Date of Issuance: November 4, 2022

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION **RESOLUTION E-5221**
November 3, 2022

R E S O L U T I O N

E-5221. Approval of the Database for Energy-Efficient Resources updates for Program Year 2024-2025 and revised version for Program Years 2023 and 2022.

PROPOSED OUTCOME:

- DEER2024 Update (effective January 1, 2024)
- Revise DEER2023 Update (effective January 1, 2023)
- Revise DEER2022 Update (retroactive to January 1, 2022)

SAFETY CONSIDERATIONS:

- There are no safety considerations associated with this resolution.

ESTIMATED COST:

There are no costs associated with this resolution.

By Energy Division's own motion in Compliance with D.15-10-028.

SUMMARY

This Resolution approves updates to the Database for Energy-Efficient Resources (DEER) for program year (PY) 2024 and a revised version of DEER for PY2023 and PY2022, in compliance with D.15-10-028, D.21-05-031,[1] and Resolutions E-4818, E-4952, E-5009, E-5082, and E-5152. This update also directs forward looking research and addresses significant transitions for the DEER and measure package system maintenance and operation.

[1] https://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=385864616

All updated DEER assumptions, methods, values and supporting documentation are available on the DEER Module on the California Energy Data and Reporting System (CEDARS).[2]

BACKGROUND

The Database for Energy Efficient Resources (DEER) contains information on energy-efficient technologies and measures. DEER provides estimates of the typical energy-savings potential for these technologies in residential and nonresidential applications. DEER is used by California Energy Efficiency (EE) Program Administrators (PAs), private sector implementers, and the EE industry across the country to develop and design energy efficiency programs.

The DEER database has a 30-year history, starting in the 1990s under the California Energy Commission (CEC) where responsibility for developing energy efficiency measure parameters was delegated to a broad stakeholder coalition. With the 2006-08 energy-efficiency (EE) portfolio cycle, the CPUC staff assumed responsibility for the DEER and began hosting it on the "DEEResources" suite of websites.

Relevant Regulatory Background

The California Public Utilities Commission (Commission or CPUC) Decision D.15-10-028, Ordering Paragraph 17 states: "Commission staff shall propose changes to the Database of Energy Efficient Resources once annually via Resolution, with the associated comment/protest period provided by General Order 96-B. However, Commission staff may make changes at any time without a Resolution to fix errors or to change documentation." D.15-10-028, retains the direction from D.12-05-015 that DEER values be updated for consistency with existing and updated state and federal codes and standards while incorporating these changes into the DEER update.[3] D.21-05-031 retains previous direction regarding CPUC staff latitude in updating DEER.[4] D.21-05-031 also adopts and Resolution E-5152 enacted a biennial update schedule for

[2] https://cedars.sound-data.com/deer-resources/

[3] D.15-10-28, at 80, states "D.12-05-015 allowed additional mid-cycle changes if there are new state and federal codes and standards that affect DEER values. Specifically, the decision stated in Conclusion of Law 84: "We generally agree with parties' request that ex ante values should be adopted and held constant throughout the portfolio cycle. However, mid-cycle updates of ex ante values are warranted if newly adopted codes or standards take effect during the cycle."

[4] D.15-10-28, at 80, quotes from D.12-05-015: "Conclusion of Law 80 states: 'Our Staff should have significant latitude in performing DEER and other policy oversight functions and, absent specific directives to the contrary, should not be required to consult with or otherwise utilize any other groups to perform this work."

DEER, eliminates the DEER and non-DEER distinction for EE measures and redefines the scope of the DEER resolution to:

a) lock down the version of ex ante EE values used for planning and claims; b) direct research to inform future DEER updates; and c) manage deemed ex ante processes.

Resolution E-5082 initiated the transition of existing DEER and measure package systems to a software platform jointly co-funded by the IOUs called the Electronic Technical Resource Manual (eTRM)[5] and conferred conditional designation "data source of record" to the eTRM.[6] Resolution E-5082 also outlined a schedule and benchmarks for the phased transition from DEER to the eTRM as the new "data source of record" for the typical deemed energy savings values for energy efficiency measures.

In addition, Resolution E-4952[7] (DEER2020), adopted on October 11, 2018, clarified and specified issues in Resolution E-4818,[8] adopted on March 2, 2017. Among other things, these resolutions ordered many significant changes including guidance on the peak demand period, building prototypes, and measure analysis software control (MASControl3) updates.

Timing and Applicability of DEER Updates

DEER updates flow into the EE portfolio development process by providing new deemed energy savings estimates and other EE measure parameter updates for program design. New energy savings estimates, and underlying assumptions, methods, and values inform the direction of energy efficiency programs. These allow program administrators to shift program eligibility requirements and incentive support mechanisms to deliver the most reliable, cost-effective energy savings. DEER updates may also reflect new market conditions. The PAs are required to ensure new assumptions and values are incorporated into the next cycle of EE programs by considering a) when the next update is planned, b) the fundamental assumptions for the update, and c) whether shifts to their programs to capture cost-effective savings are needed. Updates to DEER methods apply to EE technical measure package development and custom project energy savings estimates as well as program delivery decisions.

The terminology "DEERxxxx" is used to designate the version of updated parameters and is independent of the conversion to using eTRM. The year shown reflects the program year that a given update takes effect. Beginning January 1, 2022, DEER no

[5] https://www.caetrm.com
[6] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M346/K161/346161639.PDF
[7] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M232/K459/232459122.PDF
[8] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M179/K264/179264220.PDF

longer referred to the ExAnte and Preliminary Ex Ante Review (PEAR) databases since these data now reside in the eTRM.

Scoping Document and Updates for DEER2024 and Revised DEER2023/DEER2022

On May 4, 2022 the CPUC Energy Division released for public comment a Scoping Document outlining the proposed issues and updates to be addressed in this DEER resolution. The Scoping Document described the various issues that may be considered in this resolution and the rationale for why these issues need to be addressed. Seven stakeholders, including all four investor-owned utilities (IOUs), submitted comments on the Scoping Document.[9] Below are the issues raised most frequently in the comments:

- Research regarding the high-SEER heat pump and air conditioning performance curves
- Structuring the EnergyImpact and Measure tables in the DEER database
- Updates to the Delivery Types
- Aggregated values in permutations
- Budget/staff implications to shift historic DEER measure modeling to PAs

In consideration of the comments to the Scoping Document, the topic areas addressed in this DEER update are summarized in Table 1. The policy guidance for these updates is described in the Discussion section that follows. A more detailed technical description of the changes and additions is provided in Attachment A to this Resolution. Complete documentation and supporting material on the updated assumptions and methods and updated DEER elements such as database tables, calculators, and web pages are available at the DEER Module on CEDARS.[10]

[9] The Scoping Document for DEER2024 Update was posted on May 4, 2022 and located at: https://pda.energydataweb.com/#!/documents/2623/view.

[10] Supporting material is at https://cedars.sound-data.com/deer-resources/tools/supporting-files/resource/2/history

Table 1. DEER2024 Update

Priority	Effort	DEER Version	Update Topic Area	Sector		Measure/Tech Group					Forecasted Value				
				Res	Non-Res	Lighting	HVAC	DHW	Envelope	Plug/Process	UES	NTG	EUL	Measure Cost	Other
			Management of DEER Processes												
!!!!	$$$$	2024	A. Transition to Electronic Technical Reference Manual (eTRM)	X	X	X	X	X	X	X	X	X	X	X	X
!!!!	$$$$	2024	B. Updates to eTRM and Measure Packages	X	X	X	X	X	X	X	X	X	X	X	X
!!!!	$$	2024	C DEEResources Website Content Migrated to CEDARS	X	X	X	X	X	X	X	X	X	X	X	X
!!!	$$$	2023	D. PAs Responsible for Modeling DEER and Historically Non-DEER Values	X	X	X	X	X	X	X	X	X	X	X	X
!!!!	$$$$	2026	E. DEER 2026 Update and Measure Package Submission/Review Timeline	X	X	X	X	X	X	X	X	X	X	X	X
!!!	$$$	2024	F. Measure Lifecycle Management in DEER	X	X	X	X	X	X	X	X	X	X	X	X
!!!!	$	2024	G. Mid-Cycle Adjustments to the Locked Ex-Ante Values	X	X	X	X	X	X	X	X	X	X	X	X
!!!!	$$$$	2024	H. EnergyPlus Prototypes, Residential	X		X	X	X	X	X	X				
!!!	$	2021	I. PY2021 Evaluator Guidance	X	X	X	X	X	X	X	X	X	X	X	X
!!	$	2024	J. Hard-to-Reach/Direct-Install Net-to-Gross Ratios	X	X	X	X	X	X	X		X			
!!	$$	2024	K. Fuel Substitution Calculator Updates	X	X		X	X	X	X					X
!!	$	2023-2024	L. Add-On-Equipment (AOE) Host Clarification	X	X	X	X	X	X	X					X
!!	$$	2024	M. Structural Changes to DEER Tables	X	X	X	X	X	X	X		X	X		X
!!!	$	varies	N. Updates to DEER Support Table Values	X	X	X	X	X	X	X		X	X		X
			Research Needs for PY2026-27												
!!!!	$$$$	2026	O. EnergyPlus Prototypes, Commercial		X	X	X	X	X	X	X				
!!!!	$$	2026	P. Research to Improve Water Heater Measures	X	X			X			X				
!!!	$$	2026	Q. Net-to-Gross Ratio for Hard-to-Reach Customers	X	X	X	X	X	X	X		X			
!!!!	$$$	2026	R. High-SEER Heat Pump and AC Performance Curves	X	X		X				X				
!!!!	$$	2026	S. Boiler Compliance with Condensation of Exhaust Gasses and Associated EE Assumptions	X	X		X	X			X				
			Measure Adoption												
!!!	$	2024-2026	T. Guidance Based on Industry Standard Practice Studies	X	X		X	X			X				
!!!	$	2024	U. Guidance from 2019 Custom Industrial, Agricultural, and Commercial Impact Evaluation Review		X	X	X	X	X	X		X			
!!!!	$$$	2024	V. Guidance from Evaluation, Measurement and Verification (EM&V) Review	X	X		X	X	X		X	X	X		

DISCUSSION

Pursuant to D.15-10-028, the Energy Division published a DEER Update Scoping Document on the proposed list of updates for DEER2024 and revised DEER2023 and DEER2022 items on May 4, 2022. The list of topic areas that this Resolution will incorporate are summarized below and described in detail in Attachment A, DEER2024 Update Summary.

Management of DEER Processes

A. Transition to Electronic Technical Reference Manual (eTRM)

A.1 IOU Budgets for 2023 eTRM and CalTF Support

In Resolution E-5152,[11] we directed the IOUs to include budgets for eTRM development and California Technical Forum (CalTF) support of new measure development needs in their 2022-23 Annual Budget Advice Letter filings, with a short description and table illustrating the proposed budgets in the narrative so that CPUC staff can understand and approve the budgets along with the other forecasted activities for 2022. Section A.4 of Resolution E-5152 also allowed the PAs to include funding for the eTRM in their Business Plan applications. This contracting and funding model has been demonstrated to be effective and should continue, and if the IOUs did not budget for eTRM in their Business Plan applications, they may update their 2024-2027 budget applications in the 2023 True-up Advice Letter.

A.2 Ownership and Financial Responsibility of eTRM 2023 and Beyond

The Energy Division has oversight of ex ante values and methodologies, including measure review and processes supported by the eTRM; however, the eTRM contracting process to date has provided a model for IOU funding of EE resources that enables them to fund the eTRM from their EM&V budgets and administer the eTRM as activities within their Business Plans.

Resolution E-5082[12] Ordering Paragraph 6 required the IOU Funders to administer and maintain the eTRM without changes to contract management structure until completion of both Phase 1 and Phase 2 activities. Since both phases are completed, the IOUs are authorized to alternate eTRM contract management responsibilities to another IOU, and to manage software maintenance and development contracts as needed.

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[11] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M398/K106/398106298.PDF
[12] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M346/K161/346161639.PDF

B. Updates to eTRM and Measure Packages

Effective Program Year: 2022. California's statewide electronic Technical Reference Manual (eTRM) is the *Official Source of California Energy Efficiency Measure Data*,[13] and with the release of Version 2.3 in March of 2022, is now the sole source for energy efficiency measure package development, submittal, review, and publishing. Measure developers shall follow the rules and procedures as laid out in the documents provided by CalTF as they move measures through the development phase prior to submittal.

B.1 eTRM Table Structure Changes

Additional fields shall be added to the eTRM measure permutations table as needed to support measure development. These fields may result from fields added to the DEER support tables or they may be in addition to DEER support table fields. Measure developers shall work with CalTF to identify those fields and communicate a process whereby the permutation tables will be changed to accommodate the new data. Where the new fields and associated data impact DEER support tables, CEDARS, or CET, the CPUC staff will review and approve necessary changes to meet these needs. Examples of such fields include but are not limited to: E3 target sector, E3 climate zone,[14] Refrigerant Avoided Costs (RACC), ex ante annual water savings, in gallons (one for indoor water savings and a second for outdoor water savings), low-Global Warming Potential (GWP) refrigerants, and water-energy nexus (WEN) direct energy savings.

B.2 Refrigerant Impacts (RACC)

Per D.21-05-031 and Resolution E-5152, starting in PY2022 the reporting of refrigerant leakage avoided costs (RLAC) is required for all energy efficiency measure claims as calculated from the CPUC's Refrigerant Avoided Cost Calculator (RACC)[15] for measure packages where the retrofit involves adding (not replacing) equipment that uses refrigerant—these include fuel substitution and electric resistance to heat pump measures—or where low-GWP measure benefits will be claimed.

