

PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco CA 94102-3298



Pacific Gas & Electric Company
ELC (Corp ID 39)
Status of Advice Letter 6850E
As of August 5, 2024

Subject: Measurement and Evaluation Study Proposal for PG&E's Real-Time Pricing (RTP) Pilots,
Pursuant to D.22-08-002

Division Assigned: Energy

Date Filed: 01-30-2023

Date to Calendar: 02-06-2023

Authorizing Documents: D2208002

Disposition:	Accepted
Effective Date:	01-30-2023

Resolution Required: No

Resolution Number: None

Commission Meeting Date: None

CPUC Contact Information:

edtariffunit@cpuc.ca.gov

AL Certificate Contact Information:

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PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco CA 94102-3298



To: Energy Company Filing Advice Letter

From: Energy Division PAL Coordinator

Subject: Your Advice Letter Filing

The Energy Division of the California Public Utilities Commission has processed your recent Advice Letter (AL) filing and is returning an AL status certificate for your records.

The AL status certificate indicates:

- Advice Letter Number
- Name of Filer
- CPUC Corporate ID number of Filer
- Subject of Filing
- Date Filed
- Disposition of Filing (Accepted, Rejected, Withdrawn, etc.)
- Effective Date of Filing
- Other Miscellaneous Information (e.g., Resolution, if applicable, etc.)

The Energy Division has made no changes to your copy of the Advice Letter Filing; please review your Advice Letter Filing with the information contained in the AL status certificate, and update your Advice Letter and tariff records accordingly.

All inquiries to the California Public Utilities Commission on the status of your Advice Letter Filing will be answered by Energy Division staff based on the information contained in the Energy Division's PAL database from which the AL status certificate is generated. If you have any questions on this matter please contact the:

Energy Division's Tariff Unit by e-mail to
edtariffunit@cpuc.ca.gov

January 30, 2023

Advice 6850-E

(Pacific Gas and Electric Company U 39 E)

Public Utilities Commission of the State of California

Subject: Measurement and Evaluation Study Proposal for PG&E's Real-Time Pricing (RTP) Pilots, Pursuant to D. 22-08-002

Purpose:

The purpose of this advice letter (AL) is to describe the Measurement and Evaluation (M&E) plan for Pacific Gas and Electric (PG&E)'s Real Time Pricing (RTP) Pilots for residential and small and larger commercial customers.

Background:

Decision (D.) 22-08-002 (or "Decision")¹ authorized PG&E to implement opt-in Real-Time-Pricing (RTP) pilots available to bundled PG&E customers on B-20 (large commercial), B-6 (small commercial) and E-ELEC (residential) rates. The pilot design replaces the base rates' generation charges with real-time elements, including Marginal Energy Charge (MEC), Marginal Generation Capacity Cost (MGCC), and Revenue Neutral Adder (RNA). These Stage 1 pilots would have a duration of 24 months, subject to extension.

The Decision further requires PG&E to perform two measurement and evaluation studies: 1) an Interim Evaluation Report to be completed approximately 18 months after the Stage 1 pilots are launched, based on available data from the first 12 months' operations of the Stage 1 pilots and 2) a Final Evaluation Report based on the full 24 months of pilot operations (whether to extend or not).

Dual participation is currently prohibited between Stage 1 RTP Pilots and load management approaches, including demand response (DR) programs that are dispatched, or otherwise based, on day-ahead price signals, or have energy-based payments (such as ELRP, DRAM, BIP, CBP). The Interim Evaluation report will include

¹California Public Utility Commission. (2022). Decision 22-08-002: DECISION ADOPTING REAL-TIME PRICING PILOT AND MARGINAL GENERATION CAPACITY COST STUDY AND ITS USAGE

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M496/K429/496429610.PDF>

findings to inform whether PG&E can mitigate some dual participation challenges and consider the feasibility in permitting limited dual participation on BIP and/or day-of option for ELRP and RTP Pilots to further evaluate impacts. The Interim Report will also inform a recommendation as to whether the Commission should extend the Stage 1 pilot rates beyond the original 24-month period.

Settling parties under A. 19-11-019 also agreed that PG&E shall hold a workshop no later than 120 days after the final decision (adopted August 4, 2022), to elicit interested parties' suggestions for further developing metrics for measuring and evaluating the RTP pilots. On December 1, 2022, PG&E conducted a public M&E workshop to discuss and solicit feedback on key M&E objectives to evaluate the success of RTP Pilots.² The Decision also approved the Settlement Agreement³ which further requires PG&E to file a Tier 1 Advice Letter within 60 days from the workshop describing the proposed evaluation plan.

