phase and is awaiting installation of bidirectional equipment and software on buses. The functionality of this equipment is anticipated to roll out in Q2 2022. Through this

⁴ D.20-12-029, p. 52.

⁵ *Id.*

pilot, SDG&E will test numerous V2G services, such as facility peak shaving and potentially grid export.

- **Electric Vehicle (EV) Rates:** EV rates, including time-varying, un-tiered residential rates (EV-Time of Use (TOU), EV-TOU-2, and EV-TOU-5) and the new EV-High Power (EV-HP) rate for non-residential EV charging. The EV-TOU rate is used in public chargers in SDG&E's Electrify Local Highways Pilot, and in PYD for Schools and Parks. Passing time-varying rates to drivers will be the default billing arrangement in SDG&E's PYD Extension Program.
- **V2G Alternating Current (V2G-AC) Pilots:** As required by D.20-09-035, SDG&E Advice Letter 3774-E proposes a temporary pathway for V2G-AC pilots seeking interconnection that will ensure the requisite safety precautions.⁶
- **Emergency Load Reduction Program (ELRP) Pilot:** This program is a 5-year pilot approved in D.21-03-056 and modified by D.21-12-015. ELRP was launched in June 2021 and offers \$2/kWh for incremental load reduction or export. No penalty for non-performance. EVs will be eligible to participate under multiple subgroups. SDG&E intends to enroll some customers in the PYD for Fleets Program in ELRP.
- **V2G-Export Rate:** SDG&E has proposed a new, optional V2G-Export compensation rate in the recently filed Application (A.) 21-12-008. If approved, the V2G-Export rate would provide routine cost-based compensation for grid exports from commercial EV operators such as school districts.

4. **Adoption of rates that encourage VGI and adoption of mechanism to provide credit for export**

Discussion on the adoption of rates that encourage VGI and adoption of mechanism to provide credit for export

The following summarizes SDG&E's existing and proposed rates that encourage VGI and providing credit for export:

- SDG&E currently offers three un-tiered residential TOU rates for EV charging. The recently available EV-HP rate incentivizes grid-friendly charging for non-residential EV sites.
- VGI rate used in PYD Pilot and PYD Extension directly exposes drivers to CAISO day-ahead price and system and circuit adders, both of which incentivize grid friendly charging.
- The Commission has not authorized credit for export beyond net energy metering (NEM) and the Emergency Load Reduction Program (ELRP).
- SDG&E has proposed a routine V2G export rate through A.21-12-008.

⁶ This was a joint advice letter submitted by the Joint Utilities on May 28, 2021, and will be effective upon Commission resolution.

5. Efforts to collaborate with CAISO to design wholesale market rules and access that support VGI

Discussion on the efforts to collaborate with CAISO to design wholesale market rules and access that support VGI

For its V2G Pilot, SDG&E is adhering to CAISO's existing wholesale market rules.

6. Leveraging or supplementing EPIC and/or other sources of funding for VGI technology demonstration projects

Discussion on leveraging or supplementing EPIC and/or other sources of funding for VGI technology demonstration projects

At this time, SDG&E has no VGI funded projects in the current Electric Program Investment Charge (EPIC)-3 cycle. As for other sources, SDG&E may consider bidding on U.S. Department of Energy (DOE) procurements or on California Energy Commission (CEC) EPIC procurements.

7. Efforts to accelerate the use of VGI for resiliency

Discussion on Efforts to accelerate the use of VGI for resiliency

The V2G Pilot will not directly test resiliency use case due to relatively high reliability in the area. But electric buses with bidirectional charging could theoretically support a transportation department or facility being served during an outage event.

If approved the V2G-Export rate (A.21-12-008) could support grid reliability during peak demand events.

8. Progress to reform interconnection rules to advance VGI

Discussion on progress to reform interconnection rules to advance VGI

SDG&E will begin interconnecting Power Your Drive for Fleets customers in 2021 with bidirectional charging equipment for grid exports. SDG&E has interconnected one V2G customer as of Q3 2021. SDG&E has not yet enrolled any customers in the Emergency Load Reduction Program (ELRP) but is actively working to do so.

9. Support and adoption of non-interconnection technical standards to advance VGI

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

Electric vehicle supply equipment (EVSE) selected for the PYD Extension will be capable of supporting Open Automated Demand Response standard, which supports adoption of a non-interconnection technical standard.

10. Summary on efforts to fund and launch VGI customer education

Discussion and summary on efforts to fund and launch VGI customer education

SDG&E is conducting ongoing marketing, education, and outreach (ME&O) on TOU rates and its new EV-HP rate. SDG&E also plans to conduct outreach to medium duty/heavy duty (MD/HD) customers that have installed bidirectional EVSE regarding enrollment in ELRP.

11. Summary on efforts to develop and support complementary policies needed to support Automated Load Management (ALM) technology

Discussion and summary on efforts to develop and support complementary policies needed to support Automated Load Management (ALM) technology

SDG&E does not currently utilize automated load management in any programs or pilots.

