

RTR Appendix

Southern California Edison, Pacific Gas and Electric, Southern California Gas, and San Diego Gas and Electric (“Joint Utilities” or “Joint IOUs”) developed Responses to Recommendations (RTR) contained in the evaluation studies of the 2013-2015 Energy Efficiency Program Cycle. This Appendix contains the Responses to Recommendations in the report:

RTR for the 2015 Nonresidential ESPI Custom Lighting Impact Evaluation: Final Report (Itron, Calmac ID #CPU0168.01, ED WO #ED_I_Com_5)

The RTR reports demonstrate the Joint Utilities’ plans and activities to incorporate EM&V evaluation recommendations into programs to improve performance and operations, where applicable. The Joint IOUs’ approach is consistent with the 2013-2016 Energy Division-Investor Owned Utility Energy Efficiency Evaluation, Measurement and Verification (EM&V) Plan¹ and CPUC Decision (D.) 07-09-043².

Individual RTR reports consist of a spreadsheet for each evaluation study. Recommendations were copied verbatim from each evaluation’s “Recommendations” section.³ In cases where reports do not contain a section for recommendations, the Joint IOUs attempted to identify recommendations contained within the evaluation. Responses to the recommendations were made on a statewide basis when possible, and when that was not appropriate (e.g., due to utility-specific recommendations), the Joint IOUs responded individually and clearly indicated the authorship of the response.

The Joint IOUs are proud of this opportunity to publicly demonstrate how programs are taking advantage of evaluation recommendations, while providing transparency to stakeholders on the “positive feedback loop” between program design, implementation, and evaluation. This feedback loop can also provide guidance to the evaluation community on the types and structure of recommendations that are most relevant and helpful to program managers. The Joint IOUs believe this feedback will help improve both programs and future evaluation reports.

¹ Page 336, “Within 60 days of public release of a final report, the program administrators will respond in writing to the final report findings and recommendations indicating what action, if any, will be taken as a result of study findings. The IOU responses will be posted on the public document website.” The Plan is available at <http://www.energydataweb.com/cpuc>.

² Attachment 7, page 4, “Within 60 days of public release, program administrators will respond in writing to the final report findings and recommendations indicating what action, if any, will be taken as a result of study findings as they relate to potential changes to the programs. Energy Division can choose to extend the 60 day limit if the administrator presents a compelling case that more time is needed and the delay will not cause any problems in the implementation schedule, and may shorten the time on a case-by-case basis if necessary to avoid delays in the schedule.”

³ Recommendations may have also been made to the CPUC, the CEC, and evaluators. Responses to these recommendations will be made by Energy Division at a later time and posted separately.

Response to Recommendations (RTR) in Impact, Process, and Market Assessment Studies

Study Title: 2015 Nonresidential ESPI Custom Lighting Impact Evaluation: Final Report
Program: Lighting
Author: Itron
Calmac ID: CPU0168.01
ED WO: ED_I_Com_5
Link to Report: http://calmac.org/publications/CustomLighting_2015_FinalReport_with_Appendices.pdf

