

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE
STATE OF CALIFORNIA**

Order Instituting Rulemaking to
Continue the Development of Rates
and Infrastructure for Vehicle
Electrification.

Rulemaking 18-12-006

**AMENDED UPDATE TO COMPLIANCE FILING OF SOUTHERN CALIFORNIA
EDISON COMPANY (U 338-E), SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E),
AND PACIFIC GAS AND ELECTRIC COMPANY (U 93 E) PURSUANT TO
ORDERING PARAGRAPH 2 OF DECISION 16-06-011**

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Dated: **December 13, 2021**

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Southern California Edison Company (“SCE”), San Diego Gas & Electric Company (“SDG&E”) and Pacific Gas and Electric Company (“PG&E”) hereby file¹ an amendment to the Updated 9th Electric Vehicle Charging Infrastructure Cost Report. This Amended report replaces the entirety of the report that SCE filed on December 10, 2021. SCE is amending the report to correct inadvertent errors in Attachment 2, SCE’s Table 3. Specifically, SCE makes the following corrections to Table 3:

- SCE is correcting the Total Utility side costs for Large Sites; and
- SCE is bolding several items within the Medium and Heavy Duty Vehicle Infrastructure section to highlight that an update to the March 31, 2021 submission.

¹ Pursuant to Commission Rule 1.8(d), SDG&E and PG&E have authorized SCE to file the December 10, 2021 compliance report on their behalf.

Respectfully submitted,

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December 13, 2021

Attachment

**Amended Update to Joint IOU Electric Vehicle Load Research and Charging Infrastructure
Cost**

Report 9th Report Filed on March 31, 2021

Update submitted on December 13, 2021

**Amended Update to Joint IOU Electric
Vehicle Load Research and
Charging Infrastructure Cost Report
9th Report¹ Filed on March 31, 2021
Update submitted on December 13, 2021**

¹ The report filed in 2020 was named “Joint IOU Electric Vehicle Charging Infrastructure Report,” as it did not include a Load Research component. The name is changed for this year to reflect the inclusion of both load research and charging infrastructure cost.

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I. Summary

On October 18, 2021, the Energy Division separately notified Southern California Edison Company (SCE), Pacific Gas and Electric Company (PG&E) and San Diego Gas & Electric Company (SDG&E), collectively referred to as the Joint Investor-Owned Utilities (Joint IOUs) that a number of corrections were required to the cost section of the March 2021 cost and load report. Specifically, the Energy Division provided the following request:

- Fill in all blank fields for non-TE programs costs (Table 2) and also for programs that were operating in 2020 (Table 3).
- Include costs including transformers and labor indirect costs in all reported “total customer” and “total utility-side” costs; and identify any costs that are not included.
- Report costs based on ports installed in 2020.
- Estimate and report design costs for utility-side infrastructure based on a general ratio of design costs to utility-side upgrade installation costs in general or provide ED staff with an acceptable alternative.
- Report separately all data for MD/HD programs in Table 3 A) in aggregate for sites with customer-side of the meter make-ready infrastructure owned & operated by the utility; and B) in aggregate for sites that received a rebate, and the customers own and operate customer-side make-ready infrastructure.

For PG&E the Energy Division requested:

- Report separately all data for MD/HD programs in Table 3 A) in aggregate for sites with customer-side of the meter make-ready infrastructure owned & operated by PG&E; and B) in aggregate for sites that received a rebate, and the customers own and operate customer-side make-ready infrastructure.
- Include kW of utility-side upgrades outside of program (Table 2).
- Explain why the sum of individual cost categories doesn’t add up to the totals for utility-side upgrades outside of programs (Table 2).
- Fill in number of ports for MD/HD programs. List the number of sites in a footnote (Table 3).
- State in Table 3, or a footnote, the amount of rebates paid for each program when including in the category “other.”

Additional Revisions from PG&E:

- Revisions to Residential Charging Infrastructure costs in Table 2
- Revisions to Medium and Heavy-Duty Vehicle Infrastructure costs in Table 3

In this update to the 9th Joint IOU Electric Vehicle Load Research and Charging Infrastructure Cost Report that was submitted on March 31, 2021, the IOUs provide the requested updates to the Cost Tracking Data and Cost reports.

New content is denoted in bold, underline, and deleted content is denoted by a strikethrough line. Content was deleted for clarification purposes and replaced with updated content that may not have been previously available. No changes were made to the Load Research section or other sections that are not displayed below.

II. Cost Tracking Data

A. Overview and Approach

This report provides aggregated EV Charging Infrastructure cost data, by IOU. The IOUs have coordinated, to the extent possible, to provide consistency in data assumptions. However, because utilities have different methods of tracking their costs, the costs calculated for each category may be based on different assumptions. Each IOU section includes information on the general approach and assumptions for the cost data; it also explains why certain data may not be available at this time.

Additionally, this report is limited, in that it primarily includes utility-incurred costs. Traditionally, customer-side costs (behind the meter) are generally unknown to the utility unless covered by a utility TE program. As such, certain customer costs, which may be required for deploying EV infrastructure but unknown to the utility, may not be accounted for in this report. One example of this type of cost is the trenching and site excavation for service line extensions, costs that are not utility service facilities under Rules 15 and 16 and are therefore borne by customers and not tracked by the utility. Such costs are not included in this report.

Table 1 below provides a summary of the EV infrastructure costs and responsibilities, for projects outside of an IOU EV charging infrastructure program. Comparing the costs of installing EV charging infrastructure by IOU TE programs and traditional delivery (or non-program) is challenging, as the IOUs are unable to track and report on all non-program customer costs. This report includes information on those costs that are known to the IOUs.

Table 1: Summary of EV Infrastructure Costs and Responsibilities

	Customer Assigned Costs	Allowance?	Utility Assigned Costs
Equipment on Customer Side of Meter	Customer pays all costs for charging equipment, including costs to plan, design, install, own, maintain,		

	and operate facilities and equipment beyond the Service Delivery Point		
Service Line Upgrade	<ul style="list-style-type: none"> Excavation: trenching, backfilling, and other digging as required including permit fees Furnishing, installing, owning, and maintaining all Conduits (including pulling tape) and Substructures, furnishing riser materials Protective Structures: Furnishing, installing, owning, and maintaining all necessary Protective Structures as specified by utility for utility's facilities 	<p>Yes, to cover work responsibility assigned to utility. Customer pays amount exceeding allowance. This is in addition to Customer assigned costs.</p> <p>Note: CPUC policy exemption in place through December 2021 for residential upgrades when EV load is added. Under exemption, amount exceeding allowance is not paid by customer and instead paid by utility and recovered through distribution rates.</p>	<ul style="list-style-type: none"> Underground Service: service conductors and connectors Overhead Service: conductors and support poles Metering: meters and associated utility-owned metering equipment
Secondary Lines/ Transformer Upgrade (serving 2 or more Service Lines)			Utility pays all costs for upgrading and maintaining the distribution system. Recovered through distribution rates.

Cost data is located within Attachments 1 – 3, by IOU.² Attachments 1 - 3 include the following cost tables:

- Table 2: Non-Program Costs for 2020
- Table 3: Pilot-Program Costs for 2020

² See Attachment 1 for PG&E data; Attachment 2 for SCE data, and Attachment 3 for SDG&E data.

- Table 4: Historic Costs

The IOUs will work with the Energy Division in 2021 to continue to refine this report for the future.

B. PG&E's EV Infrastructure Cost Data

Table 2 in Attachment 1: Non-Program Costs

a. General Approach and Cost Assumptions

PG&E performed EV-related upgrade work for 81 residential charging infrastructure projects and 62 non-residential charging infrastructure projects in 2020. These only include projects that were fully invoiced during the period of January 1, 2020 through December 31, 2020 even if the project work began in 2019. Costs related to EV infrastructure installation as part of new building construction are not separately tracked and therefore not included in this report.

Upgrade costs related to EVs fall into three categories: 1) equipment on the customer side of the meter, 2) the individual customer service line, and 3) the utility distribution system that serves multiple customers. As described above, residential and non-residential customers receive an allowance for upgrade costs on the utility side of the meter and are responsible to pay any costs over the allowance. Residential EV customers are exempt and any costs above the residential allowance are assigned to the utility per current CPUC policy. PG&E does not have information on the customer side of the meter costs and limited insight on the customer assigned costs for service line upgrades, which includes costs over the Rule 16 allowance.

It is important to note that there may be differences in how non-program costs are tracked and reported across the three IOUs and therefore it is necessary to take into account the differences and caveats explained in this report when comparing the cost tables.

- **Site Costs**

- PG&E separately estimates and records the costs of specific work types of design, trenching, separate meters, permitting, distribution system work (under Rule 15³), and service line work (under Rule 16⁴). In this report, PG&E includes costs for projects that were fully invoiced in 2020 and uses the following definitions for the cost categories in Table 2:
 - Design – costs for all utility side of the meter design assigned to the utility or the customer,
 - Trenching and site excavation – Costs for all work related to digging and excavation to lay conduit and wires for projects. This includes costs for work completed by the utility or the customer and assigned to the utility and customer,

³ PG&E Electric Rule 15 - https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_RULES_15.pdf

⁴ PG&E Electric Rule 16 - https://www.pge.com/tariffs/assets/pdf/tariffbook/ELEC_RULES_16.pdf

- Separate meter – costs for all meters purchased for all projects and assigned to the utility or customer,
 - Permitting – cost of all permits necessary for work on the utility side of the meter and assigned to the utility or customer,
 - Total Distribution System Costs Incurred by Utility for Upgrades – all costs associated with work performed on the distribution system under Rule 15 including design, trenching, permitting and other materials and labor,
 - Total Service Line Costs Incurred by Utility for Upgrades – all costs associated with work performed on the service line under Rule 16 including design, trenching, permitting, meters, and other materials and labor,
 - Total Utility side costs – all costs assigned to the utility for work associated with the EV-related upgrade including Rule 15 and Rule 16 costs, grid betterment work, the allowance and costs above the allowance for residential customers, and
 - Total Customer side costs – all costs assigned to the customer for work performed on the utility side of the meter that PG&E has insight into (e.g. service line trenching, backfilling, and other digging as required including permit fees; furnishing, installing, owning and maintaining all conduits and structures, including riser material, and all rights of way costs, if applicable). The utility or the customer may have performed the work. For residential customers this includes any cost above the allowance even though this is assigned to the utility under the CPUC policy exemption.
- **Support Activities:**
 - PG&E is able to report the project management costs associated with residential and non-residential EV-related projects as a percentage of the total construction labor.
 - Other support activity costs are not reportable and further explained in section b.
- **Other (Ports Installed/New Capacity):**
 - **The capacity reported under “Amount of new capacity resulting from project (kW)” reflects the new capacity added as reflected in customer applications for Non-pilot/program Commercial Charging Infrastructure.**
 - **For Residential Charging Infrastructure capacity, 52 of the 81 residential infrastructure projects reported did not explicitly state the amount of new**

capacity added. They did include, however, information on the type of charger and the number of ports for each project. Therefore, PG&E made an estimation of 7.2 kW of added capacity for each of those 52 residential projects

