TURN DATA REQUEST
TURN-SDG&E-DR-02
SDG&E SB 350 TRANSPORTATION ELECTRIFICATION PROPOSALS (A.17-01-020)
SDG&E RESPONSE
DATE RECEIVED: February 15, 2017
DATE RESPONDED: March 3, 2017

DATA REQUEST

Please provide an electronic response to the following question. A hard copy response is unnecessary. The response should be provided on a CD sent by mail or as attachments sent by e-mail to the following:

Haley de Genova
The Utility Reform Network
785 Market Street, Suite 1400
San Francisco, CA 94103
legalassisant@turn.org

Elise Torres
The Utility Reform Network
785 Market Street, Suite 1400
San Francisco, CA 94103
etorres@turn.org

Eric Borden
The Utility Reform Network
785 Market Street, Suite 1400
San Francisco, CA 94103
eborden@turn.org

For each question, please provide the name of each person who materially contributed to the preparation of the response. If different, please also identify the SDG&E witness who would be prepared to respond to cross-examination questions regarding the response.

For any questions requesting numerical recorded data, please provide all responses in working Excel spreadsheet format if so available, with cells and formulae functioning.

For any question requesting documents, please interpret the term broadly to include any and all hard copy or electronic documents or records in SDG&E's possession.

General Objections: Regarding the request for "the name of each person who materially contributed to the preparation of the response," it is vague and overbroad. Subject to and without waiving these objections, SDG&E has provided the name of each SDG&E witness generally responsible for preparing the response. However, it should be noted that some responses involved input and assistance from a variety of individuals. Also, regarding the request for "the SDG&E witness who would be prepared to respond to cross-examination questions regarding the response," it is premature to seek such information prior to hearings and before parties are required to supply witness lists, should hearings be scheduled. Subject to and without waiving this objection, at this point, SDG&E submits that the witness identified in each response is the appropriate witness to be cross-examined on the response, should hearings take place and assuming the witness is available at the time of hearings.

TURN DATA REQUEST
TURN-SDG&E-DR-02
SDG&E SB 350 TRANSPORTATION ELECTRIFICATION PROPOSALS (A.17-01-020)
SDG&E RESPONSE
DATE RECEIVED: February 15, 2017
DATE RESPONDED: March 3, 2017

Please note that electric vehicle ("EV") refers to both battery electric vehicles and plug-in hybrid electric vehicles ("PHEV") unless otherwise noted.

1. Regarding line extension allowances (Rule 15), please explain if residential charging infrastructure falls under line extension allowance rules. For example, if a homeowner were to install a charging station today, would they receive a line extension allowance? Please explain the amount of the allowance and current rules, citing applicable sources.

SDG&E Response (prepared by Randy Schimka):
There is no specific allowance applied for EV charging equipment in a residential application. That is because electric residential allowances are a lump sum figure (currently $2,841) per meter or residential dwelling unit with no consideration for individual appliances, per Rule 15.C.3. The explanation of how that lump sum residential allowance amount is calculated that appears in Rule 15 is presented in question 2 below.

For new residential construction, the lump sum allowance is applied to the cost of providing service, both under Rule 16 for Service Extensions and Rule 15 for any applicable Distribution Extensions. For an existing residential customer seeking to add an EV charger to their house, the application of the lump sum allowance only comes into play if they have to upgrade their existing service. That need can come about as a result of them upgrading their electrical panel and/or SDG&E determining their existing service is undersized for the additional load. When SDG&E upgrades an existing service, we apply the allowance credit as if the residential unit was going in new. That is because residential allowances do not give consideration to individual appliances. If the cost of a service upgrade was to exceed the lump sum residential allowance, there would be applicable charges (excess service charges) for which the customer would be responsible.

2. Regarding line extension allowances (Rule 15):

   SDG&E Response (prepared by Randy Schimka):

   a. Please provide the formula for line extension allowances.

   Allowance = (Average Customer Revenue – Revenue Cycle Service Credit) / Cost of Service Factor
   Average Customer Revenue = Total distribution revenue / # Customers
   Cost of Service Factor = (Levelized Annual Carrying Cost Factor + O&M Factor + FF&U Factor + A&G Factor) * Replacement Factor

b. Please provide a sample calculation for a line extension allowance (e.g. assuming incremental load of X kWh, how much the line extension allowance would be). Please show all steps in the calculation.

Current Electric Residential Allowance example –per Advice Letter 2507-E/2216-G is effective August 31, 2013:

Forecasted customers 1,224,253
Total distribution revenues (000's) $532,233
Average customer revenue: 532,233,000 /1,224,253 = $434.74
Weighted AVG RCS credits: $8.68
- Comprised of Billing $5.85, Meter Services $0.60, & Meter Reading $2.23
- CPUC Sheet 15558-E, Effective. Oct 1, 2002. Methodology authorized by CPUC D.07-07-019

Net Customer Revenue: $434.74 – $8.68 = $426.06
Cost of Service Factor: 15%
Residential Allowance: $426.06/15% = $2,841

The Cost of Service Factor is comprised of O&M, A&G, and FFU factors from 2012 GRC.

