

Proposal to Revise Demand Response Control Group Settlement Methodology

PRESENTED TO:

Demand and Distributed Energy Market Integration
Working Group

PRESENTED BY:

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Background

Compared to other baseline methodologies for Demand Response (DR) settlement, CAISO's Control Group Methodology promises more accurate and precise payout to DR providers.^[1]

| Utility Program | Baseline type | Proposed | |
|-----------------------------|----------------------|---------------------------|-----------------------------------|
| | | Bias (MPE) ^[2] | Precision (CVRMSE) ^[2] |
| PG&E Residential AC cycling | Day matching | -4.00% | 0.086 |
| | Weather matching | -3.40% | 0.098 |
| | Control group | 0.40% | 0.051 |

However, despite its accuracy and precision, this methodology has rarely been utilized, if at all, for settlement by DR providers.

[1] CAISO 2017 Baseline Accuracy Report <https://www.caiso.com/documents/californiaisobaselineaccuracyassessmentnexasant.pdf>

[2] MPE = Mean Percent Error, CVRMSE = Coefficient of Variation Root Mean Squared Error



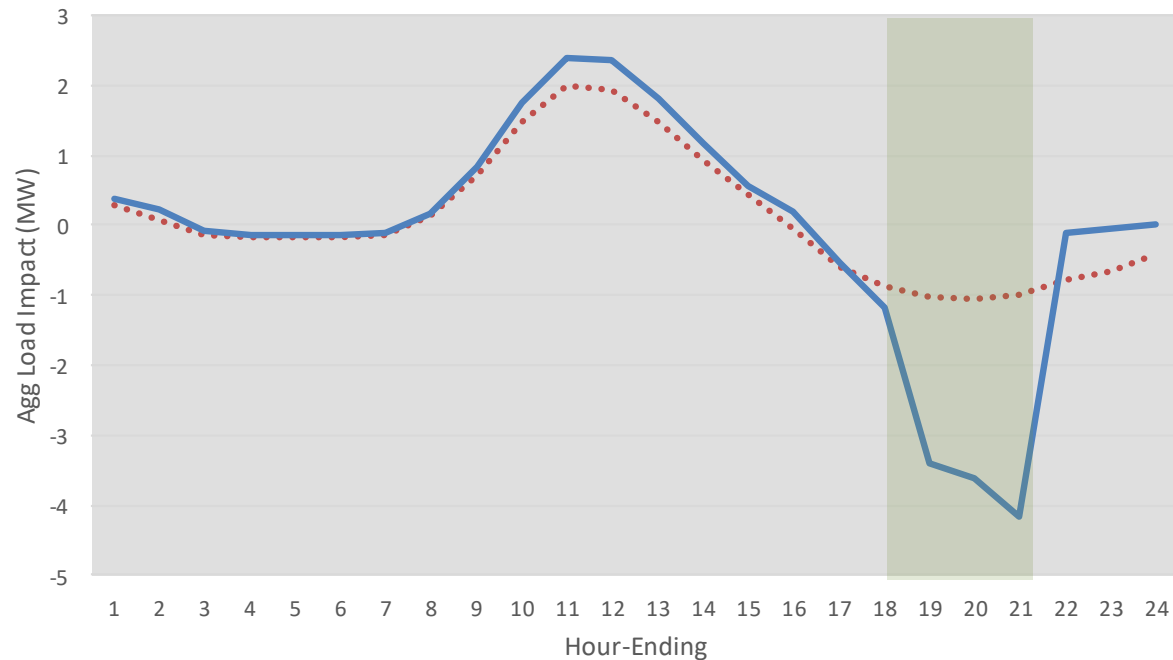
Background

For exporting resources, performance metrics which use control groups and retail (whole-home) meter loads can be as accurate as those using participant end-use (sub-meter) loads.^[3]

PG&E Emergency Load Reduction Program, Program Year 2023, A4 VPP, Battery Exports, Typical Event, 5-9P