- The methodology is the same for the recording costs of both residential and commercial charging infrastructure non-program work.

b. Explanation of why certain data is unavailable to report

- For Total Customer side costs, PG&E is only able to report on costs assigned to the customer for work on the utility side of the meter that PG&E has insight into. There may be some additional costs for work on the utility side of the meter assigned to the customer that is not reported here. Total customer side costs also do not include costs for the behind-the-meter work performed by the customer.
- PG&E does not separately track ongoing maintenance or support activities, except for project management, for EV-specific work orders; those costs are part of general new business and/or customer requested modification work orders and cannot be reported for a specific subset of projects.
- ~~• PG&E has not previously tracked residential port counts and/or kilowatt (kW) amounts. This requires a change in our tracking system and project management procedures which PG&E is taking steps to implement.~~
- ~~• PG&E began tracking commercial port counts and/or kilowatt (kW) amounts in 2020 however the process change is too new to capture the data for 2020 projects.~~

~~**c. Steps to report currently unavailable data at a later time**~~

- ~~• PG&E is working to systematically capture residential port counts and/or kilowatt (kW) amount information for future reporting periods. The data for commercial projects will be available to report for 2021 projects.~~

c. Explanation of plans to provide additional data in future reports

- PG&E and the other IOUs will continue collaborating with Energy Division staff to identify other costs of interest to include in future reports, including key cost drivers that may be identified in the future.

d. Explanation of why Total Utility Side Costs and Total Customer Side Costs do not match the sum of all other categories

The Total Utility Costs and Total Customer Side Costs do not match the sum of all other categories, because some costs accrued do not fit within any of the subcategories as presented (Design Costs, Trenching, Separate Meter Costs, Permitting, Total Distribution, Total Service Line, and Project Management). These include:

- **Mapping: labor for recording project “as-builts” in mapping records to ensure accuracy of asset records**
- **Inspection: any work done by the customer on behalf of PG&E needs to be inspected by PG&E.**
- **Land: preparation for land rights and easements that PG&E performs on behalf of the customer, which the customer pays for.**

Table 3 in Attachment 1: Pilot-Program Costs

a. General Approach and Cost Assumptions

PG&E includes costs for projects in 2020⁵ across six programs – EV Charge Network (EVCN), EV Fleet, EV Fast Charge, and three Priority Review Projects (Medium-Heavy Duty Fleet Demonstration Project, Idle Reduction Project, and Electric School Bus Renewables Integration Project). EVCN fully invoiced 94 completed projects in 2020. This included 25 projects at Multi Unit Dwelling (MUD) sites delivering 518 ports, and 69 sites at workplaces (WP) delivering 1,608 ports. EV Fleet fully invoiced ~~67~~ completed projects in 2020, including ~~56~~ Small Sites serving a total of ~~4147~~ vehicles and 1 Medium Site serving 30 vehicles. EV Fast Charge is still in early phases of program implementation (specifically, project construction) and did not fully invoice any completed projects in 2020. The PRP projects have all been substantially completed and did not accrue additional site costs during 2020. They did report support activities costs and other costs, however.

Reported costs are not tracked in this report by individual program. Instead, costs are categorized by Light Duty Vehicle (LDV) Infrastructure and Medium and Heavy Duty (MD/HD) Infrastructure. Light Duty Infrastructure is further subcategorized by L2 residential infrastructure, L2 non-residential infrastructure, and DCFC infrastructure. All EVCN MUD sites fell within the LDV MUD category and all EVCN WP sites fell within the non-residential category. DC Fast Charge aligns with the DCFC category. Furthermore, MD/HD is segmented by the capacity a given site adds to accommodate charging equipment installations: Small – installed charging capacity adds up to 500 kW, Medium – between 500 kW and 3 MW, and Large – beyond 3MW. Among EV Fleet’s ~~67~~ projects, ~~56~~ were small sites that added a total of ~~850~~ **1,150**

⁵ Some costs represented in Table 3 in Attachment 1 for TE Programs represent costs for projects that were fully invoiced within 2020 (which, therefore, PG&E has full insight into actual costs for); these costs may include costs incurred for projects whose design, construction, and activation timeline spanned multiple calendar years, and therefore some costs for the projects represented in this table may have been incurred in years prior to 2020. For this reason, it would not be possible to simply add costs from consecutive EV Load and Charging Cost Reports by TE Program and arrive at a mutually exclusive sum of program costs. Other costs represented in Table 3 in Attachment 1 represent those costs that were incurred within calendar year 2020 for that cost category.

kW of new capacity, and 1 medium site that added a total of 504 kW of new capacity. PRP projects align with the small site category but did not add new infrastructure and consequently new capacity during 2020.

It is important to note that there may be differences in how program costs are tracked and reported across the three IOUs and it is necessary to take into account the differences and caveats explained in this report when comparing the cost tables.

- **Site Costs:**

- In 2020, PG&E's site costs included projects that were fully invoiced⁶ across the EVCN and EV Fleet programs. PG&E records each project's site costs and uses the following definitions for the cost categories in Table 3:
 - Design – utility costs for all final site designs for projects,
 - Trenching and site excavation – estimated costs for all utility work related to digging and excavation to lay conduit and wires for projects fully invoiced in 2020. This does not include restoration costs,
 - Separate meter – estimated total costs for all meter panels, associated equipment, and installation costs for all projects,
 - Permitting – estimated costs associated with permits and labor to apply for permits,
 - Total Utility side costs - “to the meter” construction costs (including trenching), as well as estimated materials and design costs, and
 - Total Customer side costs – “behind the meter” construction costs (including trenching), as well as estimated materials, design, and permitting costs but excluding charger costs, participation payments, and rebates where applicable.
- The categorization is generally the same for the recording of Light Duty and Medium- and Heavy-duty site costs.
- “Site Costs” do not include project management costs and rebates.

⁶ Fully invoiced indicates that PG&E had full actual cost data because third-party vendor invoices were completed. This is different from “substantially completed”, which for light-duty vehicle infrastructure is defined as projects where all customer side or “behind the meter” (BtM) construction work is complete (excluding charger installation), and all utility side or “to the meter” (TtM) equipment is installed (excluding to the meter wire pulls or energization). Projects substantially completed in 2020 may include projects that in 2020 had not yet completed charger installation or site restoration.

- The specific site costs of design, trenching, separate meters, and permitting are a subset of the total utility side costs and total customer side costs reported for projects fully invoiced in 2020.
- **Support Activities Costs**
 - Support Activities costs are reported for work done in the 2020 calendar year and are in many cases not tracked to specific project sites⁷. In 2020, PG&E Support Activities costs included reported costs for all programs. PG&E uses the following definitions for the cost categories in Table 3:
 - Project management – all labor costs associated with project management for projects fully invoiced⁸ during 2020,
 - Customer outreach – all costs associated with customer outreach before contract was signed on any given project, with reported costs representing spend in this category in 2020,
 - Outreach and education materials – all material costs for program marketing, including collateral, website development, and events spent in 2020, and
 - Other costs – these include rebates for various programs and non-capital costs related to software and hardware integration for the Medium/Heavy Duty Customer Fleet Demonstration Pilot. **Specifically, rebates under Medium and Heavy Duty Infrastructure are primarily from EV Fleet. Those rebate costs include all infrastructure incentives and rebates associated with EVSE equipment that were issued during the 2020 calendar year. These rebates and incentives may have been issued to sites that were fully invoiced before 2020 because site hosts must submit invoices as proof of costs incurred in order to receive payment, and this may occur several months after a site has been completed.**
- **Other (Ports Installed/New Capacity):**
 - **Ports captured under Medium- and Heavy-Duty Infrastructure are primarily from PG&E’s EV Fleet Program. The ports reported under this category reflect “committed” ports, not “activated” ports. The Fleet Program differs from other TE programs because site hosts can acquire and install EVSEs over a 5-year period instead**

⁷ A portion of project management costs are associated with the specific projects fully invoiced in 2020. Some project management costs and the remaining two support activities cost categories are not directly associated with projects fully invoiced in 2020 (i.e. these could include projects that were worked on in 2020 but not fully invoiced in 2020).

⁸ See footnote 33.

of at site activation. This means that the number of ports activated for these 7 sites may change over time as site hosts install additional equipment.

b. Explanation of why certain data is unavailable to report

Some cost data from the programs was not available to report. There are different reasons depending on the cost category, and it may also vary between programs. PG&E provides detail on some of the specific data that is unavailable to report below:

- Light Duty Vehicle Infrastructure
 - Design, permitting, and trenching costs are recorded as part of broader cost categories. As a result, these costs have been estimated using contractor submission data.
 - Additionally, design, materials, overheads, and permitting costs are not separately recorded for utility side work and customer side work. As such, the provided costs are prorated between utility side costs and customer side costs based on estimated utility side vs customer side construction labor allocations.
 - In other instances, costs are not consistently separately recorded for each project site in a way that is easily aggregated, and often require manual tabulation/estimation for Light Duty Vehicle Infrastructure, e.g.:
 - Separate meter costs are estimated based on the number of meter panels installed at each project site and an estimated unit price for meter panels, associated equipment, and installation costs.
 - Permitting costs are estimated based on the costs of the labor to apply for the permit, and the permit costs.
 - Site costs for “DCFC-LDV” would only capture PG&E’s EV Fast Charge program. EV Fast Charge had no sites that were fully invoiced by December 2020.
- Medium and Heavy-Duty Vehicle Infrastructure
 - Site costs include only to-the-meter costs as there was no infrastructure construction behind the meter in projects fully invoiced in 2020.
 - ~~PG&E is able to report total number of sites installed but not total number of ports installed. This is due to design of the program as approved by the Decision on the Transportation Electrification of Standard Review Projects⁹ where PG&E has vehicle and site targets.~~

⁹ D.18.05.040: <https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442457637>

- PG&E does not separately record distribution system upgrade costs or service line upgrade costs related to EV infrastructure installation through programs. Costs incurred to the utility for any work on the distribution system or service line in the programs are considered to-the-meter costs and are captured under total utility side costs.

c. Steps to report currently unavailable data at a later time

- PG&E is working to be able to provide more granular cost actuals for permitting, trenching, and separate meters for infrastructure constructed in 2021 for certain programs¹⁰ by revising the process and structure of contractors' cost reporting and invoicing and tracking those specific cost components through new software tools. This additional data may be included in future reports.
- ~~EV Fleet tracks sites and vehicles as directed by the Decision, not ports. As a result, PG&E's tracking system was designed and structured to meet these requirements.~~

d. Explanation of plans to provide additional data in future reports

- PG&E and the other IOUs will continue collaborating with Energy Division staff to identify other costs of interest to include in future reports, including key cost drivers that may be identified during program deployment.

Table 4 in Attachment 1: Historic Costs

a. General Approach and Cost Assumptions

- **Non-program Charging Infrastructure costs:**
 - Historic non-program residential charging infrastructure costs from 2011-2018 are pulled from data used in previous Load Research Reports and 2019 costs are pulled from the EV Infrastructure Cost Report submitted in 2020.
 - The process to report utility distribution and service line costs for this Report is different than for previous Load Research Reports and may make a comparison between tables challenging.
 - Historic non-program commercial charging infrastructure costs were first included for 2019 projects and the data is pulled from Table 3 in Attachment 1 of the EV Infrastructure Cost Report filed on April 1, 2020.

