

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 and beyond. This Appendix contains the Responses to Recommendations in the report:

RTR for the Commercial ZNE Market Characterization—Final Report (TRC, Calmac ID #PGE0440.01, ED WO #2164)

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 CPUC Decision (D.) 07-09-043¹ and the Energy Division-Investor Owned Utility Energy Efficiency Evaluation, Measurement and Verification (EM&V) Plan² for 2013 and beyond.

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 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.”

² 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>.

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: Commercial ZNE Market Characterization—Final Report
Program: Multiple
Author: TRC
Calmac ID: PGE0440.01
ED WO: 2164
Link to Report: http://calmac.org/publications/IOU_-_TRC_Comm_ZNE_Mkt_Char_Final.pdf

Item #	Findings	Best Practice / Recommendations (Verbatim from Final Report)	Recommendation Recipient	PG&E (if applicable)		SCE (if applicable)		SCG (if applicable)		SDG&E (if applicable)	
				Disposition	Disposition Notes	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.	Choose: Accepted, Rejected, or Other	Examples: Describe specific program change, give reason for rejection, or indicate that it's under further review.
1	Since the study was scoped, the State has increased its focus on greenhouse gas (GHG) reduction.	Revisit ZNE goals to meet GHG emissions and demand response needs. <ul style="list-style-type: none"> Investigate options for achieving ZNE in prototype buildings, and their impacts on GHG and demand. Identify a new loading order for efficiency, renewables, and load management by building type and location. 	IOUs (lead); CPUC (support)	Accepted	The goals and load order for efficiency are defined by the CPUC, not the IOU. If this order is changed by CPUC directive, PG&E will follow the revised prescribed loading order and goals. GHG, carbon, and carbon equivalent source metrics have become the focus for current and future codes. Examples of such source energy metrics are EDR, low GWB refrigerants, electrification, clean energy grid, etc.	Accepted	Focused on encouraging customers to participate in Savings By Design's whole building approach (WBA). The WBA promotes a comprehensive, multi-measure approach to increasing the energy efficiency of a new building. This approach encourages ZNE as well as greenhouse gas reduction through recommendations such as electricity sourced appliances.	Other	CEC determines loading order, not IOUs or the CPUC; Goals are set by CPUC, not IOUs. CEC should lead and CPUC support.	Accepted	We think it's important to evaluate the ZNE goals to ensure GHG emissions goals are met.
2	Cost-effectiveness requirements prohibit aggressive action. Cost-effectiveness calculations are based on energy savings, but non-energy benefits (NEBs) can be significant.	Monetize non-energy benefits (NEBs). <ul style="list-style-type: none"> Quantify NEBs through literature review and program-incentivized occupant surveys. Include customer and utility NEBs in cost-effectiveness calculations. 	CPUC (lead); IOUs (support)	Other	The magnitude of time, effort, cost, and complexity to develop and gain agreement from all stakeholders on the monetary value of NEB's is immense. This is beyond the role of the utilities alone, but if the CPUC incorporate NEBs in the cost effectiveness tool (CET), the emissions offset could be significant. Under CPUC direction, PG&E would participate in said NEBs monetization efforts.	Accepted	One area needing further discussion is how the "program-incentivized occupant surveys" are implemented. Should it be offered through the SBD replacement program or through an independent service such as is offered through the Measurement and Evaluation support organization?			Accepted	This could be beneficial to both customers and the utilities. We also need CPUC to update P&G and CET to include such NEBs.
3	"Percent better than Title 24" does not track progress. A fixed performance baseline would enable comparison of efficiency levels across code cycles and among building types.	Develop Energy Design Rating (EDR) type metric for commercial buildings. <ul style="list-style-type: none"> IOUs should continue to support CEC in its development of a fixed performance metric, by helping to identify the baseline systems for each building 	CEC (lead); IOUs (support)	Accepted	PG&E will participate in the development of an EDR-like metric for commercial buildings in concert with CEC's lead. Once the metrics are developed, PG&E's EE programs and policies will support its adoption in the industry.	Accepted	One key approach is the use of Energy Use Intensity approach. This metric is understood by many in the industry and it also supports achieving ZNE and GHG goal attainment. Using a EUI measurement will establish a new metric and methodology which will accommodate a wider vari-			Accepted	

