

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 Final Impact Evaluation: Non-Residential Deemed Pump and Food Service—Program Year 2020 (Quantum Energy Analytics; DNV; Calmac ID #CPU0334.01, ED WO #GroupA_AgPump_YR4)

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: Final Impact Evaluation: Non-Residential Deemed Pump and Food Service—Program Year 2020
Program: Commercial
Author: Quantum Energy Analytics; DNV
Calmac ID: CPU0334.01
ED WO: GroupA_AgPump_YR4
Link to Report: https://www.calmac.org/publications/_PumpFoodService_ALLSections_Final_W_APPS.pdf

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				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	5	We found that VFD controls installed through the programs are not being properly screened in many cases for eligibility criteria. Out of a total sample size of 57 pumps, commonly observed reasons for failing eligibility requirements includes the installation of speed controls in the following cases: 14 pumps run fewer than 1,000 hours per year; 9 pumps pump well water into water storage reservoirs; 13 pumps have settings that are at or near full-load. Many of the VFDs are installed on new pumps that irrigate trees that have been planted in the last couple of years; this results in low run hours, many below 500 hours per year.	The program's application and review process should be enhanced to better screen projects against eligibility requirements and exclusions.	PG&E, SCE	Accepted	As a standard practice in the current program as of this writing, PG&E has a set of eligibility questions and exclusion guidelines which are included in the processing steps for VFDs. The program also is now required to provide copies of invoices, spec sheets, and pictures of both the pump and the VFDs being installed. These more detailed resources are the result of past program evaluations. These resources are now built into the standard review process requirements. These steps should reduce the number of notable exceptions to program requirements.	Other	Please notify SCE to which pumps are in question by Solution Code/workpaper so SCE can properly understand the pumps in question, and to better understand how the ex-post team came to this recommendation.				
2	5	In most cases, pump operations can be readily characterized using interval billing data, such as hourly demand measurements for a given pump. In fact, our evaluation applied interval billing data as a key model input used to determine VFD savings.	We recommend that the programs make use of interval billing data for characterizing pump operations, including use of those data to derive updated estimates of deemed savings for the pump VFD measure, and as screening criteria for pump run hours.	PG&E, SCE	Other	PG&E is currently updating the baseline (run time hours, %load, etc.) for the measure packages using AMI data. Measure packages SWWP002 and SWWP005 will be both updated using this method. Use of billing data is not typically part of the deemed process per submission, but can be used as an additional resource in the event	Other	Due to these being a Deemed offering, this recommendation would have to take place at the workpaper development level. Since workpapers consider a population to develop the HOU, how would the average HOU correlate to such pumps with lower hours of use?				

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						the standard qualification questions fail to render a clear picture of the operating hours of the equipment. We take this recommendation under consideration and will update our measure guidance to include this suggestion.						
3	5		The PAs should continue to track and report Service Account IDs (SAID) of meters that are affected by VFD installation. Overall, the PAs did a good job of identifying the affected customers' meters and accounts where loads were affected by VFD installations, but there were a few instances where this was not the case. Best practice would be to ensure that each record in the tracking system has an SAID that corresponds with the installed VFD/pump.	PG&E, SCE	Accepted	PG&E procedure is to not allow processing of submitted measures without the SAID information. The account information is cross referenced with the address on the project, and finally, for those projects picked for CIP inspection, that step also validates account information and project location. PG&E will continue to track and report SAIDs of affected meters, and appreciates the evaluators' recognition that in most cases, the SAIDs were identified.	Accepted	SCE already has service account information for those customers.				
4	5	Beside the potential to save energy, there are other common reasons that farmers will decide to install VFD controls on crop irrigation pumps. In fact, some pumps cannot continue to be operated without the VFD due to operational requirements, such as the use of VFD controls to automatically adjust pump speed in response to pressure settings, or due to sand contamination in the well water column that can be controlled using VFD pump speed settings. Another common reason is that the VFD pump gives the farmer the ability to monitor and control the pump remotely, from a desk in their office. Furthermore, the VFD pumps can save on equipment maintenance and extend the life of the pump. This results in a high free-ridership rate for VFD controls because a considerable number of farmers indicate	For these reasons, we recommend that the appropriate baseline be determined as a function of pump type and size. Current deemed savings estimates assume a throttle valve flow control baseline, in which partially closed valves are used to control pump flow. However, this assumed baseline ignores the fact that VFD flow controls are commonly installed, even without the influences of program intervention.	PG&E, SCE	Other	An ISP Study conducted in 2019 determined that VFDs were not an industry standard at that point and size was not a factor. The best course of action could be to do a new ISP study and to focus on size and the different reasons why farmers will install a VFDs. The arguments presented make sense however, the ISP study from 2019 somehow contradicts this recommendation.	Accepted	The ex-ante team should consider re-visiting the baselines for such workpaper.				