¹⁰ Excludes EVCN, for instance.

- Historic program infrastructure costs were first included for 2019 projects and the data is pulled from Table 2 in Attachment 1 of the EV Infrastructure Cost Report filed on April 1, 2020.
- As mentioned in the section on Table 2 of attachment 1, upgrade costs related to EVs fall into three categories: 1) equipment on the customer side of the meter, 2) the individual customer service line, and 3) the utility distribution system that serves multiple customers.
- PG&E does not have information on the customer side of the meter costs nor insight on all the customer assigned costs for service line upgrades.
 - The Customer pays all costs for beyond the Service Delivery Point.
 - The Customer is responsible for trenching, backfilling, and other digging as required including permit fees.
 - The Customer is responsible for furnishing, installing, owning and maintaining all conduits and structures, including riser material.
 - The Customer is responsible for all rights of way costs, if applicable.
- Per the CPUC policy exemption currently in place, when the Rule 16 costs exceed the allowance provided for residential EV service line upgrades, the amount exceeding the allowance is not paid by the customer, but instead by PG&E (recoverable through distribution rates).

b. Explanation of why certain data is unavailable to report

- N/A

c. Steps to report currently unavailable data at a later time

- N/A

d. Explanation of plans to provide additional data in future reports –

- PG&E will work with Energy Division and the other IOUs to determine how future historical (i.e. reporting periods 2019 and beyond) will be organized on future reporting templates.

C. SCE's EV Infrastructure Cost Data

Table 2 in Attachment 2: Non-Program Costs

a. General Approach and Cost Assumptions

In addition to SCE's TE programs and pilot activities, SCE completed Non-Program, EV-related infrastructure work for 29 residential charging infrastructure projects and 80 non-residential charging infrastructure projects in 2020. SCE is only reporting on projects, for which construction was completed between January 1, 2020 and December 31, 2020. Regardless of the year the project originated, all costs associated with a project completed in 2020 are included in this report. Costs related to EV infrastructure installation conducted as part of new building construction are not separately tracked and therefore not included in this report.

Non-program infrastructure costs related to EVs fall into three categories: (1) the utility distribution system that serves multiple customers (Rule 15), (2) the individual customer service line (Rule 16), and (3) equipment on the customer side of the meter (behind the meter). Behind the meter costs related to EV infrastructure installation, which are not specific to a TE pilot or program, are not tracked by the utility and therefore are not included in this report. In this report, EV infrastructure is accounted for only if a work order is opened and identified as an EV work order. The cost reporting methodology is the same for the recoding of costs for both residential and commercial charging infrastructure nonprogram work.

Residential and non-residential customers receive an allowance for upgrade costs on the utility side of the meter. Customers are responsible to pay any costs over the allowance. Per the CPUC Administrative Law Judge's Ruling issued on November 23, 2020, in Rulemaking 18-12-006, all residential service facility upgrade costs in excess of the residential allowance required to accommodate Basic Plug-In-Hybrid and Electric Vehicle Charging Arrangements shall be treated as common facility costs rather than being paid for by the individual plug-in hybrid and electric vehicle customer until December 31, 2021.

There are differences in how non-program costs are tracked and reported across the three IOUs and it is necessary to take into account the differences and caveats explained in this report when comparing the cost tables.

- **Site Costs**

- If applicable, SCE separately estimates and records the costs of specific types of work including trenching, separate meters, permitting, distribution system work (Rule 15), and service line work (Rule 16). In this report, SCE includes costs for projects where construction was completed in 2020 and uses the following definitions for the cost categories in Table 2:

- **Design Costs – To report design costs on the utility side of the meter, SCE used the historical recorded Planning and Design costs within Distribution for 2020 that were allocated to all distribution**

capital orders, which equates to a 12.75 percentage. The 12.75 percentage was applied against the EV work orders to estimate Design costs.

- Trenching and site excavation – **Estimated** costs, if performed by the utility, for all work related to ~~digging and excavation~~ **and installation of underground duct and structures required for projects.** ~~to lay conduit and wires for projects.~~
- Separate meter – **An** average cost for a meter **includes material only, no labor.** ~~based on~~ **The** customer rate schedule is used to calculate total cost per meter. SCE generally purchases its meters in bulk, rather than for individual work orders. Actual meter costs are recorded in mass plant and capitalized when received.
- Permitting – **Estimated** costs of all permits necessary for work on the utility side of the meter.
- Total Distribution System Costs Incurred by Utility for Upgrades – ~~all costs associated with work performed on the distribution system under Rule 15 including trenching, permitting and other materials and labor.~~ **The number provided, a combination of both actual and estimated dollars, represents the total utility side (to the meter) expenditure for all capital direct costs and indirect labor overhead recorded costs and O&M labor indirect costs, up to but not including the meter pedestal or meter panel associated with work performed to install distribution line extensions, Rule 15, and combination distribution line extension and service line extension, Rule 15 and Rule 16, non-program EV work. Cost categories include, for example, trenching, permitting, meter costs, and other material (including transformation) and labor, as well as division overhead costs.**
 - a. **Includes division overhead costs (e.g., planner activities such as site visits, creating the design and operations activities such as scheduling work, staging material, etc.) and Capital overhead labor loaders (indirect) costs (e.g., pension, benefits, etc.).**
 - b. **Includes estimated O&M labor indirect costs. SCE can only provide estimated O&M labor indirect costs because these costs are authorized in SCE's General Rate Case (GRC) and are separately recorded in the Pension, Medical, and PBOB Balancing Accounts. O&M pension & benefits do not follow the non-program accounting.**
 - c. **Transformers sized at or less than 500 kVA are estimated costs. Transformers sized greater than 500 kVA are**

actual cost specialty items that SCE orders and charges directly to the work order.

- Total Service Line Costs Incurred by Utility for Upgrades – ~~all costs associated with work performed on the service line under Rule 16 including trenching, permitting, meters, and other materials and labor.~~ **The number provided, a combination of both actual and estimated dollars, represents the total utility side (to the meter) expenditure for all capital direct costs and indirect labor overhead recorded costs and O&M labor indirect costs, up to but not including the meter pedestal or meter panel associated with work performed to install service line extensions, Rule 16, non-program EV work. Cost categories include, for example, trenching, permitting, meter costs, and other material (including transformation) and labor, as well as division overhead costs.**
 - a. **Includes division overhead costs (e.g., planner activities such as site visits, creating the design and operations activities such as scheduling work, staging material, etc.) and Capital overhead labor loaders (indirect) costs (e.g., pension, benefits, etc.).**
 - b. **Includes estimated O&M labor indirect costs. SCE can only provide estimated O&M labor indirect costs because these costs are authorized in SCE’s General Rate Case (GRC) and are separately recorded in the Pension, Medical, and PBOB Balancing Accounts. O&M pension & benefits do not follow the non-program accounting.**
 - c. **Transformers sized at or less than 500kVA are estimated costs. Transformers sized greater than 500kVA are actual cost specialty items that SCE orders and charges directly to the work order.**
- Total Utility side costs – all costs assigned to the utility for work associated with the EV-related upgrade. ~~including Rule 15 and Rule 16 costs.~~
- Total Customer side Costs – all costs invoiced to and paid by the customer for work performed on the utility side of the meter that SCE has insight into (e.g., riser material, all rights of way costs, and tax, if applicable).
 - a. For residential customers this also includes any cost above the allowance even though this is assigned to the utility under the CPUC policy exemption.

- **Support Activities**

The non-program support activities include project management, outreach, and marketing and education. SCE does not conduct marketing and education or outreach for non-program related EV charging infrastructure activities, and therefore does not have costs for these activities. While program management activities are conducted, SCE does not have a separate program management function and is not able to separate out these costs for reporting.

- **Other Support Activity**

SCE does not have “other support” activities for which to report.

b. Explanation of why certain data is unavailable to report

- ~~SCE is not able to separately track utility-side design costs; those costs are part of general new business and/or customer requested modification O&M expense and cannot be reported for specific projects.~~
- ~~For Total Customer side costs, that are non-program related, SCE is only able to report on costs assigned to the customer for work on the utility side of the meter, for which SCE has visibility. There may be some additional costs for work on the utility side of the meter assigned to the customer that are not reported here. In addition, total customer side costs do not include costs for the behind-the-meter work performed by the customer.~~
- ~~While program management activities are conducted, SCE does not have a separate program management function and is not able to separate out these costs for reporting.~~
- SCE is not able to separately track projected ongoing maintenance costs for utility-side **EV** infrastructure.
- SCE has not previously tracked residential or commercial port counts and/or residential kilowatt (kW) amounts. This requires a change to our tracking system which SCE is taking steps to implement.

c. Steps to report currently unavailable data at a later time

- SCE ~~anticipates does not yet have~~ the ability to capture information on residential ~~or~~ **and** commercial port counts and/or residential kW amounts **beginning January 1, 2022, with reporting in 2023** ~~is continuing to explore ways to systematically capture this information for future reporting periods.~~

d. Explanation of plans to provide additional data in future reports

- SCE and the other IOUs will continue collaborating with Energy Division staff to identify other costs of interest to include in future reports, including key cost drivers that may be identified in the future.

Table 3 in Attachment 2: Pilot-Program Costs

a. General Approach and Cost Assumptions

SCE is providing costs for its TE pilots and programs that were ~~invoiced or recorded in 2020~~ **complete¹¹ between January 1, 2020 and December 31, 2020**. As such, SCE's TE pilot and program costs may include costs for projects that were completed in 2019 but invoiced in 2020, in addition to projects completed in 2020. **Regardless of the year the project originated, all total capital costs associated with a project completed in 2020 are included in Site Costs (\$) category Table 3. Excluding rebates, SCE does not track O&M costs per site/project. In the Support Activities (\$) Table 3, all program O&M 2020 recorded costs are provided and grouped into their respective categories.**

The light-duty vehicle (LDV) programs that incurred costs in 2020 include Charge Ready Pilot & Bridge, Charge Ready DCFC Pilot, ~~Charge Ready Schools (AB 1082), and Charge Ready Parks & State Beaches (AB 1083)~~. The medium- and heavy-duty vehicle (MDHD) programs that incurred costs in 2020 include Charge Ready Transport, Charge Ready Transit Pilot, ~~and~~ **Port of Long Beach Rubber Tire Gantry, and Port of Long Beach Yard Tractors**. In 2020, SCE Light-Duty Vehicle Infrastructure completed construction at ~~26~~ **23** Multi-Unit Dwelling projects with ~~310~~ **278** ports, ~~and~~ 35 Non-Residential projects with ~~1,132~~ **912** ports, **and 2 DCFC projects with 4 ports**. Within the Medium- & Heavy-Duty Vehicle Infrastructure segment, SCE completed construction at ~~5~~ **1** small site with ~~22~~ **2** ports, ~~and~~ ~~12~~ **23** ports, **and 2 large sites with infrastructure to support 29 ports**. SCE tracks MDHD program goals based on vehicles electrified and not based on port count. As such, there were ~~482~~ **44** MDHD vehicles electrified for ~~15~~ **30** small sites, ~~and~~ ~~30~~ **44** MDHD vehicles electrified at the ~~24~~ **24** medium sites, **and 2 large sites SCE built infrastructure to support 29 ports for 9 gantry cranes and 20 yard tractors**.