Proposed Measurement and Evaluation (M&E) Plan

The following section details PG&E's RTP Pilots M&E plan, including key research objectives and metrics to inform load response, grid benefits, customer experience and rate design of dynamic rates. PG&E expects to conduct most of these M&E activities through a third-party evaluator, though some analysis may be conducted internally. PG&E will put forth the best effort to execute measurement and evaluation efforts defined in this plan but acknowledges that findings will be subject to data availability based on rate adoption.

Research Objective 1: Assessment of Load Response

This objective evaluates the load response from customers who participate in the RTP Pilots and the efficacy of dynamic rate design in shifting loads based on hourly prices.

- a. Key Research Questions:
 - i. What is the load impact/shift in response to RTP?
 - ii. How do customers' load impacts on RTP compare to Time-Of-Use (TOU) rates?
 - iii. Subject to data sufficiency, do customer load impacts differ between the first year and second year (after bill protection for residential customers ends)?
 - iv. What are the characteristics of customers that provided additional load impacts by reacting to RTP prices compared to those who are structural beneficiaries?

² See Attachment A (December 1, 2022 M&E Workshop Presentation)

³ Motion for Adoption of Joint Settlement Agreement on Real Time Pricing Issues Including Stage 1 Pilots, November 11, 2019.

- b. Metrics:
 - i. Hourly load impact (where possible, results may be presented by seasons, months, and 8760 by hour x day) for an average customer in each customer class
- c. Data Collection—Data elements to be collected and analyzed for this objective may include, but are not limited to:
 - i. Customer characteristics
 - ii. Hourly prices
 - iii. Weather data
 - iv. Meter interval data
 - v. Customer technology types

Estimating load impacts under an RTP design will require more complex data analysis and modeling due to dynamic price changes and lack of a typical counterfactual (i.e., the customer's energy usage on an otherwise applicable tariff (OAT)). Potential approaches to estimate load response will include regression analysis, control groups with difference-in-difference, or other statistical modeling as appropriate.

Where possible, PG&E will compare load impacts to Demand Response (DR) programs (i.e., Critical Peak Pricing (CPP)). For meaningful load impact comparisons, numerous factors will need to be considered, such as whether DR customers experienced similar dispatch conditions to RTP price signals, the similarity of weather conditions, and customer segmentation and technologies.

Dual participation between RTP pilots and DR programs is not currently allowed under Stage 1 Pilots. The Interim Evaluation report will include an evaluation of load impacts and inform whether dual participation challenges, such as allocation of impacts by program and double compensation, can be addressed before allowing limited dual participation of Stage 1 pilot participants.

Research Objective 2: Assessment of Greenhouse Gas (GHG) and System Benefits

This objective seeks to quantify overall system benefits and greenhouse gas (GHG) impacts associated with dynamically reactive loads in response to the pilots' real-time pricing structure.

- a. Key Research Questions:
 - i. What are the GHG impacts and system benefits (marginal energy costs, marginal capacity costs and marginal GHG emissions) due to the load shifting of RTP customers compared to customers on OAT such as B-20, B-6, and E ELEC?

- ii. What are the system benefits due to the load shifting of RTP customers compared to OAT customers related to transmission and distribution costs, if any?
- b. Metrics
- i. Average \$ per hour by hour of the year for each class of system benefits and class of customers
 - ii. Average GHG emissions impacts in kilogram (kg) of carbon dioxide (CO₂) equivalent by hour of the year for each class of customers
- c. Data Collection—Data elements to be collected and analyzed for this objective may include, but are not limited to:
- i. Hourly load impacts from Topic #1
 - ii. Day-ahead energy prices at PG&E Default Load Aggregation Point (DLAP)
 - iii. Capacity costs from load and net load data
 - iv. GHG emissions rates from Avoided Cost Calculator (ACC)⁴

GHG impacts can be assessed by multiplying the hourly load impacts (estimated in Objective #1) by the average marginal GHG emissions rate in each hour (or interval) and summing over appropriate periods (e.g., by month and by hour of the day). This will require 8760 load impacts (by hour x day) from Objective #1, which entails greater levels of granularity in the analysis than is common for load shift studies and will likely be subject to high levels of statistical noise.

Marginal generation capacity costs can be calculated using the formula prescribed in the RTP rate design. PG&E proposes to calculate marginal transmission and system-average distribution costs using methodologies from the most recent Avoided Cost Calculator.

Research Objective 3: Customer Bill Analysis

This objective evaluates customer bill savings and costs from participating on the RTP tariff.

- a. Key Research Questions:
- i. What is the customer bill savings by being on RTP compared to their OAT?
 - ii. What level of load response is necessary for customers to benefit from RTP?
- b. Metrics
- i. Customer bill impacts compared to OAT

⁴ ACC Model and documentation are available at <https://www.cpuc.ca.gov/industries-andtopics/electrical-energy/demand-side-management/energy-efficiency/idsm>.