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		that they would have installed VFD controls independent of the program / incentive.										
5	5	The workpaper-based estimates of savings currently draw results from a database of legacy custom and new construction projects involving pump VFDs. Our evaluation has assembled stipulated parameter values and results, including the following: operating hours, pump load distribution, motor efficiency, VFD efficiency, and the assumed affinity law exponent. Our evaluation also reported metric-based per-unit results that should prove useful to workpaper updates, in addition to updating the parameters noted above.	We recommend that the results of this evaluation, and any trends observed, should be considered for any workpaper updates for the agricultural pump VFD measures, in order to improve the accuracy of future workpaper estimates.	PG&E, SCE	Accepted	Current updates to both measure packages, SWWP002 and SWWP005, will include new baselines based on AMI data including runtime hours, pump load profiles, the use of 2.5 exponent on the affinity laws, etc.	Accepted	The ex-post team should provide this data so it can be considered in the workpaper update/development.				
6	5		The program's application and review process should be expanded to increase the range of irrigation pump performance information captured in the ex ante tracking databases. We recommend that the PAs consider including fields within the project application forms for estimated pump runtime, the acreage of the field to be served by the pump, the crop being served, irrigation endpoint type (drip, sprinkler, flood), OPE, etc. The PAs should make use of those data to fine tune ex ante savings values to better represent pumping conditions/water requirements. It might be possible, for example, to support crop-specific savings estimates and to better customize expected pump loads based on water requirement by crop, pump capacity and acreage.	PG&E, SCE	Other	The current program requirement includes pictures, spec sheets, and invoices (where available) for both the pump and the VFD. This is how PG&E gathers these data. As mentioned above, PG&E is updating measure packages (ex ante savings values) based on AMI data.	Accepted	This will be brought up to the ex-ante team for consideration.				
7	5		We recommend that the PAs consider using an enhanced deemed measure savings algorithm that provides for some reasonable level of customization for relevant input parameters. Based on observations during this evaluation, we believe that irrigation pumps are better suited as a quasi-prescriptive (partially-deemed) measure rather than a fully deemed measure. The diversity of sample points and results suggests that irrigated fields, and the VFDs that serve them, are unique to each farm, but nonetheless trends may be leveraged that can lead to more	PG&E, SCE	Other	PG&E will consider these recommendations, but more research would need to be done before implementing them in full. These recommendations would take a significant amount of time and effort to implement and if that were to be undertaken it would be appropriate to assess the potential impact and consider the balance of costs and benefits.	Other	SCE is transitioning its deemed programs to third parties for design, implementation and delivery. SCE will provide this recommendation to the appropriate third-party PAs as applicable.				