The RACC does not presently have a means to determine avoided refrigerants for dual baseline implementations. The CPUC considered and analyzed various work arounds to this issue and concluded that treating accelerated replacement (AR) measures as normal replacement (NR) measures was the best option at this time. We direct that in the RACC, accelerated replacement (AR) measures shall be treated the same as normal

[13] https://www.caetrm.com/
[14] E3 refers to Energy + Environmental Economics – these fields are needed to track the mapping to E3's sectors/climate zones.
[15] https://cedars.sound-data.com/deer-resources/tools/supporting-files/resource/2/history

replacement (NR) measures until the RACC is revised. PAs shall continue to work with CPUC staff to update the RACC to include the calculations for AR measures and align with the 2022 update to the avoided costs by June 1, 2023. Measure developers will need to submit the updated RACC for applicable measure packages thereafter. These updates will be outlined in the Measure Lifecycle Management table, see Section F. PAs are to use the most recent version of the calculator for all off-cycle new Measure Package submissions. Guidance on where to submit the addendums can be found on CEDARS at Guidance for Deemed Measures - CEDARS.[16]

CPUC Decision D.21-05-031 section 8.1 allows program administrators to collaborate with CPUC staff for developing normal replacement measures within energy efficiency programs to encourage low-GWP refrigerants. The Decision specifies "...we will set normal replacement baseline to be either the current regulation, or the refrigerant typically used for similar applications in program years 2020-2021, whichever has lower refrigerant emissions. Given the market uncertainty, we will revisit this baseline policy in 2025." The refrigerant baseline may be updated for program year 2026.

B.3 Aggregated Values in Permutations

A review of eTRM permutations found that aggregated values (e.g., "Any", "Res", "Com") were in use when more accurate deemed savings were available and should have been used. We clarify that aggregated values shall only be used in some fields of the permutations table under a limited set of conditions as described in Attachment A.

B.4 Water-Energy Nexus (WEN) Impacts

In December 2021 we released the new Water-Energy (W-E) Calculator 2.0.[17] The new calculator replaces W-E Calculator 1.0 and is to be used to calculate the embedded energy savings for Water-Energy Nexus (WEN) energy efficiency measures starting PY2023 for existing measures. To improve the traceability of embedded energy savings from measures that save water, W-E savings are no longer to be reported in a single rolled-up measure package (SWMI001); instead, the WEN calculated savings are to be included with each measure package involving water savings. PAs can now add the embedded energy savings to the direct energy savings from these WEN measures to claim incentives which will count towards PAs' energy efficiency goals.

On December 22, 2021, CPUC staff issued a guidance memo describing a short- and long-term solution for how the embedded energy savings outputs of the

[16] https://cedars.sound-data.com/deer-resources/deemed-measure-packages/guidance/resource/8/history
[17] https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/water-energy-nexus-programs

W-E Calculator 2.0 must be calculated and integrated into the measure package, eTRM, CEDARS, and CET, see Appendix A4. PAs are to use the most recent version of the calculator for all off-cycle new Measure Package submissions. Guidance on where to submit the addendums can be found on CEDARS at Guidance for Deemed Measures - CEDARS (sound-data.com).

The long-term solution to incorporate embedded energy savings outputs of the W-E Calculator are currently under integration between eTRM, CEDARS, and CET. Once the proper fields for the long-term solution are migrated into the CET, CPUC staff will inform PAs that a measure package plan (MPP) for each WEN measure will be required to update the methodology used to calculate embedded energy savings. An MPP does not require a full measure update. While the timeline is still fluid, we expect the measure package plans incorporating the long-term solution methodology will occur in early 2023.

B.5 Rebates Exceeding Incremental Measure Cost (IMC)

In 2020, CPUC staff released an *Addendum to Fuel Substitution Workpaper Documenting Incentive Greater that Incremental Measure Cost.*[18] The purpose of this addendum was to provide a pathway for PAs to inform the CPUC staff of the need to offer rebates to the customer that exceeds the net cost to the participant of installing more efficient equipment. We adopt this guidance memo.

On June 2, 2022, CPUC staff released an updated guidance document *Addendum to Measure Package Documenting Incentive Greater than Incremental Measure Cost*, see Appendix A4. We adopt this guidance memo. The guidance included the following:

- Update to include eligibility of all measures.
- Update to change the term workpaper to measure package.
- Update title of document "Addendum to Measure Package Documenting Incentive Greater than Incremental Measure Cost".
- Added directions for posting addendum to the measure log for referenced measure package.
- Added third party to Incentive Requirements narrative.
- Removed PA contact information

B.6 Measure Cost Updates

Currently measure costs are reviewed for necessary updates as measure packages are revised. As directed in Section F, measure costs shall be updated as measure packages

[18] https://cedars.sound-data.com/deer-resources/deemed-measure-packages/guidance/

are revised in accordance with the Measure Lifecycle Management table, see Section F. In addition, to ensure that measure costs stay current they will be revised no less frequently than every four years using methods described in CalTF's whitepaper on cost updates for measure package updates.[19]

B.7 Data Requirements for Distributor/Contractor-delivered Measures

Multiple evaluation reports have recommended improvements in documentation quality for measures delivered via midstream and upstream channels to meet measure verification evaluation requirements per the California Evaluation Protocols.[20] Since these recommendations have not been sufficiently acted upon, we direct that data requirements must be added to measure packages updated for PY2023 and PY2024 for all offerings using the UpDeemed delivery type. At a minimum the data collected must be sufficient to allow an evaluator to better track the installed equipment that received a rebate. These include:

- Site Identifier – A unique identifier for the shipping destination (upstream) or installed location (midstream) of the incentivized equipment (e.g., site address)
- Equipment Identifier - A unique identifier for each unit of incentivized equipment[21] (e.g., serial number)
- Quantity per sales transaction, project, or site – Total units of incentivized equipment located at the site or project

Additional data requirements for specific measure packages may be required for inclusion and will be addressed as part of the measure package review process.

C. DEEResources Website Content Migrated to CEDARS

Effective Program Year: 2022. Due to security vulnerabilities identified by the CPUC, all content from the DEEResources.com and DEEResources.net websites was migrated to the DEER Module at CPUC's CEDARS website.[22] We clarify here that no new content will be uploaded to DEEResources.com; new content will only be added to

[19] https://static1.squarespace.com/static/53c96e16e4b003bdba4f4fee/t/5f99c8d60e9651515f53a3db/1603913944726/Cal+TF+White+Paper+Cost+Analysis+Methods+Affirmed+2020.09.24++v1.0.pdf

[20] The California Evaluation Protocols, p. 57 states that Basic Rigor Verification involves physical inspection of the installation to verify correct measure installation and installation quality.

[21] Exemptions to the equipment identifier requirement will be made for measure package offerings where leveraging a serial number or other practical unique identifier is infeasible.

[22] https://cedars.sound-data.com/deer-resources/

DEEResources.net in rare instances and until it can be uploaded to the CEDARS DEER Module.

D. PAs Responsible for Modeling DEER and Historically Non-DEER Values

Effective Program Year: 2026. Decision D.21-05-031 eliminated the DEER and non-DEER distinction and clarified that all deemed ex ante values approved by staff and housed in the existing DEER systems, and ultimately in the eTRM, are considered DEER values."[23] Because of this change, there is no longer a compelling reason for these historically DEER measures to be modeled by the CPUC. Shifting this work to the PAs will allow CPUC staff to devote more time to—and elevate the rigor of—the review of measure package submissions by:

- Ensuring that the UES values are based on valid assumptions
- Verifying that policy guidance from the CPUC is appropriately interpreted and applied
- Scrutinizing building model inputs to improve the accuracy of UES values

Starting with PY2026 measure packages, the entire responsibility for calculating the UES values for all deemed measures is shifted to the measure package developers. CPUC staff will continue to develop and maintain the DEER building simulation tools and the DEER water heater calculator. Tools and methods will be fully documented and supported. CPUC staff will also continue to be responsible for critically reviewing all UES values for deemed measures.

E. DEER 2026 Update and Measure Package Submission/Review Timeline

This resolution sets forth the schedule for DEER Update and for submission of measure packages for CPUC staff approval for PY2026-27. The timeline and schedule are provided in Table 2 and Table 3.

Table 2. PY2026-27 DEER Update Cycle Timeline

Description	Responsible Party	Due Date	Approval Date	Effective Date
Measure Package Update Schedule	PAs/ Stakeholders	2023-08-01**	-	-

[23] D.21-05-031, "Assessment of Energy Efficiency Potential and Goals and Modification of Portfolio Approval and Oversight Process," adopted 2021-05-20, p. 38.

Description	Responsible Party	Due Date	Approval Date	Effective Date
Measure Package Submittals	PAs	See Table 3	2024-08-01+	2026-01-01*
Draft DEER2026 Update Resolution	CPUC	2024-08-01	-	-
DEER2026 Update Resolution	CPUC	-	2024-11-01	2026-01-01*

* There may be exceptions when updates become effective off-cycle.
** Draft for workflow scheduling. Updates to the schedule may be made if needed.
+ Per Draft Resolution release, adoption in Final Resolution

CPUC staff will work with PAs to set a prioritized schedule of updates for all PY2026-27 measure packages resulting from updates directed in the Measure Lifecycle Management (further described in Section F) and Research Needs for PY2026-27. PAs may submit additional updates to measure packages beyond what is directed and may include additional measure packages for update during that time. Only measure packages adopted in the future resolution for DEER2026 will be included in the set of deemed measures for the PY2026-27 program cycle.

Controversial measure packages must be submitted well before the standard three-month timeframe for review and approval to avoid delays. It is the responsibility of the PAs to follow the agreed schedule for submissions or risk measure packages not being included in the DEER resolution and therefore not receiving approval.

Table 3 summarizes the measures presently planned for updates and the deadline for PA measure package submittals.

Table 3. Timeline for DEER2026-27 Measure Package Updates from CPUC-Led Research

End Use Category	Update Detail	Research Data Needed By	PA Measure Package Submittal By
Commercial Refrigeration (CR)	Commercial refrigeration EnergyPlus updates per Section N	2023-12-01	2024-03-31
HVAC (HC)	Commercial weather-dependent EnergyPlus updates per Section N	2023-12-01	2024-03-31
Water Heating and Water Pumping (WH)	Water Heater Measure Update per Section O	2023-12-01	2024-03-31

Table 4 summarizes the measures presently planned for updates, when the PA-led research is due, and the deadline for the PA measure package submittals.

Table 4. Timeline for DEER2026-27 Measure Package Updates from PA-Led Research

End Use Category	Update Detail	PA Research Data Needed By	PA Measure Package Submittal By
HVAC (HC)	High-SEER performance curves for HPs/ACs per Section R	2023-12-01	2024-03-31
Water Heating (WH)	Condensing boiler operating efficiencies per Section S	2023-12-01	2024-03-31

F. Measure Lifecycle Management (MLM)

Effective Program Year: 2024. PAs shall work with CalTF to link to and synchronize with a Measure Lifecycle Management (MLM) table in DEER to track existing and planned updates to current and future measure packages. This table is intended to help manage measure package updates in a more strategic manner and space them out over time to minimize highly compressed measure package update and review periods. The table will also be used to identify those measure packages that need new research to inform planned updates. In addition to the Statewide Measure ID, end use, and technology group, at a minimum the table will track characteristics of each measure package as identified in Table 5. For each characteristic listed—including the characteristic itself—the dates each was last updated and is next expected to be considered for update will be tracked. CPUC staff will retain responsibility for approving the MLM table.

Table 5. Measure Package Characteristics Tracked for Measure Lifecycle Management

Characteristic	Description
PAlead	Lead program administrator for measure package
FuelType	Predominant fuel type saved by technology (e.g., electric, natural gas)
WeatherFile	For weather-sensitive measures, the TMY weather file used (e.g., CZ2022)
CodeStd	Relevant building code or appliance, ENERGY STAR®, or CEE standard
ISPref	Report to determine industry standard practice used for most recent update
Refrigerant	Flag to indicate measures that contain refrigerant

Characteristic	Description
EULref	Report used for most recent EUL update
NTGref	Report used for most recent NTGR update
Costref	Report used for most recent cost update
EntryYear	First year measure became available for tracking when availability exceeds two years

G. DEER Off-Cycle Adjustments to the Locked Ex-Ante Values

D. 21-05-031 (p. 39) locks ex-ante (i.e. expected) energy savings values that will be used in the Energy Efficiency next Potential & Goals Study as well as claims for the two-year DEER cycle, beginning with years 2024-25. It further notes that there may be off-cycle adjustments that will account for reasonable corrections to the existing locked values and allow new measures to be added to the portfolio. PAs may still submit new measures during the cycle, but ex ante values adopted in DEER2024 will remain locked. Off-cycle error corrections (i.e., correction of typographical and clerical errors, and other obvious, inadvertent errors and omissions) will be handled on a case-by-case basis and consider their impact to the portfolio. Building upon Resolution E-5152, these off-cycle adjustments are further clarified below.

G.1 New Measures

New measure packages and measure packages that solely include the addition of new measures may be submitted for CPUC staff review at any time during the biennial cycle and must follow the submittal, review, and approval process outlined in Resolution E-5152 (p. 13). Newly approved ex ante values adopted into the portfolio are not subject to an effective date 90-day after approval. Instead, they will become effective upon approval and can be used for off-cycle claims. Notification of new measure packages or new measures added to existing measure packages will be communicated to stakeholders through CPUC staff measure package dispositions, eTRM published values, DEER support tables, and/or stakeholder meetings.

G.2 Error Corrections

Reasonable error corrections to DEER and measure packages (i.e., "correction of typographical and clerical errors, and other obvious, inadvertent errors and

omissions.")[24] can occur at any time during the biennial cycle, shall become effective immediately. As stated in E-5152, "such errors will be handled on a case-by-case basis and assessed based on their impact to the portfolio." Notification of reasonable error corrections shall be communicated to stakeholders through CPUC staff measure package dispositions, eTRM published values, guidance documents, DEER support tables, DEER change log, and/or stakeholder meetings.

Error corrections that are egregious and have a large impact to the savings portfolio or claims (i.e., NTG values, measure eligibility requirements, or other measure packages requirements that can retroactively impact potential savings claims) may be allowed only on a very limited basis and will be handled case-by-case. CPUC staff shall hold the authority to decide whether an off-cycle update is considered critical in these circumstances. This will be communicated to stakeholders through CPUC staff measure package dispositions, guidance documents, eTRM published values, DEER support tables, DEER change log, and/or stakeholder meetings.

