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Gavin Newsom, Governor

Date: May 33, 2022

To: Energy Efficiency Proceeding Service List R.13-11-005

From: Energy Efficiency Branch, California Public Utilities Commission
CC: ALJ Julie Fitch; ALJ Valerie Kao; Simon Baker; Jennifer Kalafut; Paula Gruendling; Peter Lai; Peter Biermayer

Subject: **Solicitation for Comments on Scope of Update for Database of Energy Efficiency Resources for program years 2022 through 2026 (DEER2024)**

The California Public Utilities Commission (CPUC) Staff invite comments on this proposed scope to update the Database of Energy Efficient Resources for program years (PY) 2024-25 (DEER2024) to be scheduled for adoption by a Resolution in Q4 2022.[1] Our scoping effort started with informal feedback from and discussions with the CPUC energy efficiency (EE) Program Administrators (PAs). We also considered current market conditions, conventional DEER update sources such as evaluation results and research studies, and analysis of energy efficiency regulatory oversight operational needs. This effort targets updates needed for PY 2024-25, but due to evolving regulatory requirements, some error corrections and clarifications are also needed for the previous 2023 and 2022 DEER updates.

As noted in DEER2023 Update Resolution E-5152, Decision D.21-05-031[2] makes several changes that affect the DEER Resolution update. It delegates CPUC staff to make future updates to the DEER and measure package submittal, review, and approval processes via the resolution, removes the DEER versus non-DEER distinction for deemed ex ante values, and revises the scope of the DEER Resolution. "The new scope of the resolution will encompass:

- Approval of deemed ex ante values
- Direction of research needs
- Management of deemed ex ante value process
- Adoption of a locked, two-year version of deemed values to be used in forecasting, portfolio planning, and savings claims"

The sections in the scoping document and in the resolution will be organized into sections corresponding to the bulleted list. D.21-05-031 further changes the DEER Resolution date from September 1 to November 1 and to be issued in even-numbered years rather than every year.

[1] See D15-10-028, OP 17, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M155/K511/155511942.pdf.
[2] https://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=385864616

This year's resolution will include the continued development of the electronic Technical Reference Manual (eTRM), the introduction of measure lifecycle management, and the shift from DOE-2 based prototypes to EnergyPlus™ based prototypes.

Comments on this scoping document are due May 19, 2022. Table 1-1 presents the proposed timeline for this year's DEER update cycle.

Table 1-1. Proposed Timeline of 2024DEER Update

Activity	Scheduled Date
DEER Scoping document notice	2022-05-01
Scoping document comments due	2022-05-19
Draft Resolution and webinar notice release	2022-08-01
Public webinar	TBD
Party comments due (20 days after draft Resolution release)	2022-08-21
Deadline for Resolution to be considered by Commission	2022-10-20

DEER2024 Scoping Document

Prepared by DNV Energy Insights USA, Inc.

1 Management of DEER Processes

The following sections provide detail on proposed policy changes and all proposed updates affecting the DEER database and measure packages[3]—both structural and to ex ante values.

1.1 Updates to eTRM and Measure Packages

Effective Program Year: 2024. California's statewide electronic Technical Reference Manual (eTRM) is the *Official Source of California Energy Efficiency Measure Data*,[4] 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. It is recommended that measure developers shall follow the rules and procedures as laid out in the documents provided by California Technical Forum (CalTF) as they move measures through the development phase prior to submittal.

1.1.1 eTRM Table Structure Changes

It is recommended that 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, California Energy Data and Reporting System (CEDARS), or Cost Effectiveness Tool (CET), the CPUC staff will review and approve necessary changes to meet these needs. Examples of such fields include but are not limited to: 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.

1.1.2 Refrigerant Impacts (RACC)

Per 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)[5] 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. In a memorandum issued on November 24, 2021 CPUC staff provided guidance on the new process required by program administrators (PAs) for submittal of an addendum to measure packages for the inclusion of the updated version of the RACC and a cover sheet summarizing the changes, see Appendix A4. The updates to the RACC required adding language to the non-energy impacts

[3] Formerly referred to as "workpapers"
[4] https://www.caetrm.com/
[5] http://deeresources.com/index.php/racc-resources

section of the eTRM Measure Characterization and two new fields to the eTRM permutations table. These new fields were also added to CEDARS reporting data and to CET inputs.