SCE records each project's site costs in separate work orders for:

- Utility-side costs ("to the meter" capital labor and contract construction costs, including design, trenching, permitting, etc.) and
- Customer-side costs ("behind the meter" capital labor and contract construction costs, from the meter to the stub-out for the charging equipment, design, trenching, permitting, etc.)

The methodology is the same for the recording of Light-, Medium- and Heavy-duty, and Priority Review Projects (Port of Long Beach and Transit Bus) construction costs. This methodology will

¹¹ **Pilots and program costs are included for completed sites with rebates paid, where applicable, as of December 31, 2020.**

also be consistent with the Charge Ready Schools (AB 1082) ~~and Charge Ready Parks and State Beaches (AB 1083)~~ **and Charge Ready Light-Duty.**

- **Site costs** – Includes only Capital costs.
 - **Design costs will include both utility-side and customer-side costs.**
 - **Utility-side: To report design costs on the utility side of the meter, SCE used the historical recorded Planning and Design costs within Distribution for 2020 that were allocated to all distribution capital orders, which equates to a 12.75 percentage. The 12.75 percentage was applied against the EVSE work orders to estimate Design costs.**
 - **Customer-side: The number provided represents the actual labor and material dollars required to produce the customer-side (behind or beyond the meter) design from meter pedestal up to, but not including the EVSEs. This includes, for example, site visits, research, and design production. SCE is able to provide these customer-side costs in 2020 due to the implementation of third-party contracts with Architecture and Engineering firms for design work.**
 - ~~Design costs, trenching and site excavation and permitting costs provided in the Site Costs section are only customer-side costs. These costs are estimates based on overall program allocations.~~
 - ~~Design costs – SCE is able to provide these customer-side costs in 2020 due to the implementation of third-party contracts with Architecture and Engineering firms for design work.~~
 - ~~Trenching and site excavation – Customer side costs charged by our general contractors for trenching, site excavation, and restoration.~~
 - **Trenching and site excavation – Number provided represents the actual labor and material dollars required for excavation, installation of customer-side (behind or beyond the meter) conduits and structures (e.g. handholes, transformer pads, vaults, etc.) and site restoration.**
 - ~~Permitting costs – Starting in 2020, SCE is able to capture permitting costs.~~
 - **Permitting costs – Total actual costs for customer-side (behind or beyond the meter) permitting costs charged by the Authority Having Jurisdiction (AHJ)**
 - Separate meter costs are provided for only projects that were completed in 2020. An average cost for a meter (**material only, no labor**) based on customer rate schedule is used to calculate total cost per meter. SCE generally purchases its meters in bulk, rather than for individual work orders. Actual meter costs are recorded in mass plant and capitalized when received. Meter costs are not recorded against program budget.
 - ~~Total Utility-side costs are all actual costs charged to the “to the meter” Work Orders and separated based on the report groupings into their respected Light-Duty and Medium & Heavy Duty categories.~~
 - **Total Utility-side costs - The number provided, a combination of both actual and estimated dollars, represents the total utility-side (to the meter)**

expenditure for all capital direct costs and indirect labor overheads recorded costs, up to but not including the meter pedestal or meter panel for completed projects within the reporting period, separated by respective programs. Cost categories include, for example, trenching, permitting, meter costs, and other material (including transformation) as well as division overhead.

- Includes division overhead costs (e.g., planner activities such as site visits, creating the design and operations activities such as scheduling work, staging material, etc.) and Capital overhead labor loaders (indirect) costs (e.g., pension, benefits, etc.).
- Transformers sized at or less than 500 kVA are estimated costs. Transformers sized greater than 500 kVA are specialty items that SCE orders and charges directly to the work orders.
- ~~Total Customer side costs are the sum of design costs, trenching and site excavation, and permitting costs.~~
- Total Customer side costs - The number provided, a combination of both actual and estimated dollars, represents the total customer-side (behind or beyond the meter) expenditure for all capital direct and indirect labor overheads recorded costs, from the meter pedestal or meter panel, up to but not including the EVSEs for completed projects within the reporting period (programs with Own and Operate offerings will include EVSE costs). Examples of included costs are design, trenching, permitting, labor and material such as the meter pedestal or meter panel, transformation, cable, and connectors.
 - Includes division overhead costs (e.g., Planner activities such as site visits, creating the design and operations activities such as scheduling work, staging material, etc.) and Capital overhead labor loaders (indirect) costs (e.g. pension, benefits, etc.).
- **Support Activities** – Includes both Operation and Maintenance “O&M” and Capital expenses
 - ~~Other cost includes rebates, canceled project costs, capital IT implementation costs, and test equipment for the Charge Ready Parks and State Beaches program.~~
 - **Project Management**
 - Program-related direct labor such as program management and program support
 - **Customer Outreach (Labor) - Labor costs associated with conducting Transportation Electrification Advisory Services (TEAS) provides business customers with a dedicated "one-stop shop" for specialized education, awareness, and support on TE issues. The goal of TEAS is to promote customer adoption of TE, help with pre-planning activities, generate leads for TE programs (active or in development) and serve the TE needs of our business customers.**
 - **Marketing and Education Materials**

- Marketing, Education & Outreach (ME&O) – Includes third-party costs associated with the development and implementation of customer education and marketing campaigns and materials that are primarily targeted at potential multifamily and non-residential EV and EV charging adopters through educational webinars, fleet fueling calculator, Charge Ready Transport case studies (customer feedback), paid media ads, print collateral and promotional items, web design and content development, email marketing, industry research and data, and targeted industry group membership.
- EV Awareness – Includes third-party costs associated with the development and implementation of EV Awareness campaigns, which use mass media, direct marketing, outreach to local community organizations, and an EV ambassador network to encourage EV awareness and target customers in multiunit dwellings (MUDs), disadvantaged communities (DACs) through the SCE Cars tool with vehicle & incentive information, residential EV web content, community engagement events, promotional materials, and advertising.
- Other Costs
 - This category includes various costs not captured in the above categories, for example, rebates, canceled project costs, Capital IT implementation costs, and estimated O&M labor indirect costs. SCE can only provide estimated O&M labor indirect costs because these costs are authorized in SCE's GRC and are separately recorded in the Pension, Medical, and PBOB Balancing Accounts. O&M pension & benefits do not follow the program accounting.
- **Other Support Activity**
 - ~~Provides total number of charge ports installed for projects completed in 2020. Amount of new capacity resulting from project (kW) is calculated based on total number of ports multiplied by the maximum power output for the equipment that were installed at the project location.~~
 - Total number of charge ports installed – total completed project port count based on information provided by the customer at project application/acceptance
 - Amount of new capacity resulting from project (kw) - Total estimated capacity based on information provided by the customer at project application/acceptance

b. Explanation of why certain data is unavailable to report

- ~~SCE is not able to separately track utility-side design costs; those costs are part of general new business and/or customer requested modification O&M expense and cannot be reported for specific projects. SCE accounting is not able to break down utility-side site excavation and trenching, and permitting costs into separately recorded~~

entries. As such the totals indicated in Attachment 2 Table 3 for design, site excavation and trenching, and permitting are only for customer-side costs, which are estimated based on overall program allocations.

- ~~SCE is not able to separately record distribution system upgrade costs or service line upgrade costs related to EV infrastructure installations.~~
- ~~SCE is not able to track projected ongoing maintenance costs for utility side infrastructure as part of its program costs.~~
- ~~SCE's large sites "Large Sites: >3 MW" include only utility-side costs, with no O&M or customer-side cost component.~~
- **SCE program accounting is not able to break down utility-side site excavation and trenching and permitting costs into separately recorded entries. As such the totals indicated in Attachment 2 Table 3 site excavation and trenching and permitting are only for customer-side costs, which are estimated based on overall program allocations. However, these costs are reported within the division overhead charges which are included in the Total Utility-side Costs.**
- **Total Distribution System Costs Incurred by Utility for Upgrades**
 - **Program costs are captured as either 'to the meter' (utility-side costs) or 'behind or beyond the meter' (customer-side costs). These costs categories do not follow a Rule 15 cost category structure; therefore, SCE is not able to provide costs in this manner.**
- **Total Service Line Costs Incurred by Utility for Upgrades**
 - **Program costs are captured as either 'to the meter' (utility-side costs) or 'behind or beyond the meter' (customer-side costs). These costs categories do not follow a Rule 16 cost category structure; therefore, SCE is not able to provide costs in this manner.**
- **Projected Ongoing Maintenance Costs for Utility-Side Infrastructure**
 - **SCE is not able to separately track projected ongoing maintenance costs specific to EV utility-side (to the meter) infrastructure. On-going maintenance costs are tracked in a separately approved GRC account.**

c. Steps to report currently unavailable data at a later time

- SCE has taken steps to ensure more detailed tracking of costs by creating separate work orders per site for utility-side costs, customer-side costs, and easements. Within these work orders, SCE uses cost elements, cost descriptions, and purchase order information to further breakdown costs into additional subcomponents. An example of steps taken from 2019 to 2020 include new contracts to provide actuals for permitting and design for customer-side costs.
- SCE will continue to review our current capital reporting structure and look for ways to improve cost recording to separate site excavation and trenching costs for both utility and customer side.

d. Explanation of plans to provide additional data in future reports –

- SCE plans to work with the Energy Division to refine this report for the future, and as part of that process will consider how to best capture the data needs requested.

Table 4 in Attachment 2: Historic Costs

a. General Approach and Cost Assumptions

- Years 2011-2018 historic residential costs are pulled from data used in previously submitted Load Research Reports.
 - The template to report utility distribution and service line costs for this Report is different than for previous Load Research Reports and may make a comparison between tables challenging.
- Year 2019 historic costs are pulled from data provided in the previously submitted 2020 EV Charging Infrastructure Cost Report.¹²
- As mentioned previously, upgrade costs related to EVs fall into three categories: 1) equipment on the customer side of the meter, 2) the individual customer service line, and 3) the utility distribution system that serves multiple customers. In this report, EV infrastructure is accounted for only if a work order is opened and identified as an EV work order.
- For non-program EV charging infrastructure, SCE does not have information on the customer side of the meter costs nor insight on the customer assigned costs for service line upgrades.
 - The Customer pays all costs for beyond the Service Delivery Point.
 - The Customer is responsible for trenching, backfilling, and other digging as required including permit fees.
 - The Customer is responsible for furnishing, installing, owning and maintaining all conduits and structures, including riser material.
 - The Customer is responsible for all rights of way costs, if applicable.
- Per the CPUC policy exemption currently in place through December 31, 2021, when the Rule 16 costs exceed the allowance provided for residential EV service line upgrades, the amount exceeding the allowance is not paid by the customer, but instead by SCE (recoverable through distribution rates).

b. Explanation of why certain data is unavailable to report

- N/A

¹² See Attachment 2, Table 4, Note 2.

c. Steps to report currently unavailable data at a later time

- N/A

d. Explanation of plans to provide additional data in future reports –

- SCE will work with Energy Division and the other IOUs to determine how future historical (i.e., reporting periods 2019 and beyond) will be organized on future reporting templates.