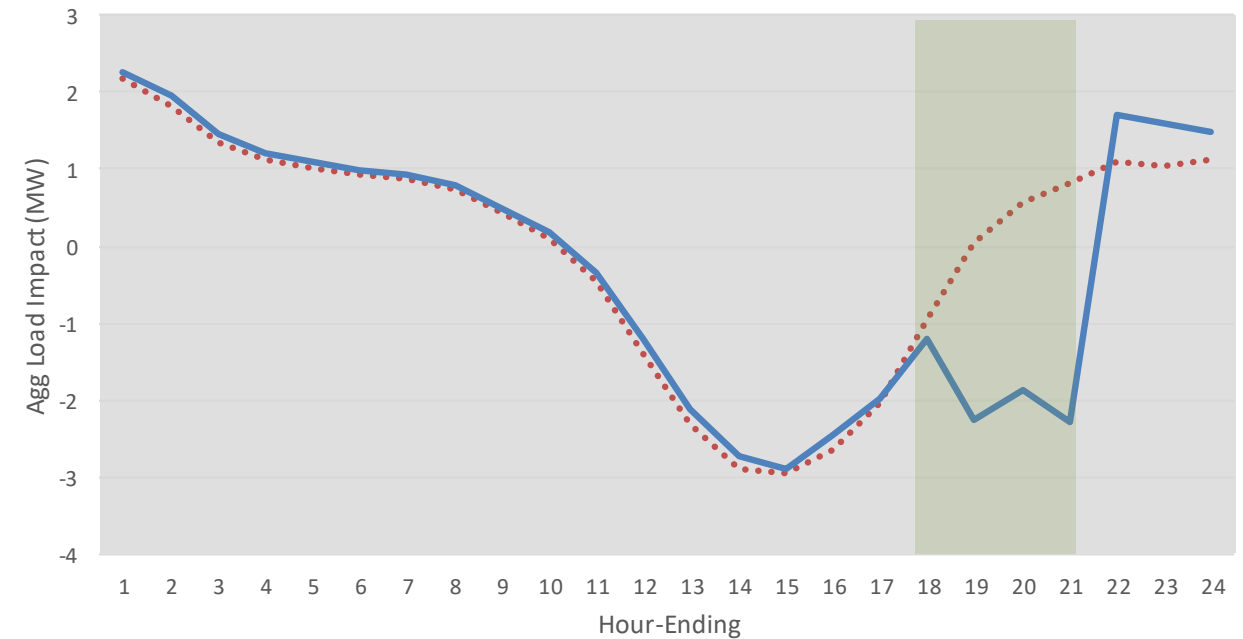
End Use: 3.00 kW/customer

Reference Load (dotted red line) Observed Load (solid blue line)



Retail + Control Group: 2.96 kW/customer

Reference Load (dotted red line) Observed Load (solid blue line)



[3] PG&E ELRP 2023 Report https://www.calmac.org/publications/8._PGE_2023_ELRP_Rpt_PUBLIC.pdf