The RACC update did not account for scenarios such as partial lifetime required for accelerated replacement (AR) measures due to the complexity of the task in the short-term. As such, the RLAC is simply calculated as the difference in the full lifecycle RLAC values for the pre-retrofit baseline device and the measure device.

It is recommended that, in the RACC, AR measures should be treated the same as normal replacement (NR) measures until the RACC is revised. PAs should continue to work with CPUC staff to update the RACC to include the calculations for AR measures as well as updates based on directed research of performance data for low-GWP as described in Section 2.7 by June 1, 2023. Measure developers will need to submit the updated RACC for applicable measure packages thereafter.

1.1.3 Aggregated Values in Permutations

It is recommended that CPUC staff clarifies that aggregated values (e.g., "Any", "Res", "Com") shall only be used in some fields of the permutations table when those conditions listed in Table 1-1 are met. The definitions of the listed delivery types are provided in Section 1.11.2.

Table 1-1. Conditions for Usage of Aggregated Values in Permutations

Field	Value	Conditions for Usage of Aggregated Value*
Building HVAC	rWtd or cWtd	· Measure is offered to all DEER building types of given sector via any delivery type except direct install
Building Location	Any	· UES values are equal across all climate zones
Building Type	Res or Com	· Measure is offered to all DEER building types of given sector via midstream, downstream, or direct install delivery type · UES values are equal across all DEER building types of given sector
		· Upstream delivery type, only
Building Vintage	Any	· Measure is offered to all DEER building vintages via upstream or midstream delivery type

* If multiple conditions are listed within a single row of this column of the table, all conditions within the row must be met.

1.1.4 Water-Energy Nexus (WEN) Impacts

In December 2021 the CPUC released the new Water-Energy (W-E) Calculator 2.0.[6] 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. 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 issued a guidance memo describing a short and long-term solution for how the embedded energy savings outputs of the W-E Calculator 2.0 must be added to direct energy savings and integrated into the eTRM, CEDARS, and CET; and how outputs must be used to update W-E savings in existing measure packages and for the development of new measures packages, see Appendix A4.

The short-term solution is only suitable for measures that use the default marginal water supply—recycled water (non-potable), and the output embedded energy savings added to the direct energy savings generated by that measure are reported as one value. The short-term solution resulted in the update to eighteen existing measure packages for PY2023. Once the CET is updated to include a separate field for embedded water savings, the long-term solution will allow for WEN measure packages to use the new CET functionality to accept the direct energy savings and embedded energy savings separately into the CET. The embedded-water-energy savings will be calculated following the same methodology described in the short-term solution, but the embedded energy savings will be stored independently of the direct energy savings within the eTRM to facilitate reporting and cost-effectiveness calculations.

It is recommended that the PA should continue to receive the same credit for both the direct and embedded energy savings as they received using the short-term solution, but for accounting purposes the two types of savings will be entered into the CET separately through CEDARS. The updates to the WEN measures required adding language to the non-energy impacts section of the eTRM Measure Characterization and two new fields to the eTRM permutations table: one for the indoor annual water savings and one for outdoor annual water savings. Both will be reported in gallons.

When the CPUC informs the relevant PAs of this transition, the PAs will create a Measure Log entry that includes a Measure Package Plan (MPP). The MPP will describe the administrative change to the measure package that will incorporate the long-term solution used to calculate the total energy savings as well as when the change will take effect. This administrative change will not

[6] https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/water-energy-nexus-programs

trigger a new version of the measure package since impacts (including savings, cost, and measure life) have not changed.

1.1.5 Rebates Exceeding Incremental Measure Cost (IMC)

In 2020, CPUC staff released an *Addendum to Fuel Substitution Workpaper Documenting Incentive Greater that Incremental Measure Cost*, see Appendix A4. 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. In the case of fuel substitution measures, the reason is often tied to market barriers.