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		type.					ety of current and emerging technologies and help in transitioning away from standard kWh and kW measurements towards a GHG reduction based approach.				
4a	Current trajectory is ~3% EUI reduction each Title 24 Cycle for commercial buildings.	Accelerate net energy reduction each code cycle. Require deeper savings through greater prescriptive trade-offs.	CEC (lead); IOUs (support)	Other	PG&E agrees that setting greater prescriptive requirements across envelope, mechanical and lighting systems will likely simplify the design process. This should accelerate net energy reduction instead of the design team making trade-offs among them. To clarify, CEC sets the prescriptive values; PG&E follow and incorporate them in future custom EE offerings.	Other	Although accelerating energy efficiency through regulations is a cost-effective approach, consideration needs to be given to the way it affects the marketplace. If “forcing” compliance is considered a negative by industry stakeholders, it can cause pushback and strong negative reactions. If this approach is implemented, it will need to be supported by enhanced training, reasonable and low-cost goal attainment and flexibility which allows the marketplace to have various timelines to adopt.			Accepted	
4b	Hospitals, hotels, and restaurants have large loads not regulated by Title 24 or Title 20.	Continue to investigate opportunities to bring more loads under Title 24 or Title 20. <ul style="list-style-type: none"> Short-term: Shift to EDR-type metric Long-term: Shift to outcome-based codes 	CEC (lead); IOUs (support)	Accepted	Agree in principle. CEC has started this process in 2019 to regulate loads for hospitals. Under CEC lead, PG&E supports similar efforts for other building types that hadn’t been covered in previous code cycles.	Other	Consideration should be given to a shift to EDR type metric or an Energy Use Intensity (EUI) metric. EUI, as stated in Item #3 response, is widely understood and accepted by many in the new construction industry and will be the first step towards the acceptance of a GHG-based metric to support the strategy of the state and CPUC. However, this is only a good short-term solution. The real effort should be to replace an energy use related goal to one that reflects the more pertinent and urgent goal of reducing GHG.			Accepted	
4c	Five percent (5%) of the commercial buildings market had solar PV in 2018. Title 24-2019 requires that residential new construction (but not commercial) install distributed generation.	Add requirements for renewable energy and load management. <ul style="list-style-type: none"> Provide flexibility so project teams can meet the specific needs of each site. 	CEC (lead); IOUs (support)	Accepted	Load management, in particular, is an important part of this strategy. Investigate the addition of PV requirements for non-res application in close collaboration with the IOUs and municipal utilities	Accepted				Accepted	
5a	New requirements can be more contested (and take more time for approval)	Update existing reach code requirements separately from new developments.	Local Jurisdictions (lead); IOUs, through Reach Code Programs	Accepted	Many local jurisdictions are increasingly focused on developing Reach Codes to reduce energy usage in their	Accepted	Accept with the same concerns as identified in 4a.			Accepted	

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	than renewals.		(support)		buildings. However, all Reach Code activities are designed by the jurisdictions and the IOUs cannot define or propose these codes. PG&E will support these efforts through training (WET) and preparation/promotion of technical support documents.						
5b	Projects may not complete plan review goals.	Impose enforcement mechanism, such as a deposit that is refunded if goals are met.	Local Jurisdictions (lead); IOUs, through Reach Code Programs (support)	Other	While this is solely the jurisdiction of the local governments, PG&E will support through training. PG&E is not in a position to be an enforcement agency on behalf of local governments.	Rejected	This should not be a programmatic decision.			Accepted	
5c	Cost effectiveness limits scope of reach codes.	Establish voluntary standards to encourage deeper energy savings or reach retrofits.	Local Jurisdictions (lead); IOUs, through Reach Code Programs (support)	Accepted	Similar to tech support for new buildings, PG&E provides technical support for existing building reach codes and will support voluntary standards led by CEC.	Accepted				Accepted	
5d	Offering "carrots" will increase participation in voluntary pathway	Encourage participation of voluntary standards through rewards, such as density bonuses or tax incentives.	Local Jurisdictions (lead); IOUs, through Reach Code Programs (support)	Other	Customers living inside the jurisdictions are eligible for existing incentive programs and offerings by their respective local governments. Tax incentives and density bonuses are outside of the IOU's scope.	Accepted				Accepted	
6a	California has no policies to directly regulate energy performance and is not on track to meet 2030 statewide goals.	Convene a statewide meeting to develop a framework for Building Performance Standards.	CPUC & Local Jurisdictions (lead); CEC, CARB, IOU Reach Code Staff (support)	Other	PG&E has issue with the finding that California "is not on track to meet 2030 goals." While this may be true for existing buildings, it appears that California may be on track for new buildings. PG&E accepts participation in a statewide meeting for Building Performance Standards with CPUC lead and IOU support, with the following caveats: 1. There is a broad range of policies and each one requires a different solution. 2. Having a meeting to more clearly articulate how State will achieve policies goals is helpful.	Accepted	The tools and programs currently in use are not able to adequately measure or provide an incentive after a building is constructed and the building begins full and varied operations.			Accepted	
6b	Building Performance Standards may be more feasible at the local jurisdiction level than statewide.	Local jurisdictions should initiate implementation of Building Performance Standards.	CPUC & Local Jurisdictions (lead); CEC, CARB, IOU Reach Code Staff (support)	Other	This is an issue to be addressed by state government policy and not by the IOUs Reach Code support is less important in this context	Other	Need more information in order to understand issues and impacts of this recommendation.			Accepted	
7a	The replacement program to Savings by Design (SBD) could	Couple financing offering with the incentive in the	IOUs	Other	Note that RFP for the statewide replacement program for SBD is underway. Changes to the scope of this RFP	Accepted	Offering of OBF, as a financial incentive, would be beneficial and could	Rejected	The SBD replacement is the Statewide New Construction Program (SWNC).	Accepted	The need to find a replacement program for SBD is key. OBF is a good op-