D. SDG&E's EV Infrastructure Cost Data

Table 2 in Attachment 3: Non-Program Costs

a. General Approach and Cost Assumptions

- Costs provided are direct costs, overheads, and AFUDC incurred in 2020 for completed sites during the year.
- Total Customer costs include excess of allowance that is due, or would be due, to the utility.
- **Design Costs: Overhead costs specifically related to engineering. Design costs are not direct charged to non-program sites**
- **Trenching and site excavation: estimated 25% allocation of costs from line "Total Distribution System Costs Incurred by Utility for Upgrades"**
- **Separate meter costs: charges billed to FERC 370 - Meters**
- **Permitting costs: utility permits are not tracked separately. Permits pulled by the utility are not generally applicable to the utility's scope for residential work. Permit costs for commercial sites vary by local jurisdiction. SDG&E has estimated the average permit costs to be approximately \$1,000 per site in past studies.**
- **Total Distribution System Costs Incurred by Utility for Upgrades: labor, services, materials, and associated overheads for distribution system upgrades**
- **Total Service Line costs Incurred by Utility for Upgrades: charges billed for construction of new service lines**
- **Total Utility side costs: sum of the above utility costs**
- **Total customer costs: required customer payments (contributions in aid of construction) made to utility**

b. Explanation of why certain data is unavailable to report

- ~~The design, permitting, trenching and site excavation costs provided are not separately tracked as a part of SDG&E's accounting information system.~~
- **SDG&E does not separately track ongoing maintenance or support activities, except for project management, for EV-specific work orders**

c. Steps to report currently unavailable data at a later time

- N/A

d. Explanation of plans to provide additional data in future reports

- ~~N/A~~

- SDG&E will work with the Energy Division staff and the other IOUs to determine how future historical data will be organized and reported in future reports / templates.

Table 3 in Attachment 3: Pilot-Program Costs

a. General Approach and Cost Assumptions

- Costs provided are direct costs, overheads, and Allowance for Funds Used During Construction (AFUDC) incurred in 2020 for sites completed during the year.
- SDG&E does not have any rebate costs for our approved infrastructure programs for sites completed in 2020.

b. Explanation of why certain data is unavailable to report

- SDG&E is not able to report separately on meter costs as they are recorded in mass plant and capitalized when they are delivered to the warehouse. Meters are not recorded in project-specific work orders.
- Permitting costs are not tracked separately and are generally included in the construction contractor and/or 3rd party engineering design support scope of work. included. Permitting costs vary by local jurisdiction but are approximately \$1,000 per site based on prior programs.
- All construction costs are included in the utility side costs. SDG&E has not historically tracked utility side costs and customer side costs separately. SDG&E solicits fixed bids for combined utility and customer side costs per site. Bids for each site may be awarded individually or as bundled packages.
- SDG&E does not separately record distribution line extension costs or service extension costs related to EV infrastructure installation.
- SDG&E does not track projected ongoing maintenance costs for utility-side infrastructure as a part of its pilot program costs.
- Costs for SDG&E's Medium Duty / Heavy Duty (MD / HD) program (Power Your Drive for Fleets) and AB1082/1083 programs (Power Your Drive for Schools, Parks, and Beaches) are not available yet as no construction sites were completed in 2020.

c. Steps to report currently unavailable data at a later time

- N/A

d. Explanation of plans to provide additional data in future reports

- SDG&E will report utility side costs versus customer side costs for recently approved programs once sites are completed.

Table 4 in Attachment 3: Historic Costs

a. General Approach and Cost Assumption

- Costs provided are direct costs, overheads, and AFUDC incurred for completed sites during the year.
- SDG&E pays all costs for upgrading and maintaining the distribution system when residential EV load is added (recoverable through distribution rates).
- Per the CPUC policy exemption currently in place through December 31, 2020, when the Rule 16 costs exceed the allowance provided for residential EV service extensions, the amount exceeding the allowance is not paid by the customer but instead by SDG&E (recoverable through distribution rates).
- The Customer pays all costs for beyond the Service Delivery Point.
- The Customer is responsible for trenching, backfilling, and other digging as required including permit fees.
- The Customer is responsible for furnishing, installing, owning and maintaining all conduits and structures, including riser material.
- The Customer is responsible for all rights of way costs, if applicable.
- The EV infrastructure is accounted for only if a work order is opened and identified as an EV work order.

b. Explanation of why certain data is unavailable to report

- N/A

c. Steps to report currently unavailable data at a later time

- N/A

d. Explanation of plans to provide additional data in future reports

- SDG&E will work with the Energy Division staff and the other IOUs to determine how future historical data will be organized and reported in future reports / templates.

ATTACHMENT 1

III. Attachment 1 – PG&E

PG&E

Table 1: Number of EVs forecasted In IOU Service Territory

		Light-Duty	Medium/ Heavy Duty
Actual ¹	2011	2,985	
	2012	10,802	
	2013	28,414	
	2014	54,267	
	2015	81,346	
	2016	111,355	
	2017	150,890	
	2018	217,080	
	2019	274,636	
	2020	320,550	485
Forecasted ²	2021	332,083	732
	2022	386,528	1,090
	2023	457,989	1,697
	2024	554,276	2,719
	2025	689,947	4,448
	2026	879,757	7,317
	2027	1,133,368	11,832
	2028	1,459,495	18,566
	2029	1,857,746	28,097
	2030	2,322,661	40,898

Notes:

¹ Actual LDV values are provided by the Electric Power Research Institute ("EPRI") on annual light-duty vehicle sales, based on third part registration data. Light Duty reflect cumulative annual EV sales. Medium/Heavy Duty reflect vehicles-in-operation, however there is significant general uncertainty about the number of MHD vehicles in operation in CA.

² Forecasted values from PG&E's 2021 EV adoption forecast (Jan 2021). PG&E's light-duty (Classes 1-2a), medium and heavy-duty (Classes 2b-8) electric vehicles long-term forecast derives from PG&E's market and policy driven probabilistic EV model. The model integrates different scenarios meeting state's Zero-Emission goals (e.g. SB1014, Gov. Brown's EO-B-48-18, Gov. Newsom's EO-N-79-20). PG&E's 20-year forecast predicts electric vehicle population by class and segment (including rideshare vehicles), energy demand and hourly capacity forecast. It tracks electric vehicle sales in California (source: EPRI), market trends (source: BNEF, others) and includes current programs and regulations (CARB, CPUC, CEC). PG&E's leverages internal data and results from pilot programs directed by state agencies and conducted in collaboration with other IOUs and vehicle manufacturers. PG&E's EV adoption forecast is subject to variables and assumptions regarding EV market demand, evolution and development that are outside PG&E's control and therefore the forecast is subject to significant uncertainty and should not be relied upon as point estimates for policy or planning

PG&E

Table 2: Non-Program Costs

2020 EV-related Upgrade Costs		Residential Charging Infrastructure	Non-pilot/program Commercial Charging Infrastructure
Site Costs (\$)	Design costs	\$110,714	\$209,352
	Trenching and site excavation	\$104,738	\$4,554,945
	Separate meter costs	\$705	\$128,186
	Permitting costs	\$23,033	\$42,300
	Total Distribution System Costs Incurred by Utility for Upgrades	\$1,276,087	\$4,666,935
	Total Service Line <u>costs</u> Incurred by Utility for Upgrades	\$12,131	\$2,995,474
	Total Utility side costs	\$1,297,670	\$19,012,727
	Total Customer Costs	\$18,364	\$4,460,195
	Projected ongoing maintenance costs for utility-side infrastructure		
Support Activities (\$)	Project management	\$53,107	\$96,231
	Customer outreach (labor)		
	Marketing and education materials		
	Other costs		
Other	Total number of charge ports installed		
	Amount of new capacity resulting from project (kW)		
Key:			
	Data not available to report		
	Data not available to report for 2020, but utilities have begun tracking for future reports		

PG&E

Updated version of Table 2 (PG&E)

2020 EV-related Upgrade Costs		Residential Charging Infrastructure	Non-pilot/program Commercial Charging Infrastructure
Site Costs (\$)	Design costs	\$110,714	\$209,352
	Trenching and site excavation	\$104,738 -\$107,976	\$4,554,945 -\$4,578,276
	Separate meter costs	\$705 -\$767	\$128,186
	Permitting costs	\$23,033	\$42,300
	Total Distribution System Costs Incurred by Utility for Upgrades ¹	\$1,276,087 -\$1,181,289	\$4,666,935 -\$3,403,289
	Total Service Line <u>costs</u> Incurred by Utility for Upgrades ¹	\$12,131 -\$8,555	\$2,995,474 -\$2,726,958
	Total Utility side costs	\$1,297,670 -\$1,466,160	\$19,012,727 -\$6,579,665
	Total Customer Costs ²	\$18,364 -\$41,247	\$4,460,195 -\$4,760,579
	Projected ongoing maintenance costs for utility-side infrastructure		
Support Activities (\$)	Project management	\$53,107	\$96,231
	Customer outreach (labor)		
	Marketing and education materials		
	Other costs		
Other	Total number of charge ports installed	83	657
	Amount of <u>new capacity</u> resulting from project (kW)	777	53,080

Key:	
	Data not available to report
	Data not available to report for 2020, but utilities have begun tracking for future reports

Notes:
¹ Includes costs for Mapping, Inspection, and Land that are not included in Project Management or any of the other Site Costs Subcategories.
² Total Customer Costs do not reflect ITCC. Customer costs are subject to ITCC.

PG&E

Table 3: Pilot-Program Costs

2020 EV-related Upgrade Costs		Pilot/Program Commercial Charging Infrastructure					
		Light Duty Vehicle Infrastructure			Medium and Heavy Duty Vehicle Infrastructure ³		
		L2 Chargers - Multi-Unit Dwellings	L2 Chargers - Non-Residential LDV	DCFC - LDV ²	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW
Site Costs (\$)	Design costs ¹	\$617,468	\$1,841,773	\$0	\$83,123	\$20,487	\$0
	Trenching and site excavation	\$1,671,765	\$5,973,466	\$0	\$241,965	\$50,381	\$0
	Separate meter costs	\$710,000	\$1,780,000	\$0	\$0	\$0	\$0
	Permitting costs	\$188,303	\$561,667	\$0	\$0	\$0	\$0
	Total Distribution System Costs Incurred by Utility for Upgrades						
	Total Service Line costs Incurred by Utility for Upgrades						
	Total Utility side costs	\$2,325,422	\$7,667,005	\$0	\$853,701	\$189,985	\$0
	Total Customer side costs	\$5,945,982	\$21,429,184	\$0	\$0	\$0	\$0
	Projected ongoing maintenance costs for utility-side infrastructure	\$155,580		\$0	\$0	\$0	\$0
Support Activities (\$)	Project management	\$1,993,545		\$0	\$546,351	\$13,110	\$0
	Customer outreach (labor)	\$83,689		\$125,221	\$1,954,245		\$0
	Marketing and education materials	\$202,135		\$24,022	\$1,343,000		\$0
	Other Costs	\$961,975		-	\$574,798		-
Other	Total number of charge ports installed ⁴	518	1,608	-	5	1	-
	Amount of new capacity resulting from project (kW)	3,471	10,774	-	850	504	-

Key:	Data not available to report
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Notes:
¹ Design costs include only Final Design costs for 2020 Fully Invoiced projects.
² Any site that has a DCFC, even if L2 chargers are also installed, will be captured in this DCFC group
³ Medium and Heavy duty infrastructure is categorized by site size based on amount of new capacity resulting from each project
⁴ Medium and Heavy Duty numbers show number of sites, not ports.