It is recommended that this requirement to use the pathway developed for fuel-substitution measures should be extended to non-fuel substitution measures.

1.1.6 Measure Cost Updates

It is recommended that costs be updated every time the measure package is updated using methods described in CalTF's whitepaper on cost updates for measure package updates.[7] In the cost section of a measure package, the author must note whether the technology has quickly-changing costs that would indicate more frequent measure package updates.

1.1.7 Data Requirements for Distributor/Contractor-delivered Measures

Multiple evaluation reports have recommended improvements in documentation quality to meet the measure data collection and evaluation requirements. It is recommended that the following data requirements be added to measure packages updated for PY2023 and PY2024—as relevant—for all offerings using the UpDeemed delivery type. If adopted, PAs would be required to submit this information in a measure package.

- SiteID – A unique identifier for the shipped location (upstream) or installed location (midstream) of the incentivized equipment
- EquipmentID - A unique identifier for each unit of incentivized equipment
- Measure Size category – General size or capacity range specific to each measure type, for example HVAC equipment would be AHRI product type and size range
- Equipment manufacturer – Manufacturer of the incentivized equipment, e.g., Carrier, Trane, Nest, Philips, GE, etc.
- Equipment model number – Manufacturer number that can be used to lookup size, features, performance, etc. for the incentivized equipment
- Rated capacity – Actual size, capacity, load rating, etc. for the incentivized equipment

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

- Rated efficiency unit (EfficUnit) – The engineering unit basis for the efficiency or performance rating, e.g., Unit Energy Factor (UEF), thermal efficiency (TE), SEER (seasonal energy efficiency ratio)
- Rated efficiency (ref. EfficUnit) – Efficiency or performance rating value for the Rated efficiency unit basis
- 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.

1.2 DEEResources Website Content Migrated to CEDARS

Effective Program Year: 2024. During Q4 2021, infrastructure to house the existing contents of the DEEResources.com and DEEResources.net websites was built within a new module on the CPUC's CEDARS website: DEER Module.[8] During Q1 2022, enhancements to said infrastructure were made and:

- All content from DEEResources.net was migrated.
- All contents from DEEResources.com that was five years old, or less, was migrated. No new content will be uploaded to DEEResources.com.

As information, CEDARS' DEER Module is organized as described in Table 1-2.

Table 1-2. DEER Module on CEDARS

DEER Module's Sub-module	Page(s) within Sub-module	Description
+ Deemed Measure Packages	Resolutions for Deemed Measures	PDF repository of final resolutions for DEER updates
	Dispositions for Deemed Measures	PDF repository of dispositions regarding deemed measures
	Guidance for Deemed Measures	PDF repository of dispositions regarding deemed measures
	Deemed Measure Archive	Repository of measure packages (a.k.a. workpapers) and supporting documentation approved by the CPUC through 2021-12-31. All statewide measure packages are available at eTRM.

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

DEER Module's Sub-module	Page(s) within Sub-module	Description
+ Tools	EnergyPlus	Information about the transition to EnergyPlus, including a Git[9] repository of idf[10] files and other supporting files
	MASControl	Git repository of zipped files, supporting workbooks, and documentation for building simulations that use the eQUEST/DOE2 engine.
	Water Heaters	Git repository of zipped files, supporting workbooks, and documentation for service/domestic water heating equipment.
	Load Shapes	Git repository of python code, supporting workbooks, and documentation for DEER load shapes and their associated Generalized Load Shape Parameters (GLSPs).
	Other	Git repository of other supporting workbooks outside of the above categories (e.g., chiller workbook, modified lighting calculator, RACC)
+ DEER Database	DEER Change Log	Information about updates made to tables of the DEER database
	Archived PEAR Change Log	Archive of updates made to the former PEAR database through 2021-12-31; the PEAR database was renamed to DEER in January 2022.
	Archived ExAnte Change Log	Archive of updates made to the former ExAnte database through 2021-12-31; the ExAnte database was retired as of 2022-01-01.
+ DEER Versions	DEER 2024	PDF repository for this and future documents up to and including the final resolution for the DEER2024 update
	DEER 2023	PDF repository of all documents up to and including the final resolution for each of the past four DEER update cycles
	DEER 2022	
	DEER 2021	
	DEER 2020	
	DEER Versions Archive	A copy of the contents of all DEER updates pages prior to DEER2020 from the legacy website of DEEResources.com
Ex Ante Review Memos	N/A	PDF repository of mid-year and final ex ante review memos to IOUs