12. ALM deployment in the utility territory in the context of both existing and future transportation electrification programs, rules, and tariffs to the extent practical; including estimates on the number of ALM

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

SDG&E does not currently utilize automated load management in any programs or pilots. As such, SDG&E does not have an estimate of the number of sites installed by third parties utilizing ALM in its service territory.

13. ALM systems Installed for passenger vehicles and any medium and heavy-duty vehicle segment(s) under currently approved transportation electrification programs as well as estimates on the potentially expected avoided distribution and customer-side cost savings attributable to such ALM installations

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

SDG&E does not currently utilize automated load management in any programs or pilots.

14. Customer VGI participation in utility demand response programs, including customer retention and efforts to reduce churn and data requested from 3rd party providers as needed

Synopsis on customer VGI participation in utility demand response programs, including customer retention and efforts to reduce churn and data requested from 3rd party providers as needed

SDG&E does not possess participation data for EVs in demand response programs. Within the ELRP pilot, aggregators will be responsible for managing EVs that participate. SDG&E will not possess any EV data.

15. Implementation of VGI pilots, lessons learned and potential future efforts

Description and discussion of Implementation of VGI pilots, lessons learned and potential future efforts

SDG&E has implemented several VGI Pilots, including:

- **PYD Pilot:** SDG&E completed construction on the PYD Pilot in 2019. The PYD Pilot installed over 3,000 chargers at multi-unit dwellings (MUDs) and workplaces. All sites are billed on the VGI rate, with the majority on Rate-to-Driver billing. The PYD Pilot was the first of its kind, and the only large deployment of dynamic rates for EVs in California. Although SDG&E found that the VGI rate generally shifts load, there was no direct comparison with a control group on TOU rates. Please see the SDG&E *Power Your Drive Research Report* for more details.⁷
- **Priority Review Project – Green Shuttles:** The Green Shuttle project received approval to support fixed route shuttles interested in electrification with grid-integrated charging facilities including direct current fast charging (DCFC) and Level 2 (L2) EVSE with a grid-integrated rate. SDG&E offered its new Public Grid Integrated Rate (GIR) at the charging stations it owns. Please see the SDG&E Priority Review Project Final Report⁸ for more details.
- **V2G Pilot:** The V2G Pilot will test bidirectional charging using six electric buses at local school districts. Progress to date includes securing buses, obtaining a Rule 21 interconnection permit, and installing the chargers. SDG&E plans to test providing V2G services and bidding into the CAISO market.
- **V2G-AC Pilots:** A joint IOU advice letter was approved, with modifications, on November 5, 2021⁹. Implementation, lessons-learned, and potential future efforts are still pending.
- **Emergency Load Reduction Program (ELRP) Pilot:** The ELRP was modified by D.21-12-015 and is currently being implemented by SDG&E. Lessons learned are expected to be available after the 2022 reliability season.

16. Integration of VGI across the utility relevant business activities

Discussion on the integration of VGI across the utility relevant business activities

SDG&E is working to integrate VGI across several SDG&E activities. Examples of this include:

- Verifying that MD/HD EVs with bidirectional charging can participate in ELRP and incorporating this into the Power Your Drive for Fleets (PYDF) program.
- Rolling out residential TOU rates that incentivize off-peak charging. Designing EV-HP rate that incentivizes ALM and shifting loads off peak.
- ELRP participation, as mentioned above.

⁷ SDG&E, *Power Your Drive Research Report* (April 2021), available at <https://www.sdge.com/sites/default/files/regulatory/SDG&E%20FINAL%20Power%20Your%20Drive%20Research%20Report%20April%202021.pdf>.

⁸ SDG&E, *Priority Review Projects Final Report*, available at <https://www.sdge.com/sites/default/files/regulatory/%5BFINAL%5D%20SDG%26E%20Final%20PRP%20Report.pdf>

⁹ Resolution E-5165 issued on November 5, 2021 by the California Public Utilities Commission.

- Accelerating the interconnection process for bidirectional charging, including MD/HD program sites.
- New application for a V2G-Export rate to incentivize grid exports.

17. Pilots underway with a discussion on the results and next steps including cost, lessons learned, etc.

Report on each pilot underway with a discussion on the results and next steps including cost, lessons learned, etc.

See response to question 13 above.

18. Metrics on interconnection reform (in conjunction with item 7)

Report out on metrics on interconnection reform (in conjunction with item 7)

SDG&E is interconnecting bidirectional chargers as part of its PYD for Fleets program with the goal of enrolling customers in ELRP.

19. Effectiveness of credit-for-export availability, lessons learned and potential next steps to increase availability

Discussion on the effectiveness of credit-for-export availability, lessons learned and potential next steps to increase availability

The Commission has not authorized credit-for-export beyond ELRP and NEM. Although no tariff for CAISO export revenue currently exists, SDG&E plans on estimating hypothetical CAISO revenue from energy export as part of the V2G Pilot.

20. Participants in credit for export and discussion to increase participation

Report on the number of participants in credit for export and discussion to increase participation

The Commission has not authorized credit for export outside of limited emergency conditions. SDG&E will estimate hypothetical CAISO export revenue at the one V2G Pilot site. SDG&E PYDFF customers with interconnected bidirectional charging equipment will have the option of enrolling in ELRP; however, no customers have enrolled to date. SDG&E believes that prompt approval of the V2G-Export rate (A.21-12-008) is likely to increase the number of customers participating in credit for export.