G.3 Codes and Standards

Anticipated changes to codes and standards that occur off-cycle shall be planned for and proceed as outlined in the Measure Lifecycle Management table, see Section F. Uncertain or unanticipated changes to codes and standards that occur off-cycle will require a revised Measure Package baseline and become effective 90 days after the Measure Package is approved. Voluntary standards such as ENERGY STAR® may also require a revision to the baseline or measure values.

H. EnergyPlus Prototypes, Residential

Effective Program Year: 2024. CPUC staff has completed the transition to EnergyPlus prototypes for residential measures with the set of residential weather dependent measures listed in Table 6 that will be adopted as part of this DEER2024 update. The draft CPUC methodology documentation was publicly reviewed, changes were made to the prototypes and the models were recalibrated. The final documentation is posted on CEDARS.[25] The transition of commercial measures is upcoming, may also include a revision of the residential prototype models, and is described in Section O.

Table 6. Measures Transitioned to EnergyPlus Prototypes

Measure ID	Measure Name
SWHC027	Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/h

[24] Resolution A-4661, Orders Correcting Errors in Commission Decisions (March 9, 1977) is available on the Commission website at: https://docs.cpuc.ca.gov/PublishedDocs/PUBLISHED/Graphics/96168.PDF

[25] https://cedars.sound-data.com/deer-resources/tools/energy-plus/resource/10/history

Measure ID	Measure Name
SWHC029	Fan Controller for Air Conditioner, Residential
SWHC030	Whole House Fan, Residential
SWHC031	Furnace, Residential
SWHC044	Ductless HVAC, Residential, Fuel Substitution
SWHC049	SEER Rated AC and HP HVAC Equipment, Residential[26]
SWSV001	Duct Seal, Residential
SWSV013	Duct Optimization, Residential
SWBE006	Ceiling Insulation, Residential
SWBE007	Wall Insulation, Residential
SWHC038	Brushless Fan Motor Replacement, Residential
SWHC050	Ductless Heat Pump, Residential
SWWH028	Heat Pump Water Heater, Commercial and MF, Fuel Substitution
SWAP001	Residential Refrigerator and Freezer
SWWH010	Boiler, Multifamily

I. PY2021 Evaluator Guidance

Effective Program Year: PY2021. Due to the transition to eTRM as the data source of record in PY2022 and the resulting transition year in PY2021 we clarify the location of the official ex ante values during the transition period. Evaluators of PY2021 programs that delivered deemed measures are directed to use the Ex Ante Data (EAD) Tables that accompany each measure package as the data source of record for ex ante UES values rather than eTRM's permutations. These EAD tables may be found in the CEDARS Deemed Measure Archive.[27] There is one exception to this guidance for measures that were developed, submitted, and approved at the end of 2021 using only eTRM permutations (i.e., no EAD tables were produced or reviewed). Table 7 lists the measure package that falls under that exception:

Table 7. PY2021 EM&V Exceptions for Measure Savings Evaluation

Measure ID	PA Lead	Measure Name
SWWH011-01	PG&E	Central Storage Water Heater, Multifamily

[26] This measure will include SEER 19-21 equipment.
[27] https://cedars.sound-data.com/deer-resources/deemed-measure-packages/measure-package-archive/

Starting in PY2022, evaluators are directed to use the ex-ante UES values provided in permutation tables contained within measure packages published in eTRM.

J. Hard-to-Reach (HTR)/Direct-Install Net-to-Gross Ratios

Effective Program Year: 2022. Due to confusion regarding the applicability of the higher NTG ratio value for HTR customers we clarify here that the 0.85 NTG ratio for HTR customers in California only applies to HTR customers as defined in D.18-05-041, Section 2.5.2 and 2.5.3 and must use a direct install (DI) delivery channel. We adopt in Section N of this resolution three additional measure application types (MATs) that are eligible to use the HTR-DI NTGRs. We also clarify the definition of the direct-install delivery channel.

K. Fuel Substitution Calculator Updates

Effective Program Year: 2026. CPUC staff may be updating the Fuel Substitution Technical Guidance Document and Fuel Substitution Calculator as soon as the summer of 2023. If available, the updated calculator shall be used beginning in 2024 to update all fuel-substitution measure packages to become effective for PY2026-27. PAs are to use the most recent version of the calculator for all off-cycle new Measure Package submissions. Guidance on where to submit the addendums can be found on CEDARS at Guidance for Deemed Measures - CEDARS (sound-data.com).

L. Add-On-Equipment (AOE) Host Clarification

Effective Program Year: 2023-2024. An AOE measure is defined as improving the nominal efficiency of the host equipment (upon which it is installed) and the host equipment is defined as the equipment that uses less energy due to the add-on measure.[28] This resolution clarifies the definition of the host equipment by adding that some AOE measures reduce the load, or energy usage, on the host equipment. The measure life of an AOE and the introduction of a host proxy is discussed in more detail in Attachment A.

[28] Resolution E-4818, Section 1.3.6.2 Add-On Equipment, pp. 26-27.

In addition, ceiling, wall, or floor insulation as well as greenhouse heat curtains and infrared film shall no longer be considered AOE and are reclassified as the building weatherization (BW) measure application type.

M. Structural Changes to DEER Tables

To improve both the traceability of updates made to deemed savings and the reporting verification abilities of CEDARS, we direct the following changes to the structures of some new and existing DEER database tables.

- A new table, "FuelSub", will categorize the types of fuel substitution measures to accommodate the transition to the Total System Benefit calculations.
- A new table—serving as a companion to the NTG_2020 table—will clarify when a given NTG ID may be used. The eTRM and CEDARS shall synchronize with this new companion table nightly.
- A new table—serving as a companion to the EUL basis table—will clarify when a given EUL ID may be used. The eTRM and CEDARS shall synchronize with this new companion table nightly.
- CPUC staff will add two new fields to the Measure Table: WeatherSim and FuelSub_ID.
- CPUC staff will add six new fields in DEER's EnergyImpact table to accommodate updates to load shapes. The contents of four fields that are no longer in use will be deleted.

N. Updates to DEER Support Table Values

To accommodate policy clarifications and improve the evaluability of reported claims, we direct the following changes to the DEER support table values.

- Expand the allowed MATs for HTR-DI NTGRs from Normal Replacement (NR) or Accelerated Replacement (AR) to also include Add-on Equipment (AOE) and Building Weatherization (BW) MATs. Retro-commissioning measures (BRO-RCx) may also be categorized as being direct install if the vendor, as part of the program, performs the installation. Whether a given measure is categorized as direct install will need to be determined on a case-by-case basis by CPUC staff.
- Updates to Delivery Types to provide more detail for upstream delivery types, and to drop the distinction between deemed and custom measures since Measure Impact Types already account for whether measures are deemed or custom.
- New Measure Impact Types (MITs) are added for use starting in program year 2022 since Normalized Metered Energy Consumption and Strategic Energy Management program measures that involve fuel substitution require their own

MITs for claims in PY2022-2025. The MITs will be consolidated in 2026 since there will no longer be a distinction between DEER and non-DEER measures and a FuelSubID field will be added to the Measure table.

- All NTGRs resulting from CPUC staff's evaluation, measurement, and verification (EM&V) studies and approved via dispositions shall be rounded to the nearest 0.05 in DEER. NTGRs results from EM&V studies shall only be updated in DEER when the EM&V NTGR (before rounding) is at least 0.05 different from the current DEER value. If a new EM&V study determines that an existing and active measure-specific NTGR is—after rounding—equal to the relevant default NTGR, the measure-specific NTGR will be expired.

Research for PY2026-27

The CPUC's future research plans center around forecasting important updates that will have significant impact on deemed measure savings.

O. EnergyPlus Prototypes, Commercial

The transition to EnergyPlus prototypes for commercial measures is anticipated to be completed by December 2023. These new commercial building prototypes will be released as available so they can be used for new measures and for PY2026-27 measure updates. CPUC staff will update the grocery and refrigerated warehouse prototypes and the refrigeration system performance curves. Refrigeration equipment performance curves used by the current DEER prototype are out of date.

P. Research to Improve Water Heater Measures

CPUC released a new version of the water heater calculator, "DEER Water Heater Calculator v5.1.xlsm," on August 29, 2022.[29] We adopt this version of the calculator that encompassed the following updates:

- Residential hot water profiles using data that had been gathered and analyzed to inform the California Energy Commission (CEC) residential code compliance software (research version)[30] for the 2022 update to Title 24
- Heat pump water heater (HPWH) performance curves

[29] "DEER Water Heater Calculator v5.0.xlsm" was previously released on January 24, 2022 in which the normalizing unit (NormUnit) was "Cap-kBTUh"; "DEER Water Heater Calculator v5.1.xlsm" uses "CapOut-kBtuh" as the normalizing unit. No other updates were made to the calculator.

[30] The software package is titled *CBECC-Res 2022 (RV).*

- Water heater sizing methodology and TechIDs using recent American Heating and Refrigeration Institute (AHRI) product data
- Embedded macro enabling users to save 8,760 load shapes to a comma-separated value (csv) file format
- To improve alignment between HPWH ratings and those used for all other water heaters, the normalizing unit used by the calculator to determine measure savings was modified from a unit's rated input capacity to its rated output capacity.

CPUC staff will add features to the water heater tools. Future updates that are under consideration involve HPWHs and include:

- Account for HPWHs located in conditioned spaces; presently HPWHs are assumed to be in unconditioned spaces.
- Investigate the proportion of the time that the HPWH uses electric-resistance water heating and update sizing requirements to minimize use of electric resistance mode. The amount of water heating generated in electric resistance mode for measure offerings will be determined.
- Investigate how the efficiency of HPWH is influenced by hot water temperature setpoint.

Q. Net-to-Gross Ratio for Hard-to-Reach Customers

Resolution E-4952 called into question the use of a higher NTGR for HTR customers. At that time, CPUC staff did not examine data specific to HTR customers, but instead CPUC staff used customer size as a proxy and assumed that smaller businesses would more likely be HTR customers.

Further research is needed to characterize the appropriate NTGR for residential and commercial HTR customers—in addition to those served through direct installation of measures—but also those served through downstream delivery mechanisms. The focus of the work would be to see if there is evidence for:

- A higher NTGR for HTR customers served through DI compared to non-HTR customers served through DI
- A higher NTGR for HTR customers served through downstream compared to non-HTR customers served through downstream

Primary research designed to inform NTGR values to use for HTR customers is needed. We direct CPUC staff to conduct this research. This work could go further to investigate

HTR customer participation rates and depth of savings to assess whether HTR customers have equitable access to energy efficiency programs. The NTG research is to be completed by December 2023 and the results will be used to inform measure packages used for the PY2026-27 cycle.

R. High-SEER Heat Pump and AC Performance Curves, Non-residential and Residential

Although many high-SEER, inverter-driven heat pumps systems are being installed and claimed as fuel substitution measures under ratepayer-supported PA programs, CPUC staff identified gaps in the understanding of their field performance. We direct the PAs to conduct research to inform parameter updates to high efficiency equipment using inverter driven compressors with variable refrigerant flow (unitary, conventional split, and mini-split systems with and without heat recovery). The research shall involve equipment that has been redesigned to comply with the new Department of Energy unitary air conditioner and heat pump appliance standards effective January 1, 2023. This data is required to inform performance curves used in modeled unit energy savings and the development of load shapes.

The limitations of existing measure development tools to capture benefits of heat recovery capabilities of high efficiency variable flow heat pumps preclude the broad inclusion of these measures in the EE portfolio. Research to assess EnergyPlus performance curves to see if they adequately capture actual performance of variable flow heat pump systems is necessary to inform changes in modeled energy savings. Further research is also required to characterize performance curves of equipment utilizing low-GWP refrigerants that are starting to emerge in the market.

This work shall leverage data collected using the new DOE Variable Refrigerant Flow test procedures (based on AHRI 1230-2021) and involve collaboration with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard Project Committee 2059 to support the gathering of equipment performance data and additional data sources for informing the development of new performance curves.

The results of this research are needed by December 2023 to inform PY2026-27 updates to measure packages.

S. Boiler Compliance with Condensation of Exhaust Gasses and the Associated Energy Efficiency Assumptions

Although the CPUC staff has approved measure packages for condensing boilers, it is necessary to verify that they operate in a mode where the return water temperatures are low enough to allow for condensing of water vapor in the exhaust gases. For a boiler to

run in condensing mode, the return water temperature must be below 140°F. We direct the PA's to conduct this research to inform updates to measure packages by answering the following questions:

- Do the boiler measure requirements preclude condensing operation in some installation cases?
- Are boiler outside-air reset temperature controls inadvertently precluding condensing mode? In other words, does raising the setpoint during cold weather result in returning water to the boiler that is too warm to facilitate condensing?
- Is commissioning in the field verifying that return water temperatures are low enough for the boiler to operate in condensing mode?
- What boiler applications are most or least likely to achieve condensing efficiency levels?

Measure Adoption

Per D.21-05-031 this resolution adopts and locks approved ex ante values contained in the measure packages for PY2023 and PY2024-2025. The list of measure packages adopted and locked for PY2023 is listed in Appendix A1 and the list of measure packages adopted and locked for PY2024-25 is listed in Appendix A2. All measures that will be active in that program year will be adopted and locked, not just those with updates. New measures can be added off-cycle and will be tracked with start and end dates of those measures in the eTRM.

The dispositions and guidance documents used to inform the measure updates for PY2023 and PY2024-25 are provided for reference in Appendices A3 and A4 respectively. New guidance that has not been previously issued is provided in the sections below.

