Measurement and Evaluation Research Plan for

LOAD IMPACT EVALUATION OF SDG&E'S VOLUNTARY RESIDENTIAL ELECTRIC VEHICLE RATES & VEHICLE GRID INTEGRATION PILOT FOR 2020

FOR

San Diego Gas & Electric

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1. INTRODUCTION AND KEY ISSUES

This research plan describes how Christensen Associates Energy Consulting, LLC (CA Energy Consulting) plans to conduct a load impact evaluation of San Diego Gas & Electric's (SDG&E) voluntary residential electric vehicle (EV) rates for program year 2020. These include the EVTOU2 and EVTOU5 time-of-use (TOU) rates and the Electric Vehicle Grid Integration (VGI) pilot.

The EVTOU time periods became effective on December 1, 2017, pursuant to D.17-080-030. The time periods address evolving changes in the timing of the utility's and the state's peak demand caused by increases in solar generation (both central station and rooftop photovoltaics). These increases tend to create later peak demands for purchased power as solar production falls in the evening hours. As a result, the on-peak periods begin and end later than the previous rates. Table 1 contains the EVTOU pricing periods currently in effect.

The EVTOU periods in Summer are centered around an on-peak period of 4:00 p.m. to 9:00 p.m. on all days, which is surrounded by morning and evening off-peak periods, and an overnight super off-peak period. The off-peak and super-off-peak periods differ by day type (*i.e.*, weekdays, weekends) as well as season (*i.e.*, Summer, Winter), as can be seen in Table 1. The Summer season covers June 1st through October 31st and the Winter season is from November 1st through May 31st.

Table 1: EV TOU Periods

Day Type	EVTOU Period	Summer	Winter
Weekdays	On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
	Off-Peak	6:00 a.m. – 4:00 p.m.; 9:00 p.m. – Midnight	6:00 a.m. – 4:00 p.m. Excluding 10:00 a.m. – 2:00 p.m. in March and April; 9:00 p.m. - Midnight
	Super-Off-Peak	Midnight – 6:00 a.m.	Midnight – 6:00 a.m.; 10:00 a.m. – 2:00 p.m. in March and April
Weekends and Holidays	On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
	Off-Peak	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - Midnight	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - Midnight
	Super-Off-Peak	Midnight – 2:00 p.m.	Midnight – 2:00 p.m.

The VGI pilot program established charging stations at two types of locations: workplaces and multi-family dwellings. Participants in the program can either be site hosts or individual drivers. At workplace charging stations, there is an option to bill the driver or host for the session costs. At multi-family dwelling stations, only billed-to-driver charging sessions occur.

Charging sessions are billed at an hourly energy rate that includes three components:

1. an hourly base rate;
2. an hourly commodity base rate, adjusted to account for the California Independent System Operator (CAISO) day-ahead hourly price, an adder to reflect the system's top 150 peak hours, and an adjustment to reflect day-of CAISO surplus energy hours; and
3. an hourly distribution base rate with an adder to reflect the top 200 annual hours of peak demand for the circuit feeding the VGI charging station.

Approximately 1,400 unique driver IDs registered charging sessions from December 2018 through November 2020.

1.1 Project Goals

The primary goals for the EVTOU evaluations are the following:

1. Estimate hourly *ex-post* non-event day load impacts for customers that transitioned from the residential voluntary electric vehicle TOU rate EVTOU2 to EVTOU5 for 2020, as well as load impacts for customers that transitioned from standard tiered rates to either EVTOU2 or EVTOU5.[1]
2. Produce *ex-ante* load impact forecasts for customers that transitioned from standard tiered rates to either EVTOU2 or EVTOU5.

The evaluations shall conform to the Load Impact Protocols adopted by the California Public Utilities Commission (CPUC) in April 2008 (D.08-04-050).

The VGI pilot evaluation will attempt to answer the following two questions:

1. Is the duration of a charging session affected by the hourly prices?
2. Is the total energy from a charging session affected by the hourly prices?

1.2 Roadmap

Section 2 discusses technical issues and our approach for conducting the study. Section 3 lists the data sources. Section 4 contains detailed work plan by task for meeting the study objectives. Section 5 contains the project schedule and lists deliverables. Section 6 describes our quality control mechanisms and processes.

2. STUDY METHOD

This section discusses technical issues to be addressed in this study, and our planned approach to resolving those issues. We begin by describing the planned *ex-post* load impact estimation methods and then turn to development of the *ex-ante* forecasts.