| Item # | Sec. # | Findings | Best Practice / Recommendations (Verbatim from Final Report) | Recommendation Recipient | PG&E (if applicable) | | SCE (if applicable) | | SDG&E (if applicable) | |
|--------|--------|--|---|--|--------------------------------------|--|--------------------------------------|--|--------------------------------------|---|
| | | | | | Disposition | Disposition Notes | Disposition | Disposition Notes | Disposition | Disposition Notes |
| | | | | If incorrect, please indicate and redirect in notes. | Choose: Accepted, Rejected, or Other | Examples: Describe specific program change, give reason for rejection, or indicate that it's under further review. | Choose: Accepted, Rejected, or Other | Examples: Describe specific program change, give reason for rejection, or indicate that it's under further review. | Choose: Accepted, Rejected, or Other | Examples: Describe specific program change, give reason for rejection, or indicate that it's under further review. |
| 1 | 5 | The evaluation team was unable to confirm the underlying ex ante parameter assumptions for some projects that were evaluated. | Projects that are routed through customized programs should provide calculation workbooks that detail each of the impact parameters that were used to estimate the total ex ante savings that are claimed for each of the measures that were incented. | PG&E, SCE, SDG&E | Accepted | PG&E implemented a QA/QC process since 2015 to insure "live" calculations are available, including QC lighting checks for Hours of Use, Coincident Diversity Factor, and Interactive Effects. These items are identified in PG&E's CPUC Review Checklist and now included with each Custom project. PG&E requires project developers to use standardized lighting calculators including the EZ Lighting Calculator (eLC). See attachment "CPUC Review Checklist." | Accepted / Other | SCE utilized tools considered appropriate to report ex ante savings claims, such as those posted on CMPA developed with input from the Commission Staff. SCE accepts the recommended best practice and will follow CPUC guidance in reporting according to established or improved protocols for detailing parameters. . | Accepted | SDG&E uses Energy Pro Model to document the lighting power density for Savings By Design projects. Since 2015, retrofit lighting measures have transitioned to the deemed rebate program. |
| 2 | 5 | The structure of the project documentation that was requested and received differed from one project to another. | Projects that are routed through customized programs should utilize, whenever possible, a standardized calculation workbook within each PA that details each of the impact parameters that were used to develop the savings claims. | PG&E, SCE, SDG&E | Accepted / Other | PG&E has a standardized documentation format through the implementation and rollout of our Energy Insight platform. PG&E requires project developers to use the eLC standard calculation tool. | Accepted | SCE is adopting a unified PFS for all newly submitted calculated projects after 10/31/17. | Accepted | SDG&E has moved to a more formalized DSM tool from an Excel-based calculator for the occasional custom retrofit lighting project. |
| 3 | 5 | Projects that claim a program-induced early retirement do not always provide sufficient documentation to justify early replacement (ER). | Projects that claim a program-induced early retirement must provide sufficient documentation to justify early replacement (ER). | PG&E, SCE, SDG&E | Accepted / Other | Please refer to response for Item #1 Page #7-1. | Accepted / Other | Please refer to response for Item #1 Page #7-1. | Accepted | Please refer to response for Item #1 Page #7-1. |
| 4 | 5 | The evaluation team discovered that several projects were claiming to have replaced high wattage HID technologies with much lower wattage LED technologies that provided significantly lower zonal lumens than the replaced equipment. | If a customer is replacing a high wattage HID technology with a much lower wattage LED system that delivers far less zonal lumens than the replaced equipment, the second baseline (for ROB measures and for the Post-RUL period for ER measures) should take into account a baseline technology that delivers a similar range of zonal lumens to the equipment that was installed through the program. | PG&E, SCE, SDG&E | Accepted | Documentation of equivalent level of service (lumen/sq ft, zonal lumen level, etc.) is required as part of the technical review for lighting projects. PG&E provided project developers, in 2016, training about equivalent levels of service. | Other | This issue is currently under review by SCE's Technical Policy Oversight Team. | Other | Since 2015, most of SDG&E's retrofit lighting measures have transitioned to the deemed rebate program and up/mid-stream programs. For the occasional custom lighting project (in 2016 we had only one, 2017 none) we reviewed a custom project using multiple criteria. See attachment "SDG&E MH Lamp and LED Comparison." |

CPUC Review Checklist

Who fills out the list

| Responsible Party | Lines to fill out* |
|-----------------------------------|--------------------|
| Implementer/Field Engineer: | 5-6, 8-10 |
| Implementer/Field Engineer: | 18 to 90 |
| Tech Reviewer: | 91 and 99 |
| CIT: | 7 and 17 |
| Implementer/Field Engineer: | 123 to 129 |
| Implementer/Field Engineer (TBD): | 131 to 134 |

*Technical reviewer to check all line items.

CPUC Review Checklist
Checklist

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|--|--|
| Program Administrator: | |
| PA Application Number: | |
| Project Number (implementer project number if different than PA Application Number): | |
| Name of the firm preparing the checklist: | |
| Staff member/reviewer name who prepared the application checklist: | |
| Date prepared : | |

This checklist must be completed for every project with the status "Ready for CPUC Staff Selection = yes" on the Bi-Monthly Submission template..

