UCAN DATA REQUEST
UCAN-SDG&E-DR-02
SDG&E SB 350 TRANSPORTATION ELECTRIFICATION PROPOSALS (A.17-01-020)
SDG&E RESPONSE
DATE RECEIVED: July 20, 2017
DATE RESPONDED: August 3, 2017

DATA REQUEST

INSTRUCTIONS:

Pursuant to rule 10.1 of the California Public Utilities Commission's Rules of Practice and Procedure UCAN hereby submits this data request for information from SDG&E. If you will be unable to meet the above deadline, or need to discuss the content of this request, please call UCAN counsel at the number(s) shown above before the due date.

If you are unable to provide the information by the due date, have an objection to any request, or plan to assert a privilege to any request, please provide a written explanation to UCAN's counsel seven calendar days before the due date. Please also explain why the response date cannot be met and your best estimate of when the information can be provided.

If you are asserting an objection or privilege, please provide the specific nature of that objection or privilege claimed and the facts upon which such claim is based. If any document is redacted, please clearly identify and describe any information that is redacted from the document and provide an explanation for the redaction. Please identify the person who provides the response and his (her) phone number. Provide electronic responses if possible.

If a document is available in Word or Excel format, do not send it as a PDF file. All data responses need to have each page numbered, referenced, and indexed so worksheets can be followed. If any number is calculated, include a copy of all electronic files so the formula and their sources can be reviewed.

These data requests shall be deemed continuing in nature so that you shall produce any additional or more current information that come to your attention after your initial responses have been sent up to the time of hearing or settlement.

---

1. What metrics will be tracked to determine the success or failure of SDG&E's home charging proposal, e.g., number of incremental EVs installed, percentage of EV owners on the VGI rate, number of EV owners with Level 2 chargers, positive RIM test based on actual rather than expected program statistics? For each performance metric, what is the threshold for success?

   SDG&E Response:

   In Randy Schimka's testimony starting on page RS-20, the Monitoring and Evaluation Plan is discussed. Section 2 discusses metrics, starting on line 17 on page RS-20. These metrics

along with any proposed program changes will be provided to the PAC in a semi-annual report to highlight the program's progress.

SDG&E does not have any pre-determined targets for the performance metrics beyond what is presented in testimony.

2. How does SDG&E plan to monitor performance of the home charging program over the installation period? Assuming the program is approved, will SDG&E recalculate the cost effectiveness tests based on actual performance to compare to pre-program expected calculations?

   SDG&E Response:

   In Randy Schimka's testimony starting on page RS-20, the Monitoring and Evaluation Plan is discussed. Section 2 discusses metrics, starting on line 17 on page RS-20. Additional metric ideas beyond what is outlined in testimony can be discussed with the PAC to determine interest and feasibility.

   Over the installation period, SDG&E is not planning on recalculating the cost effectiveness tests based on actual performance. The calculations for those tests were conducted by consultant E3 for the application, and SDG&E is not planning on hiring E3 again to re-do that work.

3. Have any criteria been developed to determine whether to continue charger installations, stop further installations or modify the program to improve performance, e.g. modify incentive structure or the EV rate structure? Has SDG&E developed any "off ramps" for this project should costs exceed estimates, or if benefits are less than anticipated?

   SDG&E Response:

   As stated in Linda Brown's Chapter 2 testimony on page LB-41, "With guidance from the PAC, SDG&E will make changes as needed during the course of project implementation. SDG&E will give careful consideration to all project modifications recommended by the PAC and implement such changes deemed feasible and necessary. Project changes will be made on an on-going basis, running concurrent with project implementation, so as not to

impact its overall progress. It is understood that certain project changes may require Commission approval."

SDG&E has not yet developed any "off ramps" for the project if benefits are less than anticipated. Those issues can be discussed with the PAC if they occur and actions recommended. Any customer-related costs that exceed estimates (or CPUC funding amounts) for this project will be borne by the customer (such as the cost of installation exceeds the caps mentioned in the testimony).

4. What will a typical existing EV owner save under the discounted VGI rate compared to the EV-TOU rate?

   - How does SDG&E anticipate recovering any revenue shortfall from the discounted VGI rate?

SDG&E Response:

Please see the document titled "TURN_SDGE DR_01 – Q14 Bill Calculation", which was provided in response to TURN's DR01, Question 14, for an illustrative sample bill/calculation model of winter and summer months for Commercial GIR, Residential GIR, and Public Charging GIR.