T. Guidance Based on Industry Standard Practice (ISP) Studies

This section summarizes CPUC guidance for measure packages related to recent industry standard practice studies. Five ISP studies were conducted by the IOUs as directed by Resolution E-4939. We find from the five completed ISP studies the following:

1. No updates are required for updating the DEER2024 baselines according to the results from the SDG&E *Industry Standard Practice Study of Unitary AC and HP Study*. The study concluded that high efficiency boilers are not yet industry standard practice. This ISP study shall be kept up-to-date with future minimum efficiency standards.

2. No update is required for DEER2024 based on the SCE *Market Impacts of Low-GWP Refrigerants for Refrigeration Equipment* as the study found that low global warming potential refrigerants were not ISP.
3. Updates are required based on the PG&E *Industrial Standard Practice Study of Commercial Domestic Hot Water Boilers for Commercial and Multifamily Sectors* . Measure Packages SWWH005-02 (Boiler, Commercial), SWWH007-03 (Storage Water Heater, Commercial), SWWH010-01 (Boiler, Commercial), and SWWH011-01 (Central Storage Water Heater, Multifamily) shall be updated to reflect all current state codes and the new federal minimum efficiency standard for hot water boilers, ≥300 kBtuh and ≤2,500 kBtuh set at 84% thermal efficiency which will become effective on January 10, 2023.
4. No update is required in DEER2024 resulting from the SCG study titled *Retrofit Modulating Gas Dryer Valve for Commercial Dryers*. The study determined that adding a modulating dryer valve to an existing dryer is not standard practice.
5. No update is required in DEER2024 resulting from the SCG study titled *Industry Standard Practice Study of Residential Low Flow Showerheads and Aerators* because low-flow showerheads and aerators comprise less than 50% of the market. However, the Water Sense specifications from this study shall be included as a measure offering requirement in low-flow showerhead and aerator measures to ensure customer satisfaction with the product.

U. Guidance from 2019 Custom Industrial, Agricultural, and Commercial (CIAC) Impact Evaluation Review

Effective Program Year: 2024. The 2019 CIAC study[31] found lower NTGRs than the defaults in the DEER database. Evaluated NTGRs were determined based on surveys with decision makers in the organizations that implemented custom projects. We direct the following:

1. The default NTG ratio for custom (ci) agricultural measures is decreased from 0.70 to 0.50.
2. The default NTG ratio for electric savings of commercial measures is decreased from 0.60 to 0.50.
3. The NTG ratio for custom, direct-install lighting measures is decreased from 0.60 to 0.45.

[31] "Group D 2019 Custom Industrial, Agricultural, and Commercial (CIAC) Impact Evaluation," by SBW Consulting for CPUC, February 1, 2022. (https://pda.energydataweb.com/#!/documents/2583/view)

V. Guidance from Review of 2022 EM&V Reports for PY2020 Deemed Measure Claims

Effective Program Year: 2024. Evaluation results with sufficient rigor and precision are used to update DEER and measure package assumptions. Resolution E-5152 instructed PAs to work with CPUC staff to determine EM&V results being released in the calendar year 2022 EM&V bus stop that affect DEER measures due to the compressed timeline during transition period and to ensure EM&V studies finalized in calendar year 2022 are considered for the DEER2024 adoption.

Final evaluation study results, focused primarily on PY2020 claims, informed updates to deemed measures that are hereby adopted as follows:

1. To ensure the gas savings expectations are met, we direct that residential ductless HVAC fuel substitution measure packages shall be revised so that only direct install and downstream delivery types are eligible and measure package eligibility requirements include decommissioning the existing gas system, per the findings and recommendations in the HVAC Fuel Substitution Impact Evaluation.[32]
2. We direct the PAs that claims shall be based on actual building type rather than using Com or Res for all downstream programs and—where possible—for midstream and upstream programs, particularly those that deliver Unitary Air-Cooled Air Conditioners or Heat Pumps, based primarily on the findings and recommendations in the Commercial HVAC Sector Impact Evaluation.[33]
3. We direct that the NTG ratio for the residential smart thermostat (rebate/downstream) is decreased from 0.60 to 0.50 based on the EM&V report for PY2020.[34] Evaluated NTG ratios for this measure over the past several years have fluctuated around 0.50 rather than showing a consistent trend.
4. We direct that the annual deemed electric and gas savings for residential smart controlling thermostats (SCT) is decreased to levels that are halfway between the previous deemed values and those that were determined using the PY2020 billing analysis results. This was done because the deemed values represent pre-COVID savings prior to thermostat optimization as a standard opt-in option

[32] "Group A Impact Evaluation PY2020 HVAC Fuel Substitution," by DNV for CPUC, May 20, 2022. (www.calmac.org/publications/CPUC Group A HVAC Fuel Substitution Impact Evaluation PY2020 Final.pdf)

[33] "Impact Evaluation Report Commercial HVAC Sector-Program Year 2020," by DNV for CPUC, April 29, 2022. (www.calmac.org/publications/Group A YR4 Com HVAC Impact Report Final CALMAC.pdf)

[34] "Impact Evaluation of Residential HVAC Measures Residential Sector – Program Year 2020," by DNV for CPUC, June 3, 2022. (www.calmac.org/publications/Group A Residential PY2020 RES HVAC Final Report CALMAC.pdf)

whereas the evaluated values represent during-COVID savings with the addition of thermostat optimization; the only way to account for the unknown effects of COVID combined with the expected savings increase from optimization is to combine these two conditions. This is because a full return to pre-COVID work patterns is not expected for the foreseeable future. Specific values by building type and climate zone are provided in Attachment A. If we had just used the energy savings based on the most recent EM&V report, the savings would have been lower.

5. We direct that the NTG ratio for residential fuel substitution heat pump measures is decreased from 1.00 to 0.55 for the midstream delivery type.[35]
6. We direct that the NTG ratio of 0.20 for commercial and multifamily space-heating boilers is expanded to apply to all delivery types (resulting in a decrease from 0.60 for upstream applications).
7. We direct that the NTG ratio for commercial water-heating boilers is decreased from 0.60 to 0.10 (excluding downstream delivery type).[36]
8. We direct that the NTG ratio for indoor LED tube lighting is increased from 0.65 to 0.70 for downstream and direct install delivery types.[37]
9. We direct that the NTG ratio for indoor LED fixtures (including high/low bay) is decreased from 0.65 to 0.60 for downstream and direct install delivery types.
10. We direct that the NTG ratio for variable frequency drives (VFD) on well pumps smaller than 300 hp is increased from 0.30 to 0.40.[38]
11. We direct that the NTG ratio for commercial fryers is decreased from 0.60 to 0.35 for the downstream delivery type.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review. Please note that comments are

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[35] "Group A Impact Evaluation PY2020 HVAC Fuel Substitution," by DNV for CPUC, May 20, 2022. (www.calmac.org/publications/CPUC Group A HVAC Fuel Substitution Impact Evaluation PY2020 Final.pdf)

[36] "Impact Evaluation Report Commercial HVAC Sector-Program Year 2020," by DNV for CPUC, April 29, 2022. (www.calmac.org/publications/Group A YR4 ComHVAC Impact Report Final CALMAC.pdf)

[37] "Final Impact Evaluation Non-Residential Lighting Sector Program Year 2020," by Quantum Consulting for CPUC, April 28, 2022. (www.calmac.org/publications/__AllSections_Final_w_Apps.pdf)

[38] "Final Impact Evaluation Non-Residential Deemed Pump and Food Service Program Year 2020," by Quantum Consulting for CPUC, April 28, 2022. (www.calmac.org/publications/_PumpFoodService ALLSections Final W APPS.pdf)

due 20 days from the mailing date of this resolution. Section 311(g)(2) provides that this 30-day review period and 20-day comment period may be reduced or waived upon the stipulation of all parties in the proceeding. Interested stakeholders do not need to have party status in order to submit comments on the resolution.

The 30-day review and 20-day comment period for the draft of this resolution was neither waived nor reduced. Accordingly, this draft resolution was mailed for comments on August 18, 2022.

On September 7, 2022 comments on the draft resolution were submitted by Google, Nikhil V. Gandhi & Associates (NVGA), Pacific Gas and Electric Company, (PG&E), San Diego Gas & Electric Company (SDG&E), Southern California Edison Company (SCE), Southern California Gas Company (SCG), and the California Efficiency + Demand Management Council (the "Council"). A summary of the comments requesting changes and updates to this Resolution and the CPUC response to those comments is provided below. Comments and responses are presented using the same headings in the preceding Discussion section. Comments involving typos have been omitted and all typos have been corrected in this document. Some comments were deemed out of scope and not addressed.

A. Transition to Electronic Technical Reference Manual (eTRM)

A.1 IOU Budgets for 2023 eTRM and CalTF Support

SDG&E commented that they had interpreted Section A.4 of E-5152 differently and did not request eTRM funding for 2023 and 2024 in their business plan application. They requested a wording change to strike the sentence stating that E-5152 required them to include eTRM funding in their Business Plan applications and to specifically state that if budget was not requested, they should make the adjustment in the 2023 True-up Advice Letter.

We did not strike out the requested sentence in the resolution but did add the language about making the adjustment in the 2023 True-up Advice Letter.

A.2 Ownership and Financial Responsibility of eTRM 2023 and Beyond

The Council and SCE commented on stable funding for the eTRM.

The issue of eTRM management and funding is currently an open issue in R. 13-11-005 and may be addressed a Decision separate from this DEER Resolution.

B. Updates to eTRM and Measure Packages

B.1 eTRM Table Structure Changes

SCE requested that field names be aligned between eTRM and CEDARS, particularly those required for the CET such as E3 Target Sector and E3 Climate Zone.

We appreciate the comment and agrees that alignment is important. Energy Division staff also plan to address this issue in the Energy Efficiency Reporting Program Coordination Group (PCG), as we further the integrations between eTRM, CEDARS and the CET.

B.2 Refrigerant Impacts (RACC)

SCE requested that the CPUC make the RACC 2022 available in CEDARS once the new avoided costs are approved and state that they will re-evaluate the new version of the RACC 2022 for application to NR and AR measures.

We support updates to tools (including the RACC) as new information becomes available. The new RACC tool is available on the CPUC Integrated Distributed Energy Resources (IDER) Cost Effectiveness page.[39] CPUC staff may post it on CEDARS after it is reviewed.

B.3 Aggregated Values in Permutations

SCE requested changes to the eTRM permutation options to align the building type options for the commercial sector with those for the residential, agricultural, and the industrial sectors. Further, SCE requested the elimination of the "Com" building type.

We clarify here that it is currently not possible to eliminate the Com building type. It is how aggregated savings are stored in DEER such that it can be used for upstream delivery type where the specific building type at which the measure was delivered is unknown. The Com records, just as is the case with Res records, contain savings values that are weighted averages of the those across all DEER building types in the relevant sector. This change has not been made to either the DEER database or to this resolution.

SCE and PG&E requested the creation of a "ComOth" building type for the commercial sector just as there are "IndOth" and "AgOth" building types for the industrial and

[39] https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/idsm

agricultural sectors. SCE suggested that these are intended for use in cases where the savings do not vary by building type within a given sector.

We clarify that in the DEER database, these building types are defined as intended for "subsectors not covered by existing [ones]." There is no mention of whether it is appropriate to use "IndOth" and "AgOth" to represent "Any" within the industrial and agricultural sectors. This change has not been made to either the DEER database or to this resolution.

B.4 Water-Energy Nexus (WEN) Impacts

SCG requested that the Resolution include an initial schedule for the implementation of the long-term solution to add energy savings outputs of the W-E Calculator to existing measure packages.

Some guiding language has been added to the Resolution since a full schedule was not possible at this time. Before a timeline can be established, the CET needs to be updated to incorporate embedded water energy fields.

B.5 Rebates Exceeding Incremental Measure Cost (IMC)

There were no comments on this section.

B.6 Measure Cost Updates

There were no comments on this section.

B.7 Data Requirements for Distributor/Contractor-delivered Measures

SCE, PG&E, and SCG commented on data requirements. SCE and SCG cited concerns about being able to provide the installed location for measures in upstream programs and wondered what equipment identifier can be used for products such as light bulbs that don't have serial numbers to use as an equipment identifier. PG&E requested that this issue be discussed in the Data and Reporting Project Coordination Group (PCG) to finalize the requirements by March 2023 so their data tracking system can be updated for 2024.

We clarify that that, these requirements are minimums and are intended to improve the consistency and completeness of reasonable recordkeeping for accountability and evaluability. Distributor purchase orders or invoices can be used to track batches of items such as light bulbs that do not have individual serial numbers. The Reporting PCG seems a reasonable venue to finalize data reporting fields.

C. DEEResources Website Content Migrated to CEDARS

There were no comments on this topic.

D. PAs Responsible for Modeling DEER and Historically Non-DEER Values

NVGA commented that it is not clear whether the use of DEER methods, values, and assumptions would continue to apply as applicable to custom projects. NVGA recommended that the Commission clarify the scope of staff reviews and require all inputs and outputs of a measure package be subject to staff review and approval, not just the unit energy savings values. NVGA added that the resolution should provide guidance on transitioning from using DEER values, methods, and assumptions in custom projects to alternative parameters. Additionally, the Custom Project Review team should be involved in reviews of measure packages that might impact default values used in custom projects.

We clarify here that CPUC staff retains final authority in approving all measure package values including all deemed UES values. CPUC staff also review and approve all methodologies and input parameters. The term DEER is not being retired; Per D.21-05-031 all deemed ex ante values approved by staff and housed in the existing DEER systems, and ultimately in the eTRM, are considered DEER values. To be clear: all values contained in the eTRM's permutations tables will be considered DEER values and all methods described in measure packages are considered DEER methods. The custom project review team will continue to communicate with the deemed measure package review team as needed.

SCE requested that CPUC facilitate a clear process for testing, updating and calibrating DEER prototypes and batch processing tools to allow PAs a consistent process for the evaluation, modeling, and update of new and existing weather sensitive measures. They also asked for training and documentation to support the new tools. SCG requested clarification on how to request additional budget for this work.

We agree with the need for clear processes, training, and documentation and CPUC staff may provide such detail. Training and documentation of the Modelkit framework used for EnergyPlus batch file processing is forthcoming in 2022.