PG&E

Updated version of Table 3 (PG&E)

2020 EV-related Upgrade Costs		Pilot/Program Commercial Charging Infrastructure								
		Light Duty Vehicle Infrastructure			Medium and Heavy Duty Vehicle Infrastructure ¹					
					Utility-owned Customer-side Infrastructure			Customer-owned Customer-Side Infrastructure		
		L2 Chargers - Multi-Unit Dwellings	L2 Chargers - Non-Residential LDV	DCFC – LDV ²	Small sites: <500 kW	Medium Sites: 500 kW – 3 MW	Large Sites: >3 MW	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW
Site Costs (\$)	Design costs ³	\$617,468	\$1,841,773					\$83,123 \$68,990	\$20,487 \$21,285	
	Trenching and site excavation	\$1,671,765	\$5,973,466					\$241,965	\$50,381	
	Separate meter costs	\$710,000	\$1,780,000					\$265,134		
	Permitting costs	\$188,303	\$561,667							
	Total Distribution System Costs Incurred by Utility for Upgrades									
	Total Service Line costs Incurred by Utility for Upgrades									
	Total Utility side costs	\$2,325,422	\$7,667,005					\$853,701 \$963,822	\$189,985	
	Total Customer side costs	\$5,945,982	\$21,429,184							
	Projected ongoing maintenance costs for utility-side infrastructure	\$155,580								
Support Activities (\$)	Project management	\$1,993,545						\$546,351 \$548,592	\$13,110	
	Customer outreach (labor)	\$83,689		\$125,221	\$1,954,245					
	Marketing and education materials	\$202,135		\$24,022	\$1,343,000					
	Other Costs ⁴	\$961,975		-				\$574,798 \$937,468		-
Other	Total number of charge ports installed ⁵	518	1,608	-	-	-	-	546 ⁵	130 ⁵	-
	Amount of new capacity resulting from project (kW)	3,471	10,774	-	-	-	-	850 1,150	504	-

Key:
 Data not available to report

Notes:

¹ Design costs include only Final Design costs for 2020 Fully Invoiced projects.

² Any site that has a DCFC, even if L2 chargers are also installed, will be captured in this DCFC group

³ Medium and Heavy duty infrastructure is categorized by site size based on amount of new capacity resulting from each project

⁴ **Includes \$961,975 for EVCN rebates, \$475,670 for EV Fleet Rebates, and \$340,798 for Medium/Heavy Duty Customer Fleet Demo (PRP) rebates.**

⁵ **These reflect "committed" ports, not "activated" ports across 6 Small Sites and 1 Medium Site for PG&E's EV Fleet Program.**

⁴ ~~Medium and Heavy Duty numbers show number of sites, not ports.~~

PG&E

Table 4: Historic Costs Summary

	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2019 ²
Non-Pilot/program Residential Charging Infrastructure¹								
Total Distribution System Costs Incurred by Utility for Upgrades	\$282,719	\$598,172	\$1,476,647	\$798,367	\$404,236	\$1,734,016	\$927,375	\$0
Total Service Line Costs Incurred by Utility for Upgrades	\$39,924	\$69,380	\$103,259	\$41,377	\$37,500	\$27,706	\$52,349	\$10,137
Total Customer Portion of Utility Costs Covered by the exemption	\$9,226	\$34,125	\$76,046	\$19,669	\$3,856	\$3,983	\$29,618	\$5,649
Non-Pilot/Program Commercial Charging Infrastructure								
Total Distribution System Costs Incurred by Utility for Upgrades								\$757,669
Total Service Line costs Incurred by Utility for Upgrades								\$1,798,229
Pilot/Program Commercial Charging Infrastructure								
Total Utility Side Costs								\$8,125,916
Total Customer Side Costs								\$19,699,909

Notes:

¹ Historical upgrade costs are from data from previously submitted Load Research Reports. The data for the 2011 - 2012 report is from July 2011 through Oct 2012. The data for the next five reports and ending with the 2016-2017 report includes data from Nov - Oct of the following year. Data for the 2017-2018 report includes data from Nov 2017 through Dec 2018. The data for 2019 shows data for January-December of 2019.

² Details on the 2019 historical costs can be found in the EV Infrastructure Cost Report that was filed on April 2, 2020.

ATTACHMENT 2

IV. Attachment 2 - SCE

SCE

Table 1
Number of EVs forecasted In IOU Service Territory

		Light-Duty	Medium/ Heavy Duty
Actual	2011	1,736	
	2012	8,526	
	2013	21,896	
	2014	39,890	
	2015	58,908	
	2016	83,186	
	2017	114,738	
	2018	163,869	
	2019	210,620	
	2020	251,584	
Forecasted	2021	326,886	969
	2022	398,801	1,836
	2023	500,847	3,386
	2024	628,491	5,789
	2025	741,619	9,120
	2026	875,111	13,358
	2027	1,061,315	18,387
	2028	1,252,352	24,027
	2029	1,477,775	29,730
	2030	1,743,775	39,162

SCE Comments:

- Actual LDV values are provided by the Electric Power Research Institute (“EPRI”) on annual light-duty vehicle sales, based on third party registration data. Please note that there is a slight revision on historical number of light duty electric vehicles provided by EPRI.

-SCE’s forecasts for light-duty, medium and heavy-duty electric vehicles reflect a forecast that more closely aligns with expected decarbonization funding, mandates, and support policies. Policies such as states 5 million zero-emission vehicles goals on the roads in California by 2030 for light duty and CARB’s Innovative Clean Transit and Advanced Clean Trucks rules for medium/heavy duty and buses were considered. The previous forecast assumes the high electrification target levels that the state will have to achieve in meeting its aggressive long-term decarbonization goals and it is based on SCE’s Clean Power and Electrification Pathway analysis. The updated EV forecast assumes currently expected decarbonization funding, mandates, and support policies which lead to a lower level of EV adoption based on SCE’s policy impact analysis.

SCE

Table 2

2020 EV-related Upgrade Costs		Residential Charging Infrastructure	Non-pilot/program Commercial Charging Infrastructure
Site Costs (\$)	Design costs		
	Trenching and site excavation	\$0	\$654,415
	Separate meter costs ¹	\$4,215	\$22,352
	Permitting costs	\$0	\$44,156
	Total Distribution System Costs Incurred by Utility for Upgrades ²	\$0	\$5,754,367
	Total Service Line costs Incurred by Utility for Upgrades	\$14,530	\$249,081
	Total Utility side costs	\$18,745	\$6,047,604
	Total Customer Costs ³	\$0	\$251,612
	Projected ongoing maintenance costs for utility-side infrastructure		
Support Activities (\$)	Project management		
	Customer outreach (labor)	\$0	\$0
	Marketing and education materials	\$0	\$0
	Other costs	\$0	\$0
Other	Total number of charge ports installed		
	Amount of new capacity resulting from project (kW)		36,519

Key:	
	Data not available to report
	Data not available to report for 2020, but utility is researching how to track for future reports

IOU Comments:

1. Separate Meter Costs are calculated based on average meter costs by rate schedule.
2. Total Distribution System Costs incurred by the Utility for upgrades; If both distribution and service costs (Rules 15 and 16) are included in a single work order, the service costs are included in the distribution system costs total.
3. Total Customer Costs for Residential Customers is the amount of excess cost to serve that would have been billable to the customer if the current residential allowance exemption was not in place. Total Customer Costs for Commercial Customers is the amount invoiced and paid by the Customer.

SCE

Updated version of Table 2 (SCE)

2020 EV-related Upgrade Costs		Residential Charging Infrastructure	Non-pilot/program Commercial Charging Infrastructure
Site Costs (\$)	Design costs ⁴	<u>\$1,876</u>	<u>\$689,746</u>
	Trenching and site excavation ⁵	\$0	\$654,415
	Separate meter costs ¹	\$4,215	\$22,352
	Permitting costs ⁶	\$0	\$44,156
	Total Distribution System Costs Incurred by Utility for Upgrades ²	\$0	<u>\$5,102,112</u>
	Total Service Line costs Incurred by Utility for Upgrades	<u>\$14,716</u>	<u>\$307,662</u>
	Total Utility side costs ⁷	<u>\$20,807</u>	<u>\$6,554,561</u>
	Total Customer Costs ³	\$0	\$251,612
	Projected ongoing maintenance costs for utility-side infrastructure		
Support Activities (\$)	Project management	\$0	\$0
	Customer outreach (labor)	\$0	\$0
	Marketing and education materials	\$0	\$0
	Other costs	<u>\$0</u>	<u>\$0</u>
Other	Total number of charge ports installed		
	Amount of new capacity resulting from project (kW)		36,519

Key:	
	Data not available to report
	Data not available to report for 2020, but utility anticipates will be available to track beginning January 1, 2022 and report in 2023.

IOU Comments:

1. Separate Meter Costs are calculated based on average meter costs by rate schedule **and are included in the utility side totals.**
2. Total Distribution System Costs incurred by the Utility for upgrades; If both distribution and service costs (Rules 15 and 16) are included in a single work order, the service costs are included in the distribution system costs total.
3. Total Customer Costs for Residential Customers is the amount of excess cost to serve that would have been billable to the customer if the current residential allowance exemption was not in place. Total Customer Costs for Commercial Customers is the amount invoiced and paid by the Customer.
4. **Design costs are included in the utility side cost totals.**
5. **Trenching and excavation are included in the distribution and service line totals.**
6. **Permit costs are included in the distribution and service line totals.**
7. **The number provided, a combination of both actual and estimated dollars, represents the total utility side (to the meter) expenditure for all capital direct costs and indirect labor overhead recorded costs, as well as O&M labor indirect costs, and transformer costs (if applicable).**