This file is available at the link below:

https://www.sdge.com/regulatory-filing/20491/application-sdge-authority-implement-priority-review-and-standard-review

[Data Responses > TURN > TURN-DR-01 (with attachments) > TURN_SDGE DR_01 Q14 Bill Calculator.xlsm]

The model calculates illustrative monthly bills based on the 2016 calendar year with 2016 CAISO Day Ahead Hourly Prices, top 150 hours of system peak in 2016 for the C-CPP Hourly Adder, and 5 options of top 200 hours of circuit peak in 2016 for the D-CPP Hourly Adder.

Note that since Schedule EV-TOU is applicable to separately metered EV usage, and Schedule EV-TOU-2 is applicable to whole-house usage, SDG&E's proposed GIR is most appropriately compared to Schedule EV-TOU-2. As such, the calculation model included here compares the GIR to Schedule EV-TOU-2.

The default scenario provided in the model assumes a customer on the proposed Residential GIR with monthly energy usage of 1,000 kWh during the summer months and 900 kWh during the winter months. Additionally, for both the summer and winter months, 25% of the customer's energy usage occurs during the Super Off-Peak period for weekdays and 60% of energy usage occurs during the Super Off-Peak period for weekends/holidays. Please see the "Inputs" tab.

The model's illustrative bill output categorizes the monthly bill by each component of the proposed GIR (Grid Integration Charge (GIC), Hourly Base Rate, and Dynamic Adders). The output also calculates the monthly billing units used to determine the monthly bill. Variations between months occur based on differences in CAISO Day Ahead Hourly Prices and occurrence of Dynamic Adder events. Please see the "Bill Estimate" tab.

For other assumptions and to calculate different rate and usage scenarios, the bill calculation model allows the user to calculate an illustrative monthly bill for each proposed GIR (Commercial GIR, Residential GIR, and Public Charging GIR), and current standard commercial schedule AL-TOU (01-01-2017) and current standard residential Electric Vehicle schedule EV-TOU-2 (01-01-2017) for comparison purposes. Please follow the instructions on the "Inputs" tab.

Please also see "NRDC DR02 – Q6 – EV Load Shapes" which was provided in response to NRDC DR02, Question 6, which contains the average hourly load profiles for customers on SDG&E's EV-TOU and EV-TOU-2 rates. Note, the EV-TOU-2 numbers have been split into NEM and Non-NEM.

This file is available at the link below:

> https://www.sdge.com/regulatory-filing/20491/application-sdge-authority-implement-priority-review-and-standard-review
>
> [Data Responses > NRDC > NRDC-DR-02 (with attachments) > NRDC DR02 – Q6 – EV Load Shapes]

As noted in the Direct Testimony of Cynthia Fang[1], SDG&E's proposed transitional incentive is direct and transparent, and proposed with the intent of furthering public policy. As such, SDG&E feels that it would be appropriate to recover any associated revenue shortfall from all customers.

5. Of the 90,000 Level 2 chargers to be installed in residential homes, how many are expected to be associated with new EV purchases versus existing EVs?

[1] Direct Testimony of Cynthia Fang, page 20, lines 4-10.

SDG&E Response:

While some Residential Charging program customers would purchase EVs even without the SDG&E program, there is no way to know for certain how many. However, to capture this issue, SDG&E supplied an estimate of residential customers that would purchase an electric vehicle with an included L1 charger under a standard retail tariff in the absence of the Residential Charging program. This estimate is referred to as the Reference Case in Chapter 8, and includes 30,678 EVs.

6. Are all EV owners (both new and existing) eligible for this program, or just those individuals who purchase or lease an EV after the program is initiated?

SDG&E Response:

Since one of the goals of the program is to shift on-peak Level 1 charging load to the super off-peak period, all EV drivers (existing and new) would be eligible for the Residential Charging program. However, a customer must own an EV in order to participate in the program.

7. In testimony, SDG&E witness Randy Schimka in Vol 4; page RS-9 at footnote 27 has estimated the cost to install one level 2 home charger as follows: $600 for the charger (EVSE), and an average $1,425 for the installation, and $206 for permits, for a total of $2,231.

   A. For the installation estimate of $1,425, please provide a breakdown of what this amount covers.
   B. Does this $1,425 figure anticipate a customers' home will require upgrades to accommodate a level 2 EV charger?
      - Of the projected 90,000 homes that SDG&E anticipates providing level 2 EV charging, please provide the estimate on the percentage of homes that SDG&E believes will need electrical upgrades to accommodate level 2 EV home charging.

   C. At the CPUC workshop in July, Mr. Schimka noted that he is aware of and has pictures of improper installations of EV charging equipment at peoples' homes that posed safety hazards. Please detail:
      - How many instances is Mr. Schimka aware of where an improper EVSE installation posed a safety hazard.

