

TURN DATA REQUEST
TURN-SDG&E-DR-01
SDG&E SB 350 TRANSPORTATION ELECTRIFICATION PROPOSALS (A.17-01-020)
SDG&E RESPONSE
DATE RECEIVED: February 9, 2017
DATE RESPONDED: February 24, 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 | Elise Torres | Eric Borden |
| The Utility Reform | The Utility Reform | The Utility Reform Network |
| Network | Network | 785 Market Street, Suite 1400 |
| 785 Market Street, Suite | 785 Market Street, Suite | San Francisco, CA 94103 |
| 1400 | 1400 | eborden@turn.org |
| San Francisco, CA 94103 | San Francisco, CA 94103 | |
| legalassisant@turn.org | etorres@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.

1. Please provide all cost estimate workpapers related to the following programs. Please provide equipment-level cost estimates if available (e.g. transformers, wires, conduit,

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charging stations, etc. such as those listed on pages 3-12 lines 23 to 34). Please provide the response in working Excel format when applicable and include all assumptions and references.

- a. Airport Ground Support Equipment
- b. Electrify Local Highways
- c. Medium Duty/Heavy Duty and Forklift Port Electrification
- d. Fleet Delivery Services
- e. Green Taxi/Shuttle/Rideshare
- f. Dealership Incentives
- g. Residential Charging Program (standard review program)

SDG&E Response (prepared by Randy Schimka):

Please see the spreadsheet attached in question 5 named “ET-Total Cost-Rev Req Inputs 01-12-17.xls” for the cost estimates for each project.

- 2. Please provide SDG&E’s workpapers for its cost-effectiveness analysis for its standard review program (presented in Chapter 8). Please include all available workpapers and studies/sources for the cost-effectiveness analysis. This should include, but is not limited to, expected incremental load (\$ and kWh from the program), per site and annually.

SDG&E Response (prepared by J.C. Martin):

Please see attached workbooks:

- E3 SB350 TE GIR Inputs (Final).xlsx
- Res Results Scenario A (Final).xlsx
- Res Results Scenario B (Final).xlsx
- SB350 Model Results (Final).xlsx



E3 SB350 TE GIR
Inputs(Final).xlsx



Res Results Scenario
A (Final).xlsx



Res Results Scenario
B (Final).xlsx



SB350 Model Results
(Final) .xlsx

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3. Please provide the current level of NO_x emissions (the most recent year available to SDG&E) and the goal by 2030 for California and SDG&E's territory, separately. The response should include all referenced materials and workpapers, in working Excel format when applicable.

SDG&E Response (prepared by J.C. Martin):

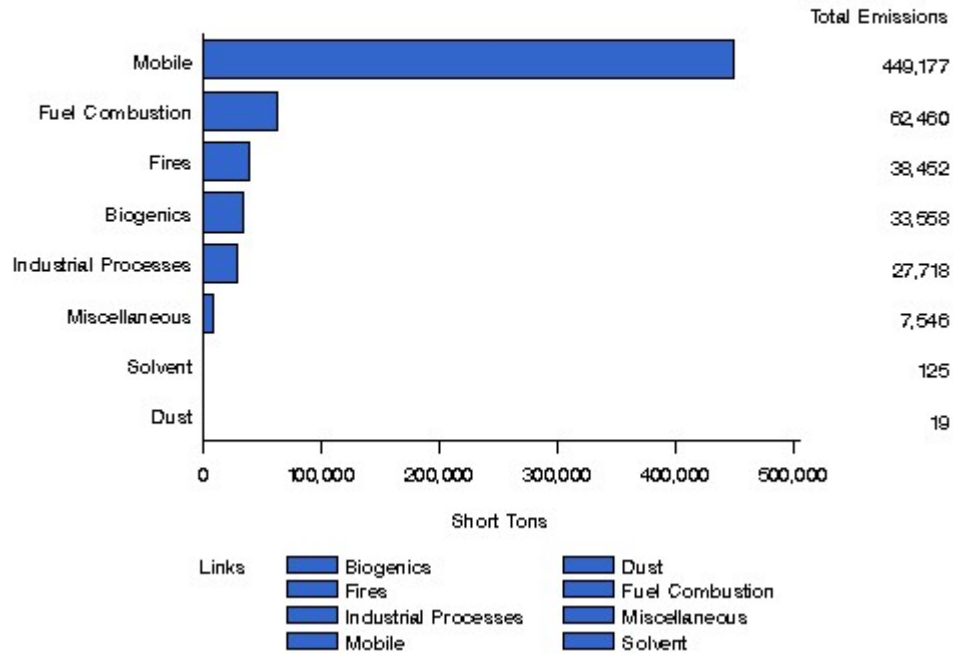
The most recent estimate of the current level of NO_x emissions available to SDG&E is from the Environmental Protection Agency's National Emissions Inventory (NEI), which reports estimates of 2014 NO_x emissions by State and Counties. Summary NEI graphs below are for California and San Diego County.