Fields highlighted in blue must be indicated "Yes" or "NA"; or the project is not ready for CPUC review

Blacked out fields are unacceptable responses.

| Yes | No | NA | Field | Comments (mandatory if proposed response is in a blacked out |
|-----|----|----|--|--|
| | | | Have all of the fields on the bi-monthly submission list marked with ** been completed? | |
| | | | Is a customer signed, dated, (and PA countersigned, if applicable) copy of the Program application provided? | |
| | | | Has equipment been ordered by the Customer? | |
| | | | Has project construction commenced? | |
| | | | Has an incentive agreement been executed between the customer and the PA? | |
| | | | Is the PA technical review included in the documentation? If not yes, provide in comment section date is expected to be provided* | |
| | | | Has the PA technical review been Quality Control (QC) reviewed? | |
| | | | Is a concise description of the facility operations included? | |
| | | | Is the project scope complete, well defined and clear for a reviewer to understand? | |
| | | | - Are existing/baseline equipment operation/operation parameters/mode of control well described & documented? | |
| | | | - Are proposed measures' operation/operation parameters/mode of control well described & documented? | |
| | | | - Are there adjacent or related equipment/phased projects (predecessor or future) that could impact this project? | |
| | | | - If applicable, are adjacent or related equipment/phased projects addressed succinctly in the documentation? | |
| | | | If using non-DEER operating hours, is valid justification provided - logged data or EMS schedule - for the annual operating hours?* | |
| | | | Is the energy savings premise of the measure(s) succinctly described? | |
| | | | Is the calculation methodology documented clearly and concisely, in a written format? | |
| | | | Are there any Show Stopper issues? Refer to the Showstopper Tab (Describe issues in the "comments section" below) | |
| | | | Is the application in the "right" program? | |
| | | | Does each measure meet the program rules? | |
| | | | Is the proposed measure(s) eligible for an energy efficiency incentive? | |
| | | | Does the measure(s) constitute an energy efficient action (a valid EE measure)? | |
| | | | Does the documentation identify and explain any like-for-like equipment replacements? | |
| | | | Are there any grid-impact-related boundary issues with the project, such as the case for a capacity expansion where customer is offering a new product which was previously manufactured/processed by another entity within CA (IOU or non-IOU service territory)? For cases like this the project boundary needs to be re-configured (beyond the customer premise) and in situ EE levels must be considered, compared and contrasted. Note: There must be a valid savings proposition and a demonstrated impact on the grid/system. Must clearly identify the electricity or gas savings (or penalties) and the parties they accrue to. | |
| | | | If yes to above, does the documentation explain the EE process improvement over the previous entity's processes. | |
| | | | Does the project have any fuel switching implications? | |
| | | | If yes to above, is a three-prong test included in the documentation; with clearly documented source Btu (Btu/kWh generated). | |
| | | | Is there recent or previous guidance/policy from CPUC Staff that will impact the project? | |
| | | | NTG Screen: Does the documentation address what (besides EE) are other key issues driving the decision for the proposed project? | |
| | | | Has the PA performed a "free ridership" assessment and are the documented results included in the submitted documentation? | |
| | | | Does the documentation provide evidence of Program influence? | |
| | | | Project Baseline Type | |
| | | | Is the measure type (ROB, NR, ER, New, REA), defined for each measure with supporting documentation included? | |
| | | | Does the documented measure baseline match the measure type (ROB, NR, ER, New, REA)? | |
| | | | Is the baseline designation clearly identified as ISP or code compliant, with supporting documentation? | |
| | | | Is the baseline equipment selection "regressive"? | |
| | | | For ER projects, is the second period baseline (EUL - RUL period) defined and documented? | |
| | | | For ER projects, has the "Preponderance of Evidence" guidance document been followed, and supporting is documentation included. | |
| | | | Project Baseline Source - Code, ISP or Pre-existing? | |
| | | | Is baseline well defined? In situ, Code (Title 24, Title 20, OSHA, AQMD, etc.), Ind. Std. (ISP study, other sources). | |
| | | | - Does the documented project baseline match the project type? (Existing for ER, ISP/Code for all other project types) | |
| | | | - Is the proposed measure baseline documented? (e.g. Section of applicable T-24 citation or ISP assessment) | |
| | | | Is an ISP assessment required for this project? | |
| | | | Has ISP been considered? Check ISP list and the ISP Guidance Document. Provide supporting documentation. | |