(LACC Factor + O&M Factor + A&G Factor + FFU Factor) * 60 Year replacement multiplier = Cos Factor
LACC factor 10.649%
O&M factor 2.383%
A&G factor 0.967%
FFU factor 0.252%
60-year replacement multiplier 1.0524

c. Is there a payback period that informs the line extension allowance calculation? If yes, please explain what it is and how it informs the calculation. If no, please describe if there is a typical payback period for line extension allowances.

The extension is credited against costs up-front (customers would have paid a one-time lump fee, that fee is offset by this calculated credit). There is no payback period.

3. Please provide all reports related to SDG&E's sub-metering pilots for electric vehicles to-date. If no reports are available, please provide all available data and a description of results of the sub-metering pilots to-date.

   SDG&E Response (prepared by Randy Schimka):
   File attached:


Submetering Phase 1 Report.pdf

4. Please provide a list of addresses and related map of all DC Fast Chargers and Level 2 public chargers in SDG&E's service territory. Please also indicate where the four Caltrans locations that have been selected are for the Electrify Local Highways project on this map.

SDG&E Response (prepared by Randy Schimka):
Please see the attached file with a list of addresses and a map of the current DC Fast charge locations in SDG&E's service territory. SDG&E does not have a corresponding address list and map for the over 1,000 Level 2 stations in SDG&E's service territory. However, the Plugshare website[1] shows the latest up-to-date map for those charging stations.


Fast Chargers in SDGE Territory Marcl

5. Regarding the "Electrify Local Highways" project

   SDG&E Response (prepared by Randy Schimka):

[1] www.plugshare.com

a. Please provide the addresses where the DCFC and L2 chargers will be located.

Site 1 is Caltrans Park and Ride #19 at the Northwest corner of I-15 and SR-76, Fallbrook, CA 92028. Site 2 is at the Oceanside Transit Center, 235 South Tremont St, Oceanside CA 92054. Site 3 is at Caltrans Park and Ride #9 at 2300 Sweetwater Road, National City CA 91950. Site 4 is at the new Caltrans Park and Ride at the northeast corner of East Palomar St and I-805 in Chula Vista CA.

b. How many chargers will be deployed per site?

As outlined in Mr. Schimka's Chapter 3 testimony on page RS-17, the Electrify Local Highways Project plan is to install 20 Level 2 EVSE and 2 DC Fast Charging stations at each site.

c. How many chargers exist or are planned separately from this program (by type) at the sites where SDG&E will deploy?

Site 1, 3, and 4 currently have no charging stations installed. Site 2 has seven Blink Level 2 charging stations currently installed, which are scheduled for removal b the Oceanside Transit Center.

d. Please provide a cost estimate for make-ready infrastructure that can deliver 350kW of power per charging station. Please include all work papers and assumptions related to this response.

File attached: 
TURN DR-02 Q5 part d.xlsx

6. Regarding the Ground Support Equipment Project at San Diego International Airport (SDIA):

SDG&E Response (prepared by Randy Schimka):

a. Please provide the number of total internal combustion engine Ground Support Equipment vehicles in SDG&E's territory.

Though SDG&E has not conducted an inventory of all ground support equipment in SDG&E's territory, SDIA has reported that of 540 total GSE, 120 are electric. That leaves 420 GSE with combustion engines. SDIA is the region's main airport. Please see Mr. Schimka's Chapter 3 testimony on RS-1- lines 10-11 and footnote 7.

b. Please explain why it is necessary for SDG&E to own the charger in this program.

SDG&E ownership and maintenance of the chargers reduces barriers to EV adoption. This enables the market because the customer does not have to maintain a new piece of equipment that they would not otherwise have to worry about had they remained with the combustion engine status quo. SDG&E's ownership and maintenance of EV chargers provides greater certainty to customers who are considering conversion to EVs that the infrastructure will be operational and broken equipment will not interfere with the core business of the customer. Electricity delivery infrastructure is a core competency of SDG&E. It is a natural fit for SDG&E to own and maintain the infrastructure to support its customers and to enable the state's goals to reduce GHG emissions.

c. Please provide an estimate for avoided costs if this project utilized sub-meters rather than installing a "load research meter."

SDG&E is assuming the term "sub-meter" refers to the billing methodology of using a separate meter or an internal EVSE meter to separately bill for the specific charging energy used by the electric vehicle and subtract that energy from the customer's overall bill. In SDG&E's discussions with SDIA, they specifically wanted to keep all loads under the same metering schema and current billing scenario. For this reason, the load research metering technology will be used strictly for data collection.

d. Please explain why a sub-meter to record charging from the EVSE is not planned for this project.

See answer to 6C above.

e. Please provide the costs incurred by SDIA for any currently installed chargers, amount of outside funding used (if any), and costs incurred by ratepayers related to installation of these chargers. Please provide all work papers, sources, and calculations.

SDG&E is not privy to this information. To the best of SDG&E's knowledge, there have been no costs incurred by ratepayers related to the existing chargers at SDIA.

f. How many additional vehicles will SDIA agree to purchase before receiving ratepayer funds? Please explain.

Typically, SDIA does not purchase GSE. The airport tenant (i.e. an airline) or the airport tenant's contractor procures and operates the GSE. As stated in Mr. Schimka's Chapter 3 testimony on page RS-9, SDG&E will conduct a measured roll-out of charging ports and infrastructure based upon electric GSE procurement commitments from SDIA, while balancing cost reductions from economies of scale.