E. DEER2026 Update and Measure Package Submission/Review Timeline

Willdan requested that CPUC develop requirements, timeline, and process for third parties to submit measure packages consistent with D.18-01-004. SCE requested the addition of a Bus Stop publishing date after which studies would not be included in measure package updates.

Through the CalTF and the eTRM, third parties have the opportunity to author measure packages and provide feedback on those measure packages, each measure package authored by a third party has a PA sponsor who will submit the measure package to CPUC. This is because CPUC has regulatory oversight over the PAs, but not over third

party implementers. Regarding SCE's Bus Stop request, the target date for most studies (ISP, market research, etc.) is December 2023 to be included in measure package updates for PY2026-27. EM&V studies may have a slightly later timeline.

F. Measure Lifecycle Management (MLM)

SCE and SoCal Gas requested further clarification of how the MLM table is to be implemented by the IOUs. CPUC staff consultant will maintain the MLM. This has been clarified in the Resolution body.

G. DEER Off-Cycle Adjustments to the Locked Ex-Ante Values

There were no comments on this topic.

H. EnergyPlus Prototypes, Residential

SCE and Willdan requested that all Residential EnergyPlus prototype supporting documentation be made available including DEER prototypes, assumptions, and workbooks used in the measure characterization. Willdan's comment encompassed not just the residential measures transitioned to EnergyPlus, but all measures. SCE further requested information regarding what type of changes are expected to the residential EnergyPlus measures and how those would be incorporated into PY2024 measure packages. SCG requested that two measures (SWWH010 - Multifamily Central Boiler, and SWWH011, Storage Water Heater) be included in Table 6.

All savings calculation, assumptions, and proposed savings values for residential measures modeled using EnergyPlus are available on CEDARS. In addition, all approved measure packages for PY2024 are available in the eTRM. We agree that public review is important and will consider opportunities for increased public input in the future.

The commercial prototypes will not trigger updates to residential measures and no further revisions to the PY2024 residential measures are planned. There may be a revision to improve the residential prototypes, for instance using the airflow network to model duct leakage, but these improved models would be applicable to measures in PY2026 and beyond.

The two measures requested by SCG were not on the list of residential measures to be transitioned to EnergyPlus developed with PA input in January 2022.[40] One of the two measures requested by SCG (SWWH010) was modeled by the CPUC staff consultant team and added to Table 6; and the other (SWWH011) was not. Guidance was provided

[40] Memo dated January 12, 2022, titled "Request for Program Administrator Residential Measure Details – Updated"

to use the EnergyPlus tools developed for the Multifamily Central Water Heating Systems available on CEDARS to model the remaining measure.[41]

I. PY2021 Evaluator Guidance

SCG suggested that Section I is unnecessary, since PY2021 claims have already been finalized.

The PY2021 claims have not yet been evaluated and the purpose of this section is to inform evaluators where to find the official ex ante data for those claims. Because PY2021 is during a transition to eTRM, the official ex ante data can be found within the Ex Ante Data tables associated with each measure package.

J. Hard-to-Reach (HTR)/Direct-Install Net-to-Gross Ratios

Willdan and NVGA commented on this section. Willdan requested we add reference to an additional section of D.18-05-041, and clarification relating to the public sector HTR definition. They also suggested a change to the text in the Attachment where we suggest a higher NTG may not be needed to bolster PA's ability to serve HTR customers. NVGA requested we clarify that the data requirements and acceptable savings estimation methodologies for Direct Install (DI) programs remain unchanged.

We deleted the requested sentence and added the requested reference. We also added language in the Attachment stating that this Resolution does not change or address the definition of HTR in the public or private sector. We confirm that there is no change to the data requirements or acceptable savings methodologies for DI programs.

K. Fuel Substitution Calculator Updates

SCE suggested requiring updates to fuel substitution measure packages only if updates to the Fuel Substitution Calculator result in substantive changes to measure impacts, particularly emissions impacts.

We are not inclined to make this change. A new fuel substitution calculator version will require all fuel substitution measure packages to be updated.

L. Add-On-Equipment (AOE) Host Clarification

NVGA suggested that the proposed clarification of the AOE measure application type should be removed from the resolution until research-based data to support it becomes available.

[41] https://cedars.sound-data.com/deer-resources/tools/water-heaters/resource/8/history

We clarify here that there has been considerable confusion around which measures should or should not be classified as AOE measures and the appropriate EUL to use for them. Since research-based supporting data is not expected in the near future, the clarification remains in the resolution. Further, the EUL of AOE has generally capped at 1/3 the life of the host or host proxy only because it is expected to be removed at the same time as the host equipment or the host proxy--rather than due to other reasons. The EULs of all equipment types—including AOE—are determined by the median age at which 50 percent are no longer in service for a variety of reasons, including customer dissatisfaction. Hence, the host proxy will remain as a tool for determining the EUL of AOE equipment.

SCE asked for clarification regarding whether measures that shut off or de-energize host equipment are intended to be reclassified as AOE. We clarify that controls measures shall remain categorized as BRO-RCx and will not be treated as AOE when completely shutting off or de-energizing the energy-consuming equipment.

Willdan suggested revising the table by inserting a row that allows for AOE that is not typically replaced at the same time as the host equipment but has no host proxy.

We have implemented this change to the table, but used pool covers as an example of this scenario. We decline to use the suggested VFD for irrigation pump as the example in Table 1-3 of Attachment A because there is some debate about the frequency with which VFDs remain in place upon burnout of the motors they control.

Willdan also suggested utilizing the California Technical Forum (Cal TF) to facilitate the categorization of current AOE custom measures. This topic is not within the scope of this resolution.

M. Structural Changes to DEER Tables

PG&E requested that the new FuelSub table includes more categories for replacing a mixed-fuel equipment baseline case with an all-electric equipment measure case. Given that the CPUC has made clear that all-electric new construction measures are not to be confused with fuel substitution, the addition of the mixed-fuel baseline cannot be added to the fuel substitution table. Further, it is beyond the scope of this resolution to address how the cost effectiveness of such replacements shall be determined.

SCE suggested that changes to the EnergyImpact table are not warranted given that deemed measure savings will no longer be modeled by Staff beginning in 2026. We will continue with these revisions since the new fields are necessary for documenting the unit energy consumption values for DEER2024 residential measures that have been modeled using EnergyPlus building prototypes.

N. Updates to DEER Support Table Values

NVGA suggested that the removal of the custom distinction in the Delivery Type table needed further clarification. We clarify that the streamlining of delivery types is intended to delete instances of measure characteristic(s) being captured by two fields. The distinction between custom and deemed would be retained in the Measure Impact Type field. Delivery Type does not also need to contain this information. This is especially true for claims reporting where deemed measures and custom measures are submitted in two separate tables.

Per SCE's comment, we have added the "online retailers" option to the description of the Mid-Retail delivery type. We also implemented SCE's suggestion to insert the term "trade professional" into the definition of the direct install (DI) delivery type. SCE further suggested that an "Any" delivery type be added to the table. This is not possible since the hard-to-reach NTGR may only be used for hard-to-reach customers reached through the DI delivery type.

PG&E suggested the elimination of the fuel-substitution-specific Measure Impact Types (MITs) since the FuelSub table has been added to DEER. We agree and have incorporated this suggestion.

O. EnergyPlus Prototypes, Commercial

SCE commented that they would like an opportunity to provide additional quality assurance on the commercial prototypes as they are developed.

We welcome the collaboration and CPUC staff plans to provide ample opportunity for public review of the commercial prototype models in EnergyPlus.

P. Research to Improve Water Heater Measures

SCE suggested two enhancements to the DEER Water Heater Calculator: 1) include HPWHs with low-GWP refrigerants; and 2) include split-system HPWHs. These suggestions will be considered when developing the work plan for the next update.

SCG commented that the reference to the DEER Water Heater Calculator v5.0 be updated to v5.1. We agree and have done so.

Q. Net-to-Gross Ratio for Hard-to-Reach Customers

There were no comments on this topic.

R. High-SEER Heat Pump and AC Performance Curves, Non-residential and Residential

SCE requested that CPUC:

1) clarify standard procedures for performance curve development, e.g. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Standard 205.

2) establish procedures for testing the integrity of new performance curves.

3) before requiring performance data collection: (a) reevaluate tier definitions for variable refrigerant flow (VRF) equipment and (b) update tier requirements in DEER2017 in alignment with the market that has improved part-load efficiencies rather than full-load efficiencies.

We agree with SCE regarding the need for more guidance on this research effort. The objective of the effort is to improve performance curves used in modeling of air conditioning and heat pump space heating measures in prototype models. This effort is more complex than merely using manufacturer performance curves reported per ASHRAE Standard 205 procedures (used to report performance curves for specific equipment that is modeled in a specific building type). This effort will entail the establishment of a set of curves that is representative of equipment in the market that would be installed through an energy efficiency program. We recommend a methodology similar to what was used in the National Renewable Energy Laboratory's (NREL) January 2013 study "Improved Modeling of Residential Air Conditioners and Heat Pumps for Energy Calculations." The PA undertaking this research will be required to submit a workplan for CPUC staff review before embarking on this project. Given summer reliability concerns, we maintain that a 15% full-load EER improvement over code remains important, especially in the fuel substitution context.

S. Boiler Compliance with Condensation of Exhaust Gasses and the Associated Energy Efficiency Assumptions

SCG commented on a typo in this section that indicated CPUC would perform the boiler compliance research. This has been corrected in the Resolution to "the CPUC directs PAs to perform this research".

NVGA submitted a comment that applied generally to the adoption of PY2024-25 measures. He recommended that the CPUC require measure package developers to report the duration of incentive support provided and submit a standard practice market assessment for measures that have not become code or standard practice in 15 years since their introduction in the EE portfolio. If the measure has not become code or standard practice in 15 years, the program delivery approaches should be re-examined and monitored over the next five years. If the measure still fails to become standard practice or code in 20 years after its introduction in the EE portfolio, the CPUC should consider sunsetting that measure.

We clarify that we update savings based on current codes and industry standard practices and we update savings methodology and NTG ratios based on evaluation studies. Not all worthwhile energy saving measures become code or ISP. In some cases, federal standards preempt more efficient equipment becoming California code. However, we agree with the commenter and will carefully consider updates to baselines and possibly sunsetting the older DEER measures.

T. Guidance Based on Industry Standard Practice (ISP) Studies

SDG&E recommended rephrasing language in the resolution describing the high efficiency boiler ISP study based on language in the attachment.

The study found high efficiency boilers are not yet industry standard practice. We are not inclined to rephrase our original language.

U. Guidance from 2019 Custom Industrial, Agricultural, and Commercial (CIAC) Impact Evaluation Review

Willdan recommended that prior to setting the NTGRs for future years, the CPUC should consider adjustments based on real grid impacts. They recommended not introducing a new NTG_ID until EM&V data can be collected on the Modified Lighting Calculator version 13.1.1 and subsequent versions.

SDG&E disagreed with adjusting the PY2024 Net to Gross (NTG) Ratios for Custom Projects "due to the length of time between installation and the impact evaluation and the high turn-over being experienced in companies." They lobby for "shortening the time between installation and CIAC Impact Evaluation interviews or surveys," and assert that it "will adversely affect the desire of Third-Party Implementers and companies to participate in the custom project process." Further, since a policy review of this issue has been officially requested in the Business Plan applications, SDG&E believes that the Draft Resolution errs in including and determining this issue at this time.

We are not inclined to make any changes. This CIAC report is the best available information on which to base NTG values.

V. Guidance from Review of 2022 EM&V Reports for PY2020 Deemed Measure Claims

SCG requested expanding the DEER2024 NTG ratio for fryers from only downstream delivery types to include upstream.

Since the evaluation results specifically pertain to downstream fryers, we recommend using the default NTG ratio for those delivered by an upstream or midstream delivery channel.

SCE recommended retention of midstream delivery type for residential ductless HVAC fuel substitution (measure package ID: SWHC044), suggesting an inclusion of a "customer affidavit acknowledging the decommissioning of existing gas furnace and capping of natural gas pipeline," to improve savings of baseline natural gas.

We do not find the proposed 'customer affidavit' attestation to gas decommissioning sufficient to sway the decision to only allow downstream and direct install delivery types for measure package ID SWHC044. Furthermore the midstream delivery type would have to adopt the evaluation finding of 40% NTGR, limiting its value in the portfolio compared to the downstream types.

SCE and Google requested using the savings values from the last approved measure package for Residential Smart Thermostats (SWHC39-04) while continuing to study the impacts on thermostat savings for future evaluations as the long-term impact of the pandemic becomes clear.

The 2020 impact evaluation results are the first evaluation results that include thermostat optimization as part of the thermostat measure. We have always believed it was important to replace the existing measure package (MP) savings estimates that include an ad hoc adjustment for thermostat optimization with empirically-based results when possible. However, we did not replace the existing MP completely because of the lock-downs due to the COVID-19 pandemic. The blended results reflects those competing motivations. Despite Google's statement to the contrary, all ex ante values are inherently based on assumptions of "how customer behavior will evolve" and a default to existing MP levels would imply an immediate return to pre-pandemic lock-down savings that is less supportable than any expectation that assumes some ongoing effect of the pandemic lock-down.

As for concerns regarding increased bias due to differential pandemic response between smart thermostat owners and comparison group members, the evaluation took this into consideration. The impact evaluation of rebated smart thermostats installed through a downstream delivery channel applied the same adjustment as the prior year. An increase in baseload consumption was assumed to be 100% explained by bias and was removed along with a consistent percentage increase in heating and cooling consumption. This adjustment generously adjusts for possible bias against thermostat savings and does so based on the empirical evidence used in that analysis. If, in fact, the differentials, pointed to by Google, affected the data used for the analysis, any biasing effects would have been controlled for by the adjustment designed to address just those issues.

For Direct Install results, the target population of many of the programs (multifamily or mobile home residents and “English as a second language” speakers) is quite different than typical smart thermostat owners such that the bias concern should be a non-issue.