[9] Git is software for tracking changes in any set of files; gits are usually used for coordinating work among software programmers.
[10] .idf is the file extension used by EnergyPlus input files

DEER Module's Sub-module	Page(s) within Sub-module	Description
Help and Contact	N/A	PDF repository of responses to FAQs and an email link to DEERsupport@dnv.com

1.3 DEER and Non-DEER Values

Effective Program Year: 2023. Decision D.21-05-031 eliminated "the DEER and non-DEER distinction and clarify 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."[11] Subsequently, Resolution E-5152 DEER2023 Update reiterated the removal of the "DEER versus non-DEER distinction for deemed ex ante values"[12] and laid out the revisions to measure package submission, review, and approval processes. CPUC staff and staff consultants have been responsible for producing and updating the DEER tools that are approved for use to generate unit energy savings values for deemed measures (e.g., MASControl3© and the water heater calculator) and for using said tools to calculate the unit energy savings (UES) values for some evaluated deemed measures. While that practice is expected to persist through the coming two-year cycle, this proposal sets forth shifting the entire responsibility for calculating the UES values for all deemed measures to the measure package developers. CPUC staff would continue to develop and maintain the DEER building simulation tools and the DEER water heater calculator and shift the focus of their efforts accordingly. During the upcoming transition period, those measures for which CPUC staff generate the UES values would continue to have an associated DEER MeasureID; once the transition is complete, the DEER MeasureID will no longer be used.

1.4 DEER 2026 Update and Measure Package Submission/Review Timeline

This proposal sets forth the recommended 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 1-3 and Table 1-4.

Table 1-3. PY2026-2027 DEER Update Cycle Timeline

Description	Responsible Party	Due Date	Approval Date	Effective Date
Draft DEER2026 Update Resolution	CPUC	2024-08-01	-	-
DEER2026 Update Resolution	CPUC	-	2024-11-01	2026-01-01*

[11] 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.
[12] Resolution E-5152 DEER2023 Update, p. 10.

Description	Responsible Party	Due Date	Approval Date	Effective Date
Measure Package Update Schedule	PAs/ Stakeholders	2023-08-01**	-	-
Measure Package Submittals	PAs	See Table 1-4	2024-08-01+	2026-01-01*

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

Staff will work with PAs to set a prioritized schedule of updates for all PY2026-27 measure packages resulting from updates directed in Sections 1.5 and 2.0. PAs may submit additional updates to measure packages beyond what is directed and may include additional measure packages for update during that time. Examples of such updates may include, but are not limited to costs, new study data, and EM&V results. Only measure packages adopted in the DEER2026 will be included in the set of deemed measures for the PY2026-27 program cycle.

Staff will work with the PAs to develop a schedule of submissions so controversial measure packages are 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 1-4 summarizes the measures presently planned for updates and the deadline for measure package submittals.

Table 1-4. Timeline for DEER2026-2027 Measure Package Updates from CPUC**

End Use Category	Update Detail	Data Needed By	Measure Package Submittal By
Appliances (AP)	TBD	TBD	TBD
Compressed Air, Commercial Refrigeration, and Process (CA, CR, PR)	Commercial refrigeration EnergyPlus updates per Section 2.1	TBD	TBD
HVAC (HC)	Commercial weather-dependent EnergyPlus updates per Section 2.1	2023-12-01	2024-03-31
Water Heating and Water Pumping (WH, WP)	Water Heater Measure Update per Section 2.2	TBD	TBD

** TBD = To be updated based on current MP review outcomes. Updates may include: UES, NTG, EUL, ISP. This schedule will be finalized for the Draft Resolution and will have the standard comment period at that time.