7. Regarding the Medium/Heavy Duty and Forklift Port Electrification Project (Chapter 3):

SDG&E Response (prepared by Randy Schimka and JC Martin):

a. Regarding the Table on page RS-32 "Leveraged Funding," please explain whether this funding will offset ratepayer expenditures and by how much.

The grants mentioned in the Table on page RS-32 are to provide funding for the heavy duty vehicles and lifting equipment. Ratepayers will not be paying for the vehicles as part of this project. This proposed project will provide funding for the load research meters, data loggers, and EV infrastructure.

b. How many additional vehicles (separately for MD/HD and forklifts) will the Port purchase after SDG&E installs charging stations and other equipment? Will the Port be required to sign a contract committing to these vehicle purchases before the project begins? Please explain.

The chart shown in Mr. Schimka's Chapter 3 testimony on page RS-41 depicts the population of vehicles at the Port that may be influenced by this project. This project is designed to support 30-40 installations. The vehicle owner will most likely be tenants at the port and not the Port District itself. SDG&E will require a commitment for electric vehicles to be purchased or leased prior to installing charging infrastructure.

c. Related to part (b) please estimate the incremental load (kWh) and revenue ($) due to the program on a per vehicle basis daily and annually. Please provide all work papers and assumptions related to this response.

The estimated incremental load is 343,663 kWh annually in 2018 for 13 incremental vehicles, resulting in 26,435 kWh per vehicle and 72.4 kWh per vehicle per day in 2018. Please see previously provided work papers "Priority Projects Results (Final).xlsx," worksheet "Additional Information" Row 35 for Forklift Charging load (kwh) and Row 40 for Forklift Charging vehicle population. Forklifts are assumed to operate 365 days per year. Revenues are not estimated for the Priority Review projects, including the Medium/Heavy Duty and Forklift Port Electrification Project.

d. Please provide Figure 3-4 (p. RS-41) in Excel with all supporting data and work papers.

Figure 3-4 (p. RS-41) is based on data purchased from R.L. Polk by SDG&E. Due to the contractual terms related to the purchase of this proprietary data from R.L Polk, SDG&E cannot share the requested data without the permission of R.L. Polk. SDG&E is currently seeking permission to share this data from R.L. Polk.

e. Please provide the R.L. Polk Fleet data referenced in footnote 52 (p. RS-41) and an accompanying description of headers and acronyms in the data provided (if applicable).

SDG&E purchased the R.L. Polk data referenced in footnote 52 (p. RS-41). Due to the contractual terms related to the purchase of this proprietary data from R.L Polk, SDG&E cannot share the requested data without the permission of R.L. Polk. SDG&E is currently seeking permission to share this data from R.L. Polk.

8. Regarding the Fleet Delivery Services Project (SDG&E Testimony, Chapter 3):

SDG&E Response (prepared by Randy Schimka):

a. How many electric delivery trucks does UPS own in California?

According to UPS, they own and operate 101 electric delivery trucks in California, out of a total fleet of 8,718 delivery trucks.

b. How many electric delivery trucks does UPS utilize at the specific site where SDG&E will deploy infrastructure (electric and diesel)?

According to UPS, there are no electric delivery trucks at the proposed sites.

c. How many chargers are currently installed at the three UPS sites where SDG&E will deploy its program? Who owns these charging stations?

According to UPS, there are no electric vehicle charging stations at the three proposed sites.

d. Related to parts (b) and (c) if UPS has previously installed charging stations please indicate the cost to ratepayers in line extension allowance on a site and per charger basis. Please provide all work papers and calculations related to this response.

UPS has not installed charging stations in SDG&E's service territory.

e. Approximately how many gallons of fuel does a delivery truck use per day and annually? Please provide all sources/work papers, including miles driven per day and fuel efficiency.

A conventional (non-EV) delivery truck uses approximately 6.18 gallons of fuel per day or approximately 2,254 gallons a year based on 52 vehicle miles traveled per day and a fuel efficiency of approximately 8.421 miles per gallon. Please see previously provided work paper titled "E3 SB350 TE GIR Inputs (Final).xlsx," worksheet "Vehicle Info," for MHD-BEVA for Weekday EV eVMT, Conventional MPG, and Annual Conventional MPG Increase (%).

f. Will UPS sign a contract with SDG&E committing to the purchase of the 90 new delivery trucks referenced on page RS-48, line 9? Or have they already purchased the vehicles? Please explain.

SDG&E's application requests infrastructure costs to support 60 electric trucks for UPS. The remaining 30, for a total of 90, will be allocated to additional customers who utilize delivery vehicles. UPS has agreed to begin operating

incremental electric vehicles within three months of the infrastructure being built and completed. To the best of SDG&E's knowledge, UPS has not procured electric trucks related to this project and may not do so if the project is not approved by the CPUC. UPS will commit to purchase electric trucks upon the infrastructure being deployed.

g. Will the UPS site still have to pay demand charges? How will this impact the business case for EVs? Please provide all calculations and work papers.

Please see Ms. Fang's Chapter 5 testimony on page CF-23. If the project is approved, the EV chargers at the UPS site will be fed by a separate electric service and will be on the Commercial Grid Integrated Rate.

h. Will the L2 chargers be single or dual port?

