Clean Energy DATA REQUEST
Clean Energy-SDG&E-DR-01
SDG&E SB 350 TRANSPORTATION ELECTRIFICATION PROPOSALS (A.17-01-020)
SDG&E RESPONSE
DATE RECEIVED: April 19, 2017
DATE RESPONDED: May 3, 2017

DATA REQUEST

Question 01-1

Please provide all working papers supporting the testimony including all reports relied on by the Utility while developing the testimony. To the extent that these reports are publicly accessible please provide a link to the report. For each report relied on, please identify the date of publication and whether it was based on information specific to the utility territory.

SDG&E Response:
SDG&E's non-confidential workpapers were previously provided to the Office of Ratepayer Advocates (ORA). Please see the "ORA DR-01 Workpapers" attachment to SDG&E's response to ORA-DR-01, which is available at the following webpage: https://www.sdge.com/regulatory-filing/20491/application-sdge-authority-implement-priority-review-and-standard-review. From the webpage, go to: "Data Responses" → "ORA" → "ORA-DR-01 (with attachments)."

Confidential workpapers are available upon execution of a non-disclosure agreement.

The following reports were relied on by SDG&E while developing its testimony:

- Chapter 5 report relied on (referenced on CF-2, footnote 5):
  - Joint IOU Electric Vehicle Load Research Report, 12/30/2016, http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M171/K806/171806139.PDF
- Chapter 8 reports relied on:
  - Application of San Diego Gas & Electric Company for Authority to Implement a Pilot Program for Electric Vehicle-Grid Integration, A.14-04-014. https://www.sdge.com/regulatory-filing/10676/sdge-electric-vehicle-grid-integration-pilot-program
  - Vehicle-Grid Integration: A Vision for Zero-Emission Transportation Interconnected throughout California's Electricity System, R.13-11-007 (2014), http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=7744
  - Alternative Fuels Data Center, Federal Laws and Incentives, http://www.afdc.energy.gov/laws/fed_summary
  - Executive Order ("EO") S-3-05 (2005), https://www.gov.ca.gov/news.php?id=1861
  - Assembly Bill ("AB") 32 (2006), http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_00010050/ab_32_bill_20060927_chaptered.pdf

- Senate Bill ("SB") 350 (2015), https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350#
- 2016 ZEV Action Plan (October 2016), https://www.gov.ca.gov/docs/2016_ZEV_Action_Plan.pdf
- EO B-16-2012 (March 2012), https://www.gov.ca.gov/news.php?id=17472
- SANDAG, Plug-in SD: Supporting the Region's Plug-in Electric Vehicle Readiness, http://www.sandag.org/index.asp?classid=17&subclassid=46&projectid=511&fuseaction=projects.detail
- Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers (2008), https://www.epa.gov/sites/production/files/2015-08/documents/understanding_cost-effectiveness_of_energy_efficiency_programs_best_practices_technical_methods_and_emerging_issues_for_policy-makers.pdf
- CAISO's proposed TOU periods (May 5, 2016), http://www.caiso.com/Documents/CAISOTOUperiodsCPUC_5_5_2016_final.pdf
- Decision Adopting Policy Guidelines to Assess Time Periods for Future Time-of-Use Rates and Energy Resource Contract Payments (adopted January 19, 2017 in R.15-12-012). http://docs.cpuc.ca.gov/publisheddocs/published/g000/m172/k782/172782737.pdf
- CAISO's proposed TOU periods to address grid needs with high numbers of renewables (May 5, 2016), (presented in R.15-12-012), http://www.caiso.com/Documents/CAISOTOUperiodsCPUC_5_5_2016_final.pdf
- Energy and Environmental Economics, Inc., Avoided Costs 2016 Interim Update (Aug. 1, 2016), http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=12504 and http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=12509
- SDG&E's General Rate Case Phase 2, A.15-04-012 https://www.sdge.com/sdge-2016-GRC-Phase-2
- Lawrence Berkeley National Laboratory, E3, and Nexant, 2015 California Demand Response Potential Study, Charting California's Demand Response Future at 7-15, R.13-09-011 (November 14, 2016), http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442451541
- EPIC Final Report – Project 1.25 DC Fast Charging Mapping, Appendix C. https://www.pge.com/pge_global/common/pdfs/about-pge/environment/what-we-are-doing/electric-program-investment-charge/EPIC-1.25.pdf