- c. Data Collection—Data elements to be collected and analyzed for this objective may include, but are not limited to:
 - i. Customer billing data
 - ii. Load impacts and load shift data from #1

To analyze this topic, PG&E will run rate analyses based on customer usage data on RTP, compared to their OAT. Where possible, PG&E will control for factors including, but not limited to, local weather conditions, geographic location, time of day and day of the week, month of the year, if significant. Subject to data availability, PG&E will attempt to analyze bill impacts across various technology types (e.g. electric vehicles (EV), heat pumps, storage, etc.).

Research Objective 4: Customer Research (during and after pilot implementation)

This objective is to evaluate the customers' experience, technologies and strategies employed on the RTP pilot.

- a. Key Research Questions:
 - i. What are the factors (drivers/barriers, risks/benefits) that influenced customers to either enroll or not enroll into the RTP pilot?
 - ii. What appliances or technologies did customers utilize to shift loads (e.g., batteries, EVs, smart appliances)?
 - iii. What optimizing strategies did customers utilize to response to RTP (e.g., charge and discharge batteries, EV charging, manual or automated technologies)?
- b. Metrics
 - i. Marketing, education and outreach (ME&O) metrics include outreach-conversion rates from marketing efforts, customer enrollment and retention.
 - ii. Customer feedback
- c. Data Collection—Data elements to be collected and analyzed for this objective may include, but are not limited to:
 - i. ME&O performance metrics
 - ii. Customer enrollments
 - iii. Customer Survey response

To answer many of these questions, PG&E will track ME&O metrics throughout pilot implementation and utilize customer surveys to collect direct customer feedback. In addition to identifying drivers for participation, PG&E will also examine the ability of the customer to plan ahead and shift usage to times when rates are lower, including technologies and optimization techniques used to be successful. Through these questions we aim to gain customer insights to better understand customer expectations, experiences, and behaviors.

Research Objective 5: Benefits and Trade-offs inherent to RTP Pricing

This objective is to analyze and understand the characteristics of those customers that elect to go on this optional rate.

a. Key Research Questions:

- i. What are the key characteristics of customers that choose to enroll in RTP? (e.g., net energy metering (NEM), load profile types, technology, etc.)
- ii. How big is the self-selection bias for those who chose RTP? Is there a revenue shortfall due to self-selection bias?
- iii. Do customers enroll in the rate because they have a structural benefit even before doing any load shifting? How does the magnitude of the structural benefit compare to the load shifting benefit?
- iv. How does the first-year bill protection for residential customers affect customer retention, customer load, and bill impacts?

To analyze many of these questions, PG&E will consider customer characteristics as well as load shapes before and after RTP enrollment. PG&E will also examine the differences between load shapes of customers on RTP and similar customers on TOU rates as a “control” group. This effort will utilize similar metrics and data sources mentioned in Objectives 1 through 4.

Research Objective 6: Pilots Costs

This objective is to track costs incurred on the RTP pilots.

a. Key Research Questions:

- i. What are the fixed costs of this RTP pilot, regardless of number of participants?
- ii. What are the variable costs that scale with the number of participants? What’s the incremental cost-per-participant?

b. Metrics

- i. Fixed costs
- ii. Variable Costs by participant

c. Data Collection—Data elements to be collected and analyzed for this objective may include, but are not limited to:

1. Pilot Costs

PG&E will track program costs throughout pilot implementation. Per the Decision, program costs would be reported on a cost-per-participant basis wherever possible. Program cost metrics will also be tracked on a fixed as well as a variable basis. The RTP settlement also acknowledges that some “fixed” costs may actually vary depending on the number of participants and whether the program were scaled from a pilot to a standard rate option. PG&E proposes to identify those types of costs by the Final Report.

Research Objective 7: Revenue Under/Over-Collection

The objective of the Revenue Under/Over-collection Study is to evaluate the accuracy of the revenue neutral adder (RNA) and propose adjustments, as needed, to ensure RTP Pilot customers’ revenues are on par with the generation revenues that would be received from the same customers, under the customer’s otherwise applicable tariffs.

PG&E will evaluate the drivers that contribute to the balance in the Energy Resource Recovery Account (ERRA), which will be used to derive the appropriate RNA value. A specific area of interest will be to evaluate how much of the balance in the ERRA is attributable to the difference between the energy cost forecast and actual energy market revenue charged to bundled customer load. Additionally, PG&E will evaluate the cost of capacity embedded in the generation rate and compare that to actual capacity expenses recorded to the ERRA to evaluate how much of the balance may be attributable to the cost of capacity.