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	help address first cost barrier, which market actors identified as a barrier to ZNE and ultra-efficient buildings.	SBD-replacement program. <ul style="list-style-type: none"> Recommend the On-Bill Financing (OBF) program as a resource (in addition to the SBD-replacement program) for retrofit projects. Offer a financing option in addition to other program incentives for new construction. 			at this time is not recommended so as to reduce complicating the bidding process. Once a successful bidder, or group of bidders is selected, this recommendation will be shared with them. If it is determined that this recommendation requires material changes to the resultant contract(s), recommend that the IOU's consider the cost/benefit of the changes prior to modification of the program. PG&E would consider recommendation for on-bill financing in the context of NC alterations only in an existing facility. OBF for greenbuild projects is problematic due to the lack of a billing account.		potentially increase interest in program participation. However, due to lacking an approved methodology for establishing a baseline to calculate energy savings for new construction projects and bill-neutral loan repayment calculations, historically SBD has not been able to take advantage of OBF.		SWNC efforts will be proposed by bidders, not by IOUs. Cost effectiveness concerns will be paramount. Bidders may or may not choose to include financing.		tion but not many customers participate in it. We need to have a program that is specific to ZNE buildings.
7b	ZNE operations and maintenance cost may be high for some strategies.	Offer optional post-occupancy support in the SBD-replacement program.	IOUs	Other	See response to 7a.	Accepted		Rejected	IOUs will not be implementing the SBD replacement.	Accepted	SBD EE and incentive calculations are based on modeling assumptions that may not reflect the actual energy use profile. Providing post occupancy support to "fully commission" a new building once occupied (6-12 months later)) will help to ensure and validate long term EE savings and address any significant discrepancies in the early post construction stages.
7c	SBD had variations on data tracked between IOUs.	Require documentation of predicted energy use and savings in the SBD-replacement program.	IOUs	Other	See response to 7a. Additionally, PG&E agrees that consistent data and reporting mechanisms are essential to effectively administer Statewide Programs.	Accepted	The current modeling tool used in the program provides estimates of impacts to energy use.	Accepted	Well-supported energy savings forecast will be required of SWNC bidders.	Accepted	It would be good to have this information since energy use may vary across the IOU's based on climate zones, building types and modeling assumptions.
7d	Post-occupancy incentives will encourage metered energy savings. Actual energy use may also exceed modeled predictions.	Use a partial "pay for performance" incentive structure or require projects to provide 12 to 24 months of post-occupancy data in replacement program.	IOUs	Other	See response to 7a. Note: Responses from the RFA indicate that multiple 3Ps may address this recommendation in the RFP.	Accepted	Recommend using the recently released CPUC NMEC guidelines as a template. Modifications such as a 12 to 24 months measurement time period requirement is a good recommendation.	Rejected	This requirement may or may not be proposed by bidders. Post occupancy data requirement will reduce TRC of bidder's proposal. As such it might make the difference between a winning and losing bid.	Other	Accepted with caveat: Might want to apply this to larger new projects (i.e., greater than 25,000 square feet only). May be a financial burden for small to mid-size new construction projects (under 25K square feet).
7e	Indoor environmental quality (IEQ) is a common ZNE driver. However, there is a lack of documented occupant benefits with some measures.	Offer incentives for administering an IEQ survey of occupants in replacement program.	IOUs	Other	IEQ is one of many NEBs that a non-residential customer may consider. The magnitude of time, effort, cost, and complexity to develop and gain agreement from all stakeholders on the monetary value of NEB's is immense. This is beyond the role of the utilities alone, but if the CPUC incorporate NEBs, in general, and IEQ, in particular, in the cost effectiveness tool (CET), the effect on the project	Rejected	Recommend having a separate study performed not related to the energy efficiency effort.	Rejected	Additional cost will reduce bidder's cost effectiveness.	Accepted	Indoor Air Quality has become an important factor for ZNE buildings. It would be beneficial to track the IAQ or incentives it.