21. Annual energy exported (kWh) and report out on potential efforts to increase participation

Discussion on the annual energy exported (kWh) and report out on potential efforts to increase participation

The V2G pilot progress to date includes securing buses, obtaining a Rule 21 interconnection permit, and installing chargers. Export planned to begin in Q2 2022 with continuous monitoring for potential to increase participation throughout the duration of the two-year program. In addition, SDG&E is accommodating several MD/HD Program participants who have independently adopted V2G technology.

22. Overall barriers removed in V2B

Report out on overall barriers removed in V2B

SDG&E is working to remove barriers to vehicle to building (V2B):

- V2G Pilot has installed bidirectional chargers capable of back feeding to the building and will test V2B for demand charge mitigation.
- PYDFF is installing bidirectional equipment at many sites. SDG&E is interconnecting these installations as non-exporting (that is, performing V2B) under Rule 21.

23. Number of EVs enrolled in DR programs

Discussion on the number of EVs enrolled in DR programs

SDG&E does not currently have a DR program with EV enrollment.

24. Rate of change of EV DR enrollment and potential steps to increase enrollment

Discussion on the rate of change of EV DR enrollment and potential steps to increase enrollment

SDG&E does not currently have a DR program with EV enrollment.

25. EV DR enrollment capacity (MW)

Synopsis on EV DR enrollment capacity (MW)

SDG&E does not currently have a DR program with EV enrollment.

26. EV DR enrollment load shift (MWh)

Synopsis on EV DR enrollment load shift (MWh)

SDG&E does not currently have a DR program with EV enrollment.

27. Estimated aggregated GHG reduction attributable to VGI

Leverage CARB's Incremental Credit Methodology which is part of LCFS Regulation to report GHG benefits due to VGI.

To align with historical reporting of SDG&E's Power Your Drive GHG reductions, SDG&E leveraged the GHG reduction methodology used within the Power Your Drive Research Report¹⁰. A third-party vendor developed both the PYD and Green Shuttles GHG reduction calculation methodology. The calculation used kWh consumption to determine the approximate

¹⁰ SDG&E, *Power Your Drive Research Report* (April 2021), available at <https://www.sdge.com/sites/default/files/regulatory/SDG&E%20FINAL%20Power%20Your%20Drive%20Research%20Report%20April%202021.pdf>.

number of miles traveled, which is used to calculate the number of gallons of the baseline fuel would have been consumed if ICE vehicles were used to travel the same distance. The baseline emissions for PYD are gasoline, and for Green Shuttles it was renewable diesel. This fuel consumption was then used to calculate the amount of CO₂ emissions that would have been emitted by ICE vehicles and were therefore reduced by the PYD and Green Shuttles programs.

Here are the calculated reductions for 2021:

- PYD reduced approximately 2,060 MT of CO₂
- Green Shuttles reduced approximately 2 MT of CO₂

28. Site Participation in rate-to-driver and discussion on how to increase participation
Report out on from sites on participating in rate-to-driver and discussion on how to increase participation

SDG&E has and continues to engage with its Power Your Drive sites through a variety of engagement tactics, including EV ride and drives, email communication, and through a site host resource portal.¹¹ The portal empowers the site hosts to grow their community of EV drivers by providing them with the tools and resources they need to engage with their employees or tenants. Resources include marketing and educational materials, driver enrollment forms, EV shopping assistant, and an option to ask SDG&E to host a virtual or physical event at their site. In the recently approved Power Your Drive Extension, SDG&E will offer rate-to-driver as a billing option to some multi-family unit dwellings.

29. Site participating in DR, lesson learned and next steps to increase participation
Report out from sites on participating in DR, lesson learned and next steps to increase participation

SDG&E does not currently have a DR program with EV enrollment.

30. Barriers to data collection and potential solutions
Discussion of various barriers to data collection efforts and potential solutions identified by the IOUs. For example, EV load may not be separately metered. IOUs will describe why these data gaps would occur and will discuss their efforts to address these gaps in their respective reports.

In the process of completing this report, SDG&E identified the following barriers to data collection. Examples of this include:

- SDG&E currently does not have Demand Response programs or programs that leverage ALM technology. Thus, the data for those type of programs are not available. If and when such programs are developed, if feasible, a potential solution would be to ensure the program data is available.

¹¹ SDG&E, *Power Your Drive for Work and Homes*, available at <https://www.sdge.com/business/electric-vehicles/power-your-drive/pyd-resources>.

- In some programs, like ELRP for example, SDG&E will not possess all the requested EV data (i.e., usage data) from the program, as the utility is not the primary owner of electric vehicle charging station. It is important to note that the quality of the data shared by charging station owners may vary which could adversely affect the data included within this report.

31. Load shift for EV rate customers

This would be updated on an annual basis for the annual VGI Report submitted in March. Metric will compare EV rate customers with known, where possible, EV driver customers on non-EV rates.

