ED DATA REQUEST
ED-SDG&E-DR-05
SDG&E SB 350 TRANSPORTATION ELECTRIFICATION PROPOSALS (A.17-01-020)
SDG&E RESPONSE
DATE RECEIVED: January 30, 2018
DATE RESPONDED: February 13, 2018

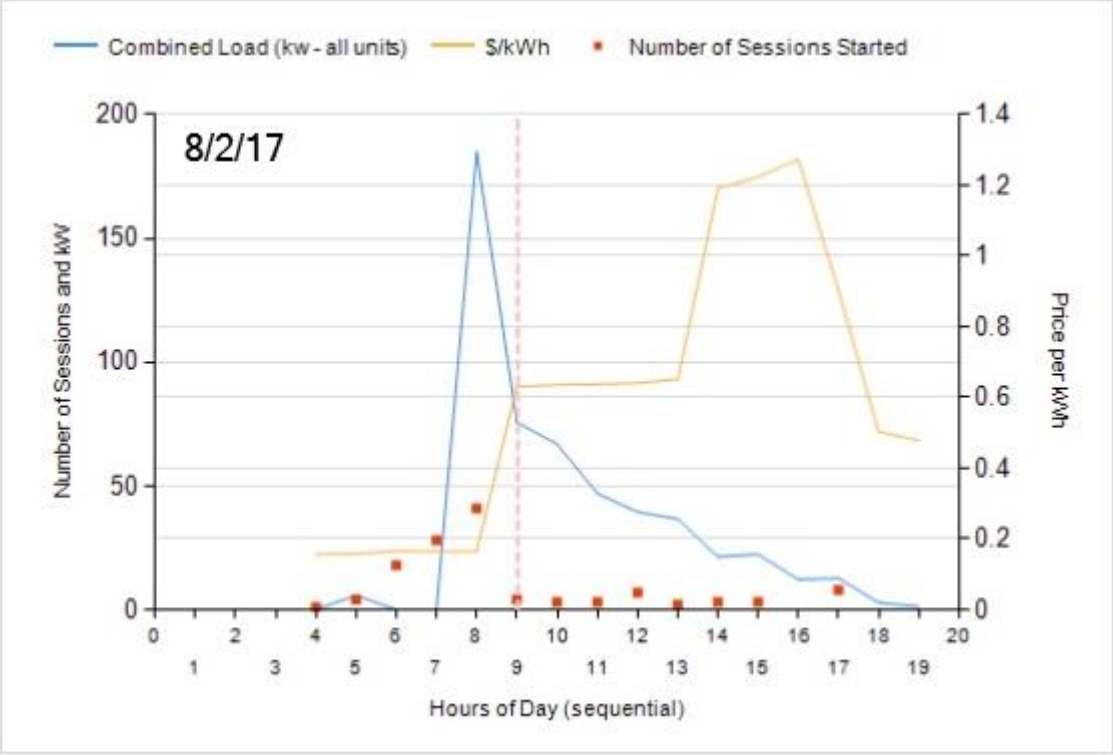
Grid Integration Rates

1. SDG&E has piloted some dynamic rates that it does not describe in its testimony to support development of its new Grid Integration Rates. (Specifically, ChargePoint's EPIC project EPC-14-078 used the Power Your Drive rate; SDG&E's On Campus Charging for SDG&E employees uses the Power Your Drive rate;[1] and the Hour X Dynamic Rate Pilot as part of residential rate design used a similar dynamic rate.[2]) Explain how the existing pilots support SDG&E's application for three new dynamic rates.
    a. How, if at all, has SDG&E considered the design or results of these three existing pilots in designing its Grid Integration Rates?
    b. If SDG&E has not considered these three existing pilots in designing the Grid Integration Rates, what lessons learned has SDG&E gathered that it will use to help implement the rates?
    c. Does SDG&E have any evidence that customers enrolled in the dynamic rates are responding to the price signals? If so, please explain the evidence.
    d. Does SDG&E have any evidence that customers are receiving and reading the rate communications sent via email or app? Are they reacting to them in advance and planning their electricity consumption accordingly? Or, are customers generally avoiding the 5-9pm period without necessarily looking at the app/email and generally able to avoid peak rates?

SDG&E Response:

a) SDG&E designed its proposed Residential GIR based closely on the design of its Hour X Dynamic Rate Pilot, and Commercial and Public GIRs based closely on the design of the rate utilized in Power Your Drive.
b) SDG&E has considered its existing and past rates in the design of the Residential and Commercial GIRs.
c) SDG&E does have evidence that employees participating in SDG&E's workplace charging program are responding to the dynamic rate.