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					cost effectiveness could be significant. Under CPUC direction, PG&E would participate in said NEBs monetization efforts.						
8a	Market actors cite non-energy benefits as drivers to ZNE.	Emphasize NEBs to project teams using outcome of Recommendation 2.	IOUs	Other	If NEBs defined, prioritized, and monetized, PG&E would support the incorporation of messaging about these NEBs into this comprehensive approach. PG&E would support a messaging strategy that includes both energy and non-energy benefits, that would present a complete and holistic picture of the benefits of ZNE.	Accepted		Other	Initiate EMV study to understand the effects of non-energy benefits towards ZNE buildings for both retrofit and new construction.	Accepted	NEB's could be beneficial to achieve ZNE. We also need CPUC to update P&G and CET to include such NEBs.
8b	Incremental costs are low for ZNE and ultra-efficient buildings, and sales and rental premiums should provide high Return on Investment (ROI).	Highlight high ROI, particularly for privately-owned buildings.	IOUs	Other	Industry or government produced benchmarking and referenceable case studies that demonstrate the low incremental cost and high ROI would help to validate these claims for customers. With the above information, PG&E would support messaging of high ROI claims associated with ZNE.	Accepted	ROI is a good measurement. ROI is not universally identified as a standard business benchmark to determine if an efficiency measure will be implemented or not. Simple payback should also be included. It is more universally requested.	Other	Unclear to whom the IOUs should "Highlight high ROI."	Accepted	We need to highlight buildings that ZNE so it will drive others to want to transition their buildings to ZNE. If we can show that the effort put into making the building ZNE pays off for the owner.
8c	Market actors commonly cite marketability as a driver to ZNE. There is also generally high participation of buildings in LEED than SBD, and much higher penetration of LEED and SBD than ZNE buildings.	Consider providing a ZNE recognition program for companies and buildings that achieve ZNE. <ul style="list-style-type: none"> To identify projects for recognition, leverage those identified by NBI or that participated in the Living Futures Institute or LEED-ZNE programs. 	IOUs	Other	Existing LEED programs could be expanded to incorporate a ZNE recognition program. This would better leverage the pre-existing equity inherent in the existing LEED certifications and expand them to encompass ZNE as an additional point of distinction.	Accepted		Rejected	IOUs will not be implementing the SBD replacement.	Accepted	The is a great way to recognize buildings that achieve ZNE. We would need to come up with a way to score/rate the building and a certificate that was recognizable, like LEED.
9a	Integrated design helps achieve ZNE and reduce cost.	Continue to provide training on integrated design and compare curriculum to high priority technologies presented in Itron (2019) study.	IOUs	Accepted	Training will continue to cover integrated design and curriculum will emphasize high priority technologies including building envelope, fenestration, HVAC, IAQ, Lighting, plug-loads, DR, occupant behavior, controls, water heating, whole-building performance, DG, storage, grid interaction, energy modeling and other tools.	Accepted		Accepted	Conditional acceptance; will be determined based on budget considerations.	Accepted	Training is key and beneficial. Case studies can help with market transformation.
9b	Several trainings requested are already provided through Workforce Education and Training (WE&T).	Use the upcoming WE&T Market Assessment to parse out actual training needs vs. participation challenges. <ul style="list-style-type: none"> Identify opportunities to increase participation in trainings. 	IOUs	Accepted	PG&E will use the WE&T Market Assessment and feedback/experience gained from other similar trainings to identify opportunities to increase user participation and to build/deliver curricula suitable to encourage industry adoption of ZNE.	Accepted	Reaching out to stakeholders is a very good idea. One of the key issues the group can consider is the current treatment of training costs and expenses towards a program's cost-effective performance. Without a solution to this issue, increased use of training will not be a viable option.	Accepted	Will incorporate based on the final WE&T Market Assessment	Accepted	We can work with our WET teams to implement this.