SDG&E does not currently have a methodology to identify EV drivers on non-EV rates, and therefore cannot compare EV TOU customers to non-EV rate customers. However, through SDG&E's separately metered EV-TOU rate, SDG&E has observed a general load shift from peak hours to non-peak and/or super-off-peak hours. The influence of the time-of-use rate is shown in the response for question 39.

32. Rate-to-driver enrollment by sites

Rate-to-driver enrollment for commercial sites subscribing to EV dynamic rates. The IOUs will report on this metric for programs that track and offer this service.

Please see Appendix A for rate-to-driver information by site. This data is inclusive of all Power Your Drive sites, as they are subscribed to SDG&E's dynamic VGI rate.

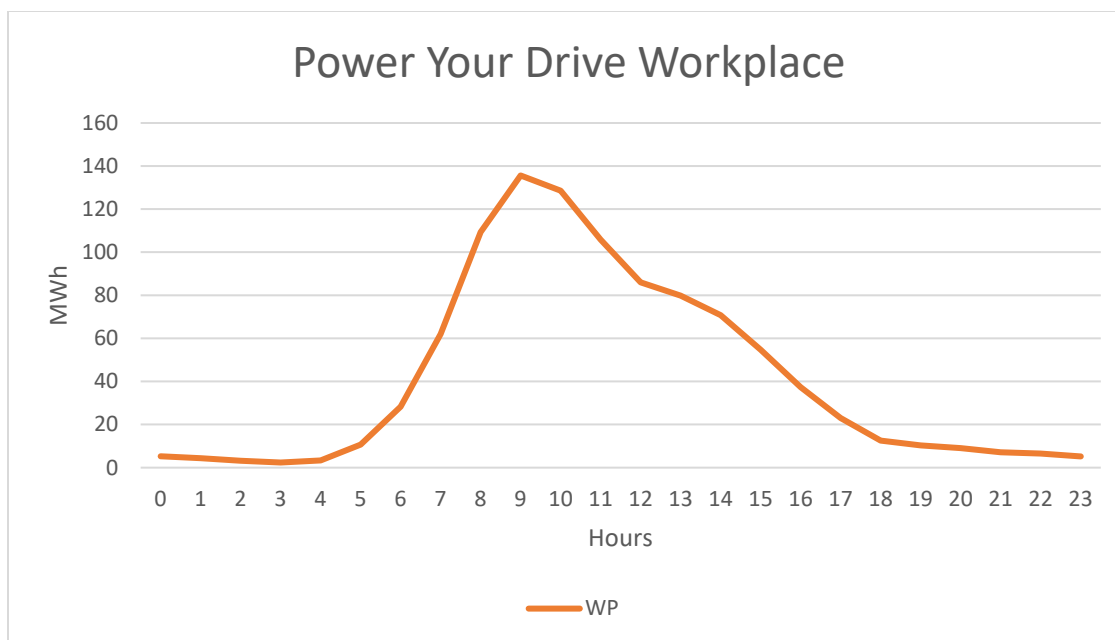
33. Dynamic rate load shift (MWh)

This will be estimated using meter load data from broadly similar program customers on TOU rates as a baseline.

SDG&E's dynamic rate load shift is calculated by observing the load during super off-peak and off-peak times versus the on peak times. SDG&E assumes that the dynamic VGI rate is largely responsible for program customers that would have charged during on peak times shifting to off peak charging likely to reduce charging costs. Per SDG&E's Power Your Drive Research Report,¹² most drivers charging their vehicles located in rate-to-driver sites spend less than 20 cents per kWh. Charging at PYD workplace sites peaks when drivers arrive at work and falls off gradually throughout the day, when prices on the dynamic VGI rate tend to rise. This shift in charging behavior in response to high price periods suggests the effectiveness of the VGI rate. The following chart represents the load profile of SDG&E's Power Your Drive Workplace sites from January 1, 2021, to December 31, 2021, to show the implied load shift from the VGI rate.

Supporting data can be found in Appendix A.

¹² SDG&E, *Power Your Drive Research Report* (April 2021), available at <https://www.sdge.com/sites/default/files/regulatory/SDG&E%20FINAL%20Power%20Your%20Drive%20Research%20Report%20April%202021.pdf>.



34. Aggregate unmanaged load profiles within programs (kWh)

Per the Decision, "unmanaged load" refers to customers not on TOU rates. There are no customers within IOU TE programs with entirely unmanaged charging, if "managed charging" includes service on TOU rates.

SDG&E does not track unmanaged load profiles within programs as there are no customers with unmanaged loads within SDG&E transportation programs.

35. Aggregate unmanaged load profiles within programs (kW)

Per the Decision, "unmanaged load" refers to customers not on TOU rates. There are no customers within IOU TE programs with entirely unmanaged charging, if "managed charging" includes service on TOU rates.

SDG&E does not track unmanaged load profiles within programs as there are no customers with unmanaged loads within SDG&E transportation programs.

36. Aggregate unmanaged load profiles outside of programs (kWh)

This metric will be estimated by distinguishing, where possible, residential EV customers not on TOU rates from those on TOU rates.

See response to question 31.

37. Aggregate unmanaged load profiles outside of programs (kW)

This metric will be estimated by distinguishing, where possible, residential EV customers not on TOU rates from those on TOU rates.