[1] SDG&E presented its On Campus Charging pilot during the December 5, 2017 CEC VGI Research Review, but was unable to answer audience questions regarding outcomes or analysis of the pilot at that time.
[2] Energy Division staff asked SDG&E for analysis of the dynamic rate during the December 4, 2017 Residential Electric Rate Summit, but SDG&E presenters had not done any analysis at that time.



The above chart shows SDG&E employee charging data from August 2, 2017. On that date, at 9am, the first pricing adder was applied. At 1pm, the second pricing adder was applied, which made the total pricing per kWh from 2pm to 4pm over $1.20.

The red squares indicate the number of charging sessions started per hour. In the hours leading up to 9am, there were almost 100 total sessions started, but from 9am to 5pm, there were just a handful of sessions that were started (due to the higher pricing during those hours).

The blue line shows the combined load in kW from all charging stations, and it peaked at 8am before the prices went up. After 9am, as prices were going up, total power dispensed went down considerably. This shows the effect that pricing has on customer charging session initialization and total power dispensed.

d) Results from SDG&E's Residential dynamic rate pilot Daily Pricing emails are as follows.

Total sent = 21,183 sent
Total unique opens = 7,318 opened
Total unique clicks = 3,090 clicked (once clicked, customers go to the sdge.com/hourx2 page where the pricing information is provided).

There were 9,208 unique Hour X page views from 10/01/16 to 01/31/18 (777 accessed the web page directly (not from clicking a link) - the other 8,431 likely accessed the pricing page from clicking the email).

2. Regarding SDG&E's On Campus Charging, SDG&E stated that there are 253 charging stations with 434 employees enrolled using the Power Your Drive rate. Do the EVSE meet the same requirements as Power Your Drive?

    a. If so, how were these installed so much sooner than the Power Your Drive EVSE? Are they all ChargePoint stations?
    b. If not, how do they pass on the rate or bill the driver?

SDG&E Response:

2. The SDG&E on-campus charging station project started in 2012 with a bank of 10 charging stations and has grown in size over 5 years to a total of 253 charging stations. Since this was 2 years before the VGI or Power Your Drive application was filed, there wasn't any "off the shelf" charging equipment available in the marketplace that could work with the innovative hourly rate that SDG&E was envisioning. SDG&E partnered with Liberty Access Technologies to design and build the networked backend controllers and the web/phone app that was required to provide basic managed charging functionality with off-the-shelf non-networked EVSE. While these controllers and EVSE share some of the same characteristics and features of what became the Power Your Drive EVSE specification, the SDG&E workplace charging station equipment does not have all the features or meet all the requirements of the Power Your Drive equipment, which were specified later with 3 years of additional experience.

2a: SDG&E's first prototype workplace charging equipment was installed 4 years "sooner" than the first Power Your Drive equipment, but like Power Your Drive, it still took preparatory time to do all the work necessary to get the first system designed, procured, installed and tested before the new technology and software could be used by employees to charge their cars.

While SDG&E has used ChargePoint equipment in the past to supply workplace charging equipment prior to the rollout of SDG&E's managed charging prototype program, the current SDG&E workplace charging equipment is not made by ChargePoint.

SDG&E is using Liberty Access Technologies as the supplier of the networked backend controllers required in the managed charging employee program. SDG&E is also using several different brands of non-networked EVSE in front of the controllers to charge employee cars.

2b. SDG&E's workplace charging project has a functional smart phone application, as well as a web site where drivers can see day-ahead and day-of prices. They can also enter their preferences and hourly charging choices, much like the app or website that a PYD driver would

see. Vehicle energy consumption is logged by the vendor and SDG&E drivers are billed quarterly for their usage with a separate internal invoice. A credit card billing option was added later after the launch of the platform for convenience.

3. Regarding the Residential GIR, what is the lowest rate a customer is expected to pay during super off peak times (i.e. Super Off Peak Hourly Base Rate + CAISO Day Ahead Hourly Price)?
    a. Is this reasonable to encourage the switch to electrification? How does it compare to the cost of gasoline?

SDG&E Response:

3. SDG&E provided historic CAISO Day-Ahead pricing for 2016 in response to San Diego Airport Parking DR01. Based on this historic information, the lowest observed hourly CAISO Day-Ahead price in 2016 was 0.923 ¢/kWh. That price, combined with the illustrative Residential Super Off-Peak base rate would be 19.974 ¢/kWh.[3]

3a. Yes, this pricing is reasonable to encourage the switch to electrification. With an electricity price of 19.974 ¢/kWh (20 cent rounded price used for calculation), and assuming an average fuel economy of 25 miles per gallon, the gasoline equivalent price for driving electric at that electric rate is approximately $1.67 per gallon.