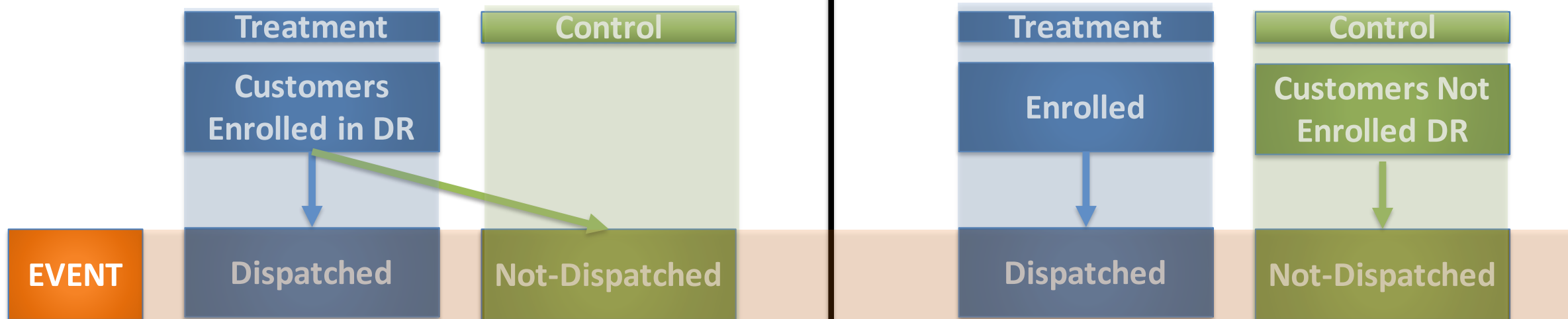
Issue 1: Registration Requirements

1. Tariff and Business Practice Manual require registration of Control Group customers, even if they are not enrolled in a Demand Response program.^[4]
 - a. Control groups can be generated using “Hold-out” or “Matched” method.
 - b. Generating a “Matched” control group utilizes customers who aren’t enrolled in a demand response program (non-DR customers).
 - c. There is no distinction between these methods in the Tariff or BPM, thus customers not enrolled in DR are required to be registered.
 - d. LSEs face legal and operational barriers registering customers who are not enrolled in DR programs:
 - i. Legal: LSEs cannot share these customer’s personally identifiable information with CAISO and;
 - ii. Operational: Other third party DRPs would encounter delays in registering these customers if they are used for “Matched” control groups, which would inhibit competitive neutrality (i.e. Electric Rule 24).

1. Differentiate between “Hold-Out” versus “Matched” Control Groups

Hold-out: DR participants that are randomly withheld from dispatch during the event season.

Matched: Customers who are not enrolled in DR throughout the event season, yet exhibit similar load profiles as DR Participants.

