

## 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 ZNE Verification Methodologies Phase 2*** (TRC Energy Services, Calmac ID #PGE0387.02, ED WO #2079)

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) Plan<sup>1</sup> and CPUC Decision (D.) 07-09-043<sup>2</sup>.

Individual RTR reports consist of a spreadsheet for each evaluation study. Recommendations were copied verbatim from each evaluation’s “Recommendations” section.<sup>3</sup> 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.

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<sup>1</sup> 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>.

<sup>2</sup> 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.”

<sup>3</sup> 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:** ZNE Verification Methodologies Phase 2  
**Program:** EM&V  
**Author:** TRC Energy Services  
**Calmac ID:** PGE0387.02  
**ED WO:** 2079  
**Link to Report:** [http://www.calmac.org/publications/ZNE\\_Verification\\_Methods\\_Phase\\_II\\_Final\\_Report\\_20181217.pdf](http://www.calmac.org/publications/ZNE_Verification_Methods_Phase_II_Final_Report_20181217.pdf)

Item #	Page #	Findings	Best Practice / Recommendations (Verbatim from Final Report)	Recommendation Recipient	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.
1	6	ZNE Design and ZNE Performance Require Different Verification Methods	A building can be both ZNE Design and ZNE Performance, but each of these requires a separate verification process. This is because, while it is feasible, it is not guaranteed that a building that meets the ZNE Design criteria will necessarily meet the ZNE Performance criteria.	<ul style="list-style-type: none"> <li>• Future evaluators</li> </ul>		
2	6	Different Metrics Require Different Criteria and Data Sources	There are various ZNE metrics that are being used by entities in the state of California and across the country. The choice of metric also affects the choice of the verification method and the data relied upon for ZNE verification. The design verification is based largely on energy simulation analysis, but the metric influences the choice of energy analysis tools as well as the outputs to be verified. For example, the TDV metric requires using a compliance tool (CBECC-Res/CBECC-Com) whereas the site energy metrics, other simulation tools may also be used.	<ul style="list-style-type: none"> <li>• CEC</li> <li>• Future evaluators</li> </ul>		
3	6	Different Audiences May Have Different Verification Needs	There are several programmatic and non-programmatic efforts that have a need to verify ZNE design and or ZNE performance. Each one of them has unique verification needs based on whether they target ZNE Design or ZNE Performance metrics. Figure 50 outlines the current California initiatives and the ZNE metrics of interest as well as the verification criteria and approach.	<ul style="list-style-type: none"> <li>• CEC, Energy Division, IOUs</li> <li>• Future evaluators</li> </ul>	Accepted	<p>3 of these levels are currently being used for PG&amp;E programs and projects: CAHP currently has a kicker for being a DOE Zero Energy Ready Homes Participant, which is equivalent to an ultra-efficient home.</p> <p>ZNE Design is the metric that is used for projects such as the PG&amp;E ZNE Production Builder Demonstration, the Proposition 39 ZNE School Retrofit Pilot, and EPIC project 15-094 "Demonstration of Affordable, Comfortable, Grid Integrated Zero Net Energy Communities".</p> <p>In the first two cases, the aim is to monitor and verify after construction.</p> <p>ZNE Performance Monitored is the qualifying criteria for being included in the 3 volumes of the Zero Net Energy Case Studies of commercial buildings.</p> <p>ZNE Performance Verified could be used in programs based on meter-based savings.</p> <p>The design portion of the ZNE needs to be verified that the model/building will be ZNE. The performance portion will need to be measured once the building is completed. The Prop 39 pilot, CAHP, and the Case study books are good examples of this.</p>