- EIA Weekly California All Grades Reformulated Retail Gasoline Price, https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMM_EPM0R_PTE_SCA_DPG&f=W
- ICF. CalETC Transportation Electrification Assessment Phase 1 Final Report. Updated September 2014, http://www.caletc.com/wp-content/uploads/2016/08/CalETC_TEA_Phase_1-FINAL_Updated_092014.pdf

Question 01-2

Identify by vehicle weight class the vehicles SDG&E considers to be Medium Duty Vehicles.

a. For each weight class, identify the typical operating characteristics of vehicles in each class, including vocation/use, daily range in miles, time of day refueling typically occurs, and refueling needs.

SDG&E Response:
SDG&E uses the Federal Highway Administration nomenclature guidelines to identify Medium Duty vehicles[1], which are Classes 3-6 (10,001 - 26,000 lbs. gross vehicle weight rating). San Diego hosts many companies with a diverse portfolio of business and vehicles. SDG&E does not have the requested information about regional San Diego vehicles to answer the typical operating characteristics of vehicles in each class, but that information will be learned as part of this project.

b. For each weight class, explain the extent to which the vehicles are used in interstate transportation.

SDG&E Response:
None of the project vehicles are expected to participate in interstate commerce.

Question 01-3

Identify by vehicle weight class the vehicles SDG&E considers to be Heavy Duty Vehicles.

[1] http://www.afdc.energy.gov/data/10380

a. For each weight class, identify the typical operating characteristics of vehicles in each class, including vocation/use, daily range in miles, time of day refueling typically occurs, and refueling needs.

SDG&E Response:
SDG&E uses the Federal Highway Administration nomenclature guidelines to identify Heavy Duty vehicles,[2] which are Classes 7-8 (greater than 26,000 lbs. gross vehicle weight rating). San Diego hosts many companies with a diverse portfolio of business and vehicles. SDG&E does not have the requested information about the regional San Diego vehicles to answer the typical operating characteristics of vehicles in each class, but that information will be learned as part of this project.

b. For each weight class, explain the extent to which the vehicles are used in interstate transportation.

SDG&E Response:
None of the project vehicles are expected to participate in interstate commerce.

Question 01-4

a. Please specify all vehicle fuels that are substitutable for electricity as a vehicle fuel for Medium Duty vehicles. Specify whether the fuels vary by vehicle weight class within the Medium Duty market segment.

SDG&E Response:
SDG&E will attempt to support whatever our customers' needs are with respect to their electric service and their fueling needs. Electric vehicles for the medium duty sector are in an early development phase. Conventional and alternative fuels such as gasoline, diesel, propane and methane (renewable or natural gas) are examples of currently available fuels that may be used for medium duty vehicles. This project will help assess where and how electric fuel can be used.

b. Did SDG&E commission or undertake a market study defining the scope of the competitive market for electricity as a vehicle fuel in the MD vehicle segment in support of the application?

[2] http://www.afdc.energy.gov/data/10380

SDG&E Response:
SDG&E did not undertake or commission a market study defining the scope of the competitive market for electricity as a vehicle fuel. Based on footnotes 53 and 54 listed in testimony on RS-41, the Medium and Heavy Duty and Forklift Port Project is relatively small in only looking at 0.2% of the total vehicles. The Fleet Delivery Project is also focused on a small fraction of the total delivery trucks in the region.

c. If yes, please provide the study.

SDG&E Response:
n/a

Question 01-5

a. Please specify all vehicle fuels that are substitutable for electricity as a vehicle fuel for Heavy Duty vehicles. Specify whether the fuels vary by vehicle weight class within the Heavy Duty market segment.