[1] For non-event-based rates, the Load Impact Protocols call for estimating average weekday load impacts by month, and by monthly peak days.

2.1 EVTOU Estimation Limitations

There are three conceivable evaluations for the residential voluntary EVTOU rates. Each option differs based on the intended counterfactual. That is, how do loads change as a result from switching from rate X to Y, where X represents the counterfactual rate. Thus, for the EVTOU rates, the three evaluations include:

- Standard tiered rate to EVTOU2 rate;
- Standard tiered rate to EVTOU5 rate; and
- EVTOU2 rate to EVTOU5 rate (if sample sizes allow and SDG&E is interested).

Ideally, these load impacts would be estimated using a difference-in-differences method, where the EVTOU load impact is estimated by comparing participant and control-group customer usage before and after the participants switch to the EVTOU rate. Conducting such an analysis is complicated by a lack of data regarding when customers obtained and began charging an electric vehicle.[2] In the absence of this information, it is difficult to isolate customer response rather than load changes due to obtaining an EV. For example, if a customer joins an EVTOU rate at the same time it obtains an EV, the differences in usage before and after joining the EVTOU rate will primarily reflect a response to owning an EV rather than a response to the EVTOU rate. Uncertainty about EV adoption also affects the ability to identify control-group customers. Ideally, control group customers would have an EV and be served on a tiered rate during the entire analysis period (pre-treatment and treatment periods). While SDG&E does not comprehensively collect information about EV ownership, we have developed a way of reasonably identifying when EVTOU customers become EV. This methodology was developed during the PY2019 analysis and will be repeated for the PY2020 analysis.

We can reliably assume that customers on either EVTOU2 or EVTOU5 have an electric vehicle. With this knowledge, it is possible to estimate load impacts for customers who transition from EVTOU2 to EVTOU5 because they would have an EV for the entire analysis period. Furthermore, customers that remain on EVTOU2 for the entire period can provide experimental leverage by serving as a control group. For customers who transitioned from standard tiered rates to either EVTOU2 or EVTOU5, we can make an educated guess about when they obtained an EV using a structural break test.

The following sub-section proposes a research plan for evaluating load impacts for customers that transition from EVTOU2 to EVTOU5. The subsection will also describe the evaluation methodology to estimate EVTOU2 or EVTOU5 load impacts relative to taking service on the tiered rate. Both approaches will follow the analysis used in PY2019.

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[2] It would also help to know the type of vehicle being charged and the typical amount of charge needed (*i.e.*, due to miles driven in between charges).

2.2 EVTOU Evaluation Design

The *ex-post* impacts will be estimated using a difference-in-differences evaluation approach that compares treatment and quasi-experimental matched control group customer usage on relevant days or time periods, adjusted by their usage differences during the corresponding pre-treatment period. The treatment group for the EVTOU2 to EVTOU5 transition analysis consists of customers who transition from EVTOU2 to EVTOU5 after October 1, 2019. The potential control group consists of customers who are on EVTOU2 for the entire analysis period October 1, 2018 through September 30, 2020. The control group will be selected by matching each treatment customer to one of an initial sample of eligible non-treatment customers in relevant population segments (*e.g.*, climate zone, CARE status), based on the closest match of load profiles. In the case of the incremental EVTOU2 and EVTOU5 analyses, the treatment group consists of customers who transition from standard tiered rates to either EVTOU2 or EVTOU5 after October 1, 2019. The analysis for transitions from standard tiered rates will not use a match to control customers.

For the EVTOU2 to EVTOU5 analysis, matching will be conducted by comparing loads in the pre-treatment period (*i.e.*, before the treatment customer switched to the EVTOU5 rate). The customers will be matched separately by season, based on two pairs of hourly loads for each season – one for all weekdays, and one for a subset of the hottest (or coldest) weekdays. In addition, SDG&E requires an analysis of weekend EVTOU load impacts even though they are not required by the Protocols. Therefore, our proposed analysis includes weekend/holiday day types for each month. Matching for the *non-summer* season will use data for the November through May preceding EVTOU5 enrollment, while that for the *summer* season used data for the June through October preceding EVTOU5 enrollment.

Matching will be based on Euclidean distance minimization between treatment and potential control group customer loads. This approach minimizes the difference between a standardized usage metric of the treatment and potential control group customers. The standardized metric, for example, combines the 48 hourly load difference statistics for the two average weekday load profiles for the EVTOU customers into a single value equal to the square root of the sum of squared differences between the load statistics. That is, each enrolled customer is compared to each potential control group customer, using the distance measure. The eligible control-group customer with the minimum distance statistic is selected as the match for the corresponding EVTOU5 customer. Potential control group customers will be allowed to be matched to multiple enrolled customers.