The Level 2 charging stations will be deployed in a manner that supports the operations of the delivery vehicle fleet operator based upon property and operational specifics that have not been determined yet. The charging stations may be either single or dual port, depending on vendor offerings. In the cost estimate for the project, single port charging stations were specified.

i. Regarding the "CEC funded vans" discussed on page RS-53, line 14, what percentage of the upfront cost of the vans was covered by the CEC grant? Please provide all sources related to this response, including the purchase price and CEC grant amount if available.

SDG&E does not know what percentage of the upfront costs of the referenced vans was covered by the CEC grant. Please see California Air Resources Board, Technology Assessment: Medium- And Heavy- Duty Battery Electric Trucks and Buses (October 2015), p. IV- 13.[2]

9. Regarding the Green Taxi Program (beginning RS-61, Chapter 3):

SDG&E Response (prepared by Randy Schimka):

a. What is the maximum power level the DC Fast Chargers will be capable of delivering on a per charger/ vehicle basis? Please explain and provide all work papers and assumptions related to this response.

[2] https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf

The DC Fast chargers budgeted in the Green taxi/shuttle/rideshare project are Chademo/CCS units with a maximum power level of 50 kW per car.

b. What is the maximum power level the charging infrastructure will be capable of delivering if all charging stations are utilized simultaneously? Please explain and provide all work papers related to this response.

If the five DC Fast Chargers SDG&E installs are each limited to charging one vehicle at a time at a maximum rate of 50 kW then the maximum power level of all chargers if operated simultaneously will be 250 kW. Note, however, that the charging stations will be installed in a distributed fashion, and not at the same location.

c. SDG&E states it will provide a "financial incentive of $10,000 per EV" (RS-66, line 12). Please provide a list and dollar value amount of other incentives available to purchase an EV. Please provide all sources related to this response.

Please see the footnote 81 in Mr. Schimka's testimony on page RS-66 that cites the CARB's CVRP rebate opportunity (which differs based on if EV is a PHEV or BEV), plus has additional funds depending on income level. Footnote 81 also cites the availability of a Federal Tax Credit, for those who purchase an EV (also differs based on if EV is a PHEV or BEV). The links to the websites where these incentives are described, with the dollar amount, and the eligibility requirements is found at footnote 85, on page RS-68.

d. Please estimate how much of the first year's fueling cost is covered by the "EV fueling credit" of $4,000 (RS-66, line 14). Please provide all work papers and sources related to this response.

The total fueling cost for the first year depends on the hourly price the driver selects for fueling the taxi. As stated in Mr. Schimka's testimony on page RS-66, lines 15 to 17, "…the incentive not only encourages each driver to maximize the number of zero emission miles driven, as well as helping to make these fueling dollars go further by charging during lower-priced, off-peak hours." For example, consider these assumptions and conclusions:

- A taxi driver, on average selects those hours priced at $0.22 per kWh
- A taxi driver drives 4,500 miles per month (roughly 5 times greater than a conventional passenger vehicle)

- One kWh provides three miles of EV range, using 1,500 kWh per month
- This amounts to a fueling cost of $330 per month, or $3,960 over 12 months (rounded to $4,000)

Therefore, if a taxi driver selects those hours priced at more than $0.22 per kWh, then the fueling incentive will not cover 12 months of fueling, so drivers will be compelled to study the day ahead prices to plan their fueling schedule for the next day to stretch the fueling incentives over more zero emission miles. It is important to note that the fueling incentive can only be used at project charging facilities, and if a driver does not use the entire $4,000 incentive over 12 months of operation, they do not keep the difference.

e. Please provide all evidence known to SDG&E that EV taxi drivers will charge off-peak in response to price signals.

There is no data of this specific nature relating to taxi fleets that SDG&E's knows of; which is why SDG&E is proposing a small pilot to gather these data. It will be informative to better understand if there will be responsiveness to price in full commercial taxi operations. In the residential arena, SDG&E has already piloted a TOU rate study[3] that showed favorable charging behavior related to grid-integrated rates. SDG&E's intent with this pilot is to determine if taxi drivers respond to pricing signals in a similar fashion.

Electric fueling must meet the operational needs of the taxi driver, so it's reasonable to assume that if the EV electric fueling time approximates that of a conventional vehicle, electric fueling will be a competitive option. This is why a faster DCFC fueling facility is a better fit for taxi operational needs. Plus, because fueling time with a DCFC can range between 10 minutes for a "topping off", or up to 20 minutes for more range, a taxi driver should be able to plan for one or more low priced hours of the day to handle their fueling needs.

10. Regarding the "Green Shuttles" Program, what percentage of the cost of a shuttle is the $10,000 financial incentive (RS-67, line 10) expected to provide, as a percentage of the total costs? Please provide all work papers and sources related to this response.

---

3 https://www.sdge.com/sites/default/files/documents/1681437983/SDGE%20EV%20%20Pricing%20%26%20Tech%20Study.pdf

SDG&E Response (prepared by Randy Schimka):
The $10,000 financial incentive to shuttles is approximately 9.4% of the total vehicle cost, exclusive of taxes or other incentives.

$10,000 Incentive /$106,500 cost of vehicle= 9.4%

Source: Electric Shuttle Van quotation from Zenith Motors dated April 22, 2015.


Zenith bus quotation.pdf

11. Please provide the latest low carbon fuel standard (LCFS) report that indicates how much funding was collected and distributed on an annual basis.