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		<ul style="list-style-type: none"> Identify needs, audiences, and delivery methods for coursework that can build the business case for ZNE. 									
10	Mandated training would reach a much larger audience, but California governors have rejected continuing education requirements.	Convene a statewide forum to discuss requirements for continuing ZNE and GHG education.	CPUC (lead); IOUs (support)	Accepted	If the CPUC convenes a statewide ZNE forum, PG&E would support this effort to continue discussion of ZNE and GHG reduction education, in concert with CEC's lead.	Accepted	See response in #9b.			Accepted	
11	Benchmarking was recently mandated for large buildings. Compliance software does not accurately capture some advanced strategies.	<p>Allow 3rd parties access to modeling (in addition to benchmarking) data, to allow for improvements in model accuracy.</p> <ul style="list-style-type: none"> Compare modeled and actual energy use. IOUs can help prioritize modeling improvements by identifying common strategies in their custom programs. 	CEC (lead); IOUs (support)	Other	The CEC is the entity that decides on producing and disseminating modeling data. Under CEC lead, PG&E supports this effort. A statewide non-residential compliance database would be a very valuable tool for helping administer EE programs..	Other	This recommendation needs more definition. It might be prudent to convene a working group to identify the information needed and ensuring customer confidentiality in its being shared.			Accepted	
12	Statewide ZNE progress is not tracked.	Track ZNE claims in a central registry. Consider creating an internship program to create the registry.	CPUC (lead); CEC (support)	Other	If a central registry is established under CPUC lead, PG&E will support as necessary. Note that protection of customer PII may reduce the usefulness of such a registry.	Accepted				N/A	
13a	Actual energy use varies by operation and occupant behavior. Facility operators are in a good position to identify opportunities for improvement.	Provide an industry competition for strategies to improve operations and occupant behavior.	IOUs	Other	While this idea appears to have merit, we think this recommendation should be addressed statewide by the CEC, not at the IOU level. Suggest this be considered under EPIC.	Accepted	Positive competition can be effective tool in encouraging and modifying behavior to support energy efficient decisions rather than mandating them.	Rejected	IOUs will not be implementing the SBD replacement.	Accepted	
13b	Most ZNE project teams track building performance	Ask ZNE contacts for methods to reduce occupant energy use. Methods can be publicized through social media, short videos, or case studies.	IOUs	Other	Rather than ask ZNE contacts for methods, recommend that we promote and highlight proven techniques and approaches gleaned from a commissioned study and/or approaches identified and proven via prior programs or campaigns (e.g. Step Up and Power Down, or other ZNE projects). Once methods are identified and prioritized, PG&E would support the incorporation of messaging about these	Accepted	This effort can be made more effective if it is combined with the industry competition approach as stated in Item #13a.	Rejected	IOUs are going through a solicitation. The design of the program is unknown.	Accepted	

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					methods into a comprehensive approach (e.g. social media, videos, studies, etc.).						
14	Itron (2019) recently published a study that identified high priority technologies	IOU programs, codes and standards, and policies should continue to encourage adoption of the high priority technologies.	IOUs (lead); CPUC and CEC (support)	Accepted	PG&E's EE programs and policies will continue to encourage adoption of high priority technologies.	Accepted	Education and incentives have proven to be effective ways to transform the market.	Rejected	IOUs are going through a solicitation. The design of the program is unknown.	Accepted	
15	Data centers were not studied, because there is no data center prototype.	<p>Improve tracking of building stock and EUI for data centers.</p> <ul style="list-style-type: none"> • Use results as initial step to identify savings opportunities. • Track data centers as a separate category in the next building stock or energy use survey. 	CEC (lead); IOUs (support)	Accepted	There is a proposed 2022 T24 measure to require PUE monitoring and reporting of datacenters over a certain capacity. If adopted, this measure could provide data for tracking and benchmarking.	Other	A better approach would be to revise ISPs that are broadly applied to data centers and consider whether ISP studies need to be revisited for certain technologies (e.g., server virtualization) based on the size and type of business/building type. For example, server virtualization was ruled to be ISP across all server types including single closet level servers for which there is no virtualization because virtualization typically applies to use of multiple servers.			Accepted	We know that data centers can be energy intensive. It would be beneficial to track the energy usage and savings opportunity.