See response to question 31.

38. Net avoided costs from avoided upgrades from behind-the-meter VGI services such as ALM

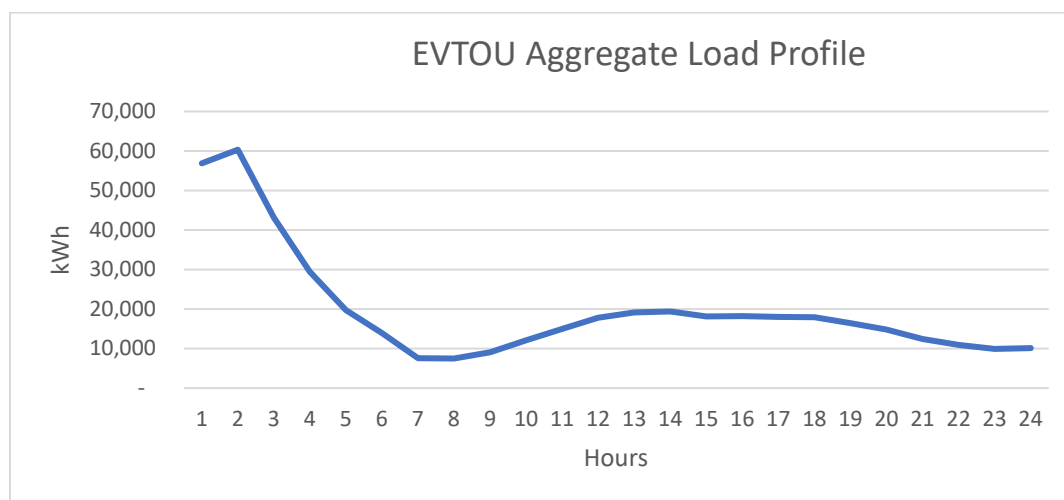
IOU deferral calculations are currently confidential; pursuant to ALJ Ruling issued January 27, 2021, within R.14-08-013, deferral value calculations are required to be public for 2021. The IOUs will provide additional detail regarding the net avoided costs from avoided upgrades in the report. The methodology may vary over time and based on the program or pilot.

SDG&E does not currently utilize automated load management in any programs or pilots, and therefore does not have net avoided costs from avoided upgrades from behind-the-meter VGI services to report.

39. Aggregate load profiles for EV TOU rates within programs (kWh)

Data will be based on separately metered EV load.

The EV TOU Aggregate Load Profile chart below represents SDG&E residential customers on a separately metered EV-TOU rate from January 1, 2021, to December 31, 2021. This hourly load profile suggests EV-TOU customers primarily charge their vehicles in the early hours of the day. However, the EV-TOU customer base is much smaller compared to EV-TOU-2 and EV-TOU-5. It therefore may not be an accurate representation of all EV drivers charging behavior in the service territory.



Supporting data can be found in Appendix A.

40. Aggregate peak load of EV TOU rates within programs (kW)

Data will be based on separately metered EV load.

The aggregate peak load of customers on a residential EV TOU rate occurs in the second hour of the day and is approximately 165 kW. The date range of January 1, 2021, to December 31, 2021.

Supporting data can be found in Appendix A.

41. Rate-to-host

Utilities will report on this metric for programs that track and offer this service.

For each of its programs, SDG&E has the following rate-to-host sites:

Program	Number of Rate-to-Host Sites
Power Your Drive 1.0 ¹³	57
Priority Review Project – Airport GSE	1
Priority Review Project – Electrify Local Highways	4
Priority Review Project – Fleet	4
Priority Review Project – Green Shuttles	3
Priority Review Project – Port	2
Power Your Drive for Parks	5
Power Your Drive for Schools	1
Power Your Drive for Fleets	3

42. Rate-to-driver

Utilities will report on this metric for programs that track and offer this service.