SDG&E Response (prepared by Randy Schimka):
SDG&E has collected $2.1M from the sale of LCFS credits to date, and is in the process of signing up drivers through May 2017 to receive the first annual credit. The amount of the first annual credit won't be known until all of the accumulated LCFS credits are sold and SDG&E knows how many qualified EVs/drivers have signed up.

12. Regarding the Dealership Incentives Project, please explain why SDG&E did not propose use of low carbon fuel standard funds for this program.

SDG&E Response (prepared by Randy Schimka):
SDG&E filed Advice Letter 2716-E[4] (effective July 30, 2015) providing its Implementation Plan for returning revenue from the sale of LCFS credits and Low Carbon Fuel Standard Balancing Account pursuant to Decision (D.) 14-12-083[5]. Under SDG&E's Implementation Plan, SDG&E returns revenue from the sale of LCFS credits through an annual rebate to residential electric vehicle drivers. For electric vehicle drivers that are customers of SDG&E, the annual rebate is applied as a credit to their

[4] http://regarchive.sdge.com/tm2/pdf/2716-E.pdf

[5] http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M143/K640/143640083.PDF

electric bill. Pursuant to D.14-12-083,[6] SDG&E would have to file a subsequent Tier 2 Advice Filing in order to change its selected method for returning LCFS revenues.

SDG&E believes that using the LCFS funds as credits against actual EV driver electric bills is the most direct means of returning those funds back to EV drivers. Moreover, in light of SB 350, there exists alternative funding for SDG&E's proposed dealership program.

13. Please provide all data known to SDG&E, including all sources and work papers, regarding the following:

SDG&E Response (prepared by Randy Schimka):

a. The number of EV (including PHEV) drivers in SDG&E's territory residing in a single family home versus multi-unit dwelling.

SDG&E does not have this data, but the Center for Sustainable Energy published an EV driver survey in 2017 with relevant data.[7] 72% of respondents reside in a single-family detached home, 15% reside in an apartment/condo, 12% reside in a single-family attached home, and 2% reside in other dwellings.

b. The stock of single family homes versus multi-family dwellings in SDG&E's territory.

SDG&E does not have this data, but the San Diego Association of Governments has this data in the "San Diego City/County Population and Housing Estimates 2010" report.[8]

c. The number of EV drivers on a TOU rate.

At the end of January 2017, SDG&E has 8,774 EV drivers on a TOU rate.

---

[6] *See* p. 33

[7] https://cleanvehiclerebate.org/eng/content/infographic-plug-electric-vehicle-owners-california%E2%80%99s-disadvantaged-communities

[8] http://www.sandag.org/uploads/publicationid/publicationid_485_637.pdf

d. The number of EV drivers using Level 1 charging versus Level 2 at the residence.

SDG&E does not have data linking each EV in our territory to a specific SDG&E account. However, SDG&E does have recent data collected from the LCFS EV Climate Credit program and the Residential EV Rate signup process that is applicable.

i. EV Climate Credit customer signup data collected in February 2017 shows that 42% of EV drivers currently charge at Level 1 and 54% currently charge at Level 2, while 3% either don't charge at home or don't know their level of charging.
ii. Residential customer EV Rate signup data collected from 2013-2017 shows that 58% of these customers report using Level 1 charging. Note that the total signup number (9,108) is higher than current EV rate customer count (8,774) due to attrition.

SDG&E Customer EV Climate Credit Sign up and Survey		
Level 1 (120 volts)	760	42%
Level 2 (240 volts)	975	54%
Not sure/don't charge at home	63	3%
Grand Total	1798	100%

Residential Optional EV Rate Signup and Survey		
Level 1 (120 volts)	5,288	58%
Level 2 (240 volts)	3,820	42%
Grand Total	9,108	100%

e. The number of EV drivers with access to workplace charging.

SDG&E does not have this data, but the Center for Sustainable Energy published an EV driver survey in 2017 with relevant data.[9] 43% of PHEV respondents have access to workplace charging, and 45% of BEV respondents have access to workplace charging.

f. EV purchases by model on a monthly basis since 2013 to the most recent date available.

SDG&E generates monthly EV purchase data based, in part, on data it purchases from R.L. Polk. Due to the contractual terms related to the purchase of the proprietary data from R.L Polk, and because SDG&E cannot provide the monthly data without revealing the R.L. Polk data upon which it is based, SDG&E cannot share the requested data without the permission of R.L. Polk. SDG&E is currently seeking permission to share this data from R.L. Polk.

9 https://cleanvehiclerebate.org/eng/content/infographic-plug-electric-vehicle-owners-california%E2%80%99s-disadvantaged-communities

14. Please provide all work papers and calculations related to Figure 4-4, page RS-8.

SDG&E Response (prepared by Randy Schimka):

File attached: 
Work Paper.Figure 4.4.xlsx

15. Page RS-12, lines 5-6, state "The residential charging program will also minimize new electrical infrastructure upgrades by encouraging the new load from EV adoption to shift to off-peak hours." Related to this statement:

SDG&E Response (prepared by Randy Schimka):

a. Please explain and list specifically what electrical infrastructure upgrades will be avoided or "minimized" due to expected off-peak EV charging.