4	6	ZNE Metrics are Still Evolving	<p>ZNE remains a developing approach to building energy efficiency. As a result, definitions, strategies, and metrics are still evolving. One potential new approach, which is still in the early stages of development, is a metric based on carbon emissions or an equivalent. Because carbon metrics are still in the early stages of development TRC did not evaluate the project data in this report against any potential Zero Net Carbon metrics. It is likely that a carbon metric would require additional or different inputs from those described in this report. In addition, many of the inputs necessary for an accurate determination of Zero Net Carbon status, such as detailed information on utility generation fuel mix, is not yet readily available at a sufficient level of detail.</p> <p>As metrics and standards for verifying ZNE status continue to develop and evolve over time, the details of the verification requirements will need to evolve alongside, but the overall approach and strategy recommended in this report will still be valid.</p>	<ul style="list-style-type: none"> <li>• CEC, Energy Division, IOUs</li> <li>• Future evaluators</li> </ul>	Accepted	ZNE is still an evolving metric that will need to be created by the CEC and with the input of IOUs and other stakeholders and modified regularly, similar to the energy code, to make ensure the building metrics keeps up with the evolving code.
5	6-7	<p>Proposed Verification Levels</p> <p>We propose three levels of ZNE Verification and one level that is short of ZNE for those projects that don't quite meet the ZNE designation. These ZNE levels are designed for multiple use cases and differ in terms of the verification methods and the stringency of the data and verification process.</p>	<p><b>Ultra-Efficient</b> – projects that are not quite ZNE but have high levels of efficiency and some renewables.</p> <p><b>ZNE Design</b> – The ZNE Design designation is assigned to those buildings where there is demonstrated design intent to have a building/project to be ZNE. This designation by its nature is for those buildings that are in design or construction but not yet occupied or operated.</p> <p><b>ZNE Performance Monitored</b> – The ZNE Performance Monitored designation is assigned to those ZNE projects where the building has been operational for at least 12 months and there is a credible claim for ZNE performance, but not enough data to validate that claim. This is a common occurrence based on the 94 buildings studied by TRC for this project.</p> <p><b>ZNE Performance Verified</b> - ZNE Performance Verified is the highest level of ZNE designation awarded to those projects where the ZNE Performance claim is credible, backed by the right quality and quantity of data that is verified by an independent verifier. This level has the most degree of difficulty to achieve but the most guarantee of accuracy and verification of ZNE Performance. This level is appropriate where the ZNE performance is part of a contractual agreement or when ratepayer funds are being used to support the ZNE performance project.</p>	<ul style="list-style-type: none"> <li>• CEC, Energy Division, IOUs</li> <li>• Future evaluators</li> </ul>	Accepted	New Buildings Institute (NBI) may have a good approach to review.
6	7-8	Proposed mapping of Use Cases and ZNE Verification Levels	As identified in Section 6, there are various potential end users for these verification methods and different levels of rigor that they are likely to need with ZNE verification. On one end of the spectrum are all the voluntary claims of ZNE design and performance that need to be credible but may not need independent verification, whereas on the other end of the spectrum, the verification activities need to be conducted by independent third parties subject to stringent requirements.	<ul style="list-style-type: none"> <li>• Homeowners</li> <li>• Residential builders</li> <li>• Commercial developers</li> </ul>		

			Figure 57 shows the proposed mapping of the intended users and the ZNE Verification Levels. As discussed above, the Verified designation is most useful to those users who need independent verification of ZNE claims to justify spending ratepayer funds (program implementers, CPUC) or meet contractual obligations (designers and MEP firms that have signed performance guarantees).	<ul style="list-style-type: none"> <li>• Designers and MEP firms</li> <li>• Local building code officials</li> <li>• Program implementers</li> <li>• CPUC</li> </ul>		
7	8	Need for ZNE Registry	<p>TRC has developed comprehensive methods for verifying claims of ZNE Design and Performance based on extensive review of existing ZNE projects – a total of 90 projects were reviewed for this study. To date, this is the most comprehensive review of California ZNE buildings that included both quantitative (review of underlying energy use and generation data) as well as qualitative (degree of difficulty and accuracy of verification methods). However, this is still not likely an exhaustive list and with the expected increase in ZNE construction in the state, there is a need to conduct ongoing tracking of ZNE claims and verifications.</p> <p>Ideally, the CPUC would work with its sister agencies (CEC, CARB) to develop such as registry or at least support the development of such a registry. The registry would allow for a transparent way to provide insights into ZNE growth, energy performance of ZNE buildings and challenges and opportunities for ZNE buildings.</p>	<ul style="list-style-type: none"> <li>• Energy Division, with CEC and CARB</li> </ul>		
8	8	ZNE Performance Verification is Not a One-time Activity	As outlined in Section 6.3, the status of ZNE Performance Monitored or ZNE Performance Verified should not be in perpetuity but rather a time-bound rating like how vehicles need to prove they are meeting emissions standards every few years. We recommend that buildings undergo ZNE performance verification every 3-5 years to get insights into whether/how ZNE buildings can maintain energy performance.	<ul style="list-style-type: none"> <li>• CEC, Energy Division, IOUs</li> <li>• Future evaluators</li> </ul>	Accepted	As seen by the high potential savings from retro-commissioning, building operation and maintenance have a large impact on actual performance. Re-verifying ZNE performance ensures that operators and occupants continue to be mindful of energy consumption to allow the building to live up to its promise.