- **Power Your Drive 1.0** program has 197 rate-to driver sites.¹⁴

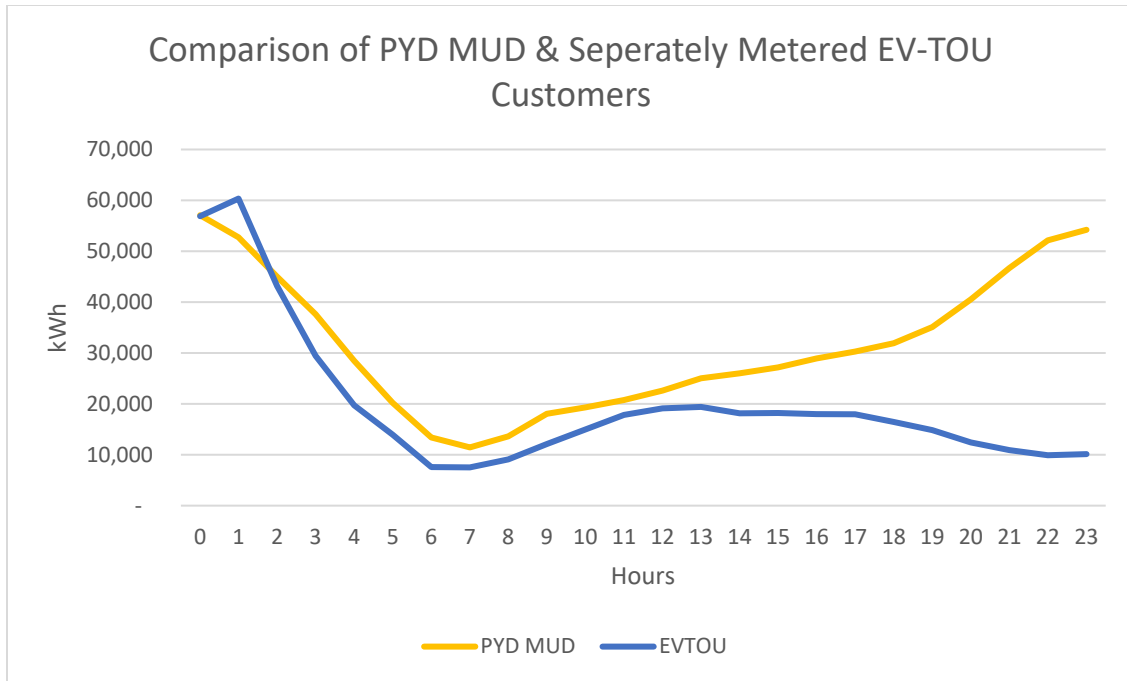
43. Aggregate load profiles for EV TOU rates outside of programs (kWh)

This would be updated on an annual basis for the annual VGI Report submitted in March. Metric will compare EV rate customers with customers enrolled in IOU infrastructure programs.

In the chart below, SDG&E has provided a comparison of aggregate load profiles from the SDG&E Power Your Drive multi-family unit dwelling (MUD) customers and separately metered EV-TOU customers.

¹³ In November 2021, one SDG&E Power Your Drive site with two facilities switched from Rate-to-Driver billing option to a Rate-to-Host billing option.

¹⁴ In November 2021, one SDG&E Power Your Drive site with two facilities switched from Rate-to-Driver billing option to a Rate-to-Host billing option.



44. Aggregate peak load of EV TOU rates outside of programs (kW)

This would be updated on an annual basis for the annual VGI Report submitted in March. Metric will compare EV rate customers with customers enrolled in IOU infrastructure programs.

The aggregate peak load of customers on a residential EV TOU rate occurs in the second hour of the day and is approximately 165 kW. Similarly, the aggregate peak load of customers on Power Your Drive MUD occurs in the first hour of the day and is approximately 156 kW. The date range of January 1, 2021, to December 31, 2021.

APPENDIX A

Question 32**Rate-to-driver enrollment by sites**

Site Unique Identifier	Site Type	Driver Count
MF160001	RTD	6
MF160008	RTD	11
MF160011	RTD	38
MF160012	RTD	4
MF160016	RTD	32
MF160018	RTD	21
MF160022	RTD	27
MF160048	RTD	4
MF160086	RTD	11
MF160088	RTD	3
MF160105	RTD	52
MF160106	RTD	28
MF170008	RTD	13
MF170024	RTD	6
MF170025	RTD	15
MF170028	RTD	3
MF170029	RTD	1
MF170042	RTD	8
MF170047	RTD	7
MF170059	RTD	14
MF170061	RTD	24
MF170064	RTD	10
MF170071	RTD	20
MF170091	RTD	20
MF170095	RTD	45
MF170104	RTD	49
MF170112	RTD	40
MF170123	RTD	8
MF170125	RTD	5
MF170126	RTD	4
MF170135	RTD	17
MF170137	RTD	7
MF170144	RTD	27
MF170152	RTD	30
MF170157	RTD	49
MF170159	RTD	12
MF170178	RTD	40
MF170181	RTD	49
MF170185	RTD	112
MF170192	RTD	11
MF170243	RTD	19
MF170247	RTD	28
MF170275	RTD	16

Site Unique Identifier	Site Type	Driver Count
MF170279	RTD	3
MF170280	RTD	10
MF170282	RTD	3
MF170286	RTD	9
MF170312	RTD	19
MF170313	RTD	69
MF170329	RTD	11
MF170343	RTD	2
MF170346	RTD	5
MF170355	RTD	2
MF180016	RTD	1
MF180020	RTD	24
MF180021	RTD	13
MF180023	RTD	3
MF180028	RTD	12
MF180041	RTD	13
MF180044	RTD	52
MF180049	RTD	10
MF180056	RTD	30
MF180097	RTD	1
MF180099	RTD	80
MF180100	RTD	15
MF180104	RTD	2
MF180113	RTD	17
MF180115	RTD	36
MF180120	RTD	23
MF180124	RTD	16
MF180125	RTD	2
MF180126	RTD	4
MF180129	RTD	7
MF180132	RTD	86
MF180133	RTD	68
MF180134	RTD	38
MF180135	RTD	53
WP160003	RTD	13
WP160004	RTD	42
WP160011	RTD	47
WP160014	RTD	5
WP160015	RTD	16
WP160016	RTD	28
WP160025	RTD	129
WP160027	RTD	132
WP160033	RTD	20
WP160035	RTD	30
WP160036	RTD	21
WP160040	RTD	53