SDG&E is unaware of a 2030 NO_x emissions goal for California and SDG&E's service territory, beyond the SB 350 Greenhouse Gas Emission goals. NO_x contains N₂O, which is a greenhouse gas, like carbon dioxide (CO₂) that absorbs infrared radiation to hold heat radiating from Earth contributing to global warming. NO_x is also a criteria pollutant containing NO₂ which contributes to tropospheric ozone, smog, acid rain, and eutrophication. *

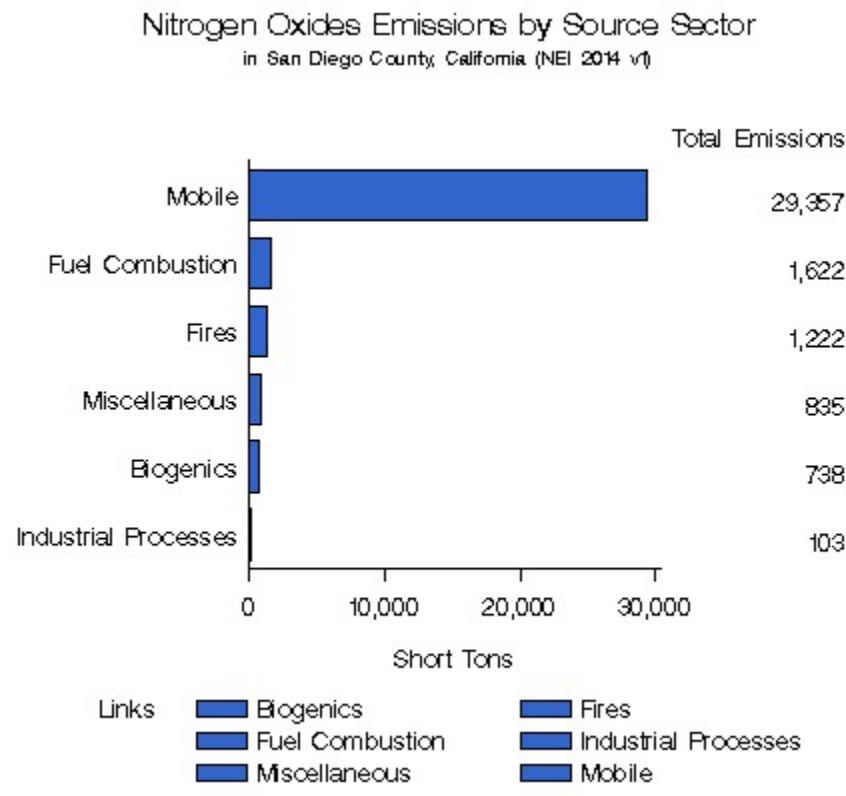
*Source: US EPA, Nitrogen Oxides (NO_x), Why and How They Are Controlled (1999),
Downloaded 2/12/2017: <https://www3.epa.gov/ttnca1/dir1/fnoxdoc.pdf>

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Nitrogen Oxides Emissions by Source Sector
in California (NEI 2014 v1)



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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

4. For every program proposed in the Application (each priority review program and the standard review program), please separately provide the expected/estimated annual CO₂ and NO_x emissions reductions through 2030 *resulting from each specific program*. Please provide all workpapers and the sources for SDG&E's analysis.

SDG&E Response (prepared by J.C. Martin):

For the priority review projects, estimated annual CO₂ and NO_x emission reductions through 2030 are available in the work papers spreadsheet titled "Priority Projects Results (Final).xlsx". Please see the "Additional Information" worksheet for Carbon from Fuel (avoided metric tons), Carbon from Electricity (metric tons), and Net Avoided NO_x (metric tons) by year for each priority review project. Annual net CO₂ emissions reductions are obtained by subtracting Carbon from Electricity from the Carbon from Fuel.