If there are enough NEM customers, we will conduct matches for NEM customers with the additional restrictions: (1) must be NEM for the entire analysis period, (2) matched on solar PV size (and other solar PV characteristics, if available), and (3) must not have large changes in net profiles between years.[3] A separate difference-in-difference analysis will be conducted for the NEM customers.

Once matched control group customer accounts have been selected for each EVTOU2 to EVTOU5 participant, we set up difference-in-differences fixed-effects panel regression models for each relevant group (*e.g.*, separate groups by Coastal and Inland climate zones, NEM). The models include hourly load data for the relevant period for each participant in the group, along with their matched control group customer, as well as data for the pre-treatment period. The transition from standard tiered rates will be modeled using a before/after analysis. These models are described in detail in Section 2.3.

2.3 EVTOU *Ex-post* Load Impact Evaluation

The primary objectives of the *ex-post* impact evaluation were described in Section 1.1. This section describes the data and specific methods that we plan to use, including a discussion of the estimation of uncertainty-adjusted load impacts and distributions of load impacts. The methods described here focus on the control-group methods, as those will be the basis for the impacts reported under the Protocols.

2.3.1 EVTOU Data

Analysis that addresses each of the load impact objectives listed in Section 1.1 requires the following types of data:

- *Customer* information for the residential EVTOU enrollees and potential control group customers (*e.g.*, location indicator for matching to climate zone, and a summary indicator of their usage level);
- Billing-based *interval load data* (*i.e.*, hourly loads for each EVTOU enrollee, and potential control group customers);
- *Weather data* (*i.e.*, hourly temperatures and other variables for the relevant time period, for both climate zones—coastal and inland);
- *Program event data* (*i.e.*, dates and hours of events EVTOU customers are enrolled in, and event triggers).

2.3.2 EVTOU Analysis Methods

This section describes the process that we plan to follow in estimating program load impacts. Estimating load impacts using data for both participants and matched control group customers involves three steps. First, we request hourly load data for the EVTOU enrollees for the current year and pre-enrollment year. Second, we select matched control group customers for the EVTOU2 to EVTOU5 enrollees, as described above.

[3] A large change in net profile is more likely attributable to changes in solar PV characteristics rather than a response to an EVTOU rate. Removing these instances from the analysis mitigates confounding load impact estimates.

Third, we estimate fixed-effects panel regression models, representing difference-in-differences estimates of average EVTOU period load impacts.

Fixed-effects panel regression models

The formal *ex-post* load impact estimates will be based on *fixed-effects* panel regression models. These models are appropriate in situations like the current study, in which observed data are available for both multiple individual customers (cross-section) and multiple days, or time periods (time-series). The advantages of estimating such models include: 1) accounting for the effect of relevant factors on the variation in usage across customers and days, 2) accounting for the effects of weather conditions on usage, and 3) calculation of standard errors around the estimated load impact coefficients, thus allowing construction of *confidence intervals*.

Estimating hourly ex-post load impacts by subgroup

For EVTOU load impacts, we estimate a distinct model for each required result. For example, we estimate a model including only August non-holiday weekdays to get the average EVTOU load impacts on that day type. In this case, we simplify the model to include customer and date fixed effects, plus a variable to estimate the load impact (*i.e.*, the coefficient β_1). Separate models are estimated by hour, month, day-type (*i.e.*, average weekday versus peak month day), applicable customer groups (*e.g.*, climate zone, NEM). Results for NEM customers will be separately reported and appropriately aggregated into the program results. The customer-level fixed-effects models are of the following form:[4]

$$kW_{c,d} = \beta_0 + \beta_1 \times Treatment_{c,d} + \beta_2 \times Evt_{c,d} + C_c + D_d + \varepsilon_{c,d}$$

The variables and coefficients in the equation are described in the following table:

[4] Note that the customer and date fixed effects remove the need for us to include stand-alone $Treatment_c$ and $Post_d$ variables. The former is perfectly collinear with the customer's fixed effect and the latter is perfectly collinear with a combination of date fixed effects.