SCG commented on the net-to-gross ratio change for space heating boilers. Their specific requests include: 1) Specify exclusion of residential and direct-install applications for NTG of space heating boilers; 2) categorize separately for condensing and non-condensing water heating boilers; 3) survey upstream customers to derive an upstream NTG ratio.

We agree with item 1 and have updated the text above in section V to stipulate the update applies to the upstream delivery type for space heating boilers.

With regard to item 2, we find the evaluated PY2020 commercial water heating boiler (SWWH005) claims were comprised of ~95% condensing water heating boilers, so the NTG finding of 0.10 is highly reflective of the program influence for condensing boiler technology delivered through a midstream program delivery. Based on the data in the boiler ISP study reviewed as part of Section T, code is requiring domestic hot water boiler efficiencies close to those of the higher efficiency non-condensing boilers, and thus those boilers do not need a NTG value as they represent no program influence on boiler efficiency above the norm.

Concerning item 3, we find the HVAC and water heating boiler savings claims evaluated for PY2020 were predominantly delivered through midstream programs (PGE21012, SCG3814). The evaluation surveyed end-user and distributors where appropriate. "The commercial boiler programs at PG&E and SCG were predominantly midstream programs providing incentives to influence distributors to stock, upsell, and (at the distributors discretion) reduce the price of high-efficiency boilers. This means that to have an effect on the final decision to purchase a high-efficiency boiler, the program must first change the distributors’ behaviors and then those behaviors have to make a difference to the person purchasing from the distributors. The evaluation team captured this “causal chain” by surveying both the distributors and the buyers (end users) to capture the program influence." Inclusion of the NTGR evaluation findings for SCG's downstream program only increases the overall statewide NTGR findings for water heating boiler by 3%, from 8% (for PGE 21012) to 11% statewide. The PY2020 Commercial HVAC Impact Evaluation findings on boiler measure NTG are predominantly indicative of midstream delivery type program activity, and so the DEER Resolution updates to the boiler measure NTGR values apply to midstream design.

FINDINGS

1. We find it reasonable for the eTRM to continue to be administered by the PAs.
2. Resolution E-5082 authorized the IOUs to fund eTRM development and CalTF support activities in their EE program budgets or their EM&V budgets.
3. Resolution E-5082 authorized CPUC staff to make adjustments to the eTRM development timeline to address issues that arise during development and testing.
4. Resolution E-5082 OP 6 required that DEER databases and eTRM shall continue to be administered and maintained by the IOU funders without changes to contract management structure until completion Phase 1 and Phase 2 activities, and both Phase 1 and Phase 2 have been satisfactorily completed.
5. The IOU funders will grant the CPUC an irrevocable, royalty-free license to use, copy, distribute, and own the eTRM in perpetuity while they continue to contract for administration, maintenance, and enhancements of the eTRM.
6. Decision D.15-10-028 retains the direction from D.12-05-015 that DEER values be updated to be consistent with existing and updated state and federal codes and standards.
7. Decision D.15-10-028 also states that CPUC staff may make changes at any time without a Resolution to fix errors or to change documentation.
8. We find it feasible to transition from the use of MASControl3© and eQUEST models that use the DOE2 simulation engine to the EnergyPlus simulation engine.
9. It is appropriate to update the DEER values as result of a) updates to underlying methodology, b) updates for corrections and clarifications, c) updates based on evaluation study results, d) new code updates, e) review of market and research studies, and f) addition of new measures.
10. Decision D.05-01-055 establishes the CPUC Energy Division authority to review and approve measures, including authority to designate a set of values as the deemed data source of record.

THEREFORE, IT IS ORDERED THAT:

1. The IOUs will continue to fund and administer the eTRM from the IOU portion of the EM&V budgets and will address support activities for eTRM and CalTF in their 2024-2027 Business Plans.
2. The IOUs may alter the structure of eTRM contract management upon completion of Phase 2 activities in order to alternate the role of lead contract manager and solicit contractors for software development and coordination.

3. The DEER2024 and Revised DEER2023 and DEER2022 Updates, listed in Table 1, as described in Attachment A, and per supporting documentation available on the DEER Module at the CEDARS website, are approved with effective dates as listed. The Appendices and the Attachment to this resolution may be updated by staff as needed.
4. Pacific Gas and Electric Company (PG&E), Southern California Electric Company (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric (SDG&E), the San Francisco Bay Area Regional Energy Network (BayREN), Southern California Regional Energy Network (SoCalREN), Tri-County Regional Energy Network (3CREN), Local Government Sustainable Energy Coalition (LGSEC), Lancaster Choice Energy (LCE), and Marin Clean Energy (MCE) must use the updated assumptions, methods and values for Program Years 2022 and 2023 planning and savings claims, and Program Years 2024-25 planning, implementation and reporting.
5. Pacific Gas and Electric Company (PG&E), Southern California Electric Company (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric (SDG&E), the San Francisco Bay Area Regional Energy Network (BayREN), Southern California Regional Energy Network (SoCalREN), Tri-County Regional Energy Network (3CREN), Local Government Sustainable Energy Coalition (LGSEC), Lancaster Choice Energy (LCE), and Marin Clean Energy (MCE) must follow the updated process adopted in this resolution for deemed ex ante activities as directed in this resolution.
6. Pacific Gas and Electric Company (PG&E), Southern California Electric Company (SCE), Southern California Gas Company (SCG), and San Diego Gas & Electric (SDG&E), the San Francisco Bay Area Regional Energy Network (BayREN), Southern California Regional Energy Network (SoCalREN), Tri-County Regional Energy Network (3CREN), Local Government Sustainable Energy Coalition (LGSEC), Lancaster Choice Energy (LCE), and Marin Clean Energy (MCE) must comply with the updated schedule for activities adopted in this resolution unless expressly authorized by CPUC staff.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed, and adopted at a conference of the Public Utilities Commission of the State of California held on November 3, 2022; the following Commissioners voting favorably thereon:

/s/ RACHEL PETERSON
Rachel Paterson
Executive Director

ALICE REYNOLDS
President

CLIFFORD RECHTSCHAFFEN
GENEVIEVE SHIROMA
DARCIE HOUCK
JOHN REYNOLDS
Commissioners

Attachment:

E-5221 Resolution ATTACHMENT A

A1. PY2023 Measures

The list provided for PY2023 in Table A1.1 is current as of the adoption of the final resolution.

A1.1. PY2023 Measure Package Updates

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWAP001-04	Refrigerator or Freezer, Residential	2023	SDGE	Approved
SWAP003-04	Clothes Dryer, Residential	2023	SCG	Approved
SWAP004-03	Clothes Washer, Residential & Multifamily	2023	SCG	Approved
SWAP005-02	Ozone Laundry, Commercial	2023	SCG	Approved
SWAP006-04	Dishwasher, Residential	2023	SCG	Approved
SWAP007-02	Room Air Conditioner, Residential	2023	SDGE	Approved
SWAP008-02	Room Air Cleaner, Residential	2023	SDGE	Approved
SWAP011-03	Vending and Beverage Merchandise Controller	2023	SCE	Approved
SWAP012-01	Gas Dryer Modulating Valve, Commercial and Multifamily	2023	SCG	Approved
SWAP013-02	Residential Cooking Appliances – Fuel Substitution	2023	SCE	Approved
SWAP014-01	Heat Pump Clothes Dryer, Residential, Fuel Substitution	2023	SCE	Approved
SWAP015-02	Induction Cooking Top with or without Electric Range, Residential	2023	SDGE	Approved
SWAP017-02	Oven, Gas, Residential	2023	SCG	Approved
SWBE001-03	Greenhouse Heat Curtain	2023	SCG	Approved
SWBE002-03	Greenhouse Infrared Film	2023	SCG	Approved
SWBE006-01	Residential Ceiling Insulation	2023	SCG	Approved
SWBE007-01	Residential Blow-In Wall Insulation	2023	SCG	Approved
SWCA001-03	Air Compressor VFD Retrofit	2023	SCE	Approved
SWCR001-03	Anti-Sweat Heat Controls	2023	SCE	Approved
SWCR002-03	Low-Temperature Display Case Doors with No Anti-Sweat Heaters	2023	SCE	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWCR003-02	High Efficiency Motor Retrofit for Refrigerated Display Case	2023	SCE	Approved
SWCR004-02	EC Motor Retrofit for A Walk-In Cooler or Freezer	2023	SCE	Approved
SWCR005-03	Auto Closer for Refrigerated Storage Door	2023	SCE	Approved
SWCR007-03	Floating Head Pressure Controls, Multiplex	2023	PG&E	Approved
SWCR008-03	Floating Suction Controls, Multiplex	2023	SCE	Approved
SWCR010-03	Bare Suction Pipe Insulation	2023	SCE	Approved
SWCR012-02	Compressor Retrofit, Multiplex	2023	PG&E	Approved
SWCR014-03	Medium or Low-Temperature Display Case	2023	PG&E	Approved
SWCR015-02	Medium-Temperature Case Doors	2023	PG&E	Approved
SWCR017-03	Ultra-Low Temperature Freezer	2023	PG&E	Approved
SWCR018-03	Reach-In Refrigerator or Freezer, Commercial	2023	PG&E	Approved
SWCR019-02	Low-Temperature Coffin to Reach-In Display Case Conversion	2023	PG&E	Approved
SWCR020-02	Medium-Temperature Open Display Case Retrofit	2023	PG&E	Approved
SWCR021-02	Medium or Low-Temperature Display Case with Doors	2023	PG&E	Approved
SWCR022-03	Efficient Adiabatic Condenser	2023	SCE	Approved
SWFS001-02	Commercial Convection Oven – Electric & Gas	2023	SCG	Approved
SWFS002-03	Door Type Dishwasher, Commercial	2023	SCG	Approved
SWFS003-02	Combination Oven, Commercial	2023	SCG	Approved
SWFS004-01	Commercial Griddle – Electric & Gas	2023	SCG	Approved
SWFS005-03	Steamer, Commercial	2023	SCG	Approved
SWFS006-02	Commercial Ice Machine	2023	PG&E	Approved
SWFS007-03	Insulated Hot Food Holding Cabinet	2023	SCG	Approved
SWFS008-01	Conveyor Oven, Gas, Commercial	2023	SCG	Approved
SWFS009-02	Commercial Deck Oven, Electric	2023	SCG	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWFS010-02	Commercial Hand Wrap Machine	2023	SCG	Approved
SWFS011-04	Fryer, Commercial	2023	SCG	Approved
SWFS012-01	Exhaust Hood Demand Controlled Ventilation, Commercial	2023	SCG	Approved
SWFS013-02	Low-Flow Pre-Rinse Spray Valve	2023	SCG	Approved
SWFS014-02	Rack Oven	2023	SCG	Approved
SWFS016-02	Refrigerated Chef Base	2023	SCE	Approved
SWFS017-02	Automated Conveyor Broiler, Commercial	2023	SCG	Approved
SWFS018-04	Undercounter Dishwasher, Commercial	2023	SCG	Approved
SWFS019-02	Underfired Broiler, Commercial	2023	SCG	Approved
SWFS021-03	Commercial Fryer, Fuel Substitution	2023	SCE	Approved
SWFS022-02	Commercial Convection Oven, Fuel Substitution	2023	SCE	Approved
SWFS023-02	Conveyorized Toaster, Commercial	2023	SCE	Approved
SWHC001-02	Wall Furnace, Residential	2023	SCG	Approved
SWHC002-02	Intermittent Pilot Light, Residential	2023	SCG	Approved
SWHC004-04	Space Heating Boiler, Multifamily	2023	SCG	Approved
SWHC005-03	Water-Cooled Chiller	2023	SDGE	Approved
SWHC006-02	Demand Control Ventilation for Single Zone HVAC	2023	PG&E	Approved
SWHC008-01	VSD For Central Plant System	2023	SCE	Approved
SWHC009-03	Supply Fan Controls, Commercial	2023	SDGE	Approved
SWHC011-02	Furnace, Commercial	2023	SCG	Approved
SWHC012-02	Classroom HVAC Occupancy Sensor	2023	SCE	Approved
SWHC013-03	Unitary Air-Cooled AC and HP, over 65 kBtu/hr, Commercial	2023	SDGE	Approved
SWHC014-03	Unitary Air-Cooled AC and HP, below 65 kBtu/hr, Commercial	2023	SDGE	Approved
SWHC018-03	VSD for HVAC Fan Controls, Commercial	2023	PG&E	Approved
SWHC020-03	Air Cooled Chiller	2023	SDGE	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWHC023-03	Enhanced Ventilation for Packaged HVAC	2023	PG&E	Approved
SWHC024-03	Cogged V-Belt for HVAC Fan, Commercial	2023	SCE	Approved
SWHC027-02	Packaged Terminal Air Conditioner or Heat Pump, Under 24kBtuh	2023	SCE	Approved
SWHC029-02	Fan controller for air conditioner, residential	2023	SCE	Approved
SWHC030-03	Whole House Fan	2023	SCE	Approved
SWHC031-02	High-Efficiency Furnace, Residential	2023	SCG	Approved
SWHC038-02	Brushless Fan Motor Replacement, Residential	2023	SCE	Approved
SWHC039-05	Smart Thermostat, Residential	2023	SCE	Approved
SWHC041-03	Software-Controlled Switch Reluctance Motor	2023	SCE	Approved
SWHC042-03	Evaporative Pre-Cooler System and Controls for Packaged HVAC Unit	2023	SCE	Approved
SWHC043-03	Multiple Capacity Unitary Air-Cooled Commercial Air Conditioners Between 65 and 240 kBtu/hr	2023	SDGE	Approved
SWHC044-02	Ductless HVAC, Residential, Fuel Substitution	2023	SCE	Approved[42]
SWHC045-01	Heat Pump HVAC, Residential – Fuel Substitution	2023	SCE	Approved[42]
SWHC046-02	Heat Pump, Unitary Air-Cooled HVAC, Commercial - Fuel Substitution	2023	SCE	Approved
SWHC047-02	Gas Fireplace, Residential	2023	SCG	Approved
SWHC048-03	Packaged AC Heat Recovery	2023	SCG	Approved
SWHC049-02	HVAC, SEER-Rated AC and HP Equipment, Residential	2023	SDGE	Approved[42]
SWHC050-02	Ductless Heat Pump, HVAC, Residential	2023	SDGE	Approved[42]

[42] Will be updated mid-cycle to meet Department of Energy Code of Federal Regulations, 10 CFR 430.32(c) – 2023 Central Air Conditioners and Heat Pumps, effective 2023-01-01.