The estimated tons NO_x per Gallon are available in the work paper spreadsheet titled "E3 SB350

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TE GIR Inputs (Final).xlsx,” in the “Vehicle Info” worksheet at column “M”. The estimated tons CO₂ for gasoline and electricity are available in the work paper spreadsheet titled “E3 SB350 TE GIR Inputs (Final).xlsx,” in the “Gasoline and Emissions” worksheet starting at cell B2.

The electric generation emissions factors for NO_x and CO₂ are presented in Table 10 (Chapter 8, Appendix A). These factors are multiplied by the gross hourly PEV charging load times the hourly marginal heat rate to calculate the emissions for electricity. Electricity emissions are subtracted from the gasoline emissions to obtain net emissions.

Please see attached workpapers:

- Priority Projects Results (Final).xlsx (attached below)
- E3 SB350 TE GIR Inputs (Final).xlsx (attached above in Q2)
- Res Results Scenario A (Final).xlsx (attached above in Q2)



Priority Projects
Results (Final).xlsx

5. Please provide the total revenue requirement on annual basis for each proposed transportation electrification (“TE”) program in A.17-01-020, separately and in total through 2030. Please sum the remaining revenue requirement after 2030 in a column to the right. Please provide all workpapers and calculations related to this response in working Excel format, which should include all items impacting the revenue requirement.

SDG&E Response (prepared by Mike Calabrese):

Detailed cost assumptions for Six Priority Revenue Projects, and Residential Home Charging Program:



ET-Total Cost-Rev
Req Inputs 01-12-2017

Six Priority Review Projects Revenue Requirement Detail:



Electrify Local Hwy
Rev Req WP (02.15.20)



Dealer Incentives Rev
Req WP (02.15.2017)



MD HD Port Rev Req
WP (02.15.2017).xlsx



Fleet Delivery
Services Rev Req WP



Taxi Shuttle
Rideshare Rev Req WP

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Airport GSE Rev Req
WP (02.15.2017).xslm

Residential Charging Program Revenue Requirement Detail:



Residential Charging
Rev Req WP (02.15.2017)

6. In chapter 2 on page LB-3-4, lines 22-1, SDG&E states its project “will provide support to the MD/HD electric vehicles recently awarded through CEC and CARB grant funding.” If SDG&E’s program is not approved, how will the port pay for the charging infrastructure? Please provide all sources related to this response.

SDG&E Response (prepared by Randy Schimka):

Of the port tenants committed to demonstrating grant funded vehicles, not all have committed in the grant applications to fund the necessary charging infrastructure for all of the vehicles. Therefore, if SDG&E’s pilot is not approved, there is a risk that the port tenants may not be able to fund all of the required charging infrastructure. Without approval of this Pilot, the electric load research meters will not be installed. As such, there would be no way to gather load research data from the port tenant vehicles that could be used to evaluate a future grid-integrated rate design. It must also be noted that approximately half of this project was to support grant vehicles. The other half was designed to enable and study the electric forklift market through providing infrastructure if port tenants committed to procuring electric forklifts. Without the SB350 funding, there would be no mechanism to encourage the electric forklift market, and therefore, there would also be no mechanism to collect load research data pertinent to grid-integrated rate design.

7. In Chapter 4, page RS-5, lines 8-9, SDG&E states the Power Your Drive program “focuses on workplace locations and larger multi-unit dwellings (“MuDs”), such as five plus units.” Please explain whether this five unit or more cutoff is a Commission directive (e.g. required by the Commission) or a criteria imposed by SDG&E. Please include references with page numbers.

SDG&E Response (prepared by Randy Schimka):

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As outlined in SDG&E's Opening Brief of Settlement Agreement, filed September 4, 2015, in paragraph 6 on page xiv, "the 10 charging stations per VGI facility represent an expected average per site; individual sites may have more or fewer stations."¹

In the CPUC decision for SDG&E's VGI application (Decision 16-01-045, February 4, 2016, page 128), the project goal of 3,500 EVSE at 350 EV site installations was discussed, with a minimum requirement of 3,000 EVSE at 300 EV site installations.²

SDG&E expects to arrive at the VGI project goal by installing an average of 10 charging stations per site. Now that SDG&E is currently working to engage site hosts for the VGI project, the site visit and cost estimate processes have brought to light the fact that MuD sites desiring less than 5 charging stations will exceed the average budgeted cost per installation and cannot be funded within the approved VGI project budget.

Therefore, SDG&E is proposing to offer MuD sites with less than 5 units the opportunity to participate in the Residential charging program. This is clarified in Mr. Schimka's Residential Charging Chapter 4 testimony on page RS-5, and in footnote 12.