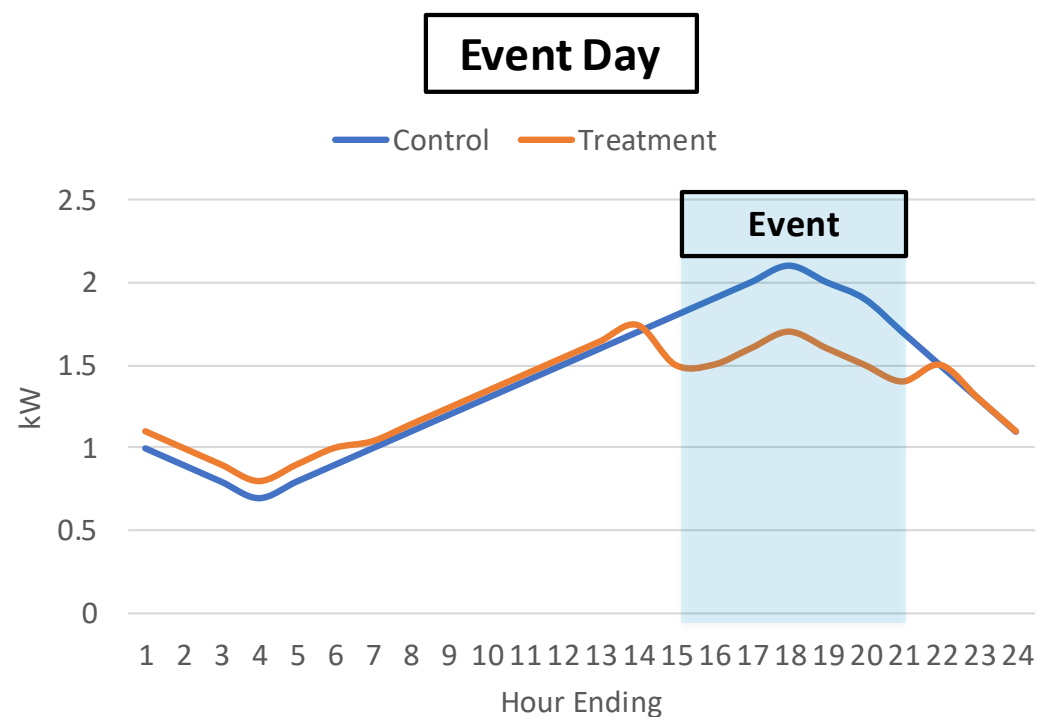


2. Remove registration requirements for “Matched” control groups;

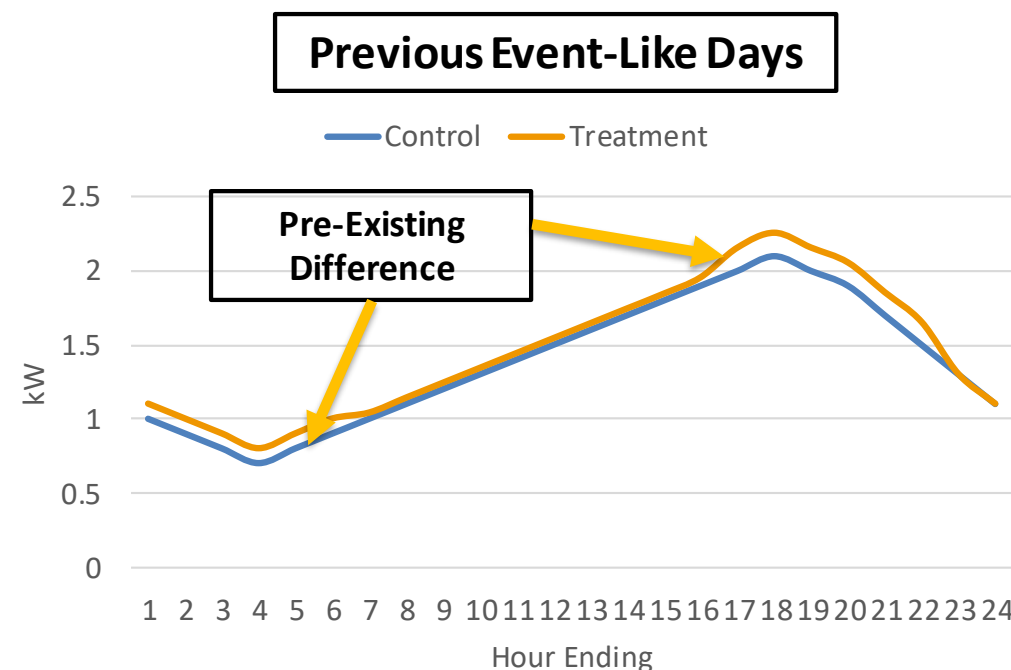
- a. As this approach uses customers that are not enrolled in DR programs, registration should not be required.

Issue 2: Methodological deficiencies

1. Tariff and BPM does not allow for a baseline adjustment to account for pre-existing differences between Control and Treatment group load profiles.^[4]



The current performance calculation is defined as the difference between hourly Treatment and Control group load on the event hours.



If there are pre-existing differences in load between Treatment and Control group customers, this bias is not removed from the performance calculation.

[4] Tariff Section 4.13.4.3, Section B, Page 68; Business Practice Manual Section 5.3, Page 38

Issue 2: Methodological deficiencies

2. The assessment period for validating the Control Group does not adequately reflect the conditions in which a demand response event is dispatched.



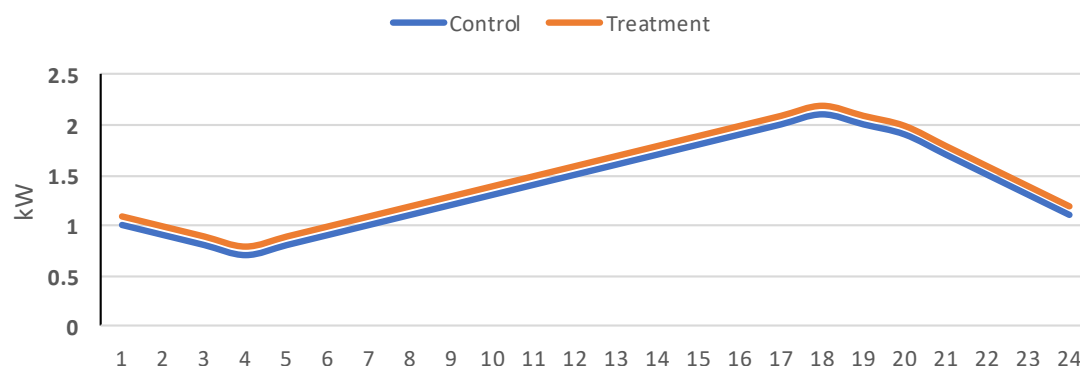
- a. The current validation method uses 75-day lookback period. The most recent 30 days are not used. Of the remaining 45 days in the lookback period, a minimum of 20 must be selected.^[5]
- b. There are minimal criteria for day selection, days do not need to resemble event conditions.