Symbol	Description
$kW_{c,d}$	Load in a particular hour for customer *c* on day *d*
$Treatment_{c,d}$	Variable indicating whether customer *c* is a treatment customer that transitioned from EVTOU2 to EVTOU5 (1) or a Control EVTOU2 (0) customer on day *d*
$Evt_{c,d}$	Variable indicating whether day *d* is an event day for customer *c*[5]
β_0	Estimated constant coefficient
β_1	Estimate of EVTOU load impact
β_2	Estimate of average event-day load impact
C_c	Customer fixed effects
D_d	Date fixed effects
$\varepsilon_{c,d}$	Error term

Estimating distributions of load impacts for different customer segments
We will produce distributions of load impacts by percentiles of usage from the statistical comparison of event-day treatment and control groups separated by categories of average hourly peak-period usage. That is, the models described above can be estimated on different sub-sets of customers, allowing us to estimate, for example, load impacts by climate zone.

Calculating uncertainty-adjusted load impacts
The Load Impact Protocols require the estimation of uncertainty-adjusted load impacts. In the case of *ex-post* load impacts, the coefficients that represent the estimated load impacts in the fixed-effects regressions are not estimated with certainty, but with a range of uncertainty indicated by the variance of the estimates. Therefore, we will base the uncertainty-adjusted load impacts on the variances associated with the estimated load impact coefficients (*e.g.*, the treatment-period coefficients in the twenty-four hourly regressions).

The uncertainty-adjusted scenarios will then be simulated under the assumption that each hour's load impact is normally distributed with the mean equal to the sum of the estimated load impacts and the standard deviation equal to the square root of the sum of the variances of the errors around the estimates of the load impacts. Results for the 10^{th}, 30^{th}, 70^{th}, and 90^{th} percentile scenarios will be generated from these distributions.

In order to develop the uncertainty-adjusted load impacts associated with the *average* EVTOU pricing period, we will estimate additional sets of regression models in which the load impact variable is constrained to be the same across the applicable hours. The associated standard errors will then be used to develop the uncertainty-adjusted load impacts in the same manner described above.

Validity assessment

[5]The *Evt* variable indicates any event day that a customer is enrolled in (*e.g.,* CPP).

Because we are employing a control-group approach, our validity assessment will focus on comparisons of treatment and control-group loads for pre-treatment days. To the extent that the two groups differ systematically, we will assess the ability of our models to properly implement the difference-in-differences approach. This will be implemented by comparing simulated loads to observed loads on pre-treatment days. The performance of the models will be evaluated in terms of accuracy and potential bias (*e.g.*, do the equations systematically understate load on pre-treatment days?). We will also report statistics like relative root mean square error and median percent error, which provide formal estimates of the percent differences between observed and simulated loads.

2.4 Developing EVTOU *Ex-Ante* Load Impacts

Estimating *ex-ante* load impacts for future years for a particular DR rate or program requires three key pieces of information:

- An *enrollment forecast* for relevant elements of the program;
- *Reference loads* by customer type;
- A forecast of *load impacts per customer*, again by relevant customer type, where the load impact forecast also varies with weather conditions, as determined in the *ex-post* evaluation.

SDG&E will provide the first of the three required items, the *enrollment forecast*. The second and third items (per-customer *reference loads* and *load impacts*) will be simulated using a modified version of the regression model presented in Section 2.3. Specifically, we will add an interaction between the load impact variable and weather to the “descriptive” model (with weather variables, etc. in place of daily fixed effects). This will allow us to simulate both the reference loads (using predicted loads with the load impact variables “turned off”) and the load impacts (using only the load impact variables, including the estimated effect of weather on the load impact). If the estimated load impact does not vary with weather (*e.g.,* small number of events), then we propose applying the *ex-post* load impact percentage to simulated reference loads to calculate the *ex-ante* load impact.

Reference loads and load impacts are simulated using the appropriate weather scenario data (*i.e.*, the 1-in-2 and 1-in-10 weather-year conditions to be provided by SDG&E) and event-day characteristics. If SDG&E determines that future participants will be systematically different from current participants, we will explore the availability of interval data for more representative customers that can be used to develop the *ex-ante* reference loads and load impacts. We then apply the per-customer reference loads and load impacts to SDG&E’s enrollment forecast to generate *ex-ante* forecasts.

Uncertainty-adjusted load impacts will be generated from variations in the *ex-post* estimation precision by day type/hour for EVTOU. Scenario-specific percent load impacts will be developed from 10th, 30th, 50th, 70th, and 90th percentile load changes estimated for the relevant program year.

2.5 VGI Pilot Evaluation Methods

For the VGI Pilot evaluation, separate analyses will be conducted for workplace and "home" charging (*i.e.*, the charging at multi-family dwellings), for two reasons: the charging behavior appears to differ at the two location types, especially by hour of day; and only workplace charging sessions allow us to compare behavior when the session is billed to the driver rather than the host.