8. In Chapter 4, on page RS-7, lines 7-9, SDG&E states it "has set the goal of obtaining a 75% participation rate through this program, which leads to the goal of 90,00 participants." Please define "75% participation rate." Please include how this 75% participation rate was determined and whether the 90,000 participants are incremental to what would have otherwise been adopted in SDG&E's territory.

SDG&E Response (prepared by Randy Schimka):

As described in Mr. Schimka's Chapter 4 Residential Charging Program testimony on pages RS-6 through RS-7, SDG&E used the difference between the projected 2020 ZEV population (29,691) and the 150,000 ZEVs needed in SDG&E's service territory to meet the Governor's goals (out of 1.5 million ZEVs) as the starting point in the calculation. The ZEV count in SDG&E's service territory represents approximately 10% of the ZEVs in the State of California. A 100% participation rate would include all of the incremental ZEVs (120,309) in the program. SDG&E wanted to account for a percentage of ZEV owners who might not be interested in participating in the program, and therefore decided to target 75% of the 120,309 incremental ZEVs, which is approximately 90,000 ZEV drivers.

¹<https://www.sdge.com/sites/default/files/documents/369712156/Opening%20Brief%20on%20Settlement%20Agreement.pdf?nid=15641>

² <https://www.sdge.com/sites/default/files/documents/461232896/VGI%20FD.PDF?nid=17366>

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9. Please provide all data and reports regarding SDG&E's VGI Rate, in particular all data and reports regarding how customers respond to the rate.

SDG&E Response (prepared by Randy Schimka):

SDG&E's VGI rate, as outlined in Advice Letter (AL) 2877-E, was approved by the California Public Utilities Commission (CPUC) Energy Division (ED) on December 16, 2016.³ The first charging stations that will utilize the VGI rate have not yet been installed. Therefore, no data regarding customer response to the VGI rate is available at this time.

However, SDG&E conducted a previous TOU Pricing and Technology Study for electric vehicles from 2011 to 2013 that involved EV drivers responding to TOU pricing signals. The data and results from that study are available in the final report, including how customers responded to the applicable TOU rates.⁴

10. On page RS-14, lines 11-12, SDG&E states its program "creates a lower relative cost for electric service, which lowers rates for all ratepayers." Related to this statement:
- a. What does "relative" mean?

SDG&E Response (prepared by JC Martin):

On page RS-14, lines 9-12, SDG&E states "A L2 EVSE combined with the Residential GIR ... creates a lower relative cost for electric service, which lowers rates for all ratepayers; ..." In this context "relative" is relative to EV charging with a L1 EVSE combined with the DR and EV-TOU-2 rates (SDG&E's "Reference Case" discussed in Chapter 8, Section 1.B, page JCM-2).

- b. Please provide all quantitative evidence and related workpapers that support the statement that the program lowers rates for all ratepayers.

³ <http://regarchive.sdge.com/tm2/pdf/2877-E.pdf>

⁴ <http://www.sdge.com/documents/sdge-plug-ev-pricing-and-technology-study>

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SDG&E Response (prepared by JC Martin):

In context of RS-14, lines 9-12; a L2 EVSE combined with a Residential GIR results in the net bill revenues which more than cover the net electric supply costs (See Chapter 8, Section IIIB, lines 5 to 7).

Please see Workpapers workbook “Res Results Scenario A (Final).xlsx,” worksheet “NPVResults” for Gross Program Results RIM test (column E) summing Utility Bills and all the Marginal electric supply costs (Rows 13 through 19). Also see responses below to questions 10c and 10d.

- c. Please calculate the benefit to the system, in dollar terms on an annual basis, from program participants shifting load from on-peak to off-peak. Please provide all workpapers and assumptions.

SDG&E Response (prepared by JC Martin):

SDG&E cannot perfectly isolate the system (Electricity Supply Cost) impact of shifting load from on-peak to off-peak in the cost-effectiveness results, including system marginal costs. To be responsive to this question, E3 performed calculations to isolate the combined impact on system marginal costs (i.e., incremental grid costs) of a) increasing charging from Level 1 to Level 2, and b) switching the tariffs applicable to EV charging from the DR and EV-TOU-2 schedules to the Residential GIR schedule. These calculations hold EV adoption constant at the reference case level, excluding the effect of program-driven increases in EV adoption. They do incorporate the assumption of Level 2 charging enabling increased electric vehicle miles traveled (eVMT). These calculations can be found in the workbook attached below “Res Results Scenario A with TURN DR1 Q10dc Analysis.xlsx,” worksheet “TURN DR1 Q10cd”, Rows 42 through 48.