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			accurate savings claims. To that effect, crop-specific irrigation requirements, for example, could be used to better characterize and differentiate the measure savings algorithms. Continuing to use a database of legacy ex ante pump VFD results will likely continue to misrepresent realized program savings.									
8	5	Tracking system improvements are needed to properly characterize the pumps on which the VFD controls are installed. Pumps are mislabeled, including proper classification by motor size (horsepower) and type of pumping being performed by each pump (well pump versus booster pump).	The program's verification process should ensure that pump VFD installations are both valid and accurately represent the associated irrigation system.	PG&E, SCE	Accepted	The current program requirement includes pictures, spec sheets, and invoices (where available) for both the pump and the VFD, so these instances should be minimized. Appropriate motor size and visual verification (via photo) are also part of the review process with this measure.	Accepted	SCE appreciates this recommendation and will take this into consideration.				
9	5	For the majority of water pump upgrades evaluated, program tracking data did not provide sufficient information. For approximately 70% of projects sponsored by PG&E in 2020, we did not have sufficient participant contact data to verify pump installations or evaluate savings. As a result, we expanded our evaluation recruitment pool to include all participants in 2020 but ultimately fell short of the target sample count.	The PAs should require participating distributors and partnering contractors to collaboratively collect and submit basic information for each customer ultimately receiving the equipment. This appears to be most challenging to accomplish for installed equipment that are delivered by the programs through retail or other equipment supplier sources, in contrast with equipment that are installed directly by contractors, and should therefore be an area of focus for implementing this recommendation. This basic information is critical for the PAs, the CPUC, and its contractors to verify installations and maintain the integrity of ratepayer incentive dollars.	PG&E	Accepted	The process of identifying the proper field contact for installed measures is a challenge, but as cited, especially for product sold through distribution. The contact hurdle is common across many mid-stream channels and is high with respect to validating the correct field contact. PG&E's CIP process provides information to help PG&E support distributors to improve this process. PG&E recognizes the importance of this step to ensure incentive dollars are managed responsibly. Improved "Data Collection" plans will be included in the update of both measure packages.						
10	5	The reported savings were overestimated primarily due to differences in pump efficiency indices (PEIs). For all pumps rebated in 2020, we compared the installed pump efficiency indices (PEIs) with corresponding baseline PEIs as a function	The Water Pump Upgrade workpaper should be revised to reflect the most accurate and up-to-date PEI values available. Our evaluation team has been working with PG&E and the CPUC to refine this measure's workpaper, and this recommendation aligns with those	PG&E	Accepted	A revised measure package, SWWP004, was submitted to CPUC which included this recommendation, measure package was approved by CPUC on July 14, 2022.						

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		of pump size, application, and controls system. Overall, we found that the achieved efficiency increase was 69% lower than that reflected in program savings claims. This difference was the primary contributor to the measure's 19% GRR.	ongoing efforts. Should PG&E prefer that the workpaper incorporates blended PEI values for installed and/or baseline pumps, we recommend that the revised workpaper reflects the characteristics of pumps (sizes, applications, and controls types) rebated in 2020.									
11	5	We determined that 6 of the 20 evaluated projects have not saved energy. 2 projects occurred at newly constructed facilities that have not yet opened, 2 projects occurred at facilities that have not yet installed the rebated pumps, and 2 projects involved pumps with rated PEIs identical to baseline. These projects resulted in zero savings and reduced the realized program savings by 12%.	PAs should require participating distributors and partnering contractors to submit more comprehensive installation documentation (e.g., invoices, commissioning reports, photographs) to prove measure installation, quantity, size, and efficiency. As noted above, this appears to be most challenging to accomplish for installed equipment that are delivered by the programs through retail or other equipment supplier sources, in contrast with equipment that are installed directly by contractors, and should therefore be an area of focus for implementing this recommendation.	PG&E	Accepted	PG&E has taken steps since 2020 to improve verification of installations through pictures, invoices, and CIP inspections. PG&E is currently examining adjustment of CIP sampling rates to potentially increase distributor sold or customer installs to address this issue. The Data Collection section in the updated measure packages will include this information.						
12	5	9 of the 20 evaluated projects involved incorrect per-unit savings values or mischaracterizations of the rebated pumps. Correcting these errors resulted in a 1% decrease in realized savings.	PAs should redouble efforts to ensure that reported savings estimates are based on the correct application of per-unit savings values. We primarily attribute these observed errors to mischaracterizations of pump horsepower, pump application, or pump controls. This recommendation coincides with recommendations to collect more comprehensive installation data from contractors for all claimed installations.	PG&E	Other	Since 2020, the additional documentation steps described above are intended to address the challenges of these errors. Connecting the errors to the source or channel will be a key aspect of improving this performance.						
13	5	For many of the gas fryer projects evaluated, program tracking data did not provide sufficient information. For approximately 83% of projects rebated in 2020, we did not have sufficient participant contact data to verify fryer installations or evaluate savings. In addition, the ongoing COVID-19 pandemic further limited our ability to	We recommend that PAs require participating distributors and partnering contractors to collaboratively collect and submit basic information for each customer ultimately receiving the equipment or other program support. This appears to be most challenging to accomplish for installed equipment that are delivered by the programs through retail or other equipment supplier sources, in	PG&E, SCG and SDG&E	Other	PG&E is a nonlead partner in the statewide foodservice point of sale program, which SCG leads. PG&E defers to SCG on its response to recommendations for this program.			Accepted	Beginning August 1, 2022, the program will now require basic customer contact info be provided.	Other	For local programs that may install these, this recommendation doesn't seem to be an issue since end user data is collected. However, sample size is much smaller with this application SDG&E does not run the midstream program and will not be able to comment on that portion. However, it should be noted that midstream delivery doesn't provide for end