[5] Tariff Paragraph 4.13.4.3. Section C, Page 67

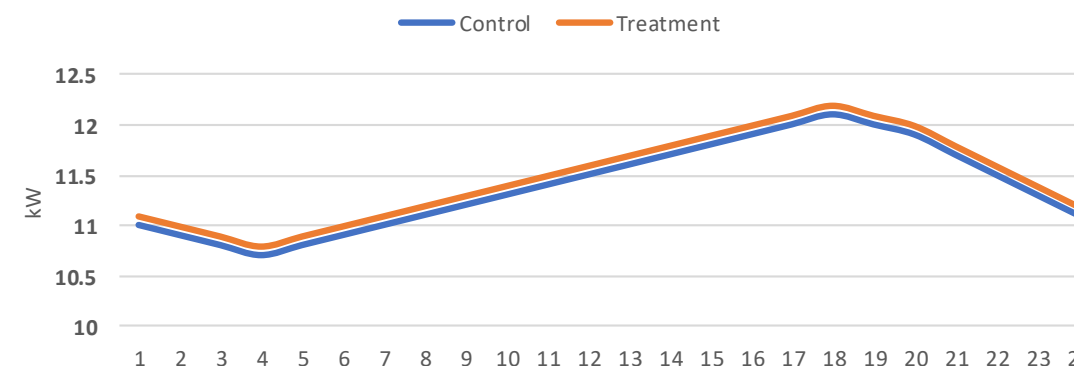
Issue 2: Methodological deficiencies

3. The metrics suggested to determine error fail when accounting for customer loads that are consistently small (values between -1 and 1; NEM or Exports). [6]

Small kW Values: Mean Percent Error = 5%



Large kW Values: Mean Percent Error = 1%



Although the difference between Control and Treatment Group load is the same for every hour (0.1 kW), the Mean Percent Error calculation will demonstrate larger error as baseline load approaches zero. [7]

[6] Note: Demand Response Registration User Guide Version 4.9's [Day Randomization Validation Template](#) suggests using a linear regression's beta coefficient, which is methodologically similar to Mean Percent Error.

[7] Hyndman & Kohler (2006) Another look at measures of forecast accuracy, International Journal of Forecasting 22(4), 679-688

Proposal 2

1. Allow for a ten-in-ten load baseline adjustment.
 - i. Based on the treatment group's observed usage, select ten days for which the amount of totalized load was highest during the hours when the Demand Response Services were provided in the forty-five (45) calendar days prior to the Trading Day.
 - ii. Separately for the Treatment group and the Control group, calculate the simple hourly average of the collected Meter Data to determine a baseline amount.
 - iii. Divide the Treatment and Control group baseline to produce an adjustment factor.
 - iv. Multiply the adjustment factor by the calculated performance.
2. Validation days should be those used for the baseline adjustment.
3. The list of eligible validation metrics should be expanded.
 - i. DR providers should be able to select from an expanded list of CAISO approved validation metrics to account for a greater variety of estimation concerns. Some examples of alternative metrics include Relative Mean Absolute Error (RMAE), Mean Absolute Scaled Error (MASE) and Standard Deviation adjusted Mean Absolute Error (SDMAE).

1. More accurate, accessible, and clearer information about Stakeholder's Demand Response performance and settlement.
2. Prevents complications for Stakeholders with regard to dual enrollment between LSEs and third-party DRPs.
3. Improved stakeholder confidence in the available CAISO market incentives for DR services.

Thank you!

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