Site Unique Identifier	Site Type	Driver Count
WP160048	RTD	81
WP160052	RTD	4
WP160053	RTD	4
WP160054	RTD	16
WP160064	RTD	11
WP160084	RTD	27
WP160102	RTD	106
WP160118	RTD	10
WP160127	RTD	45
WP160134	RTD	9
WP160136	RTD	7
WP160139	RTD	1
WP160146	RTD	7
WP160148	RTD	98
WP170006	RTD	6
WP170007	RTD	1
WP170015	RTD	9
WP170022	RTD	16
WP170029	RTD	65
WP170032	RTD	198
WP170033	RTD	76
WP170038	RTD	16
WP170050	RTD	39
WP170052	RTD	71
WP170053	RTD	15
WP170055	RTD	1
WP170058	RTD	16
WP170059	RTD	12
WP170060	RTD	15
WP170061	RTD	79
WP170062	RTD	118
WP170063	RTD	48
WP170068	RTD	69
WP170070	RTD	12
WP170207	RTD	33
WP170219	RTD	22
WP170247	RTD	21
WP170250	RTD	46
WP170266	RTD	91
WP170267	RTD	98
WP170271	RTD	4
WP170276	RTD	12
WP170302	RTD	120
WP170304	RTD	32
WP170310	RTD	3
WP170311	RTD	6

Site Unique Identifier	Site Type	Driver Count
WP170312	RTD	6
WP170313	RTD	10
WP170316	RTD	20
WP170320	RTD	23
WP170328	RTD	9
WP170330	RTD	9
WP170331	RTD	6
WP170365	RTD	12
WP170367	RTD	20
WP170370	RTD	31
WP170371	RTD	20
WP170372	RTD	4
WP170374	RTD	22
WP170379	RTD	42
WP170383	RTD	6
WP170384	RTD	21
WP170386	RTD	58
WP180011	RTD	8
WP180015	RTD	56
WP180016	RTD	18
WP180049	RTD	38
WP180057	RTD	83
WP180060	RTD	22
WP180075	RTD	2
WP180080	RTD	19
WP180082	RTD	5
WP180085	RTD	4
WP180107	RTD	18
WP180123	RTD	5
WP180124	RTD	19
WP180126	RTD	7
WP180138	RTD	23
MF180022	RTH	6
WP160002	RTH	62
WP160005	RTH	65
WP160018	RTH	28
WP160026	RTH	36
WP160042	RTH	18
WP160049	RTH	23
WP160050	RTH	24
WP160082	RTH	73
WP160085	RTH	17
WP160087	RTH	73
WP160088	RTH	71
WP160090	RTH	76
WP160092	RTH	75

Site Unique Identifier	Site Type	Driver Count
WP160096	RTH	71
WP160102	RTH	93
WP160130	RTH	65
WP160138	RTH	96
WP160145	RTH	10
WP161033	RTH	67
WP161120	RTH	4
WP170002	RTH	78
WP170016	RTH	11
WP170020	RTH	182
WP170021	RTH	84
WP170031	RTH	550
WP170075	RTH	48
WP170111	RTH	2
WP170241	RTH	26
WP170242	RTH	110
WP170249	RTH	237
WP170262	RTH	264
WP170263	RTH	83
WP170264	RTH	253
WP170285	RTH	11
WP170321	RTH	69
WP170377	RTH	28
WP180003	RTH	33
WP180006	RTH	26
WP180010	RTH	2
WP180012	RTH	39
WP180053	RTH	697
WP180081	RTH	439
WP180083	RTH	24
WP180099	RTH	439
WP180100	RTH	446
WP180101	RTH	425
WP180102	RTH	439
WP180111	RTH	6
WP180113	RTH	29
WP180115	RTH	71
WP180122	RTH	49
WP180133	RTH	451

Question 33**Dynamic rate load shift (MWh)***Supporting Data*

Site Type	Hour PST	MWh
WP	0	5.24
WP	1	4.38
WP	2	3.19
WP	3	2.40
WP	4	3.33
WP	5	10.71
WP	6	28.25
WP	7	61.99
WP	8	109.32
WP	9	135.65
WP	10	128.57
WP	11	105.83
WP	12	86.02
WP	13	79.79
WP	14	70.74
WP	15	54.75
WP	16	37.34
WP	17	23.03
WP	18	12.56
WP	19	10.33
WP	20	9.02
WP	21	7.11
WP	22	6.51
WP	23	5.20

Question 39
Aggregate load profiles for EV TOU rates within programs (kWh)
Supporting data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
EV TOU Load Shape (kWh)	56,886	60,346	43,168	29,413	19,717	13,920	7,581	7,519	9,072	12,114	14,974	17,824	19,128	19,383	18,151	18,202	17,995	17,938	16,449	14,831	12,416	10,917	9,912	10,112

Question 40

Aggregate peak load of EV TOU rates within programs (kW)

Supporting data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
EV TOU Load Shape (kWh)	56,886	60,346	43,168	29,413	19,717	13,920	7,581	7,519	9,072	12,114	14,974	17,824	19,128	19,383	18,151	18,202	17,995	17,938	16,449	14,831	12,416	10,917	9,912	10,112