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWHC052-02	Air-Cooled Chiller, Path B	2023	SDGE	Approved
SWLG009-04	LED, Tube, Type A	2023	SCE	Approved
SWLG011-04	LED, High or Low Bay	2023	SCE	Approved
SWLG018-03	LED, Tube Type B and Type C	2023	SCE	Approved
SWMI001-02	Water Energy Nexus	2023	SDGE	Approved
SWPR001-01	Ventilation Fan, Agriculture	2023	PG&E	Approved
SWPR002-02	VFD for Glycol Pump Motor	2023	PG&E	Approved
SWPR003-01	Steam Trap, Commercial	2023	SCG	Approved
SWPR004-03	Circulating Block Heater	2023	SCE	Approved
SWPR005-02	Dust Collection Fan VSD	2023	PG&E	Approved
SWPR006-02	VSD For Ventilation Fan	2023	PG&E	Approved
SWPR007-01	Steam Boiler Economizer, Industrial	2023	SCG	Approved
SWRE001-02	Pool Cover, Commercial	2023	SCG	Approved
SWRE003-03	Pool or Spa Heater, Commercial	2023	SCG	Approved
SWRE004-02	Pool or Spa Heater, Residential	2023	SCG	Approved
SWRE005-02	Heat Pump Pool Heater, Residential - Fuel Substitution	2023	SCE	Approved
SWSV001-04	Duct Seal, Residential	2023	PG&E	Approved
SWSV005-02	Economizer Repair, Commercial	2023	SDGE	Approved
SWSV010-02	Economizer Controls, Commercial	2023	SDGE	Approved
SWSV013-02	Duct Optimization, DMo	2023	SDGE	Approved
SWWB002-01	Universal Audit Tool	2023	PG&E	Approved
SWWB004-02	Home Energy Reports	2023	PG&E	Approved
SWWH001-03	Faucet Aerator, Residential	2023	SCG	Approved
SWWH002-03	Low-Flow Showerhead, Residential	2023	SCG	Approved
SWWH003-02	TSV with Low Flow Showerhead	2023	SCG	Approved
SWWH004-03	Laminar Flow Restrictor	2023	SCG	Approved
SWWH005-05	Boiler, Commercial	2023	SCG	Approved
SWWH006-07	Tankless Water Heater, Commercial	2023	SCG	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWWH007-05	Storage Water Heater, Commercial	2023	SCG	Approved
SWWH008-01	Boiler, Process	2023	PG&E	Approved
SWWH010-02	Boiler, Multifamily	2023	SCG	Approved
SWWH011-02	Central Storage Water Heater, Multifamily	2023	SCG	Approved
SWWH012-03	Storage Water Heater, Residential	2023	SCG	Approved
SWWH013-03	Tankless Water Heater, Residential	2023	SCG	Approved
SWWH014-04	Heat Pump Water Heater, Residential	2023	SCE	Approved
SWWH015-03	Demand Control for Centralized Water Heater Recirculation Pump, Multifamily & Commercial	2023	SCG	Approved
SWWH016-03	Domestic Hot Water Loop Temperature Controller, Multifamily & Commercial	2023	SCG	Approved
SWWH017-04	Hot Water Pipe Insulation, Nonresidential and Multifamily	2023	SCG	Approved
SWWH018-04	Hot Water Tank Insulation, Nonresidential and Multifamily	2023	SCG	Approved
SWWH019-04	Faucet Aerator, Commercial	2023	SCG	Approved
SWWH020-04	Low-Flow Showerhead, Commercial	2023	SCG	Approved
SWWH021-01	Recirculation Pump Timer, Commercial	2023	SCG	Approved
SWWH022-01	Smart Pump, Residential	2023	PG&E	Approved
SWWH023-02	Tub Spout TSV	2023	SCG	Approved
SWWH025-05	Residential Heat Pump Water Heater, Fuel Substitution	2023	SCE	Approved
SWWH026-02	Water Heater Pipe Wrap, Residential	2023	SCG	Approved
SWWH027-03	Heat Pump Water Heater, Commercial, Fuel Substitution	2023	SCE	Approved
SWWH028-02	Multi-Family and Commercial Large Heat Pump Water Heater– Fuel Substitution	2023	SCE	Approved
SWWH030-01	Tankless Combination Space and Water Heater, Residential	2023	SCG	Approved
SWWH031-02	Heat Pump Water Heater, Commercial	2023	SCE	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWWH032-01	Solar Thermal Water Heating System, Residential	2023	SCG	Approved
SWWH033-02	Gas Heat Pump Water Heater, Multifamily	2023	SCG	Approved
SWWH034-01	Solar Thermal Water Heating System, Multifamily	2023	SCG	Approved
SWWP002-02	VFD on Ag Pump	2023	PG&E	Approved
SWWP004-02	Water Pump Upgrade	2023	PG&E	Approved
SWWP005-02	Enhanced VFD On Irrigation Pump	2023	PG&E	Approved

A2. PY2024-25 Measures

The list provided in Table A2.1 is current as of the adoption of the final resolution.

Table A2.1. DEER2024-25 Measure Packages to be Updated

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWAP001-05	Refrigerator or Freezer, Residential	2024	SDGE	Approved
SWAP003-04	Clothes Dryer, Residential	2024	SCG	Approved
SWAP004-03	Clothes Washer, Residential & Multifamily	2024	PG&E	Approved
SWAP005-02	Ozone Laundry, Commercial	2024	SCG	Approved
SWAP006-04	Dishwasher, Residential	2024	SCG	Approved
SWAP007-02	Room Air Conditioner, Residential	2024	SDGE	Approved
SWAP008-02	Room Air Cleaner, Residential	2024	SDGE	Approved
SWAP011-03	Vending and Beverage Merchandise Controller	2024	SCE	Approved
SWAP012-01	Gas Dryer Modulating Valve, Commercial and Multifamily	2024	SCG	Approved
SWAP013-02	Residential Cooking Appliances – Fuel Substitution	2024	SCE	Approved
SWAP014-02	Heat Pump Clothes Dryer, Residential, Fuel Substitution	2024	SCE	Approved
SWAP015-02	Induction Cooking Top with or without Electric Range, Residential	2024	SDGE	Approved
SWAP017-02	Oven, Gas, Residential	2024	SCG	Approved
SWBE001-03	Greenhouse Heat Curtain	2024	SCG	Approved
SWBE002-03	Greenhouse Infrared Film	2024	SCG	Approved
SWBE006-02	Residential Ceiling Insulation	2024	SCG	Approved
SWBE007-02	Residential Blow-In Wall Insulation	2024	SCG	Approved
SWCA001-03	Air Compressor VFD Retrofit	2024	SCE	Approved
SWCR001-03	Anti-Sweat Heat Controls	2024	SCE	Approved
SWCR002-03	Low-Temperature Display Case Doors with No Anti-Sweat Heaters	2024	SCE	Approved
SWCR003-02	High Efficiency Motor Retrofit for Refrigerated Display Case	2024	SCE	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWCR004-02	EC Motor Retrofit for a Walk-In Cooler Or Freezer	2024	SCE	Approved
SWCR005-03	Auto Closer for Refrigerated Storage Door	2024	SCE	Approved
SWCR007-03	Floating Head Pressure Controls, Multiplex	2024	PG&E	Approved
SWCR008-03	Floating Suction Controls, Multiplex	2024	SCE	Approved
SWCR010-03	Bare Suction Pipe Insulation	2024	SCE	Approved
SWCR012-02	Compressor Retrofit, Multiplex	2024	PG&E	Approved
SWCR014-03	Medium or Low-Temperature Display Case	2024	PG&E	Approved
SWCR015-02	Medium-Temperature Case Doors	2024	PG&E	Approved
SWCR017-03	Ultra-Low Temperature Freezer	2024	PG&E	Approved
SWCR018-03	Reach-In Refrigerator or Freezer, Commercial	2024	PG&E	Approved
SWCR019-02	Low-Temperature Coffin to Reach-In Display Case Conversion	2024	PG&E	Approved
SWCR020-02	Medium-Temperature Open Display Case Retrofit	2024	PG&E	Approved
SWCR021-02	Medium or Low-Temperature Display Case with Doors	2024	PG&E	Approved
SWCR022-03	Efficient Adiabatic Condenser	2024	SCE	Approved
SWFS001-02	Commercial Convection Oven – Electric & Gas	2024	SCG	Approved
SWFS002-03	Door Type Dishwasher, Commercial	2024	SCG	Approved
SWFS003-02	Combination Oven, Commercial	2024	SCG	Approved
SWFS004-01	Commercial Griddle – Electric & Gas	2024	SCG	Approved
SWFS005-03	Steamer, Commercial	2024	SCG	Approved
SWFS006-02	Ice Machine, Commercial	2024	PG&E	Approved
SWFS007-03	Insulated Hot Food Holding Cabinet	2024	SCE	Approved
SWFS008-01	Conveyor Oven, Gas, Commercial	2024	SCG	Approved
SWFS009-02	Commercial Deck Oven, Electric	2024	SCE	Approved
SWFS010-02	Commercial Hand Wrap Machine	2024	SCE	Approved
SWFS011-05	Fryer, Commercial	2024	SCG	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWFS012-01	Exhaust Hood Demand Controlled Ventilation, Commercial	2024	SCE	Approved
SWFS013-02	Low-Flow Pre-Rinse Spray Valve	2024	SCG	Approved
SWFS014-02	Rack Oven	2024	SCG	Approved
SWFS016-02	Refrigerated Chef Base	2024	SCE	Approved
SWFS017-02	Automated Conveyor Broiler, Commercial	2024	SCG	Approved
SWFS018-04	Undercounter Dishwasher, Commercial	2024	SCG	Approved
SWFS019-02	Underfired Broiler, Commercial	2024	SCG	Approved
SWFS021-03	Commercial Fryer, Fuel Substitution	2024	SCE	Approved
SWFS022-02	Commercial Convection Oven, Fuel Substitution	2024	SCE	Approved
SWFS023-02	Conveyorized Toaster, Commercial	2024	SCE	Approved
SWHC001-03	Wall Furnace, Residential	2024	SCG	Approved
SWHC002-03	Intermittent Pilot Light, Residential	2024	SCG	Approved
SWHC004-05	Space Heating Boiler, Multifamily	2024	SCG	Approved
SWHC005-03	Water-Cooled Chiller	2024	SDGE	Approved
SWHC006-02	Demand Control Ventilation for Single Zone HVAC	2024	PG&E	Approved
SWHC008-01	VSD For Central Plant System	2024	SCE	Approved
SWHC009-03	Supply Fan Controls, Commercial	2024	SDGE	Approved
SWHC011-02	Furnace, Commercial	2024	SCG	Approved
SWHC012-02	Classroom HVAC Occupancy Sensor	2024	SCE	Approved
SWHC013-03	Unitary Air-Cooled AC and HP, over 65 kBtu/hr, Commercial	2024	SDGE	Approved
SWHC014-03	Unitary Air-Cooled AC and HP, below 65 kBtu/hr, Commercial	2024	SDGE	Approved
SWHC018-03	VSD for HVAC Fan Controls, Commercial	2024	PG&E	Approved
SWHC020-03	Air Cooled Chiller	2024	SDGE	Approved
SWHC023-03	Enhanced Ventilation for Packaged HVAC	2024	PG&E	Approved
SWHC024-03	Cogged V-Belt for HVAC Fan, Commercial	2024	SCE	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWHC027-03	Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/hr	2024	SDGE	Approved
SWHC029-03	Fan Controller for Air Conditioner, Residential	2024	SCE	Approved
SWHC030-03	Whole House Fan	2024	SCE	Approved
SWHC031-03	High-Efficiency Furnace, Residential	2024	SCG	Approved
SWHC038-02	Brushless Fan Motor Replacement, Residential	2024	SCE	Approved
SWHC039-06	Smart Thermostat, Residential	2024	SCE	Approved
SWHC041-03	Software-Controlled Switch Reluctance Motor	2024	SCE	Approved
SWHC042-03	Evaporative Pre-Cooler System and Controls For Packaged HVAC Unit	2024	SCE	Approved
SWHC043-03	Multiple Capacity Unitary Air-Cooled Commercial Air Conditioners Between 65 and 240 kBtu/hr	2024	SDGE	Approved
SWHC044-03	Ductless HVAC, Residential, Fuel Substitution	2024	SCE	Approved[43]
SWHC045-02	Heat Pump HVAC, Residential – Fuel Substitution	2024	SDGE	Approved[43]
SWHC046-02	Heat Pump, Unitary Air-Cooled HVAC, Commercial - Fuel Substitution	2024	SCE	Approved
SWHC047-03	Gas Fireplace, Residential	2024	SCG	Approved
SWHC048-03	Packaged AC Heat Recovery	2024	SCG	Approved
SWHC049-03	SEER-Rated AC and HP HVAC Equipment, Residential	2024	SDGE	Approved[43]
SWHC050-03	Ductless, Heat Pump, Residential	2024	SDGE	Approved[43]
SWHC052-02	Air-Cooled Chiller, Path B	2024	SDGE	Approved
SWMI001-02	Water Energy Nexus	2024	SDGE	Approved
SWPR001-01	Ventilation Fan, Agriculture	2024	PG&E	Approved

[43] Will be updated mid-cycle to meet Department of Energy Code of Federal Regulations, 10 CFR 430.32(c) – 2023 Central Air Conditioners and Heat Pumps, effective 2023-01-01.