The model uses session-level data (each data point is an instance of a driver plugging into a charging station). The workplace charging model is specified as follows:

$$kWh_s = \beta_0 + \beta_1 \times Price_s + \beta_2 \times (Price_s \times RTD_s) + \beta_3 \times Weather_s + \Sigma_h (\beta_{4,h} \times Start\_hour_{s,h}) + Site + Driver + \varepsilon_s$$

The variables and coefficients in the equation are described in the following table:

Symbol	Description
kWh_s	Total kWh during charging session *s*
$Price_s$	Average price during charging session *s*
RTD_s	Variable indicating that session *s* is billed to the driver (rather than the station host)
$Weather_s$	Weather variable reflecting average temperature during charging session *s*
$Start\_hour_s$	Hour of day in which session *s* begins
β_0	Estimated constant coefficient
β_1	Estimated effect of price in session kWh charged
β_2	Incremental estimated effect of price in session kWh charged for sessions billed to the driver
β_3	Estimated effect of weather on the charge quantity
$\beta_{4,h}$	Estimated effect of start hour *h* on the charge quantity
Site	Charging site fixed effects
Driver	Driver fixed effects
ε_s	Error term

The two coefficients of primary interest are β_1 and β_2. The former represents the effect of price on the session's charging quantity while the latter represents the incremental price effect when the driver pays the bill. Our prior is that β_2 will be negative and statistically significant, reflecting greater price response when the driver pays the hourly prices. We may test variations of this model in which kWh and/or price are logged.

A separate set of models of the effect of the session's charging price on the duration of the charging session will take the same form as above, simply replacing the dependent variable with the duration of the charging session in hours.

The non-workplace models will take the same form, but omit the interaction between RTD and price, as only RTD charging sessions exist at the multi-family dwelling charging stations.

While the VGI analyses do not readily conform to the Load Impact Protocols (*e.g.*, there aren't 1-in-2 and 1-in-10 schedules of hourly prices to align with the required scenarios), we intend to provide simulation-based results that illustrate the magnitude of the estimated price effect. For example, we may show the reduction in kWh charged when the session has high (event-based) prices rather than low everyday prices.

3. DATA SOURCES

SDG&E will provide the required data, including customer characteristics; interval load data; weather data; program participation and event data; and *ex-ante* scenario data (*i.e.*, the weather conditions associated with each required scenario).

4. DETAILED PLAN OF WORK

This section describes our work plan for conducting the project, which consists of six tasks.

Task 1: Develop Measurement and Evaluation Plan

CA Energy Consulting will draft a measurement and evaluation (M&E) plan (this document), which builds on our proposal document and takes into account discussions at the PI meeting. The plan is organized around the following outline:

- *Introduction and Key Issues*.
- *Study Method* (*e.g*., show specifics on how the data collection and research plan will address all of the research objectives outlined in the introduction).
- *Data Sources*. This section specifies data sources needed to successfully complete the evaluation, including customer information for any planned samples, program implementation information, and Smart Meter interval load and billing data.
- *Detailed Plan and Work*. This section describes planned tasks and sub-tasks for completing the evaluation, including task definitions and deliverables.
- *Deliverables Schedule and Due Dates*. This section summarizes deliverables and due dates, and provides a timeline for the project.
- *Quality Control Mechanisms and Processes*. This section outlines our plans to ensure the tables, figures, data files, and table generators have been checked for accuracy and are error-free.

Deliverables:

• Draft M&E plan	October 30, 2020
• Final M&E plan	5 days after receipt of comments

Task 2: Impact Evaluation

This task involves assembling data and conducting the *ex-post* and *ex-ante* evaluations.

Task 2.1: Data Collection and Validation

The data required to conduct the analysis include:

- Customer account information for all customers in selected samples, including:
  - a Customer ID that is consistent across databases;
  - closest weather station;
  - Rate code (*e.g*., low-income)
  - Information on EVTOU enrollment dates
  - NEM enrollment dates and solar PV characteristics (*e.g.,* size, tilt, azimuth)
- Billing-based interval load data for each sample customer;
- Hourly temperatures and other weather variables for each weather station; and
- VGI price data.

We will examine the data to ensure that the customer information can be matched to hourly load data; and to ensure that the hourly load data appear to be accurate. CA Energy Consulting will then create the databases required to conduct the analyses.