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		access food preparation areas for verification and measurement of the rebated fryers. As a result, we expanded our evaluation recruitment pool to include all 2020 participants but ultimately fell short of the target sample count.	contrast with equipment that are installed directly by contractors, and should therefore be an area of focus for implementing this recommendation. This basic information is critical for the PAs, the CPUC, and its contractors to verify installations and maintain the integrity of ratepayer incentive dollars.									user customer information.
14	5	We verified the installation of all rebated fryers in the evaluation sample. However, we determined one fryer to be ineligible for program rebates, as it was not ENERGY STAR-qualified. Similar to the clean water pump measure, fryers are primarily delivered through retail or equipment supplier channels. But in contrast to the clean water pump measure, we determined an installation rate of 100% after confirming fryer claims at 12 sampled participating facilities. We did not consider the lone ineligible fryer in the installation rate calculation.	PAs should continually update eligible products lists to reflect the most up-to-date ENERGY STAR qualified product list. PAs should continually disseminate eligible product lists to participating distributors to ensure that rebates exclusively support high-efficiency equipment.	PG&E, SCG and SDG&E	Other	PG&E is a nonlead partner in the statewide foodservice point of sale program, which SCG leads. PG&E defers to SCG on its response to recommendations for this program.			Accepted	ENERGY STAR does not frequently change specifications. When there is a new ENERGY STAR specification, a new measure package version is created and the Qualified Product List (QPL) is updated. Additionally, the QPL is updated monthly to ensure only qualified units are rebated. Foodservice Programs offered by the California IOUs do not use the Energy Star lists as the Program's operating QPL. California Foodservice QPLs are managed and distributed on California Energy Wise and offer many products that may not be currently Energy Star qualified. Additionally, many of the measures in these programs are not offered through Energy Star or have Energy Star lists available for them. For the Products where Energy Star lists are available, Energy Star often removes products from their list due to various reasons such as: product was discontinued, manufacturer forgot to turn in paperwork, or manufacturer did not share sales data. Although these products may have dropped from the Energy Star list, the product is still high-efficiency and meets the energy efficiency requirements for the California Programs and continues to be listed on the California QPLs. SoCalGas/CA QPLs are updated monthly to ensure the most up to date information is available.	Other	SDG&E does not lead the workpaper updates.

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15	5	Measured operation differed from workpaper assumptions and led to slightly reduced savings. We deployed temperature measurement devices on rebated fryers installed at sampled facilities. The operational data showed that fryers operate more frequently than predicted by the reported savings calculations. Increased operation led to a corresponding increase in realized savings. On the other hand, we determined higher energy usage rates than predicted, counterbalancing the operation increase. We confirmed through phone surveys and in-person interviews that our evaluation data collection, which occurred between November 2021 and February 2022, reflected typical operation and was not affected by COVID-19 precautions.	The measure workpaper should be revised to incorporate operational data from this evaluation study as well as the PY2017 evaluation cycle. The metered dataset now represents a combined sample of 55 projects. This real-world data can inform workpaper assumptions on operating hours per year among idle, preheat, and frying modes.	PG&E, SCG and SDG&E	Other	PG&E defers to SCG, the lead for this measure package, on its response to this recommendation.			Accepted	Measure package updates have already been submitted for the 2024 DEER cycle but these changes in operating hours will be considered for the next measure update effective 2026. For the Energy Usage rates, the evaluation measured flue gas temperature and then calculated heat rates. SoCalGas believes it would be better to use the heat rates from gas metering of tested appliances in lab settings, a more controlled environment than that of field studies, which do not measure the gas usage directly.	Other	SDG&E is not the lead IOU on this measure package.
16	6	The programs exhibit influence in making high-efficiency fryers cost-competitive. Participating distributors indicated that the program has caused them to stock and sell more high-efficiency models than they would have absent the program. Distributors generally use the program rebates to discount the high-efficiency fryers. These point-of-sale discounts help convince end-users to choose a more efficient model than they otherwise would have. Overall, we observed net-to-gross ratios from distributors to be slightly above that predicted in the measure workpaper.	NA	SCG					Accepted	SoCalGas has requested that Commission Staff adopt the findings of this impact evaluation report, specifically the higher NTG for upstream programs in the DEER2024 update cycle through the DEER resolution process.		