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWPR002-02	VFD for Glycol Pump Motor	2024	PG&E	Approved
SWPR003-01	Steam Trap, Commercial	2024	SCG	Approved
SWPR004-03	Circulating Block Heater	2024	SCE	Approved
SWPR005-02	VFD for Dust Collection Fan	2024	PG&E	Approved
SWPR006-02	VSD For Ventilation Fan	2024	PG&E	Approved
SWPR007-01	Steam Boiler Economizer, Industrial	2024	SCG	Approved
SWRE001-02	Pool Cover, Commercial	2024	SCG	Approved
SWRE003-03	Pool or Spa Heater, Commercial	2024	SCG	Approved
SWRE004-03	Pool or Spa Heater, Residential	2024	SCG	Approved
SWRE005-02	Heat Pump Pool Heater, Residential - Fuel Substitution	2024	SCE	Approved
SWSV001-05	Duct Seal, Residential	2024	SDGE	Approved
SWSV005-02	Economizer Repair, Commercial	2024	SDGE	Approved
SWSV010-02	Economizer Controls, Commercial	2024	SDGE	Approved
SWSV013-03	Duct Optimization	2024	SDGE	Approved
SWWB002-01	Universal Audit Tool	2024	PG&E	Approved
SWWB004-02	Home Energy Reports	2024	PG&E	Approved
SWWH001-03	Faucet Aerator, Residential	2024	SCG	Approved
SWWH002-03	Low-Flow Showerhead, Residential	2024	SCG	Approved
SWWH003-02	TSV with Low Flow Showerhead	2024	SCG	Approved
SWWH004-03	Laminar Flow Restrictor	2024	SCG	Approved
SWWH005-06	Boiler, Commercial	2024	SCG	Approved
SWWH006-07	Tankless Water Heater, Commercial	2024	SCG	Approved
SWWH007-05	Storage Water Heater, Commercial	2024	SCG	Approved
SWWH008-01	Boiler, Process	2024	PG&E	Approved
SWWH010-02	Boiler, Multifamily	2024	SCG	Approved
SWWH011-02	Central Storage Water Heater, Multifamily	2024	SCG	Approved
SWWH012-03	Storage Water Heater, Residential	2024	SCG	Approved
SWWH013-03	Tankless Water Heater, Residential	2024	SCG	Approved

Measure Package ID	Measure Name	Program Year	Lead IOU	Status
SWWH014-04	Heat Pump Water Heater, Residential	2024	SCE	Approved
SWWH015-03	Demand Control for Centralized Water Heater Recirculation Pump, Multifamily & Commercial	2024	SCG	Approved
SWWH016-03	Domestic Hot Water Loop Temperature Controller, Multifamily & Commercial	2024	SCG	Approved
SWWH017-04	Hot Water Pipe Insulation, Nonresidential and Multifamily	2024	SCG	Approved
SWWH018-04	Hot Water Tank Insulation, Nonresidential and Multifamily	2024	SCG	Approved
SWWH019-04	Faucet Aerator, Commercial	2024	SCG	Approved
SWWH020-04	Low-Flow Showerhead, Commercial	2024	SCG	Approved
SWWH021-01	Recirculation Pump Timer, Commercial	2024	SCG	Approved
SWWH022-01	Smart Pump, Residential	2024	PG&E	Approved
SWWH023-02	Tub Spout TSV	2024	SCG	Approved
SWWH025-05	Residential Heat Pump Water Heater, Fuel Substitution	2024	SCE	Approved
SWWH026-02	Water Heater Pipe Wrap, Residential	2024	SCG	Approved
SWWH027-03	Heat Pump Water Heater, Commercial, Fuel Substitution	2024	SCE	Approved
SWWH028-02	Multi-Family and Commercial Large Heat Pump Water Heater– Fuel Substitution	2024	SCE	Approved
SWWH031-02	Heat Pump Water Heater, Commercial	2024	SCE	Approved
SWWH032-01	Solar Thermal Water Heating System, Residential	2024	SCG	Approved
SWWH033-02	Gas Heat Pump Water Heater, Multifamily	2024	SCG	Approved
SWWH034-01	Solar Thermal Water Heating System, Multifamily	2024	SCG	Approved
SWWP002-03	VFD on Well Pump, <= 300 hp	2024	PG&E	Approved
SWWP004-02	Water Pump Upgrade	2024	PG&E	Approved
SWWP005-03	Enhanced VFD on Irrigation Pump	2024	PG&E	Approved

A3. Dispositions

The list of 2021 dispositions that will impact PY 2023 and PY 2024 measure packages is listed in Table A3.1. These documents can be downloaded from the DEER Module on CEDARS.[44]

Table A3.1. Measure Package Dispositions Directing Updates for PY2023 and PY2024-2025

Measure ID	Title	Date	Summary of Direction
SWWH028-02	Large Heat Pump Water Heater, Commercial and Multifamily, Fuel Substitution	2022-10-19	Disposition approves the statewide measure package Large Heat Pump Water Heater, Commercial and Multifamily, Fuel Substitution: SWWH028-02 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.
SWWH027-03	Heat Pump Water Heater, Commercial, Fuel Substitution	2022-10-14	Disposition approves the statewide measure package Heat Pump Water Heater, Commercial, Fuel Substitution: SWWH027-03 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.
SWWH025-05	Heat Pump Water Heater, Residential, Fuel Substitution	2022-10-14	Disposition approves the statewide measure package Heat Pump Water Heater, Residential, Fuel Substitution: SWWH025-05 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.
SWAP014-02	Heat Pump Clothes Dryer, Residential, Fuel Substitution	2022-10-13	Disposition approves the statewide measure package Heat Pump Clothes Dryer, Residential, Fuel Substitution: SWAP014-02 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.

[44] https://cedars.sound-data.com/deer-resources/deemed-measure-packages/dispositions/

Measure ID	Title	Date	Summary of Direction
SWLG018-02	LED, Tube, Type B and Type C	2022-10-05	Disposition approves the statewide measure package LED, Tube, Type B and Type C: SWLG018-02 to be effective retroactively from January 1, 2022, to December 31, 2022. Measure package updates were to correct the hours of use for the garage building type.
SWLG009-03	LED, Tube, Type A	2022-10-05	Disposition approves the statewide measure package LED, Tube, Type A: SWLG009-03 to be effective retroactively from January 1, 2022, to December 31, 2022. Measure package updates were to correct the hours of use for the garage building type.
SWAP001-03	Refrigerator or Freezer, Residential	2022-09-22	Disposition approves the statewide measure package Refrigerator or Freezer, Residential: SWAP001-03 to be effective retroactively from January 1, 2022, to December 31, 2022. Measure package updates were to correct the interactive effect factors.
SWAP013-02	Cooking Appliances, Residential, Fuel Substitution	2022-09-19	Disposition approves the statewide measure package Cooking Appliances, Residential, Fuel Substitution: SWAP013-02 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.
SWHC046-02	Packaged Heat Pump Air Conditioner, Commercial, Fuel Substitution	2022-09-13	Disposition approves the statewide measure package Packaged Heat Pump Air Conditioner, Commercial, Fuel Substitution: SWHC046-02 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.

Measure ID	Title	Date	Summary of Direction
SWRE005-02	Heat Pump Pool Heater, Residential, Fuel Substitution	2022-09-01	Disposition approves the statewide measure package Heat Pump Pool Heater, Residential, Fuel Substitution: SWRE005-02 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.
SWAP010-02	Smart Connected Power Strip	2022-08-23	Disposition rejects the statewide measure package Smart Connected Power Strip: SWAP010-02 due to a lack of data collection to support measure package savings. SWAP010-01 will expire on December 31, 2022.
SWFS022-02	Convection Oven, Commercial, Fuel Substitution	2022-08-02	Disposition approves the statewide measure package Convection Oven, Commercial, Fuel Substitution: SWFS022-02 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.
SWFS021-03	Fryer, Commercial, Fuel Substitution	2022-08-02	Disposition approves the statewide measure package Fryer, Commercial, Fuel Substitution: SWFS021-03 to be effective on January 1, 2023. Measure package updates were in accordance with Resolution E-5152.
SWWH028-01	Heat Pump Water Heater, Multifamily and Commercial, Fuel Substitution	2022-01-25	Disposition approves the statewide measure package Heat Pump Water Heater, Multifamily and Commercial, Fuel Substitution: SWWH028-01 to be effective upon approval. The program administrators are directed to submit the incremental measure cost (IMC) addendum when the cost of the rebate exceeds the IMC.

Measure ID	Title	Date	Summary of Direction
SWHC039-04	Smart Thermostat, Residential	2021-12-20	Disposition approves the statewide measure package Smart Thermostat, Residential: SWHC039-04 to effective on January 1, 2022 and expire on December 31, 2022. The program administrators (PAs) are directed to revise the measure package for 2023 based on ongoing evaluation work in 2021 and early 2022. All additional analyses will be completed by Spring 2021 in time to facilitate a measure package update by June 1, 2022 to be effective January 1, 2023.
SWWP002-02	VFD on Well Pump, ≤300 hp	2021-09-01	Disposition approves the statewide measure package VFD on Well Pump, ≤ 300 hp: SWWP002-02 to be effective on January 1, 2022 and expire on December 31, 2023. The program administrators are directed to revise the measure package for PY 2024-2025 based on ISP research, possible combination of this measure with SWWP005-02 (Enhanced VFD on Irrigation Pump) based on the most recent data for operating profiles.
SWWP005-02	Enhanced VFD on Irrigation Pump	2021-09-01	Disposition approves the statewide measure package Enhanced VFD on Irrigation Pump: SWWP005-02 to be effective on January 1, 2022 and expire on December 31, 2023. The program administrators are directed to revise the measure package for PY 2024-2025 based on ISP research, possible combination of this measure with SWWP002-02 (VFD on Well Pump, <=300 hp) based on the most recent data for operating profiles.

Measure ID	Title	Date	Summary of Direction
SWRE005-01	Heat Pump Pool Heater, Fuel Substitution	2021-07-30	Disposition approves the statewide measure package Heat Pump Pool Heater, Fuel Substitution: SWRE005-01 to be effective upon approval. The program administrators are directed to submit the incremental measure cost (IMC) addendum when the cost of the rebate exceeds the IMC.
SWWH027-02	Heat Pump Water Heater, Commercial, Fuel Substitution	2021-06-11	Disposition approves the statewide measure package Heat Pump Water Heater, Commercial, Fuel Substitution: SWWH027-02 to be effective on January 1, 2022. The program administrators are directed to submit the incremental measure cost (IMC) addendum when the cost of the rebate exceeds the IMC.
SWWH025-04	Heat Pump Water Heater, Residential, Fuel Substitution	2021-06-11	Disposition approves the statewide measure package Heat Pump Water Heater, Residential, Fuel Substitution: SWWH025-04 to be effective on January 1, 2022. The program administrators are directed to submit the incremental measure cost (IMC) addendum when the cost of the rebate exceeds the IMC.
SWHC044-02	Ductless HVAC, Residential, Fuel Substitution	2021-04-21	Disposition approves the statewide measure package Ductless HVAC, Residential, Fuel Substitution: SWHC044-02 to be effective on July 21, 2021. The program administrators are directed to submit the incremental measure cost (IMC) addendum when the cost of the rebate exceeds the IMC.

A4. Measure Package Guidance

Table A4.1 lists the guidance released since the last DEER Resolution that informs PY2023 and PY2024 Measure Updates. These documents can be downloaded from CEDARS at https://cedars.sound-data.com/deer-resources/deemed-measure-packages/guidance/.

Table A4.1. Measure Package Guidance for PY2023 and PY2024-2025

Date	Title (linked to full document)	Summary
2022-10-18	Measure Package Plan (MPP) Template	This template is to be used for proposed new measures or measure updates to receive early CPUC feedback.
2022-09-27	NTG Ratio for Nonresidential Package/Split System AC/HP	This guidance clarifies which NTG ratios should be applied to various nonresidential HVAC measures for program years 2022 and 2023.
2022-08-16	Duct Seal Measure Guidance	This guidance provides clarification regarding the duct sealing (SWSV001-04) and duct optimization (SWSV013-02) measure packages and the specific requirements related to: the duct leakage test method, the leakage reduction required to claim this measure, and the building era that can be claimed.
2022-06-09	Measure Package Adoption by PAs	This guidance sets forth the process for PAs and third-party implementers to upload and adopt PA implementation codes in eTRM. A measure log entry will be created and set to 'PA Implementation Codes' with an attachment summarizing the specific permutations each PA will offer.
2022-06-02	Addendum to Measure Package Documenting Incentive Greater than Incremental Measure Cost	This guidance sets forth the process and documentation required for PAs to submit an addendum to measure packages informing the CPUC as to the need to provide an incentive which is greater than the incremental measure cost.

Date	Title (linked to full document)	Summary
2022-02-22	Short- and Long-term Solutions for Integrating Embedded Energy Savings into CEDARS	Guidance outlining short- and long-term solutions for integrating water-energy embedded energy savings for claims.
2022-02-22	Measure Package Submission Cover Sheet Template Version 6	This document is an updated cover sheet template for the IOUs to use when submitting measure packages through the eTRM.
2022-02-03	Guidance for NTG ratios for HTR with DI	This guidance document summarizes the CPUC decision for applying the hard-to-reach (HTR) NTG ratio of 0.85 to HTR customers who receive equipment through direct install delivery channels.
2021-12-16	Energy Plus Files Memo	This memo describes the files and supporting documents that should be submitted for residential non-DEER measures that were previously modeled using MASControl3 and eQUEST/DOE2 building simulations.
2021-12-03	Guidance for Refrigerant Avoided Cost Addendum (RACC) to Measure Packages	This guidance provides the PAs with the approved RACC cover sheet and calculator to be submitted as an addendum to active measure packages.
2021-09-30	CPUC Guidance on the use of Negative Incremental Measure Cost (IMC) in the Cost Effectiveness Tool	This guidance sets the precedent for fuel substitution measures to use zero for negative IMC value in the CET and use the standard addendum template for rebates greater than IMC values.