4. Regarding the Residential GIR, in the Rebuttal Testimony of Cynthia Fang, SDG&E shows an hourly base rate of 19.051 ¢/kWh for super off peak and 21.752¢/kWh for all other times. Why is the differential so small?

SDG&E Response:

In the Residential GIR, the differential between the base rate applicable to Super Off-Peak charging and the base rate applicable to All Other Hours reflects an exemption that is limited to generation capacity costs in Super Off-Peak hours. As such, the difference between the Super Off-Peak base rate and the base rate for All Other Hours is small.

5. Regarding the Residential GIR, why is it limited to EV-only, rather than optionally applicable to the whole house, inclusive of EV load? Will SDG&E use submeters to measure the EV load, or always install a separate service meter?

SDG&E Response:

[3] Illustrative base rates based on 1/1/17 effective rates.

5a. The Residential GIR proposed in SDG&E's rebuttal testimony was revised based on parties' feedback. SDG&E had originally proposed (in its opening testimony) a whole-house Residential GIR.[4] Parties expressed concerns regarding the complexity of the rate, and the implications of an hourly dynamic rate on non-EV household usage. In response to these concerns, SDG&E withdrew its originally proposed whole-house GIR, and replaced it with the proposed EV-only GIR.[5]

5b. As outlined in the Modified Residential charging program application, SDG&E plans on using the embedded meter (submeter) in the networked EVSE to measure the car charging consumption. That data will be used to bill the customer if they choose the EV-TOU rate or the Residential GIR rate. The car charging data will not be necessary for billing if the customer chooses the EV-TOU2 whole house rate, but the data will be gathered and archived for study purposes by SDG&E.

No separate service utility meters will be installed as part of the modified residential charging program.

6. Regarding the Commercial GIR, in the Rebuttal Testimony of Cynthia Fang, SDG&E shows an hourly base rate of 13.871 ¢/kWh.
    a. Why is this base rate so much lower than the residential GIR base rate?
    b. Why is there no time differentiation for the base rate as there is for the Residential GIR?

SDG&E Response:

a. SDG&E's proposed GIRs are based on the class-average rates associated with their respective customer classes, with modifications for the Distribution and Commodity CPP adders. As such, the difference in the base rates for the Residential and Commercial GIRs are reflective of differences between their respective class average rates. Illustrative rates presented in this proceeding are based on rates effective 1/1/17. At that time, the Residential class average rate was 24.896¢/kWh, while the Medium and Large Commercial & Industrial class average rate was 19.374 ¢/kWh.
b. As noted in response to Question 1a above, SDG&E's proposed Residential GIR is closely based on SDG&E's Hour X Pilot rate, and SDG&E's proposed Commercial GIR is based closely on the Power Your Drive rate. As such, the Residential GIR includes a lower base rate applicable to charging during the Super Off-Peak hours, as did the Hour X Pilot rate, while the Commercial GIR maintains a single base rate for all hours, similar to the Power Your Drive rate.

[4] Direct Testimony of Cynthia Fang, at CF-6, line 2.
[5] Rebuttal Testimony of Cynthia Fang, at CF-2.

7. Do the rate design proposals align with D.17-08-030 in A.15-04-012?

SDG&E Response:

Yes, the Residential GIR proposed here utilizes the same Super Off-Peak hours that were approved in D.17-08-030.

Residential Charging Infrastructure

8. What information does SDG&E currently provide to residential customers that install EV charging at their homes (and do not participate in an SDG&E infrastructure program) regarding safety and installation practices?

SDG&E Response:

SDG&E speaks to potential EV drivers at organized outreach events, ride & drive events, and from time to time, we receive phone calls and emails from EV drivers that have questions. Most of the questions revolve around our EV rates, billing questions, EV charging programs, and incentives, but some of the callers are interested in more information about charging their EV or getting a charging station involved.

One example of a document that is provided to interested multi-unit dwelling customers is the attached handout called "Prepping for Plugin Vehicles." As can be seen in this particular handout, we try to address many of the challenges in getting charging stations installed, and also touch on the importance of hiring a qualified contractor and conducting a site evaluation.

Other safety items that have been discussed with customers at events and on phone calls are:

- UL listing and NRTL testing program that applies to charging stations;
- SAE J1772 standard for plugs that most manufacturers use and comply with in their products
- installer training programs, such as the EVITP program; and
- National Electrical Code and how it applies to the installations.