SCE

Table 3

2020 EV-related Upgrade Costs		Pilot/Program Commercial Charging Infrastructure					
		Light Duty Vehicle Infrastructure			Medium and Heavy Duty Vehicle Infrastructure		
		L2 Chargers - Multi-Unit Dwellings	L2 Chargers - Non-Residential LDV	DCFC - LDV ¹	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW ⁵
Site Costs (\$)	Design costs ²	\$ 84,741	\$ 463,694	\$ -	\$ 313,095	\$ 62,619	\$ -
	Trenching and site excavation ²	\$ 2,736,690	\$ 10,077,484	\$ 240,163	\$ 514,449	\$ 100,178	\$ -
	Separate meter costs ³	\$ 28,455	\$ 36,043	\$ -	\$ 4,742	\$ 948	\$ -
	Permitting costs ²	\$ 22,683	\$ 82,267	\$ -	\$ 13,261	\$ 2,652	\$ -
	Total Distribution System Costs Incurred by Utility for Upgrades						
	Total Service Line costs Incurred by Utility for Upgrades						
	Total Utility side costs	\$ 714,332	\$ 2,619,899	\$ 1,534	\$ 453,649	\$ 118,451	\$ (144,416)
	Total Customer Costs	\$ 2,844,115	\$ 10,623,445	\$ 240,163	\$ 840,805	\$ 165,450	\$ -
	Projected ongoing maintenance costs for utility-side infrastructure						
Support Activities (\$)	Project management	\$ 34,056	\$ 499,087	\$ 39	\$ 742,726	\$ 148,568	\$ -
	Customer outreach (labor)	\$ 1,819	\$ 30,629	\$ -	\$ 331,290	\$ 66,258	\$ -
	Marketing and education materials	\$ 74,059	\$ 273,299	\$ -	\$ 420,062	\$ 84,012	\$ -
	Other costs ⁴	\$ 349,783	\$ 2,018,874	\$ 183,386	\$ 504,875	\$ 381,652	\$ -
Other	Total number of charge ports installed	310	1,132	-	22	12	
	Amount of new capacity resulting from project (kW)	2,232	8,150	-	777	600	

Key:	
	Data not available to report

IOU Comments:

- 1 Any site that has a DCFC, even if L2 chargers are also installed, will be captured in this DCFC group.
- 2 Only Customer-side costs separated into Design, Trenching and site excavation, and Permitting costs.
- ~~3. Meter totals are calculated based on average meter costs by rate schedule.~~
4. Other costs include rebates, canceled project costs, Capital IT implementation costs, and one test equipment for Parks & State Beaches.
5. Credits recorded in 2020 for unused materials recorded in 2019.

SCE

Updated version of Table 3 (SCE) – See Corrected table

2020 EV-related Upgrade Costs		Pilot/Program Commercial Charging Infrastructure								
		Light Duty Vehicle Infrastructure			Medium and Heavy Duty Vehicle Infrastructure					
					Utility-owned Customer-side Infrastructure			Customer-owned Customer-side Infrastructure ¹⁰		
		L2 Chargers - Multi-Unit Dwellings	L2 Chargers - Non-Residential LDV	DCFC - LDV ¹	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW ⁵	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW
Site Costs (\$) ⁶	Design costs ⁷	\$ 870,123	\$ 2,537,667	\$ 108,886	\$ 4,944	\$ 133,177	\$ 189,111			
	Trenching and site excavation ²	\$ 2,575,516	\$ 8,332,562	\$ 229,388	\$ 32,958	\$ 357,332	\$ 658,597			
	Separate meter costs ³	\$ 24,935	\$ 31,849	\$ 1,897	\$ 948	\$ 1,897	\$ 1,897			
	Permitting costs ²	\$ 23,776	\$ 69,554	\$ -	\$ -	\$ -	\$ -			
	Total Distribution System Costs Incurred by Utility for Upgrades									
Support Activities (\$)	Total Service Line costs Incurred by Utility for Upgrades									
	Total Utility side costs ⁸	\$ 773,402	\$ 2,793,495	\$ 189,009	\$ 12,018	\$ 610,065	\$ (144,416)			
	Total Customer side costs ⁹	\$ 3,024,652	\$ 9,763,066	\$ 288,728	\$ 32,958	\$ 384,639	\$ 697,410			
	Projected ongoing maintenance costs for utility-side infrastructure									
Other	Project management	\$ 40,027	\$ 493,115	\$ 39	\$ 891,256	\$ 38	\$ -			
	Customer outreach (labor)	\$ 2,211	\$ 30,237		\$ 397,548	\$ -	\$ -			
	Marketing and education materials	\$ 87,701	\$ 259,657		\$ 504,074	\$ -	\$ -			
	Other costs ⁴	\$ 360,327	\$ 2,042,370	\$ 191,660	\$ 418,731	\$ 476,059	\$ 17,980			
Other	Total number of charge ports installed	278	912	4	2	23	29			
	Amount of new capacity resulting from project (kW)	2,002	6,566	250	38	2,845	15,000			

Key:
Data not available to report

IOU Comments:

- 1 Any site that has a DCFC, even if L2 chargers are also installed, will be captured in this DCFC group.
- 2 Only Customer-side costs separated into Design, Trenching and site excavation and Permitting costs.
3. Meter totals are calculated based on average meter costs by rate schedule.
4. Other costs include rebates, canceled project costs, Capital IT implementation costs, one test equipment for Parks & State Beaches, **estimated O&M labor indirect costs because these costs are authorized in SCE's GRC and are separately recorded in the Pension, Medical, and PBOB Balancing Accounts. O&M pension & benefits do not follow the program accounting.**
5. Credits recorded in 2020 for unused materials recorded in 2019.
6. **Site Costs (\$)** - Capital costs reported for completed projects in 2020. SCE is aware there is a small amount of trailing costs in 2021.
7. **Design costs include estimated Utility-side costs and actual Customer-side costs.**
8. **Total Utility-side costs** - The number provided, a combination of both actual and estimated dollars, represents the total utility-side (to the meter) expenditure for all capital direct costs and indirect labor overheads recorded costs, up to but not including the meter pedestal or meter panel for completed projects within the reporting period, separated by respective programs. Cost categories include, for example, trenching, permitting, meter costs, and other material (including transformation) as well as division overhead.
 - Includes division overhead costs (e.g. planner activities such as site visits, creating the design and operations activities such as scheduling work, staging material, etc.) and Capital overhead labor loaders (indirect) costs (e.g. pension, benefits, etc.).
 - Transformers sized at or less than 500 kVA are estimated costs. Transformers sized greater than 500 kVA are specialty items that SCE orders and charges directly to the work orders.
9. **Total Customer side costs** provide a combination of both actual and estimated dollars, represents the total customer-side (behind or beyond the meter) expenditure for all capital direct and indirect labor overheads recorded costs, from the meter pedestal or meter panel, up to but not including the EVSEs for completed projects. Examples of included costs are design, trenching, permitting, labor and material such as the meter pedestal or meter panel, transformation, cable, and connectors.
 - Includes division overhead costs (e.g. Planner activities such as site visits, creating the design and operations activities such as scheduling work, staging material, etc.) and Capital overhead labor loaders (indirect) costs (e.g. pension, benefits, etc.).
10. SCE does not have any Customer-owned Customer-side Infrastructure projects completed in 2020.

SCE

Corrected version of Table 3 Update (SCE)

2020 EV-related Upgrade Costs		Pilot/Program Commercial Charging Infrastructure								
		Light Duty Vehicle Infrastructure			Medium and Heavy Duty Vehicle Infrastructure					
					Utility-owned Customer-side Infrastructure			Customer-owned Customer-side Infrastructure ¹⁰		
		L2 Chargers - Multi-Unit Dwellings	L2 Chargers - Non-Residential LDV	DCFC - LDV ¹	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW ⁵	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW
Site Costs (\$) ⁶	Design costs ⁷	\$ 870,123	\$ 2,537,667	\$ 108,886	\$ 4,944	\$ 133,177	\$ 189,111			
	Trenching and site excavation ²	\$ 2,575,516	\$ 8,332,562	\$ 229,388	\$ 32,958	\$ 357,332	\$ 658,597			
	Separate meter costs ³	\$ 24,935	\$ 31,849	\$ 1,897	\$ 948	\$ 1,897	\$ 1,897			
	Permitting costs ²	\$ 23,776	\$ 69,554	\$ -	\$ -	\$ -	\$ -			
	Total Distribution System Costs Incurred by Utility for Upgrades									
	Total Service Line costs Incurred by Utility for Upgrades									
	Total Utility side costs ⁸	\$ 773,402	\$ 2,793,495	\$ 189,009	\$ 12,018	\$ 610,065	\$ 1,235,295			
	Total Customer side costs ⁹	\$ 3,024,652	\$ 9,763,066	\$ 288,728	\$ 32,958	\$ 384,639	\$ 697,410			
	Projected ongoing maintenance costs for utility-side infrastructure									
Support Activities (\$)	Project management	\$ 40,027	\$ 493,115	\$ 39	\$ 891,256	\$ 38	\$ -			
	Customer outreach (labor)	\$ 2,211	\$ 30,237		\$ 397,548	\$ -	\$ -			
	Marketing and education materials	\$ 87,701	\$ 259,657		\$ 504,074	\$ -	\$ -			
	Other costs ⁴	\$ 360,327	\$ 2,042,370	\$ 191,660	\$ 418,731	\$ 476,059	\$ 17,980			
Other	Total number of charge ports installed	278	912	4	2	23	29			
	Amount of new capacity resulting from project (kW)	2,002	6,566	250	38	2,845	15,000			

Key:	Data not available to report
-------------	------------------------------

IOU Comments:

- 1 Any site that has a DCFC, even if L2 chargers are also installed, will be captured in this DCFC group.
- 2 Only Customer-side costs separated into Design, Trenching and site excavation and Permitting costs.
3. Meter totals are calculated based on average meter costs by rate schedule.
4. Other costs include rebates, canceled project costs, Capital IT implementation costs, one test equipment for Parks & State Beaches, estimated O&M labor indirect costs because these costs are authorized in SCE's GRC and are separately recorded in the Pension, Medical, and PBOB Balancing Accounts. O&M pension & benefits do not follow the program accounting.
- 5- Credits recorded in 2020 for unused materials recorded in 2019.
6. **Site Costs (\$)** - Capital costs reported for completed projects in 2020. SCE is aware there is a small amount of trailing costs in 2021.
7. Design costs include estimated Utility-side costs and actual Customer-side costs.
8. **Total Utility-side costs** - The number provided, a combination of both actual and estimated dollars, represents the total utility-side (to the meter) expenditure for all capital direct costs and indirect labor overheads recorded costs, up to but not including the meter pedestal or meter panel for completed projects within the reporting period, separated by respective programs. Cost categories include, for example, trenching, permitting, meter costs, and other material (including transformation) as well as division overhead.
 - Includes division overhead costs (e.g. planner activities such as site visits, creating the design and operations activities such as scheduling work, staging material, etc.) and Capital overhead labor loaders (indirect) costs (e.g. pension, benefits, etc.).
 - Transformers sized at or less than 500 kVA are estimated costs. Transformers sized greater than 500 kVA are specialty items that SCE orders and charges directly to the work orders.
9. **Total Customer side costs** provide a combination of both actual and estimated dollars, represents the total customer-side (behind or beyond the meter) expenditure for all capital direct and indirect labor overheads recorded costs, from the meter pedestal or meter panel, up to but not including the EVSEs for completed projects. Examples of included costs are design, trenching, permitting, labor and material such as the meter pedestal or meter panel, transformation, cable, and connectors.
 - Includes division overhead costs (e.g. Planner activities such as site visits, creating the design and operations activities such as scheduling work, staging material, etc.) and Capital overhead labor loaders (indirect) costs (e.g. pension, benefits, etc.).
10. SCE does not have any Customer-owned Customer-side Infrastructure projects completed in 2020.