Peak Load Calculation	
Peak Load	60,346 kWh
# of Days	365 Calculated days for span of data
Aggregate peak load (kW)	165 kW

Question 43 & Question 44

Aggregate load profiles for EV TOU rates outside of programs (kWh)

Supporting data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
EV TOU Load Shape (kWh)	56,886	60,346	43,168	29,413	19,717	13,920	7,581	7,519	9,072	12,114	14,974	17,824	19,128	19,383	18,151	18,202	17,995	17,938	16,449	14,831	12,416	10,917	9,912	10,112
PYD MUD Load Shape (kWh)	57,084	52,739	44,997	37,606	28,453	20,191	13,399	11,438	13,601	18,043	19,296	20,748	22,598	25,031	26,012	27,149	28,922	30,264	31,897	35,090	40,542	46,685	52,121	54,211

Peak Load Calculation	
Peak Load	60,346 kWh
# of Days	365 Calculated days for span of data
Aggregate peak load (kW)	165 kW

Peak Load Calculation	
Peak Load	57,084 kWh
# of Days	365 Calculated days for span of data
Aggregate peak load (kW)	156 kW

APPENDIX B

The Program and Pilot Metrics tab includes metrics in the VGI Decision by program or pilot. This tab plans to list the utilities VGI programs and pilots and their associated aggregated metrics. Definitions of each metric are provided in the Descriptions tab. For draft purposes, illustrative program examples are provided.

Aggregated totals:										0	0	257	11851	1	0	0	0	0	0	0	\$ 314,026,943.70	\$ 94,593,372.43
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Program/Pilot	Market Segment - Residential or Commercial	Market Segment - Subcategory	ESI subcategory	Launch Date	Implementation Status	Enrolled	Dropped Out	Currently Participating	Counts By Program or Pilot					Cost By Program or Pilot						
									Number of ports participating in ALM	Number of sites participating in ALM	Number of sites participating in dynamic rates	Number of EV drivers participating in dynamic rates	Total number of V2G EVSE customers	Distribution-side cost savings	Customer-side cost savings (related to panel and similar equipment)	Sites with Upgrade avoided by ALM	Avoided utility-side costs (where known) Savings of upgrades avoided by ALM	Authorized Budget	Budget expended	
Power Your Drive 1.0	Commercial	Workplace, MUD	DAC 2.0	1/28/2016	Active	0	0	0	0	0	254	11,367	0	0	0	0	0	\$	45,000,000.00	\$69,781,498.81
Priority Review Project - Airport GSE	Commercial	Fleet	DAC 3.0	1/11/2018	Active	0	0	0	0	0	0	0	0	0	0	0	0	\$	4,290,926.04	\$1,203,139.51
Priority Review Project - Electrify Local Highways	Commercial	Destination Charging	DAC 3.0	1/11/2018	Active	0	0	0	0	0	0	0	0	0	0	0	0	\$	6,219,395.49	\$3,390,046.46
Priority Review Project - Fleet	Commercial	Fleet	DAC 3.0	1/11/2018	Active	0	0	0	0	0	0	0	0	0	0	0	0	\$	3,741,681.26	\$3,071,865.96
Priority Review Project - Green Shuttles	Commercial	Fleet	DAC 3.0	1/11/2018	Active	0	0	0	0	0	3	478	0	0	0	0	0	\$	5,850,736.18	\$2,000,635.52
Priority Review Project - Port	Commercial	Fleet	DAC 3.0	1/11/2018	Active	0	0	0	0	0	0	0	0	0	0	0	0	\$	4,921,062.69	\$1,042,707.35
Priority Review Project - Dealership Incentives	Commercial	Light Duty	DAC 3.0	1/11/2018	Active	0	0	0	0	0	0	0	0	0	0	0	0	\$	2,213,386.05	\$1,223,861.43
Power Your Drive for Parks & Beaches	Commercial	Destination Charging	DAC 3.0	11/7/2019	Active	0	0	0	0	0	0	0	0	0	0	0	0	\$	12,509,769.00	\$3,853,298.55
Power Your Drive for Fleets	Commercial	MD/HD Fleet	DAC 3.0	8/15/2019	Active	0	0	0	0	0	0	0	0	0	0	0	0	\$	154,799,790.00	\$6,268,201.84
V2G Pilot	Commercial	School Bus	DAC 3.0	8/15/2019	Active	0	0	0	0	0	6	1	0	0	0	0	0	\$	2,195,998.00	\$1,062,222.80
Power Your Drive for Schools	Commercial	Workplace	DAC 3.0	11/7/2019	Active	0	0	0	0	0	0	0	0	0	0	0	0	\$	14,102,089.00	\$1,675,994.20
Power Your Drive 2.0	Commercial	Workplace, MUD	Underserved	4/15/2021	Approved not yet launched	0	0	0	0	0	0	0	0	0	0	0	0	\$	58,182,110.00	\$

Notes:
 (1) SDG&E currently does not have Programs/Pilots with ALM
 (2) Program costs included fully loaded capital and O&M expenses. Actuals are through 12/31/2021.