- How many of these instances involved permitted work?
- Please provide copies of any pictures, reports or any other documents that detail these observed safety hazards from improper installation.

SDG&E Response:

A. A spreadsheet containing the breakdown of the estimated $1,425 EVSE installation cost is attached (filename: EVSE installation cost). The $206 related to permits is within the $1,425 cost estimate, not in addition to. Accordingly, the footnote in Mr. Schimka's testimony will need to be corrected.

   Information from the residential portion of ECOtality's EV Project supports this average estimate for permits and installation costs.[2] An additional source[3] estimates the cost of professional residential charging station installation to be $1,100 to $1,200 on a national average basis, plus an 11% adder above national costs for San Diego. This cost estimate does not include the costs of the permit itself, which puts the total cost estimate slightly higher than the $1,425 amount SDG&E has estimated for an average installation.

B. No, the cost estimate of $1,425 for EVSE installation does not include any funds for panel upgrades to accommodate a Level 2 charging station. If the total installation costs exceed the specified caps in the testimony, the excess will be paid for by the customer.

   Note: If the load calculations for the electrical permit show that putting in a 40-amp circuit for charging would trigger a panel upgrade, SDG&E suggests revisiting the calculations with a 20 amp charging circuit instead. Frequently, a lower powered Level 2 circuit can be installed in those situations without requiring a panel upgrade. Given this information and suggestion, SDG&E estimates that approximately 5-10% of panels would actually require a panel upgrade.

C. Below is a collection photos of residential charging installations from Mr. Schimka's collection that have identifiable visual issues. Note that it is difficult with photos to show potential electrical issues, as those issues are usually hidden inside conduit or the equipment. These photos represent a sample of improper EVSE installations of which Mr. Schimka is aware. Mr. Schimka does not recall specifically how many instances of

[2] Please see Appendix A in this INL document (Tables of Average Residential Installation Costs by Market) that shows average costs for permits and installations as part of the EV Project in San Diego and other cities: https://avt.inl.gov/sites/default/files/pdf/EVProj/HowDoResidentialChargingInstallationCostsVaryByGeographicLocations.pdf

[3] https://www.fixr.com/costs/home-electric-vehicle-charging-station

improper EVSE installations he is aware of and how many of these instances involved permitted work.

Example 1: This is an example of a Level 2 EVSE installation in a garage. There are two issues with this installation.

- First, as shown in photo "Example 1a", the cord that goes from the EVSE to the wall receptacle power source appears longer than specified by the National Electrical Code (NEC) Article 625.17(3)(b): "the power supply cord shall not be more than 12 inches long." If this cord came with the EVSE, this could be a sign that this EVSE is not UL or NRTL certified (which would require a shorter cord).
- As shown in "Example 1a" and "Example 1b", the J1772 cord that goes from the EVSE to the car appears that it was run through a wall and associated conduit to go outside so that it resides by a gas meter to charge vehicles outside. NEC Article 625.50 states that the EVSE shall be located for direct electrical coupling of the EV connector to the electric vehicle. It is also unusual to see an EV charging cable go through a garage wall like this. There are EVSE on the market that have weatherproof qualities, so this type of connection can be avoided.

Example 1a

Example 1b

Example 2: This is an example of a Level 2 EVSE mounted on a garage wall.

- As shown in photo "Example 2" below, the power supply cord on this EVSE was meant for a hard-wired connection. Instead, it appears that the installer attached a 240 volt plug to the end of the power supply cord for the EVSE and plugged it into a receptacle on the wall. The supply cord, with this added plug, appears longer than the maximum 12-inch safety specification in NEC Article 625.17(3)(a).

Example 2

Example 3: This is an example of a Level 2 EVSE mounted on a garage wall that is fed by a hard-wired connection.

- As shown in photo "Example 3" below, the EVSE is mounted close to the floor, with the car cord unmanaged and laying on the ground. NEC Article 625.50 requires the coupling means of the EVSE be located at a height of not less than 18 inches above the floor. It appears this installation may be in violation of that Article and a potential safety hazard.

Example 3

Example 4: This is an example of a Level 2 EVSE mounted on a garage wall that is fed by a hard-wired connection.

- As shown in photo "Example 4" below, the installer should not use cable ties to attach the car cord to the power supply conduit, per NEC Article 300.11(C).

Example 4

Example 5: This is an example of a Level 2 EVSE mounted on a garage wall that is fed by a NEMA receptacle.