CPUC Review Checklist
Checklist

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| | | Have codes, standards and regulatory requirements of the existing equipment and proposed equipment (as if installed today) been considered and documented? (Measures must exceed code or ISP to be eligible for program participation.) | |
| | | EUL (Effective Useful Life) - What is EUL for each measure? See RUL/EUL Guidance Document when available. | |
| | | Is the EUL (Effective Useful Life) for each measure being installed specified? | |
| | | Is the basis (or source) for each EUL(s) specified? | |
| | | Is any EUL less than five years? | |
| | | RUL (Early retirement projects only) - What is the RUL (Remaining Useful Life) for each measure? | |
| | | Does the documentation follow the most recent CPUC Guidance document for Early replacement projects? Available Here: http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Ex+Ante+Review+Custom+Process+Guidance+Documents.htm | |
| | | - Does the documentation provide compelling evidence that the program induced ER of pre-existing equipment? | |
| | | - Does the documentation provide pre-existing equipment vintage & condition, maintenance practice & schedule, etc.? | |
| | | - Does the documentation provide the RUL for the pre-existing equipment? | |
| | | - Does the documentation provide support for the RUL of pre-existing equipment? | |
| | | - Are both 1 st and 2 nd baselines stated and explained? Savings calculated for both? | |
| | | Project Cost Basis (See Cost Basis Guidance Document when available) | |
| | | Are the itemized invoice(s) and/or cost document(s) included? | |
| | | If applicable does the documentation provide IMC (incremental measure cost)? Show how the IMC was calculated? | |
| | | Is the project cost (FMC and/or IMC) limited to the EE measure(s) only? | |
| | | Calculations Tool Review | |
| | | Are "Live" Calcs provided? | |
| | | Are input and output calculation files provided (simulation software)? | |
| | | Did you calibrate the energy model with the monthly utility bill usage? Is the correct weather file used? | |
| | | For lighting projects only: Correct HOU? CDF and IE calculations included? | |
| | | Pre- or Post- Installation M&V Plan | |
| | | Is M&V proposed by the implementer or required by the PA? | |
| | | If M&V is Proposed or required, is a concise and comprehensive M&V plan included in the documentation? | |
| | | Are the raw data files from data logging included, if applicable? | |
| | | Are M&V measure parameters specified? | |
| | | Are M&V period and duration specified? | |
| | | Other Key Issues | |
| | | Does the customer have cogeneration? Renewable energy? Other non-utility generation? | |
| | | If Yes - is cogen system explained and grid impact calculation completed? | |
| | | Has the PA confirmed that the customer pays PPP charges? | |
| | | If the customer has cogen or self-gen, does the analysis follow the "Energy Efficiency Savings at Sites with non-IOU Fuel Sources Guidance Document"? | |
| | | PA Reviewer Comments and Clarifications: | |
| | | Additional Notes: | |

Req'd Input area by Technical Reviewer.

| | | | |
|--|--|---|---------------------|
| | | Measure Type | 1st BL Measure Cost |
| | | ER (Early Replacement) With evidence of program inducement | FMC |
| | | ROB/NR (Replace on Burnout/Normal Replacement) | IMC |
| | | New (New Construction/Major Renovation/New Load/Capacity Expansion) | IMC |
| | | REA (Retrofit Add-on) | FMC |
| | | IMC = Incremental Measure Cost | |
| | | FMC = Full Measure Cost | |

- * CPUC Staff will not issue a disposition until all required materials have been provided and reviewed by the PA. The CPUC Staff review period does not begin until all required materials have been submitted.
- ** Use of non DEER hours is only allowed for buildings that do not fall into DEER building classifications.

| FOR PG&E ONLY | | | Required Documentation | |
|--------------------------|----|----|---|---|
| Yes | No | NA | | Comments (mandatory if proposed response is in a blacked out) |
| | | | <i>Pre-Installation</i> | |
| | | | Is this project originated from a Large Integrated Audit (LIA)? | |
| | | | Any evaluation or third party reports or benchmarking studies? | |
| | | | Pre-installation inspection report. | |
| | | | Copy of vendor quote(s) for project cost during pre-installation. | |