SCE

Table 4: Historic Costs Summary

	Non-Pilot/program Residential Charging Infrastructure	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2019
Historical Upgrade Costs ¹	Total Distribution System Costs Incurred by Utility for Upgrades	\$ 4,268	\$ 4,863	\$ 9,373	\$ 17,290	\$ 2,984	\$ -	\$ 1,845	\$ 39,369
	Total Service Line costs Incurred by Utility for Upgrades	\$ 26,433	\$ 43,586	\$ 67,627	\$ 76,000	\$ 44,561	\$ 17,152	\$ 37,538	\$ 54,136
	Total Customer Portion of Utility Costs Covered by the exemption	\$ 6,133	\$ 12,704	\$ 4,246	\$ 4,885	\$ 1,174	\$ 375	\$ 8,120	\$ 511
	Non-Pilot/Program Commercial Charging Infrastructure ²								
	Total Distribution System Costs Incurred by Utility for Upgrades								\$ 2,814,530
	Total Service Line costs Incurred by Utility for Upgrades								\$ 358,083
	Pilot/Program Commercial Charging Infrastructure								
	Total Utility Side Costs								\$ 4,286,852
	Total Customer Side Costs								\$ 4,955,447

Notes:

1. Historical upgrade costs from 2011-2018 are from the previously submitted Load Research Reports. The data for the 2011-2012 report is from July 2011 to October 2012. The data for the next five reports, ending with the 2016-2017 report is from November to October of the following year. Data for the 2017-2018 report is from November 2017 to December 2018. Historical upgrade costs from 2019 from the previously submitted EV Charging Infrastructure Cost Report. Data for the 2019 report is from January to December.

2. In preparing this report, SCE identified an error in its 2019 Non-Pilot/Program Commercial Charging Infrastructure. SCE updated two figures from its original submission to reflect the correct data. Specifically SCE revised the figures in the 2019 report, from \$543,539 to \$2,814,530 Total Distribution System Costs Incurred by Utility for Upgrades and from \$194,221 to \$358,083 Total Service Line Costs Incurred by Utility for Upgrades (the total project count increased from 25 to 65). These cost totals do not include separate meter costs (not tracked in 2019).

ATTACHMENT 3

V. Attachment 3 – SDG&E

SDG&E

Table 1 (SDG&E)

Number of EVs forecasted in IOU Service Territory

	Light-Duty	Medium/ Heavy Duty
Actual:	2011	
	2012	2,125
	2013	4,400
	2014	11,500
	2015	18,000
	2016	22,040
	2017	26,498
	2018	34,833
	2019	49,585
	2020	61,363
Forecasted:	2021	57,820 N/A
	2022	64,436 N/A
	2023	71,051 N/A
	2024	77,667 N/A
	2025	84,283 N/A
	2026	90,899 N/A
	2027	97,515 N/A
	2028	104,131 N/A
	2029	110,746 N/A
	2030	117,362 N/A

IOU Comments:

Light-Duty historical / actual counts:

Historical EV counts are based off the EV count communicated in the load research report for that year.

Light-Duty forecasted counts:

SDG&E's EV forecast is the expected growth in the SDG&E service territory without the influence of SDG&E's EV programs at each year end. The forecasted vehicle count may be overstated due to a significant growth in EVs in 2018 and 2019.

Medium/ Heavy-Duty forecasted counts:

SDG&E has not yet completed its Medium / Heavy-Duty EV forecast.

Updated version of Table 1 (SDG&E)

Table 1 (SDG&E)

Number of EVs forecasted in IOU Service Territory

	Light-Duty	Medium/ Heavy Duty
Actual:	2011	
	2012	2,125
	2013	4,400
	2014	11,500
	2015	18,000
	2016	22,040
	2017	26,498
	2018	34,833
	2019	49,585
	2020	56,274
Forecasted:	2021	68,036 N/A
	2022	79,076 N/A
	2023	90,117 N/A
	2024	101,157 N/A
	2025	112,197 N/A
	2026	123,237 N/A
	2027	134,277 N/A
	2028	145,318 N/A
	2029	156,358 N/A
	2030	167,398 N/A

IOU Comments:

Light-Duty historical / actual counts:

Historical EV counts are based off the EV count communicated in the load research report for that year.

Light-Duty forecasted counts:

SDG&E's EV forecast is the expected growth in the SDG&E service territory without the influence of SDG&E's EV programs at each year end. The updated forecast vehicle count may be overstated due to a significant growth in EVs in 2018, 2019.

Medium/ Heavy-Duty forecasted counts:

SDG&E has not yet completed its Medium / Heavy-Duty EV forecast.

Table 2 (SDG&E)

2020 EV-related Upgrade Costs		Residential Charging Infrastructure	Non-pilot/program Commercial Charging Infrastructure
Site Costs (\$)	Design costs		
	Trenching and site excavation		
	Separate meter costs	\$1,933	\$5,377
	Permitting costs		
	Total Distribution System Costs incurred by Utility for Upgrades	\$52,172	\$99,471
	Total Service Line costs Incurred by Utility for Upgrades	\$44,954	\$5,547
	Total Utility side costs		
	Total Customer Costs	\$3,563	\$73,404
	Other construction costs		
	Projected ongoing maintenance costs for utility-side infrastructure		
Support Activities (\$)	Project management		
	Customer outreach (labor)		
	Marketing and education materials		
	Other costs		
Other	Total number of charge ports installed		
	Amount of new capacity resulting from project (kW)		

Key:	
	Data not available to report
	Data not available to report in 2020, but utilities will begin tracking for future reports

IOU Comments:

Updated version of Table 2 (SDG&E)

2020 EV-related Upgrade Costs		Residential Charging Infrastructure	Non-pilot/program Commercial Charging Infrastructure
Site Costs (\$)	Design costs	9,735	22,050
	Trenching and site excavation	-	19,355
	Separate meter costs	1,933	5,377
	Permitting costs	-	-
	Total Distribution System Costs Incurred by Utility for Upgrades	42,438	58,066
	Total Service Line costs Incurred by Utility for Upgrades	44,954	5,547
	Total Utility side costs	99,059	110,395
	Total Customer Costs	3,563	73,404
	Other construction costs	-	-
	Projected ongoing maintenance costs for utility-side infrastructure		
Support Activities (\$)	Project management		
	Customer outreach (labor)		
	Marketing and education		
	Other costs		
Other	Total number of charge ports installed	99	45
	Amount of new capacity resulting from project (kW)	366	1167
Key:			
Data not available to report			
See IOU Comments Section for further details			

IOU Comments:

Design Costs: Overhead costs specifically related to engineering . Design costs are not direct charged to non-program sites

Trenching and site excavation: estimated 25% allocation of costs from line “Total Distribution System Costs Incurred by Utility for Upgrades”

Separate meter costs: charges billed to FERC 370 - Meters

Permitting costs: utility permits are not tracked separately. Permits pulled by the utility are not generally applicable to the utility’s scope for residential work. Permit costs for commercial sites vary by local jurisdiction. SDG&E has estimated the average permit costs to be approximately \$1,000 per site in past studies.

Total Distribution System Costs Incurred by Utility for Upgrades: labor, services, materials, and associated overheads for distribution system upgrades

Total Service Line costs Incurred by Utility for Upgrades: charges billed for construction of new service lines

Total Utility side costs: sum of the above utility costs

Total customer costs: required customer payments (contributions in aid of construction) made to utility

Total number of charge ports installed: Residential - Assumes 1 port installed per job; Commercial - based on available port data listed on “as-builts” or port information from chargehub.com for applicable site address

Amount of new capacity resulting from project (kW): Residential - Assumes 3.7kW per site; Commercial - uses available detailed data or 50kW default for L3 and 7.2kW for L2 if data is unavailable.

Table 3 (SDG&E)

2020 EV-related Upgrade Costs		Pilot/Program Commercial Charging Infrastructure					
		Light Duty Vehicle Infrastructure			Medium and Heavy Duty Vehicle Infrastructure		
		L2 Chargers - Multi-Unit Dwellings	L2 Chargers - Non-Residential LDV	DCFC - LDV ¹	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW
Site Costs (\$)	Design costs			8,174	41,998		
	Trenching and site excavation			612,702	374,022		
	Separate meter costs						
	Permitting costs						
	Total Distribution System Costs Incurred by Utility for Upgrades						
	Total Service Line costs Incurred by Utility for Upgrades						
	Total Utility side costs			227,503	175,829		
Total Customer Costs							
	Projected ongoing maintenance costs for utility-side infrastructure						
Support Activities (\$)	Project management			18,111	13,159		
	Customer outreach (labor)			5,394	7,249		
	Marketing and education materials						
	Other costs			66,512	17,711		
Other	Total number of charge ports installed			88	10		
	Amount of new capacity resulting from project (kW)			960	400		

Key:
 Data not available to report

IOU Comments:
 1 Any site that has a DCFC, even if L2 chargers are also installed, will be captured in this DCFC group

Updated version of Table 3 (SDG&E)

Table 3 (SDG&E)

2020 EV-related Upgrade Costs		Pilot/Program Commercial Charging Infrastructure					
		Light Duty Vehicle Infrastructure			Medium and Heavy Duty Vehicle Infrastructure		
		L2 Chargers - Multi-Unit Dwellings	L2 Chargers - Non-Residential LDV	DCFC - LDV ¹	Small sites: <500 kW	Medium Sites: 500 kW - 3 MW	Large Sites: >3 MW
Site Costs (\$)	Design costs	-	-	8,174	41,998	-	-
	Trenching and site excavation	-	-	612,702	374,022	-	-
	Separate meter costs	-	-	-	-	-	-
	Permitting costs	-	-	-	-	-	-
	Total Distribution System Costs Incurred by Utility for Upgrades						
	Total Service Line costs Incurred by Utility for Upgrades						
	Total Utility side costs	-	-	227,503	175,829	-	-
	Total Customer Costs						
Support Activities (\$)	Projected ongoing maintenance costs for utility-side infrastructure						
	Project management	-	-	18,111	13,159	-	-
	Customer outreach (labor)	-	-	5,394	7,249	-	-
	Marketing and education materials	-	-	-	-	-	-
Other	Other costs	-	-	66,512	17,711	-	-
	Total number of charge ports installed	0	0	88	10	-	-
	Amount of new capacity resulting from project (kW)	0	0	960	400	-	-

Key:	
	Data not available to report

IOU Comments:
 1 Any site that has a DCFC, even if L2 chargers are also installed, will be captured in this DCFC group

Table 4 (SDG&E)

		2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2019 ²
Historical Upgrade Costs ¹	Total Distribution System Costs Incurred by Utility for Upgrades	4,089	0	0	0	0	0	124,572
	Total Service Line costs Incurred by Utility for Upgrades	27,952	0	1,876	2,326	2,009	15,113	23,535
	Total Customer Portion of Utility Costs Covered by the exemption	32,041	0	1,876	2,326	2,009	15,113	2,046

IOU Comments:

¹ Historical upgrade costs from previously submitted Load Research Reports for periods 2012-2018

² 2019 historical upgrade costs based on actual costs incurred for customer upgrade jobs completed in 2019.