9. In the September 5, 2017 Rebuttal Testimony of Randy Schimka, SDG&E revised its proposed program to allow for customer ownership of the EVSE. In Excel, provide the following for the revised proposal for 3 customer EVSE ownership scenarios of 0%, 50%, and 100%: the total budget of direct costs; annual revenue requirement from 2018-2028; and the total revenue requirement for the lifetime of the program or assets, whichever is longer. Include the total revenue requirement irrespective of whether it is recovered through a TE balancing account or another mechanism, such as the GRC.

SDG&E Response:

The attached spreadsheets with the following file names are responsive to this request:

- ED DR-05 Q9-Rebuttal-SDGE 0 Pct Ownership-Residential-Rev Req Inputs-09-12-17.xlsx
- ED DR-05 Q9-Rebuttal-SDGE 50 Pct Ownership-Residential-Rev Req Inputs-09-12-17.xlsx
- ED DR-05 Q9-Rebuttal-SDGE 100 Pct Ownership-Residential-Rev Req Inputs-09-12-17.xlsx

10. Does SDG&E believe that all residential customers need full utility involvement in EVSE installation and maintenance, or does it believe some segments require more of a turnkey solution than others?

SDG&E Response:

Regarding installation of the 240 volt circuit that will power the charger, SDG&E believes that this part of the installation should be managed by SDG&E as a means to ensure proper and safe installation and to eliminate the significant barriers associated with the customer having to obtain permits and hire a qualified electrical contractor. Where it is possible, safe and makes reasonable sense to do so, SDG&E also believes in providing customers with options. Accordingly, the modified Residential Charging Program provides participants with the option of either owning and maintaining the charger themselves or allowing SDG&E to own and maintain the charger. This is consistent with the ACR, which stated that the Commission's "intent is to provide the utilities flexibility to maximize benefits and consider innovative program designs, while establishing a market signal towards widespread TE."[6] In addition, as pointed out by NRDC, "smart chargers that are used for billing an EV-only tariff, are even more analogous to service drops, because the EVSE becomes the point of delivery for the electricity service provided to the electric vehicle. Accordingly, because EVSE are analogous to equipment owned and installed by SDG&E already, the utilities core competencies necessarily include EVSE ownership and installation.[7]

SDG&E believes there will be some customers who will want the utility to take on the responsibility of ownership and maintenance, and there may also be some customers who want to take on those responsibilities themselves. Those decisions are not necessarily spread cleanly among different segments or types of customers, thereby making it appropriate to offer the option and allow the customers to make this decision.

11. Does SDG&E need to test every EVSE that will be installed under its Residential Charging Infrastructure program under Rule 18?[8]

[6] ACR at 19, R.13-11-007 (issued September 14, 2016)
[7] Joint Parties Rebuttal Testimony, pgs 12-13
[8] http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-RULES_ERULE18.pdf.

a. If the customer purchases and owns the EVSE, does Rule 18 still apply?
b. Could the EVSPs that qualify through the RFO or RFP process have their qualifying EVSE randomly tested after installation to prove meter accuracy?[9]

SDG&E Response:

11. The utility is ultimately responsible for the safety, reliability, and accuracy of the devices used to bill our customers. Because of this, SDG&E is not in favor of promoting the concept of allowing the manufacturers to self-certify their equipment and meters. As a point of comparison, here are the results from SDG&E's testing of the first 976 Power Your Drive EVSE with the manufacturer and model information made generic:

Project Totals							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Totals
Total Received	124	438	32	101	321	12	1028
Total Test Pending	24	12	16	0	0	0	52
Total Test Completed	100	426	16	101	321	12	976
Total Test Passed	98	411	16	101	320	11	957
Total Test Failed	2	15	0	0	1	1	19

The failure rate of these EVSE is about 2%, or 19 of the units tested. SDG&E believes this technology is not yet mature and requires 100% verification.

a. SDG&E believes that Rule 18 would still apply, regardless of the ownership or source of the meter or EVSE.

b. Eventually, a sampling methodology could be used to test meters after they have been proven to be accurate. SDG&E currently performs two types of testing on metering equipment, and would like to apply that same methodology to the EVSE meters:

- New product testing
- Ongoing field accuracy testing

New chargers would first need to pass initial certification testing conducted by SDG&E's meter engineering team. Once the EVSE has been approved as part of the RFP process, SDG&E would perform 100% testing on a specific number of units (which hasn't yet been decided for EVSE meters). If failure rates are acceptable after the initial 100% testing, SDG&E would begin using ANSI (Z1.4) double sampling testing for future shipments. ANSI sample testing

[9] PG&E has similar meter testing requirements as SDG&E, but for new meters, the manufacturer's test can be used as the installation test when random PG&E tests indicate satisfactory accuracy results for a particular manufacturer for a particular shipment. See https://www.pge.com/tariffs/tm2/pdf/ELEC_RULES_17.pdf

reduces accuracy testing quantities, and could be applied to future shipments. Any shipment that fails the testing would then be sent back to the manufacturer.