The Residential Charging Program will avoid potential overloads on six distribution circuits if unconstrained charging were allowed to occur. The circuits, and the costs associated with infrastructure upgrades on those circuits are presented in the table below.

Circuit in Need of Offload	Conventional Capacity Project Cost Estimate	Estimated Yearly Avoided Cost Deferral Value
68	$ 244,000.00	$ 28,500.00
563	~$5,000.00 (Cutover/Tagging only)	Negligible
751	$ 138,000.00	$ 16,300.00
992	~$5,000.00 (Cutover/Tagging only)	Negligible
1094	$ 3,319,000.00	$ 390,000.00
1117	~$5,000.00 (Cutover/Tagging only)	Negligible

b. Please explain how SDG&E will model peak load on the distribution circuit where residential charging infrastructure is installed. For example, how will SDG&E incorporate expected EV charging off-peak when considering whether or not to upgrade distribution infrastructure? Please explain.

SDG&E's load forecasting software is used to generate a 24-hour load curve for each distribution circuit. The forecast is updated annually with load actuals and installed assets (including EV's) from the prior year. The adjusted load forecasts are used to determine if any overload is expected on the distribution circuit, and if any infrastructure upgrades are required to alleviate the overload. The off-peak EV charging is assumed to occur between 12am and 5am along the load curve due to favorable rates, whereas unconstrained charging could occur at the same time as the circuit peak, exacerbating the peak load on that circuit.

16. Please provide the percentage of EV owners living in single family residences that rent their home versus those that own it in SDG&E's territory.

SDG&E Response (prepared by Randy Schimka):
SDG&E does not track or maintain this type of information.

17. Regarding "metrics" (p. RS-20, Chapter 4) does SDG&E plan to track incremental EV adoption due to the program? Please explain whether this is meant by "Annual growth in ZEV by type."

SDG&E Response (prepared by Randy Schimka):
SDG&E currently and plans to continue keeping track of the number of ZEV registered in SDG&E service territory, by ZEV type. These ZEVs do not have to be participants of the program to be counted.

18. Please explain what law or legal constraint prevents SDG&E from interfacing with the Department of Motor Vehicles (DMV) to know where all EV drivers live in its territory.

SDG&E Response (prepared by Randy Schimka):
Senate Bill 859 allows utilities to access DMV data to locate EV owner's registration address, but the utility use of this data is severely restricted by California Vehicle Code 1808.23.[10] SDG&E has not obtained any EV or address information from the DMV

[10] http://codes.findlaw.com/ca/vehicle-code/veh-sect-1808-23.html

because of the regulations outlined in CVC 1808.23 and the risk of an unintended violation.

19. On page CF-26, SDG&E states "the GIC…[will be] based on average hourly demand rather than demand based on 15-minute interval data." Please explain how "average hourly demand" is calculated and provide an example.

    SDG&E Response (prepared by Cynthia Fang):
    Average hourly demand is the average demand (kW) measured in a one-hour interval. Unlike Commercial GIR's demand based on 15-minute interval data, Residential GIR's demand is based on a one-hour interval data. The average hourly demand is a measurement equivalent to energy consumption (kWh) within the hour interval.

20. Please quantify the increase or decrease in bills (bill impact) for a current residential customer on a tiered rate that switches to the residential GIR rate. Please provide 2 calculations, one with average residential consumption for SDG&E's territory and one with above average (150% of average) and provide all work papers and assumptions related to this response.

    SDG&E Response (prepared by Cynthia Fang):
    Based on the bill calculation model provided for TURN-SDG&E-DR-01 question #14 submitted on 02/24/2017, we have now added a new tab "Res DR", which allows user to calculate illustrative monthly bills for residential customer on the current 01/01/2017 tiered Schedule DR (AL 3028-E). Please see the attached "TURN_SDGE DR_02 – Q20 Bill Calculation."

    The default scenario provided in the current 01/01/2017 Schedule DR (AL 3028-E) bill calculation, assumes a customer with an average residential energy consumption of 500 kWh per month. The model allows the user to select another option for above average (150% of average) residential consumption of 750 kWh per month. Please see the "Res DR" tab.

    For comparison purpose, the default scenario provided in the proposed Residential GIR bill calculation, also assumes a customer with energy consumption of approximately 500 kWh per month. In the proposed Residential GIR bill calculation, monthly energy consumption is slightly different due to the number of days in each month. Additionally, the energy consumption is equally distributed in every hour of the day. Please see the "Inputs" tab.

User may then view and compare the illustrative customer bills on the current 01/01/2017 Schedule DR (AL 3028-E) in the "Res DR" tab with the proposed Residential GIR in the "Bill Estimate" tab.


TURN_SDGE DR_02
- Q20 Bill Calculatior

21. Regarding Table 5-4, "Class Average Rates Impact:"
    a. Please provide this table in Excel with all calculations.
    b. Please explain why rates go down in 2018 and 2019 and provide all work papers and an explanation of how this is calculated. This includes, but is not limited to, assumptions of customer uptake of the new residential GIR rate.
    c. Please recreate this table through 2030 and provide both rate and bill impacts ($) for the residential and small commercial rate classes due to SDG&E's program.

SDG&E Response (prepared by Cynthia Fang):
a. Please see attached "TURN_SDGE DR_02 - Q21a Class Ave Rates Impact" for the table in Excel. Additionally, please see attached work papers for calculation specifically of the 2018-2021 class average rates impacts presented in Table 5-4 "Class Average Rates Impact".