SDG&E Response:
SDG&E will attempt to support whatever our customers' needs are with respect to their electric service and their fueling needs. Electric vehicles for the heavy duty sector are in an early development phase. Conventional and alternative fuels such as gasoline, diesel, propane (less used for heavy duty) and methane (renewable or natural gas) are examples of currently available fuels that may be used for heavy duty vehicles. This project will help assess where and how electric fuel can be used.

b. Did SDG&E commission or undertake a market study defining the scope of the competitive market for electricity as a vehicle fuel in the HD vehicle segment in support of the application?

SDG&E Response:
SDG&E did not undertake or commission a market study defining the scope of the competitive market for electricity as a vehicle fuel. Based on footnotes 53 and 54 listed in testimony on RS-41 the Medium and Heavy Duty and Forklift Port Project is relatively small in only looking at 0.2% of the total vehicles. The Fleet Delivery Project is also focused on a small fraction of the total delivery trucks in the region.

c. If the answer to Question 01-5(b) above is yes, please provide the study.

SDG&E Response:
SDG&E did not undertake or commission a market study defining the scope of the competitive market for electricity as a vehicle fuel.

Question 01-6

a. Please identify any third-party businesses currently offering EV infrastructure in the SDG&E service territory.

SDG&E Response:
Any certified electrical contractor and or construction company can install EV infrastructure to support EV charging equipment. Using Plugshare as a source, below is a list of Electric Vehicle Service Providers (EVSPs) that provide electric vehicle infrastructure and hardware in the San Diego region: eVgo, Greenlots, ChargePoint, Tesla, OPConnect, Sema Connect, Aerovironment, Clipper Creek, and Blink (Car Charging Group).

b. For each party identified above, please specify the nature of infrastructure provided.

SDG&E Response:
It is SDG&E's understanding that the parties listed above provide the following types of charging infrastructure.

- eVgo: DC Fast Charging and Level 2 charging stations.
- Greenlots: DC Fast charging stations.
- Chargepoint: DC Fast Charging and Level 2 charging stations.
- Tesla: DC Fast charging and Level 2 charging stations.
- OPConnect: Level 2 charging stations.
- Sema Connect: Level 2 charging stations.
- Clipper Creek: Level 2 charging stations.
- Blink (Car Charging Group): DC fast chargers and level 2 charging stations.

Question 01-7

Page MMS-10, line 10-12, indicates that SDG&E does not propose a standard review program for the MD and HD markets at this time. Instead, in Note 14, Mr. Schneider notes the intention to "pursue projects as technologies for these sectors become feasible for the region."

a. Please state the basis for the conclusion that technologies in these sectors are not feasible for the SDG&E service territory and provide all workpapers, studies or other documents supporting this conclusion.

SDG&E Response:
SDG&E has not concluded that technologies related to buses, medium and heavy duty commercial and industrial and tourism are not feasible. Many technologies across a range of market segments are feasible. Much of this depends upon customer needs, operational characteristics and other factors specific to the vehicle and customer. Education is also needed so that customers understand the advancements in these technologies.

b. What characteristics make a technology "feasible" and appropriate for support?

SDG&E Response:
See response to 01-7a.

c. Identify the factors that may make a technology feasible in one region and infeasible in another.

SDG&E Response:
As stated above in 01-7a, level of customer interest, vehicle adoption, operational characteristics, and other factors specific to the vehicle and customer may make a technology feasible in one region and infeasible in another.

d. Has SDG&E identified what is required for a technology to be considered feasible for its region?

SDG&E Response:
Please see answer to 01-6c.

Question 01-8

Identify all policy goals underlying Transportation Electrification (TE) considered by SDG&E in developing its Priority Review and Standard Review programs.

a. Are California climate goals limited to the reduction of GHG emissions?

SDG&E Response:
California climate goals may go beyond reduction of GHG emissions, however SDG&E's SB350 application (A.17-01-020), focuses on the policy goals described in the CPUC's "Assigned Commissioner's Ruling Regarding the Filing of the Transportation Electrification Applications Pursuant to Senate Bill 350" (ACR), dated 9/14/2016.

b. Do California climate goals include reduction in NOx levels?