The evaluation of both the energy and capacity expenses embedded in the RNA will shed light on whether any adjustments to the RNA are warranted, avoid double counting of actual energy or actual costs already paid for by the RTP Pilot customers through their energy and capacity rates.

- a. Key Research Questions:
 - i. What part of the over-and under-collection (balance in the Energy Resource Recovery Account (ERRA)) is due to structural effects (i.e., due solely to enrollment and disenrollment) and what part of the balance is attributable to rate-induced changes in customer energy use?
 - ii. Are there elements of the ERRA balance used to derive the RNA that may not be applicable to a RTP rate or that double count Stage 1 Pilot Customers’ RTP Energy and / or Capacity costs?
- b. Metrics:
 - i. Quantify line items that contribute to balancing account variance, which will include both billed customers’ revenue variance and cost variance.
 - ii. Quantify double counting in the Revenue Neutral Adder (RNA) for RTP customers, which will be directly related to RTP customers’

energy and capacity rate revenues already collected from these customers.

- c. Data Collection—Data elements to be collected and analyzed for this objective may include, but are not limited to:
 - i. Customer load profiles before and after Stage 1 Pilot,
 - ii. RTP prices compared to TOU prices,
 - iii. ERRA balance as well as the balance in the Portfolio Allocation Balancing Account (PABA), which collected above-market generation expenses through the PCIA and the balance in New System Generation Balancing Account (NSGBA) which collects net capacity costs for generation resources supporting system capacity from all retail customers through the New System Generation Charge (NSGC).

Although it was expected that the Power Charge Indifference Adjustment (PCIA) would no longer be included in Bundled service customers' generation rates at the time of the RTP implementation, full implementation of unbundling the PCIA on customers' bills has been delayed. As a result, the non-time varying PCIA rates for each rate schedule will be added to the RNA.

Additionally, regulatory accounting changes implemented in 2020 and 2021 now allow for balance transfers between the ERRA and PABA, which may complicate the RNA evaluation given the ERRA balance effectively becomes collected through the non-bypassable PCIA rates. Thus, any proposed RNA adjustments may require creative solutions to implement RNA adjustments just for RTP customers.

PG&E will provide a comprehensive evaluation of the RNA and generation-related balancing account balances in its status reports along with a proposal to adjust the RNA, if warranted, to avoid under-recovery or over-recovery of costs if they are paid through other components of the RTP Pilot rates.

Feedback from M&E Workshop:

PG&E hosted an M&E workshop on December 1, 2022 to elicit feedback from public parties on the RTP Pilots M&E plan. Attendees included representatives from the California Energy Commission (CEC), M.Cubed, Resource Insight, Illume Advising, California Public Utilities Commission (CPUC), Valley Clean Energy, Enel North America, Demand Side Analytics (DSA), and San Diego Gas and Electric (SDG&E).

Key actionable comments are described below:

- One participant asked whether load impacts will be averaged or specific to customer segments.

- PG&E will analyze load impacts by customer class (commercial/residential), at a minimum. To the extent possible, PG&E will attempt to estimate load impacts by additional customer segments such as technology types.
- One participant asked if PG&E can calculate the downside potential for RTP if there is an extended extreme heatwave, even if one doesn't occur during the pilot period.
 - The MGCC (Marginal General Capacity Cost) Study includes an analysis of downside potential. PG&E will consider updates to the study with newer rates and an extended dataset that includes more recent history.
- One participant asked, "Given the potential for self-selection bias, will PG&E craft any kind of control group within the sample group?"
 - Given PG&E expects limited enrollment on RTP rates, there may not be enough participants to incorporate a within-sample control group. However, PG&E will include control customers on the OATs (otherwise applicable tariffs) for analysis purposes.

After the workshop, PG&E shared associated materials and requested participants to provide any additional comments and feedback by December 15, 2022. No additional feedback was received.

Timeline and Deliverables

Following the implementation of the RTP Pilots, PG&E will submit 1) an Interim Evaluation Report approximately 18 months after the pilot launches, based on available data from the first 12 months' pilot operations and 2) a Final Evaluation Report approximately 30-32 months after the pilot launches, based on the full 24 months of pilot operations (whether to extend or not).

The Interim Evaluation Report would be submitted as part of a Tier 2 Advice Letter (AL), which would also include a recommendation as to whether the Commission should extend the Stage 1 pilot rates, either as is or with minor modifications, beyond the original 24-month period. The Interim Evaluation report will also inform whether PG&E can mitigate dual participation challenges and discuss whether limited dual participation should be permitted on BIP and/or the day-of option for ELRP and RTP Pilots. The Final Evaluation Report will be filed as part of a Tier 1 AL and will include a recommendation as to whether or not to continue any of the Pilot rates on a broader scale.