Task 2.2: Ex-post Load Impact Analysis

We will undertake the *ex-post* load impact analysis using the data received from SDG&E and the methods described in Section 2.3.

<u>Load impact estimation</u>

We will estimate average load impacts for customers who switch from EVTOU2 to EVTOU5 and the standard rate to EVTOU2 or EVTOU5, at the program and average customer level, using methods as described in Section 2.3, and as agreed upon with the SDG&E project manager. Uncertainty-adjusted load impacts and distributions of load impacts by customer subgroups will be developed as described in Section 2.3. Separately, we will estimate the effect of VGI hourly prices on participant charging behavior (session duration and kWh charged).

Task 2.3: Ex-ante Impact Analysis

Forecasted load impacts and reference loads for 2020 through 2031 will be produced for 1-in-2 and 1-in-10 weather year conditions, for customers that transition from the standard tiered rate to EVTOU2 or EVTOU5, on a per-customer and aggregate basis. Results shall be provided for:

- Forecasts shall be provided for the monthly system peak day and average weekday and weekend, for each month that the rates will be available, under both 1-in-2 and 1-in-10 weather year conditions, for both CAISO and SDG&E monthly peak days.

- Forecasts for the average day by month in both 1-in-2 and 1-in-10 weather year conditions.
- Uncertainty-adjusted load impacts shall be estimated on an aggregate and per-customer basis.

Task 3: Prepare Reports

CA Energy Consulting will prepare draft, high-level summary, and final reports that summarize the load impacts estimated in Tasks 2.2 and 2.3, in the schedule provided below. The report will contain a non-technical abstract and executive summary; an introduction summarizing objectives and an overview of the program and project; a section describing the data used and analysis techniques employed; a results section presenting *ex-post* load impacts; a validity assessment of the findings discussing any threats to the reliability of the results; and a conclusion section summarizing findings and recommendations. In conjunction with the final report, we will deliver spreadsheet-based Protocol table generators, which will provide the user with explanations for why some data may not be reported in the table (*e.g.*, no customers in the cells, or restrictions to maintain customer confidentiality). The report will include an abstract of less than 3,000 characters that is suitable for posting on the CALMAC website.

In addition, we will provide a Quality Control (QC) report that will demonstrate that load impacts add up correctly, demonstrate that the number of customers in the program agrees with the datasets provided, compare *ex-post* and *ex-ante* load impacts, and ensure that MW levels are consistent with the enrollment forecasts.

Deliverables:

• Draft *ex-post* LI estimates (report/table generators)	Early January 2020.
• Final *ex-post* LI estimates (report/table generators)	Mid-January 2020.
• Draft *ex-ante* LI estimates (report/table generators)	February 15, 2021.
• Final *ex-ante* LI estimates (report/table generators)	March 1, 2021.
• Final hourly and monthly *ex-post* and *ex-ante* datasets	March 1, 2021.
• Executive Summary write-up for April 1st reports	March 15, 2021.
• Non-technical abstract for CALMAC website	April 10, 2021.

Task 4: Presentation of Results

CA Energy Consulting will attend the DRMEC load impact workshop that traditionally follows the submittal of the utilities' impact evaluation reports and will present results of EVTOU load impacts.

Task 5: Project Management and Progress Reporting

The CA Energy Consulting project manager (Dr. Daniel Hansen) shall manage all day-to-day details of the project. He will work closely with the SDG&E project manager to ensure smooth operation of the project.

We shall participate in conference calls as requested and shall provide monthly written status reports by the 10th day of each month.

Deliverables:

- Monthly or bi-weekly conference calls. TBD.
- Monthly status reports showing: 1) summary of accomplishments in previous month; 2) current month's planned activities; and 3) any variances in schedule and budget, with explanations as needed.

Task 6: Database Documentation

Upon Program Manager's request, CA Energy Consulting shall provide an integrated project database consisting of all the data collected and developed in the project and produce detailed documentation of all variables used in the database.

Deliverables:

- Integrated project database March 1, 2021.
- Database specifications and documentation March 1, 2021.

6. QUALITY CONTROL MECHANISMS AND PROCESSES

CA Energy Consulting will conduct a variety of quality assurance procedures, as described below.

- *Database review*. We will evaluate the interval data to ensure consistency and regularity, checking it against billing data if necessary.
- *Reporting checklist*. We have developed a checklist that the project team will apply to each results table generator and to the evaluation report. This will help ensure that results are correct, complete, consistent, and properly labeled.

CA Energy Consulting will also carefully review the databases that must be provided to comply with the Protocols.