CPUC Review Checklist
Checklist

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|------------|-----------|-----------|---|--------------------------|
| | | | Pre-installation data collected. | |
| | | | Manufacturer's cut sheets/specifications. | |
| | | | Is there an Exception Request for this project? | |
| Yes | No | NA | | <i>Post-Installation</i> |
| | | | Post-installation inspection report. | |
| | | | Post-installation data collected. | |
| | | | Is there any scope change to this project (from Pre- to Post-)? | |
| | | | Is ERC calculated for ER measure(s)? | |

CPUC Review Checklist

ShowStoppers

| | |
|----|---|
| 1 | Inadequate consideration of the implications of fuel switching, not just the failure of perform the three-prong test. |
| 2 | Not addressing the implications of any form of existing and planned on-site or self generation at the participating site. |
| 3 | Overlooking the real project boundary by recognizing the impact of an EE project beyond the participant facility where the real impact on the grid/system occurs. EE first in the loading order principle 1 is ignored. |
| 4 | Lack of attention to program eligibility requirements |
| 5 | Lack of due diligence on mandated State and/or Federal (Title 24, ASHRAE 90.1, etc.) requirements |
| 6 | Installation of ISP measures |
| 7 | Wrong baseline: Inconsistent with category definition. |
| 8 | Non-existent EE proposition; measure does not save energy usage. |
| 9 | Repairs in retrofit programs |
| | Ineligible Repairs in RCx programs |
| 10 | IMC of a project is negative. |
| 11 | Regressive baseline used |
| 12 | Violation of Program Rules |
| 13 | Violation of CPUC Policy |
| 14 | Equipment Installation commenced before incentive offer signed and countersigned. |
| 15 | Equipment ordered before application documentation, including savings estimates and cost submitted. |
| 16 | Equipment ordered without PA approval to proceed. |

CPUC Review Checklist

ISP list

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|--|-----------------|
| Per CPUC staff, High Priority Baseline studies are: | |
| Data Center Baseline Study | Annual update |
| Industrial boiler Efficiency | In progress |
| Insulation of wine and juice tanks | Near completion |
| Network power management software | In progress |
| | |
| Hospital NC Baseline | TBD |
| Cloud computing and server virtualization | TBD |
| Variable speed drive for the Dairy and WWT industries | TBD |
| VOC control methods (RTOs, etc.) | TBD |
| Baseline new construction building practices | TBD |
| Steam trap and air leak maintenance practices | TBD |
| RCx maintenance practices | TBD |
| Oil Segment Baseline Update (Oil Field, Refineries and Pipeline) | TBD |

CPUC Review Checklist

ED Measures of interest

ED Measures of Interest

1. Rectifiers
2. Power supplies
3. UPS systems
4. Chargers
5. Computing equipment and software
6. Networking equipment and software
7. Electronic storage and communications products
8. Mass market products
9. Insulation
10. Measures that are individually small savers but cumulatively over all projects constitute energy savings greater than or equal to 1% of their forecasted custom measures savings.

CPUC Review Checklist

Instruction

Who should fill out the checklist?

| | |
|------------------|------------------------------|
| Line 18 to 90 | Implementer/Field Engineer |
| Line 91 and 99 | Implementer / Field Engineer |
| Line 7 and 17 | CIT |
| Line 123 and 132 | Implementer / Field Engineer |

SDG&E MH Lamp and LED Comparison

Last year – one outdoor lighting retrofit (car dealership) project.

Direct comparison of initial lumens per watt of MH lamp and LED lamp are not valid. Here are some reasons why. The particular lighting application must be evaluated and designed to account for multiple factors

Metal halide

- lumen depreciation up to 35% within 6 – 9 months
- Fixture light loss from stray emissions (the light that never makes it to the illuminated surface) up to 40%
- Delivers intense amount of light from a pinpoint source creating hot spots under the fixture
- Resulting delivered lumens at 26% of lamp lumens

LED

- Multiple emitters with focus controlled optics to provide more consistent coverage of light on the illuminated surface – Uniformity
- Scotopic effect – eye perceives the LED white light at a higher level than traditional metal halide- 26000 lumens from an LED can appear more like 43000 lumens from a Metal halide