- As shown in photo "Example 5" below, this installation is located in a garage with the car cord going under the garage door outdoors to where the car is parked and charged. This is a potential violation of NEC Article 625.50, like the examples above, as well as a potential safety issue. Garage doors repeatedly get opened and closed, and as that happens, the EVSE car cord will receive pressure and pinching from the garage door over time that may ultimately damage the cord.

Example 5

8. Does the amount SDG&E has estimated for the Level 2 charger costs, installation costs and permitting fees include funds to cover other costs i.e., an allocation of fixed corporate or other overheads, e.g., A&G? If you included an allocation of overhead or other fixed costs, were these incremental costs associated with the incremental EVs purchased or an allocation of total overhead costs?

   SDG&E Response:

   Please see the response to Question #9.

9. Please list the overhead and other fixed costs included in the SDG&E Level 2 charger cost, if any? Please identify the relevant cost driver, e.g., number of employees, kWh energy, revenues, etc.?

SDG&E Response:

The overheads applied to the capitalized Level 2 charger costs are 48.9%. (see attached worksheet "UCAN Data Response for Q8 and Q9" and the tab labeled "Master Esc & Loader" Col. E Row 29). This overhead rate is applied to Contracted Electric Vehicle Equipment & Installation costs. It includes services which are provided by electric distribution, Purchasing, and administrative and general group functions. Escalation percentages also are applied and compounded monthly. Please refer to the worksheet tab "Residential RR Input" Row 58 labeled Escalation Percentage for escalation percentages identified below, and row 75 Escalator Multiplier for monthly compounded escalation percentages.

Escalation Year	Percentage	Compounded
2020	2.95%	see worksheet
2021	3.00%	see worksheet
2022	3.02%	" "
2023	3.01%	" "
2024	2.97%	" "
2025	3.00%	" "

The overheads applied to the capitalized labor of $1,425 are 5.0%. (see attached worksheet "UCAN Data Response for Q8 and Q9" and the tab labeled "Master Esc. & Loaders" Col. E Row 30). This overhead rate is applied to contracted engineering, design, and permitting. It includes services which are provided by administrative and general group functions, and Purchasing. Annual Escalation percentages also are applied and compounded monthly. Please refer to the worksheet tab "Residential RR Input" Row 58 labeled Escalation Percentage for escalation percentages identified below, and row 75 Escalator Multiplier for monthly compounded escalation percentages.

Escalation Year	Percentage	Compounded
2020	2.95%	see worksheet
2021	3.00%	see worksheet
2022	3.02%	" "
2023	3.01%	" "
2024	2.97%	" "
2025	3.00%	" "

10. Other than increasing the number of EV chargers in the SDG&E service area to promote increased EV purchases, what other standard review program options were considered and rejected that would increase the number of EV purchases in San Diego, e.g., were direct incentive to offset EV capital cost premium considered?

    SDG&E Response:

    After the ACR was released, SDG&E considered various ideas for Transportation Electrification projects besides Residential Charging, including addressing needs in the medium/heavy duty space, tourism and secondary markets.

11. SDG&E predicts that the premium in cost for EVs over conventional vehicles will decline over time. In light of this prediction, why not wait until these premiums decline before initiating an expensive program to promote and install Level 2 chargers?

    SDG&E Response:

    Regardless of the premium in cost of an EV over a conventional vehicle, one of the benefits of SDG&E's proposed Residential Charging program is to convert new and existing Level 1 EV charging load to faster charging Level 2 load and move that charging load from the peak evening period to the super off-peak time period.

    Additionally, following the guidance in the September 14, 2016 ACR regarding SB 350 Transportation Electrification Applications and Pub. Util. Code §740.12(b), SDG&E filed its "…application[s] for programs and investments to accelerate widespread transportation electrification to reduce dependence on petroleum, meet air quality standards, achieve the goals set forth in the Charge Ahead California Initiative." (ACR p. 6)

12. In your preliminary CE analysis, did you consider a "wait/defer" option to test whether ratepayers and customers are better off when EV costs are closer to the cost of conventional vehicles?

    SDG&E Response:

    No. Following the guidance in the September 14, 2016 ACR and Pub. Util. Code §740.12(b), SDG&E filed its "…application[s] for programs and investments to accelerate widespread transportation electrification to reduce dependence on petroleum, meet air quality standards, achieve the goals set forth in the Charge Ahead California Initiative." (ACR p. 6)

13. Does SDG&E have similar predictions regarding when EV technology will improve to extend miles driven on a single charge? If so, please quantify the expected net benefit of a program deferral until the EV price premium declines, i.e. the incremental savings to ratepayers and EV owners from a deferral.