Protests

Anyone wishing to protest this submittal may do so by letter sent electronically via E-mail, no later than February 21, 2023, which is 22⁵ days after the date of this submittal. Protests must be submitted to:

CPUC Energy Division
ED Tariff Unit
E-mail: EDTariffUnit@cpuc.ca.gov

The protest shall also be electronically sent to PG&E via E-mail at the address shown below on the same date it is electronically delivered to the Commission:

Sidney Bob Dietz II
Director, Regulatory Relations
c/o Megan Lawson
E-mail: PGETariffs@pge.com

Any person (including individuals, groups, or organizations) may protest or respond to an advice letter (General Order 96-B, Section 7.4). The protest shall contain the following information: specification of the advice letter protested; grounds for the protest; supporting factual information or legal argument; name and e-mail address of the protestant; and statement that the protest was sent to the utility no later than the day on which the protest was submitted to the reviewing Industry Division (General Order 96-B, Section 3.11).

Effective Date

PG&E requests that this Tier 1 advice letter become effective on January 30, 2023, which is the date this advice letter was submitted to the Commission.

Notice

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically to parties shown on the attached list and the parties on the service list for A.19-11-019 and A.20-10-011. Address changes to the General Order 96-B service list should be directed to PG&E at email address PGETariffs@pge.com. For changes to any other service list, please contact the Commission's Process Office at (415) 703-2021 or at Process_Office@cpuc.ca.gov. Send all electronic approvals to PGETariffs@pge.com. Advice letter submittals can also be accessed electronically at: <http://www.pge.com/tariffs/>.

⁵ PG&E is moving this date to the following business day because the 20-day protest period concludes on a weekend and holiday.

/S/

Sidney Bob Dietz II
Director, Regulatory Relations

cc: Service List A.19-11-019 and A.20-10-011



ADVICE LETTER SUMMARY

ENERGY UTILITY



MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: Pacific Gas and Electric Company (U 39 E)

Utility type:

- ELC GAS WATER
 PLC HEAT

Contact Person: Stuart Rubio

Phone #: (951)965-8905

E-mail: PGETariffs@pge.com

E-mail Disposition Notice to: stuart.rubio@pge.com

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas WATER = Water
 PLC = Pipeline HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 6850-E

Tier Designation: 1

Subject of AL: Measurement and Evaluation Study Proposal for PG&E's Real-Time Pricing (RTP) Pilots, Pursuant to D. 22-08-002

Keywords (choose from CPUC listing): Compliance

AL Type: Monthly Quarterly Annual One-Time Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: D. 22-08-002

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: No

Summarize differences between the AL and the prior withdrawn or rejected AL: N/A

Confidential treatment requested? Yes No

If yes, specification of confidential information:

Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required? Yes No

Requested effective date: 1/30/23

No. of tariff sheets: 0

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: N/A

Service affected and changes proposed¹: N/A

Pending advice letters that revise the same tariff sheets: N/A

¹Discuss in AL if more space is needed.

Protests and correspondence regarding this AL are to be sent via email and are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

California Public Utilities Commission
Energy Division Tariff Unit Email:
EDTariffUnit@cpuc.ca.gov

Contact Name: Sidnev Bob Dietz II. c/o Megan Lawson
Title: Director, Regulatory Relations
Utility/Entity Name: Pacific Gas and Electric Company

Telephone (xxx) xxx-xxxx: (415)973-2093
Facsimile (xxx) xxx-xxxx:
Email: PGETariffs@pge.com

Contact Name:
Title:
Utility/Entity Name:

Telephone (xxx) xxx-xxxx:
Facsimile (xxx) xxx-xxxx:
Email:

CPUC
Energy Division Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102

Clear Form

Attachment A

PG&E's Real Time Pricing (RTP) Pilots Measurement and
Evaluation (M&E) Plan Proposal

PG&E's Real Time Pricing (RTP) Pilots Measurement and Evaluation (M&E) Plan Proposal

Workshop

December 1, 2022



Together, Building
a Better California



Agenda

Introduction Safety Message Housekeeping Presenters Workshop Objectives	10 min
Background Real Time Pricing (RTP) Landscape Highlights of D.22-08-002	10 min
Measurement and Evaluation Approach Research Objectives and Metrics Next Steps & Timeline	40 min 5 min
Questions and Comments	25 min
Adjourn	



Earthquake

- Drop
- Cover
- Hold



Fire

- Exits, escape routes, evacuation plan
- [Compliant fire extinguisher](#)