In addition to the internal testing, SDG&E would require the manufacturer to send an ASN file with charger attributes and their accuracy test results.

Ongoing field testing will be performed on an annual basis. Testing would be based on sampling (manufacturer type and population size).

12. How did SDG&E qualify the 36 EVSE models currently listed on its Marketplace: https://marketplace.sdge.com/ev-chargers/.
    a. Are there any specific safety requirements EVSE models must meet to be listed on the Marketplace?

SDG&E Response:

SDG&E's Clean Transportation group provided a list of EVSE models to the Marketplace contractor for posting on the site that were for sale on Amazon and were UL tested or NRTL listed. No other qualifications were used.

13. On page 25 of its opening brief filed on November 21, 2017, SDG&E states it has "seen evidence in its PYD Program that the RFP process has driven competition and innovation in the market as vendors develop new products and capabilities in order to serve PYD customers."
    a. What evidence has SDG&E seen that its RFP process has driven competition and innovation in the market?
    b. How many vendors have been able to develop new products and capabilities to serve PYD customers?
    c. Would SDG&E set similar requirements as those established for PYD for the EVSE it installs through its residential program, given the EVSE would be in single-family home garages?
    d. What lessons have been learned from PYD regarding EVSE metering requirements? Can the lessons be applied to the proposed residential charging program?

SDG&E Response:

13a. In the Power Your Drive Request for Proposal (RFP) process, SDG&E solicited input from nearly 90 vendors and providers that had shown interest and responded to SDG&E's earlier Request for Information solicitation. From the RFP solicitation, SDG&E received 34

responses from interested vendors and providers that wanted to participate. The RFP process drove innovation because no vendor had off-the-shelf products and software ready to deliver that could fulfill all of SDG&E's PYD requirements for the hourly VGI rate to drivers and the billing data specifications (although some vendors were closer than others). All vendors needed some time to modify their software and processes in order to give a demonstration of their capabilities and move forward. SDG&E allowed any vendor or partnering vendors to show interest, but they needed PYD compliant products and services to move forward with the qualification process.

SDG&E believes that the idea of participating in one of the first historic utility pilot EV charging projects with managed charging features is what drove many of the RFP bidders to take the necessary steps to add and refine the required PYD features to their products and software. After doing that work, these features and products will be available to all customers in the future who want to implement a managed charging solution. Without the PYD program driving innovation and competition for the program in this manner, it is doubtful that this managed charging innovation would have occurred in the industry as early as it has.

13b. SDG&E has signed contracts with three vendors to provide PYD products and capabilities to customers.

13c. SDG&E will create a specification for the EVSE that will be used in the modified Residential Charging Program. While that hasn't been done yet, SDG&E believes that many of the requirements that were put in place for the PYD EVSE would also apply to the residential EVSE. Requirements such as NRTL testing, SAE J1772 compliance, NEC Code Article 625 compliance, FCC Part 15 Class A compliance, NEMA 3R housings, input voltage specs, temperature min and max, metering specs, networking specs, and cord length will most likely be similar to the PYD requirements. On the other hand, PYD requirements that might be different or not required on the modified residential program would include ADA requirements, NIST 44 requirements related to public charging, cord management systems, driver authentication related to public charging, and pedestal mounting requirements (to name a few).

13d. As part of the PYD procurement process, the concept of managed charging with an hourly rate was new. It took time to write the specifications and prepare all the required documentation to administer the RFP. After the RFP process, it took some time to work with the vendors, test their metering solutions, evaluate their product offerings, and work with them to get ready for testing. All of this work (to create the RFP as well as working through it with the vendors) was a big contributor to the "lessons learned" in PYD, and all of this work should be easier to do again in the Residential program.

General

14. On June 15, 2017, SDG&E provided a response to an Energy Division data request, detailing rate impacts of SDG&E's proposed TE application. The response included an Excel file that quantified impacts to revenue requirement and rates of existing and proposed TE projects from 2015-2023.
    a. Based on the data SDG&E provided in this data response, it appears that the greatest impact to revenue requirement from the current and proposed projects will occur in 2023. Is that the year of the maximum revenue requirement impact from the existing and proposed projects? If not, in which year will that occur?

SDG&E Response:

a. No, the year of the maximum revenue requirement impact from the existing and proposed projects is not 2023. The maximum revenue requirement impact is in 2025.