SDG&E Response:

No, SDG&E does not have predictions regarding when EV technology will improve to extend miles driven on a single charge.

14. As the premium in EV cost declines over time (as claimed in SDG&E's proposal), what percentage of new EV purchases will SDG&E attribute to the reduction in vehicle cost and what percentage of new EV purchases will SDG&E attribute to the utility-owned charger program? Please explain.

SDG&E Response:

Please see response to Q 5. SDG&E did not estimate new EV adoption attributable to reduction in vehicle cost.

15. What is the expected life of the currently available EVs on the market that would use a Level 2 charger?

SDG&E Response:

For the Cost Benefit analysis in Chapter 8, SDG&E assumes a 10-year vehicle lifetime for EVs included in the Residential Charging program.

16. What is the expected life of the Level 2 charger?

SDG&E Response:

In Michael Calabrese's testimony on page MAC-11, the FERC accounting useful life of the Level 2 charging stations was assumed to be 16 years. For the Cost Benefit analysis in Chapter 8, SDG&E assumes a 10-year lifetime for residential chargers included in the

Residential Charging program, consistent with the life of the vehicle.

17. How did you reconcile the unequal EV and Level 2 charger lives for the CE analysis?

SDG&E Response:

For the Cost Benefit analysis in Chapter 8, SDG&E assumes a 10-year lifetime for both residential chargers and EVs included in the Residential Charging program.

18. Assuming an EV owner requires one full charge daily and uses the EV-TOU or VGI rate optimally (to receive the lowest bill), which rate is least expensive for the customers' EV charging and what savings can be expected? (Compare only the EV charging portion of the bill in each case).

SDG&E Response:

SDG&E's existing Schedule EV-TOU is an EV only rate, while SDG&E's proposed Residential GIR is a whole house rate. Due to the structure and nature of the proposed Residential GIR, it is not possible to predict possible savings that a customer might achieve. Customers' bills on either rate will vary based on various factors.

Please see the response to Question 4. Note that the calculation model provided compares SDG&E's Schedule EV-TOU-2 with its proposed GIR, as those are both whole-house rates.

19. Since EV-TOU is a whole house rate, why offer the VGI rate as a whole house rate when doing so makes household operation so much more complicated? Doesn't VGI make more sense as an EV only rate and the less complex EV-TOU make more sense as a whole house rate?

SDG&E Response:

SDG&E objects to this question as assuming facts and as being argumentative. Subject to and without waiving that objection, SDG&E responds as follows.

SDG&E's schedule EV-TOU is applicable to separately metered EV charging, not whole house electric use. SDG&E's existing whole-house EV rate is Schedule EV-TOU-2.

As addressed in Appendix A of the Assigned Commissioner's Ruling Regarding the Filing of the Transportation Electrification Applications Pursuant to Senate Bill 350, objectives of the IOUs' Transportation Electrification Applications include cost minimization and benefits maximization, and efficient grid management.[4] SDG&E's proposed GIR will help to accomplish this by efficiently integrating EV charging load into the electric grid by encouraging charging and energy use at times that are beneficial to the grid, both at the EV charger, and throughout the home.

20. Which of the cost effectiveness tests, i.e., RIM, PCT, PAC, TRC and/or SCT, are appropriate for the evaluation of the utility-owned charger program? Is the EV charger program considered a load building, fuel substitution or treated the same as DR/EE programs for evaluation using the standard California Cost Effectiveness (CE) tests?

    a. Which cost effectiveness tests are appropriate for load building?

    b. Which cost effectiveness tests are appropriate for fuel substitution?

    c. If fuel substitution, what costs and benefits associated with the alternative fuel were included in the CE analysis? (Use electrification of natural gas processes as an example of what alternative fuel costs and benefits to consider).

SDG&E Response:

Transportation Electrification is fundamentally different from EE, DR, and DERs historically evaluated with the Standard Practice Manual cost benefit methodology in that it promotes efficiency through fuel switching across the utility and transportation sectors and with the primary goal of reducing Greenhouse Gas (GHG) emissions as opposed to reducing electricity generation.

Despite this fundamental difference from EE, DR, and DERs, the cost-benefit results presented in Chapter 8 are useful guides for the Commission to evaluate the SB 350 programs given the requirement in the September 14, 2016 ACR and Pub. Util. Code §740.12(b) that "[p]rograms proposed by electrical corporations shall seek to minimize overall costs and maximize overall benefits."

[4] Assigned Commissioner's Ruling in R.13-11-007, dated September 14th, 2016 – Appendix A, page A2.