Medical Emergency

- First aid/CPR
- 911/share location
- AED



Security

- Active shooter—get out, hide out, take out
- Use badge—don't tailgate
- Lock computer when unattended
- Report Phishing emails



Ergonomics

- 30/30
- [Proper ergo](#)
- RSI Guard



COVID-19

- Handwashing/masking
- CAL-OSHA regulations, local county health orders
- [Visit COVID-19 website](#)
- HR Helpline
415-973-4357



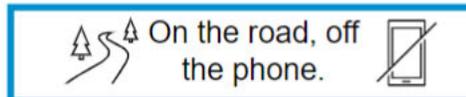
Emergency Planning

- Update [emergency contacts](#) and [personal emergency preparedness plan](#)



Psychological Safety

- Care for each other
- Look out for one another
- Create a safe space for all
- Welcome new ideas from everyone
- Practice self-care





Housekeeping



Mic & Camera Off



Presentation materials
will be distributed

Please enter name, affiliation and email in the chat



Questions or Comments?



Public



Presenters

Cross-functional PG&E Team & Responsibilities

Andrew Au

- Pricing Products LOB Lead

Katrina Wu

- M&E Lead

Jan Grygier

- Marginal Generation Cost Analysis Lead

Tysen Streib/ Donna Barry

- Rate Design Leads

Workshop Objectives



1. Present PG&E's Real-Time Pricing (RTP) Pilots Measurement and Evaluation (M&E) strategy, including key research objectives and metrics required in Decision (D.) 22-08-002



2. Elicit interested parties' suggestions for further developing and refining metrics for RTP Pilots.

RTP Pilots Rate Background





Real-Time Pricing (RTP) Landscape

D.21-12-015
Rate Enablement + Rate Comparison Tools
Opt-in Rate
2-year Export Compensation Pilot

D.22-08-002
Cross-over with CEV Dynamic Rate:
MGCC research
2-year pilot with option for extension

CEV RTP



GRC
Phase 2:
RTP Pilots



D.21-12-015
Non-PG&E Billing
3-year Pilot

VCE AG
Pumping



Q2 2022

Q4 2023

Public



Overview

Real Time Pricing (RTP) Pilots for: Residential, Small and Large Commercial customers

Decision

D. 22-08-002 approved on August 4, 2022

CPUC Authorized PG&E to:

- Implement opt-in RTP pilots available to bundled PG&E customers on B-20 (large commercial), B-6 (small commercial), and E-ELEC (residential) rates
- Offer Stage 1 Pilots for duration of 24 months, subject to potential extension after Interim Evaluation Report
- Replace generation charges with real-time elements
- Offer 1 year bill protection to residential participants
- Research and Evaluation
 - Interim Evaluation Report based on first 12 months' findings
 - Final Report after 24 months

Measurement & Evaluation Approach





Research Overview

Benefits and Trade-offs inherent to RTP Pricing

- Load Impacts
- Greenhouse Gas (GHG) Impacts and System Benefits
- Customer Bill Impacts
- Customer Research/Feedback

Pilot Costs

Revenue Under-Collection/Over Collection



Research Topic #1

Assessment of Load Response

Research Questions:

- What is the load impact/shift in response to RTP? How does customers load impacts on RTP compare to Time-Of-Use (TOU) rates?
- Do customer load impacts differ between the first year and second year (given sufficient data)?
- Who are the customers that provided additional load benefits by being on RTP compared to those who are structural benefiteres?

Additional Considerations:

- Where possible, load impacts may also be compared to Demand Response programs (i.e., Critical Peak Pricing (CPP))
- Dual participation not currently allowed but will be re-evaluated during Interim Report

Metrics

- Hourly load impacts (incl. by seasons/months/8760 by hour x day)

Data Collection Required

- Customer characteristics, hourly pricing, weather data, meter interval data, technology types

Approach

- Regression analysis, control groups with difference-in-difference, or other statistical modeling as appropriate



Research Topic #2

Assessment of Greenhouse Gas (GHG) and System Benefits

Research Questions:

- What are the GHG impacts and system benefits (marginal energy costs, marginal capacity costs and marginal GHG emissions) of RTP customers compared to customers on OAT (otherwise applicable tariffs) such as B-20, B-6, and E-ELEC ?
- What are system benefits of RTP customers compared to OAT related to transmission and distribution costs, if any?