TURN_SDGE DR_02
- Q21a Class Ave Rat


TURN_SDGE DR_02
- Q21a 2018 Class Av


TURN_SDGE DR_02
- Q21a 2019 Class Av


TURN_SDGE DR_02
- Q21a 2020 Class Av


TURN_SDGE DR_02
- Q21a 2021 Class Av

b. The reason for the reduction in revenues for the years 2018 and 2019 is due to self-developed software for the six one-year pilot projects in 2018, and the Residential Home Charging program (multi-year program) in 2019. The self-developed software costs are the only costs incurred for 2018 for the six pilot projects, and 2019 for the Residential Home Charging program. These costs are 100% deductible for tax purposes and generate a tax credit, which is passed on to ratepayers in the first year only.

c. Please see attached "TURN_SDGE DR_02 - Q21c Rates & Bill Impacts". The "Rate Impact" tab shows class average rates impact from 2018 to 2030. The "Bill Impact" tab shows bill impact for 1) residential in inland and coastal climate zone with the average residential energy consumption of 500 kWh per month and 2) small commercial on secondary service with maximum demand between 5-20 kW and energy consumption of

1,500 kWh per month.


TURN_SDGE DR_02
- Q21c Rates & Bill Ir

22. Please provide all evidence, work papers, and related source material related to SDG&E's representation that its program will result in 59,322 incremental vehicles by 2030 (Chapter 8, Table 4, page 8 of the E3 Appendix A).

SDG&E Response (prepared by J.C. Martin):
Two implementation cases are used to determine net impacts of the residential charging program. The "Program Case" represents the residential charging program as described in Chapter 4 with 90,000 electric vehicles ("EVs") charging on the residential grid-integrated rate using Level 2 chargers. The "Reference Case" is intended to represent ZEV adoption using SDG&E service territory observed ZEV growth trend-- in other words, the SDG&E service territory EV adoption absent SDG&E's program. This case includes 30,678 EVs charging on either the residential time-of-use rate or the domestic residential rate (i.e., tiered rate) using Level 1 chargers. Net impacts are estimated by subtracting the Reference Case from the Program Case, which results in 59,322 incremental vehicles.


Reference Case
Estimate (Final).xlsx

Work papers for the reference case 30,678 EVs are attached.

23. Related to Table 4, page 8 of Appendix A (Chapter 8), please explain why the total "Free Riders" vehicles do not increase between 2024 and 2030.

SDG&E Response (prepared by J.C. Martin):
Free Rider vehicles do not increase between 2024 and 2030 since the program enrollment will be limited to the five-year period: 2020-2025 (Chapter 4, page RS-11, p 15). The Chapter 8 cost-effectiveness analysis assumes enrollments start in 2020 and end in 2024.

24. Regarding Table 8 on page 11 of Appendix A (Chapter 8):
    a. The table shows PHEVs use more electricity than BEVs. Why is this the case? Are driving patterns for the two vehicles the same or different? Please explain.
    b. Please provide all assumptions regarding driving patterns and the source of this material that relate to this table.

SDG&E Response (prepared by J.C. Martin):
The electric vehicle miles traveled (eVMT) is assumed to be higher for the PHEV40s than for the BEVs. Why this is the case may be because PHEV drivers do not have the same range anxiety as BEV drivers, therefore influencing driving patterns and eVMT.

Please see work paper "E3 SB350 TE GIR Inputs(Final).xlsx," worksheet "Vehicle Info," Rows 9 & 10 under Weekday EV eVMT and Weekend EV eVMT. These eVMT values are in line with eVMT reported in the CalETC California Transportation Electrification Assessment Phase 1 (Sept. 2014), Table 35, page 68. (See http://www.caletc.com/wp-content/uploads/2016/08/CalETC_TEA_Phase_1-FINAL_Updated_092014.pdf)

25. From Chapter 8, Appendix A, please provide Figures 2 and 5 in Excel with all underlying calculations and assumptions.

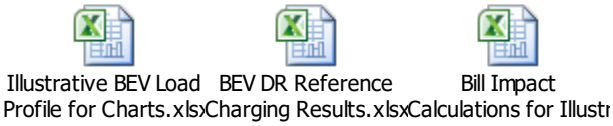
SDG&E Response (prepared by J.C. Martin):
Figures 2 and 5 in Chapter 8, Appendix A are illustrative charts used to demonstrate specific model logic details. These figures should not be treated as cost-effectiveness results.

To be responsive to this question, SDG&E provides the illustrative data behind Figure 2 in the workbook attached below "Illustrative BEV Load Profile for Charts.xlsx." To see actual model results, refer to workbook attached below "BEV DR Reference Charging Results.xlsx," which contains optimized charging results for battery electric vehicles under the DR schedule in the Reference Case. The E3 PEV Grid Impacts model calculates these optimized charging patterns as described in Chapter 8, Appendix A. To reflect slight customer preferences for fully charged vehicles, the model frontloads charging during time periods with constant price signals. Please see previously provided work papers "E3 SB350 TE GIR Inputs(Final).xlsx" for driving patterns, battery size, and charging level assumption.