This workbook shows the net marginal electricity supply cost benefit of Level 2 charging with the GIR rate, relative to Level 1 charging with the DR and EV-TOU-2 rate. In 2020, the marginal electricity supply benefit is \$209 per vehicle (or customer).



Res Results Scenario
A with TURN DR1 Q10

- d. Please provide the residential ratepayer bill impact in dollar terms on an annual

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basis from program participants shifting load from on-peak to off-peak. Please provide all workpapers and assumptions.

SDG&E Response (prepared by JC Martin):

SDG&E cannot perfectly isolate the bill impact of shifting load from on-peak to off-peak on the cost-effectiveness results, including ratepayer impacts. In response to this question, E3 performed calculations to isolate the ratepayer impact of a) increasing charging from Level 1 to Level 2, and b) switching the tariffs applicable to EV charging from the DR and EV-TOU-2 schedules to the Residential GIR schedule.

These calculations can be found in the workbook attached above “Res Results Scenario A with TURN DR1 Q10dc Analysis.xlsx”, worksheet “TURN DR1 Q10cd”, Rows 57 through 60.

This workbook shows the net bill benefit of Level 2 charging with the GIR rate, relative to Level 1 charging with the DR and EV-TOU-2 rate. In 2020, the net bill benefit is \$519 per vehicle (or customer).

11. Please provide a list of zip codes and census tracts that are considered “disadvantaged” in SDG&E’s service territory as displayed in Figure 4-7 on page RS-16.

SDG&E Response (prepared by Randy Schimka):

This information is contained within SDG&E’s Advice Letter (AL) 2876-E, dated March 31, 2016, starting on page 12.⁵

12. Related to question 11 please provide the average income level by census tract and zip code in disadvantaged communities.

SDG&E Response (prepared by Randy Schimka):

SDG&E does not have income level data by census tract and zip code in disadvantaged communities. However, the CalEnviroScreen tool website⁶ has a spreadsheet file for downloading⁷ that contains applicable data for each census tract, including Poverty percentile data in column AW.

⁵ <http://regarchive.sdge.com/tm2/pdf/2876-E.pdf>

⁶ <http://oehha.ca.gov/calenviroscreen/maps-data/download-data>

⁷ CES3results.xlsx

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13. For the Residential Charging Program, please explain the rationale for why SDG&E proposes to own the L2 charger. Please also provide all available evidence that utility ownership is necessary for home charging equipment.

SDG&E Response (prepared by Randy Schimka):

The rationale for utility ownership is discussed in detail in Mr. Schimka's Chapter 4 Residential Charging Program testimony from page RS-17 through RS-20. The section emphasizes four main topics: 1) Customer Experience, 2) Installation Safety Standards, 3) Dynamic Grid Conditions, and 4) Stranded Asset Mitigation. Regarding the request for "all available evidence," it is vague, assumes facts and is overbroad. Subject to and without waiving these objections, SDG&E points to the direct testimony already submitted in support of its Application as containing evidence in support of utility ownership. SDG&E submits that the utility ownership it has proposed maximizes overall benefits while minimizing overall costs.

14. Please provide a sample bill/calculation for one representative winter and one representative summer month for each type of grid integration rate proposed in Chapter 5 testimony (residential GIR, commercial GIR, public charging GIR) that includes all components of the grid integration rate and corresponding charges in energy, power, and dollar terms. Please explain all assumptions, include all workpapers and calculations in Excel, and also explain how various terms that are dynamic (e.g. day-ahead pricing, peak adders) might change the bill calculation and the magnitude of change for various months. All work should be provided in Excel with working formulas.

SDG&E Response (prepared by Cynthia Fang):

Please see the attached file "TURN_SDGE DR_01 - Q14 Bill Calculation" for an illustrative sample bill/calculation model of winter and summer months for Commercial GIR, Residential GIR, and Public Charging GIR. The model calculates illustrative monthly bills based on the 2016 calendar year with 2016 CAISO Day Ahead Hourly Prices, top 150 hours of system peak in 2016 for the C-CPP Hourly Adder, and 5 options of top 200 hours of circuit peak in 2016 for the D-CPP Hourly Adder.

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

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weekends/holidays. Please see the “Inputs” tab.

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

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



TURN_SDGE DR_01
- Q14 Bill Calculation