SDG&E Response:
SDG&E is unaware of explicit NOx climate goals for California, beyond the SB 350 Greenhouse Gas Emission goals. NOx contains N_2O, which is a greenhouse gas (GHG), like carbon dioxide (CO_2) that absorbs infrared radiation to hold heat radiating from Earth contributing to global warming. NOx is a criteria pollutant containing NO_2 which contributes to tropospheric ozone, smog, acid rain, and eutrophication.[3] *

c. Identify other vehicle fuel technologies available to serve the California goals of GHG and NOx reductions.

SDG&E Response:
Various fuel technologies may be available to serve the California goals of GHG and NOx reductions, however SDG&E's SB350 application (A.17-01-020) focuses on TE since the CPUC's ACR dated 9/14/2016 states "Clearly, vehicles that are unable to use grid electricity and rely exclusively on natural gas or hydrogen do not fit the TE definition. Accordingly, the SB 350 TE applications shall not propose these kinds of projects and investments." (ACR at p. 14)

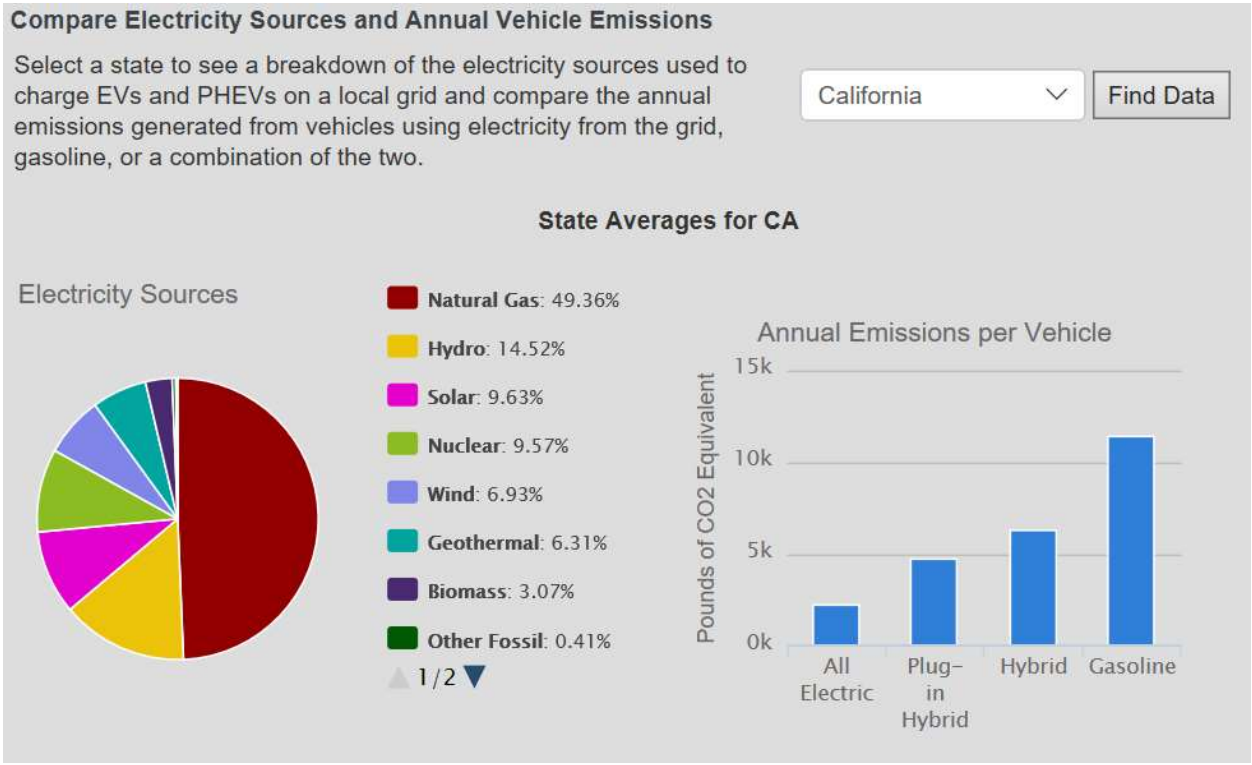
d. Is it possible that increased EV load will require the Utility to procure additional generation capacity?