Additional Considerations:

- Marginal generation capacity costs calculated using formula used in RTP rate
- Marginal GHG emissions rate calculated and published in five-minute intervals for Self-Generation Incentive Program (SGIP) participants
- Marginal transmission and system-average distribution costs calculated using methodologies from Avoided Cost Calculator
- Will require 8760 load impacts (by hour x day) from #1, which may be subject to high level of statistical noise

Metrics	<ul style="list-style-type: none"> • \$ per kWh of load by hour of the year for each class of system benefits • GHG emissions impacts
Data Collection Required	<ul style="list-style-type: none"> • Hourly load impacts from Topic #1 • Day-ahead energy prices at PG&E Default Load Aggregation Point (DLAP) • Capacity costs from load and net load data • GHG emissions rates from Avoided Cost Calculator (ACC)
Approach	<ul style="list-style-type: none"> • Sum-product of load impacts x marginal costs



Research Topic #3

Customer Bill Analysis

Research Questions:

- What is the customer bill savings by being on RTP (after load shift in response to RTP) compared to their OAT?
- What level of load response is necessary for customers to benefit from RTP?

Additional Considerations:

- Where possible, PG&E may run rates analysis and compare bill savings on other rates (ex. TOU).
- Given sufficient data, PG&E will attempt to analyze bill impacts across different technology types (e.g. electric vehicles (EV), heat pumps, storage, etc.)

Metrics

- Customer bill impacts compared to OAT

Data Collection Required

- Customer billing data
- Load impacts and load shift data from #1

Approach

- Rate analysis based on customer usage on RTP compared to OAT
- Use load impacts/ load shifts from #1 and model bill saving scenarios (some theoretical analysis required: if load shifts X amount, what is the bill savings?)



Research Topic #4

Customer Research (during and after pilot implementation)

Research Questions:

- What is the customer experience (drivers/barriers, risks/benefits) from those who experienced the RTP pilot?
- What appliances or technologies did customer utilize to shift loads (e.g. batteries, EVs, smart appliances)?
- What optimizing strategies did customers utilize to response to RTP (e.g. charge and discharge batteries, EV charging, manual or automated technologies)?

Additional Considerations:

- Where possible, customer surveys will draw parallels to Customer Research Study conducted by Demand Side Analytics (DSA).
- Includes tracking marketing, education and outreach (ME&O) metrics during pilot implementation to hone ME&O strategies and understand enrollment/de-enrollment trends.

Metrics

- ME&O metrics including: outreach-conversion rates from marketing efforts, customer enrollment and retention.
- Customer feedback

Data Collection Required

- ME&O performance metrics
- Customer enrollments
- Customer Survey response

Approach

- Track ME&O efforts, outreach conversion rates, enrollments during pilot implementation
- Conduct customer surveys/focus groups post participation



Research Topic #5

Benefits and Trade-offs inherent to RTP Pricing

Research Questions:

- What are key customer characteristics of customers that choose RTP? (e.g., net energy metering (NEM), load profile types, technology, etc.)
- How big is the self-selection bias for those who chose RTP? Is there a revenue shortfall due to self-selection bias?
- How does the magnitude of the structural benefit compare to the load shifting benefit?
- How does the first-year bill protection for residential customers affect customer retention, customer load, and bill impacts?

Additional Considerations:

- Informed by analysis in earlier topics (load analysis, bill impacts analysis, GHG and other marginal cost impacts, customer surveys)

Metrics	Load differences, bill impacts or trends comparing: 1) RTP before and after adoption 2) RTP vs TOU
Data Collection Required	Customer characteristics, data elements from #1-4
Approach	Analyze bill/load differences on RTP vs TOU Combine findings from #1-4



Research Topic #6

Pilot Costs

Research Questions:

- What are the fixed costs of this RTP pilot, regardless of number of participants?
- What are the variable costs that scale with the number of participants? What's the incremental cost-per-participant?

Additional Considerations:

- Pilot costs would be reported on a cost-per-participant basis where possible.
- These metrics can help inform the cost-effectiveness of this pilot and the level of enrollment necessary to scale up pilot to permanent rate.

Metrics

- Fixed costs
- Variable Costs by participant

Data Collection Required

- Pilot costs

Approach

- Track costs throughout pilot implementation



Research Topic #7: Revenue Under/Over-Collection

Evaluate Revenue Neutral Adder (RNA) Accuracy by reviewing balance in the Generation and Generation-Related Balancing Accounts

Research Questions:

- What part of the over- and under-collection (balance in the Energy Resource Recovery Account (ERRA)) is due to structural effects (i.e., due solely to enrollment and disenrollment) and what part of the balance is attributable to rate-induced changes in customer energy use?
- Are there elements of the ERRA balance used to derive the RNA that may not be applicable to a RTP rate or that double count Stage 1 Pilot Customers RTP Energy and / or Capacity costs

Additional Considerations:

- PG&E's RTP RNA did not anticipate using the Portfolio Allocation Balancing Account (PABA) balances in developing the RNA
- The regulatory accounting does intermingle the ERRA balance with the PABA for rate setting
- It may be important to consider how the ERRA balance transfer to PABA impacts the derivation of the RNA.