Figure 5 aims to demonstrate the scope of the bill impacts analysis used within the cost-effectiveness analysis. SDG&E limited the bill impact analysis to the EV charging portion of bills. The Residential Charging Program may also impact participant bills by switching the retail rate schedule applicable to non-EV usage to the Residential GIR schedule. However, this impact varies considerably across customers due to variation in timing, quantity, and flexibility of household usage. SDG&E did not perform a full bill impacts analysis that assesses the distribution of bill impacts across all SDG&E customers.

The workbook attached below "Bill Impact Calculations for Illustrative Chart.xlsx" provides the

illustrative calculations underlying Figure 5. This captures the bill impacts of one illustrative customer who only modifies EV charging in response to the GIR. The representative customer load shape used to produce these illustrative calculations is from SDG&E's average residential customer Dynamic Load Profile data.



26. Please provide a definition for "free riders" as referenced in Appendix A of Chapter 8. The definition should include whether free riders participate in the residential charging infrastructure program and how they affect the cost-effectiveness analysis.

SDG&E Response (prepared by J.C. Martin):
As referenced in Chapter 8, "free riders" are residential customers with the following characteristics: a) they participate in the residential charging infrastructure program, thereby receiving a Level 2 charger and paying for electricity under the residential GIR schedule; and b) prior to the residential program, they have purchased an EV, charged it at Level 1, and paid for electricity under either the DR or the EV-TOU-2 rate schedule.

For free riders, the cost-effectiveness results do not reflect the costs and benefits of EV adoption and charging at Level 1. These results do capture the effects of changing the applicable tariff to the GIR schedule, increasing from Level 1 to Level 2 charging, and adding associated charger and program costs.

A key goal of the residential charging program is to increase EV adoption; "free riders" receive program benefits without contributing towards this goal (as they would have adopted EVs the program). The cost-effectiveness analysis includes free riders to account for the fact that SDG&E may not be able to restrict program participation to customers who would not otherwise purchase EVs (i.e. exclude free riders).

Previously provided work papers "Res Results Scenario A (Final).xlsx" and "Res Results Scenario B (Final).xlsx" demonstrate the impacts of free riders on the cost-effectiveness analysis. The "gross" cost-effectiveness results reflect costs and benefits in the absence of free riders, while the "net" cost-effectiveness results include free rider impacts. Free riders make the residential charging program less cost-effective for non-participating ratepayers. To the extent that SDG&E is able to target customers who would not purchase an EV absent the program,

ratepayer economics would improve. Free riders may improve or harm participant, total resource, and societal cost-effectiveness depending on the assumptions for incremental vehicle costs, tax credits, and gasoline prices. The two market scenarios (Scenario A and B) in the cost-effectiveness analysis demonstrates this uncertainty.

In the cost-effectiveness analysis, free rider participation in the Residential Charging Program does reduce gasoline consumption and better align charging with grid costs. Availability of Level 2 charging allows customers to meet a larger portion of their driving needs with electricity, and the GIR rate is more reflective of costs than the DR or EV-TOU-2 rate.

27. Please provide SDG&E's annual forecast of electric vehicles **without** the proposed residential charging program through 2030.

SDG&E Response (prepared by JC Martin):
SDG&E did not prepare an annual forecast of electric vehicles without the proposed residential charging program through 2030. However, please see the work papers attached above in the Question 22 response for the projected trend line used to calculate the Reference Case vehicles.

28. In Chapter 8, page 18 of Appendix A, E3 states "To estimate net program impacts, E3 analyzes a reference case with SDG&E-provided estimates of the number of customers who have purchased EVs and using a Level 1 charger under a non-integrated rate."
    a. Please explain this statement – does this mean E3 modeled all EV drivers in the reference case as charging on a tiered rate, on peak, with Level 1 charging? Please explain.
    b. Please explain the inputs and assumptions for the "reference case" and how this affects the cost-effectiveness calculations.

SDG&E Response (prepared by J.C. Martin):
a. No, EV drivers in the reference case are assumed to be charging at Level 1, the reference case does not assume all charging on peak under a tiered rate. In the Reference Case, 70% of vehicles charge under the tiered DR schedule, and 30% of vehicles charge under the time-of-use EV-TOU-2 schedule.

The E3 PEV Grid Impacts Model calculates timing of charging for each vehicle type under each retail rate in the reference case. The PEV Grid Impacts Model optimizes charging to minimize EV driver bills, given a set of constraints and a slight customer

preference to frontload charging. While weekday charging tends to occur on peak for vehicles on the DR rate, weekend charging and charging under the EV-TOU-2 rate rarely occur on peak.

The "net program impacts" include the existence of free riders (as described in Question 26). Net program impacts are determined by subtracting the Reference Case costs and benefits from the Program Case costs and benefits. The Program Case cost-effectiveness results reflect all program costs and benefits under the assumption that no participants purchased EVs in the prior to the program (i.e. no free ridership).

b. Please see previously provided work papers "E3 SB350 TE GIR Inputs(Final).xlsx" for a full summary of Reference Case assumptions. The input assumptions that vary between the reference and program cases are the following:

- EV adoption,
- Participant retail rates,
- Charging level, and
- Electric vehicle miles traveled.

The Reference Case is used exclusively to capture the impact of free ridership on the cost-effectiveness analysis. See Q22 above for a discussion of how free riders (i.e. the inclusion of a Reference Case) affect the cost-effectiveness results.