[3] US EPA, Nitrogen Oxides (NOx), Why and How They Are Controlled (1999), Downloaded 2/12/2017: https://www3.epa.gov/ttncatc1/dir1/fnoxdoc.pdf

SDG&E Response:
Yes, it is possible that increased EV load may require the Utility to procure additional generation capacity, however SDG&E's SB350 proposals includes three Grid Integration rates designed to reflect cost-causation principles: "A rate design based on cost-causation principles is critical to ensure that charging occurs in a manner consistent with electric grid conditions and provides customers with price signals to incent behavior which minimizes incremental system and local capacity needs." (Chapter 5, p. CF-2). One aspect of the priority review program is to collect data which will be useful in assessing the need to mitigate peak load and potential strategies to do so after the priority review project is completed.

e. Will all additional generation capacity procured to serve the increased load be emissions free?

SDG&E Response:
Increased load due to EV adoption does not necessarily result in the need to procure additional generation capacity. Electric generation does not need to be "emissions free" to support SB350 GHG goals. Information from the Alternative Fuels Data Center shows that California's generation source mix results in lower annual CO2 emissions for All-Electric and Plug-in Hybrid vehicles compared to gasoline vehicles.



Source: AFDC, Downloaded 4/25/2016: http://www.afdc.energy.gov/vehicles/electric_emissions.php#wheel.

Question 01-9

Please specify the carbon intensity (MT/MWh) and average NOx emissions of SDG&E's system generation in 2016 for the following periods:

Hours	Summer		Winter	
	GHG	NOx	GHG	NOx
4 pm to 9 pm				
6 am to 4 pm,				
9 pm to 12 am				
12 am to 6 am				

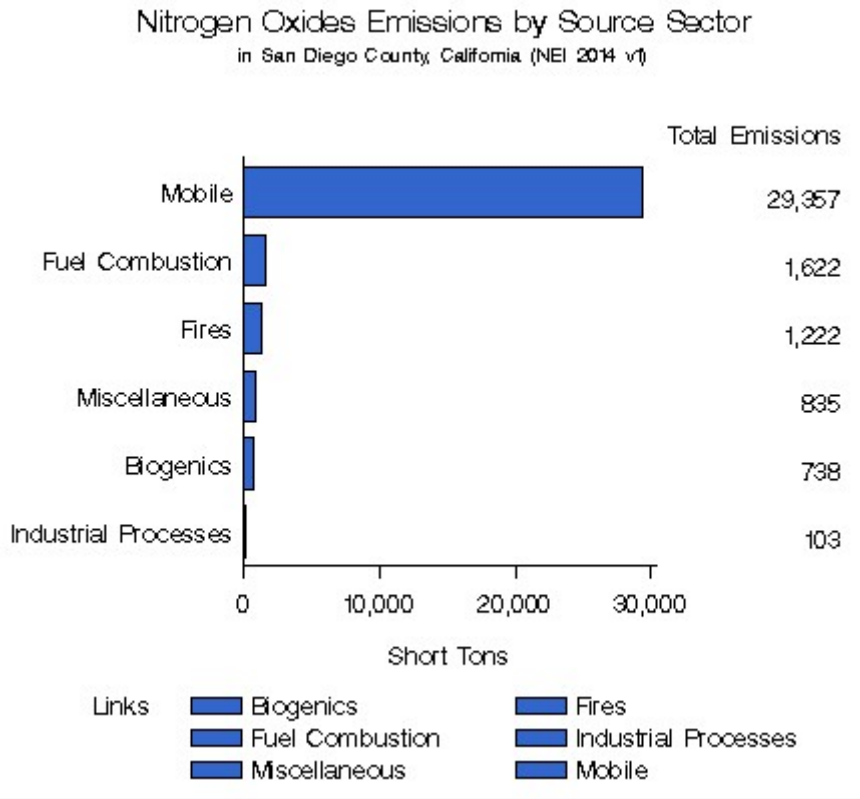
SDG&E Response:
The chart below is an estimate of the marginal carbon intensity of SDG&E's system in 2016 (MT/MWh). These estimates are based on marginal implied heat rates using Southern California city-gate gas prices, GHG Allowance Index prices, and the California Independent System Operator (CAISO) reported SDG&E DLAP electric prices.