Metrics

- Quantify line items that contribute to balancing account variance
- Quantify double counting in Revenue Neutral Adder (RNA)

Data Collection Required

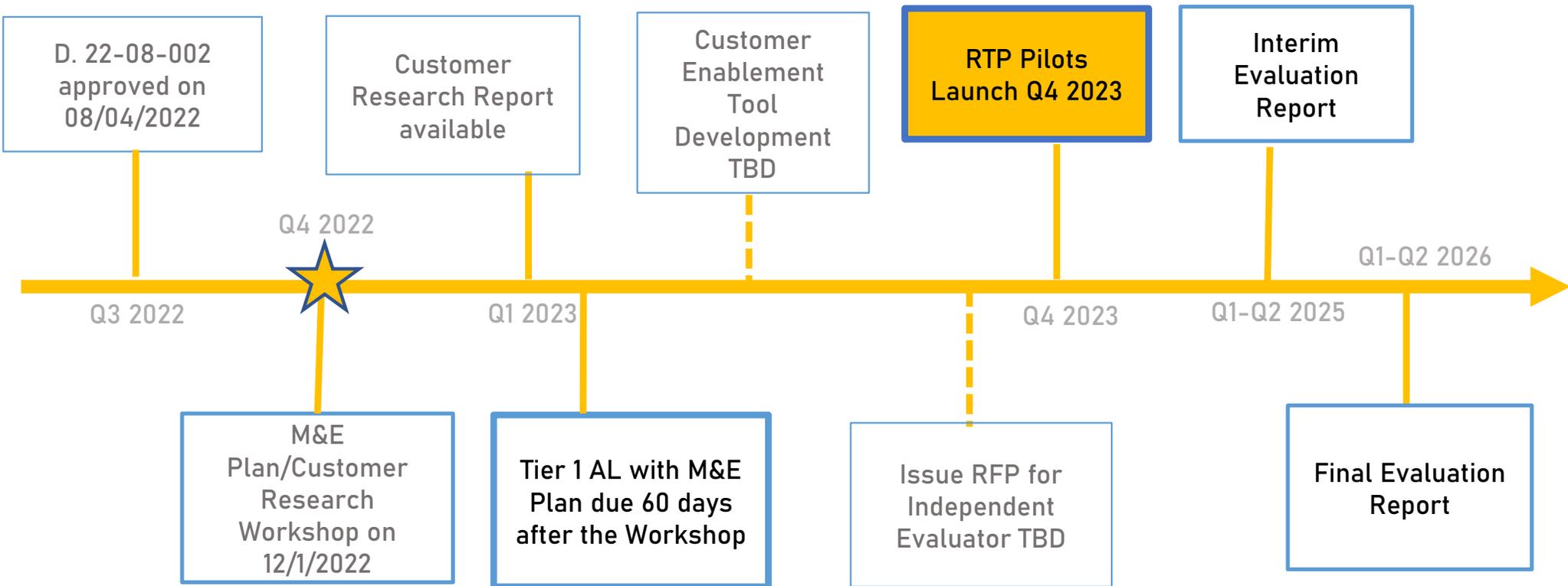
- Customer load profiles before and after Stage 1 Pilot,
- RTP prices compared to TOU prices,
- ERRA/PABA/New System Generation Balancing Account (NSGBA) data

Approach

- Analysis will evaluate load profiles and line items variance in ERRA
- PG&E will also evaluate PABA and NSGBA net capacity costs to identify relevant variances



Timeline and Next Steps



Instructions

- To ask a question or make a public comment, please use the "Raise Your Hand" option in your Teams window
- You will be called in the order of hands raised
- When called on, unmute yourself by pressing the mic button as seen in the graphic below. For those dialing in, press *5
- Please state your name and affiliation
- You may also ask a question via chat feature





Follow Up:

Please send any additional comments to the below contacts by Dec 15, 2022.

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Thank you!



Together, Building
a Better California

**PG&E Gas and Electric
Advice Submittal List
General Order 96-B, Section IV**

AT&T Albion Power Company	East Bay Community Energy Ellison Schneider & Harris LLP Engineers and Scientists of California	Pioneer Community Energy
Alta Power Group, LLC Anderson & Poole	GenOn Energy, Inc. Goodin, MacBride, Squeri, Schlotz & Ritchie Green Power Institute Hanna & Morton ICF	Public Advocates Office Redwood Coast Energy Authority Regulatory & Cogeneration Service, Inc.
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Dept of General Services Don Pickett & Associates, Inc. Douglass & Liddell Dish Wireless L.L.C.		