Hours	Summer	Winter
	GHG	GHG
4 pm to 9 pm	0.7557	0.6621
6 am to 4 pm,	0.4875	0.4078
9 pm to 12 am	0.5409	0.5123
12 am to 6 am	0.4100	0.3923

Average SDG&E's system NOx emissions by time period is nearly impossible to estimate, since the CAISO is the control area which schedules all generation resources used to meet SDG&E service territory loads on any given hour. SDG&E is unaware of any CAISO data on NOx emissions attributed to SDG&E service territory loads, by time-of-day or by hour. However, NOx emissions in the San Diego region are primarily from mobile sources. In the 2012 CARB Emissions inventory for San Diego county shows electric generation represents 0.5 percent of total NOx emissions, while mobile sources accounted for 93.6 percent of total NOx emissions.

> Source: CARB, Downloaded 4/26/2017:
> https://www.arb.ca.gov/app/emsinv/2013/emssumcat_query.php?F_YR=2012&F_DIV=-4&F_SEASON=A&SP=2013&F_AREA=CO&F_CO=37&F_COAB=

A more recent estimate from the Environmental Protection Agency's National Emissions Inventory (NEI), reports estimates of 2014 NOx emissions in San Diego County. The chart below shows the mobile sector is responsible for 86.7 percent for all NOx emission in San Diego County:



Source: EPA, Downloaded 2/12/2017: https://www3.epa.gov/cgi-bin/broker?_service=data&_debug=0&_program=dataprog.state_1.sas&pol=NOX&stfips=06

Question 01-10

a. Are there additional Light Duty Priority Review or Standard Review Programs SDG&E considered but did not propose?

SDG&E Response:
Yes.

b. If so, please describe any such programs and the reason why SDG&E elected not to advance the program.

SDG&E Response:
SDG&E anticipates future program proposals may include buses, further support for medium and heavy duty commercial market, tourism, secondary EV market including stationary energy storage and support for DAC's (See Chapter 1 at page MMS-10), however time constraints did not allow SDG&E to advance these program ideas beyond the concept phase for the SB350 application (A.17-01-020). SDG&E considered expanding its Power Your Drive workplace and multi-unit dwelling light duty charging program as part of the SB350 application (A.17-01-020). However, SDG&E did not advance this idea in the SB350 filing since the ACR, dated 9/14/2016 states, "[i]t is important to note here that projects and programs that scale up or expand charging infrastructure-based projects as proposed or authorized under A.14-04-014 (SDG&E Power Your Drive), A.14-10-014 (SCE Charge Ready) and A.15-02-009 (PG&E Charge Smart and Save), should be considered and reviewed pursuant to provisions in their authorizing decisions." (ACR p. 32).

Question 01-11

a. Are the capital and operating costs of the charging infrastructure to be borne by the users of the charging facility?

SDG&E Response:
The capital cost to purchase and install the charging equipment, as well as the operating cost to maintain the equipment will be borne by ratepayers. The electricity for charging vehicles will be paid for by the site host or the driver, depending on the project.

b. If no, who will bear the capital and operating costs of the charging infrastructure?

SDG&E Response:
Please see the response to question 01-11a.

c. Who will bear the cost of grid upgrades or other system reinforcements for the additional load resulting from increased transportation electrification?

SDG&E Response:
Other than new transformers, which were included in some of the SB350 priority review project budgets (to be funded by ratepayers), there was no project funding requested for grid upgrades or

other system reinforcements. The loads from SDG&E's SB350 projects are not expected to require grid upgrades or other system reinforcements.