Table 1-5 summarizes the measures presently planned for updates, when the PA-led research needs to be completed, and the deadline for measure package submittals.

Table 1-5. Timeline for DEER2026-2027 Measure Package Updates from PA-Led Research

End Use Category	Update Detail	Data Needed By	Measure Package Submittal By
Appliances (AP)	TBD	TBD	TBD
Compressed Air, Commercial Refrigeration, and Process (CA, CR, PR)	TBD	TBD	TBD
HVAC (HC)	High-SEER performance curves for HPs/ACs per Section 2.3	2023-12-01	2024-03-31
Water Heating and Water Pumping (WH, WP)	Condensing boiler operating efficiencies per Section 2.4	TBD	TBD

1.5 Measure Lifecycle Management (MLM) in DEER

Effective Program Year: 2024. Staff proposes to establish a DEER database table 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, the table will track characteristics of each measure package as identified in Table 1-6. For each characteristic listed, the dates each was last updated and is next expected to be considered for update will be tracked. The eTRM shall synchronize with this table on a nightly basis.

Table 1-6. 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
EULref	Report used for most recent EUL update

Characteristic	Description
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
CPUCmgmt	Flag indicating whether senior management at the CPUC will need to review

1.6 Mid-Cycle Adjustments to the Locked Ex-Ante Values

D. 21-05-031 (p. 39) locks ex-ante values used in Potential & Goals as well as claims for the two-year DEER cycle. It further notes that there may be mid-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. Mid-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. Per Resolution E-5152 these mid-cycle adjustments are further clarified below.

1.6.1 New Measures

New measure packages and measure packages that solely include the addition of new measures may be submitted for CPUC review at any time during the biennial cycle. New measure packages and measure packages that solely include the addition of new measures must follow the submittal, review, and approval will follow the process outlined in Resolution E-5152 (p.13). Newly approved ex ante values shall be adopted into the portfolio, will become effective upon approval, and can be used for mid-cycle claims. Notification of new measure packages or new measures added to existing measure packages will be communicated to stakeholders through measure package dispositions, eTRM published values, DEER support tables, and/or stakeholder meetings.

1.6.2 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.")[13] can occur at any time during the biennial cycle, shall become effective immediately, and are not intended to impact the claims process. 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 measure package dispositions, eTRM published values, guidance documents, DEER support tables, DEER change log, and/or stakeholder meetings.

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

Error corrections that may be egregious and have a large impact to the savings portfolio may be allowed only on a very limited basis and will be handled case-by-case. Commission staff shall hold the authority to decide whether a mid-year update is considered critical in these circumstances. This will be communicated to stakeholders through measure package dispositions, guidance documents, eTRM published values, DEER support tables, DEER change log, and/or stakeholder meetings.

1.6.3 Codes and Standards

Anticipated changes to codes and standards that occur mid-cycle shall be planned for and proceed as identified in Section 1.4. Unanticipated changes to codes and standards that occur mid-cycle will require a revised Measure Package baseline and become effective 90 days after the Measure Package is approved.

1.6.4 EnergyPlus Prototypes, Residential

Effective Program Year: 2024. The transition to EnergyPlus prototypes for residential measures has started with the measures listed in Table 1-7 that will be adopted as part of this 2024DEER update. The transition of commercial measures is upcoming and described in section 2.1.

Table 1-7. Measures that will be Transitioned to EnergyPlus Prototypes

Measure ID	Measure Name
SWHC027	Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/h
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[14]
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
SWWH024	Central Boiler Dual Setpoint Temperature Controller, Multifamily
SWWH028	Heat Pump Water Heater, Commercial and MF, Fuel Substitution

[14] This measure will include SEER 19-21 equipment.

The CPUC methodology documentation is available on PDA for review, will be posted on CEDARS when final[15] and comprises the following:

- Documentation of the calibration decisions, calibration methods and results, prototype baseline consumption comparison with previous models, example measure comparisons with previous savings
- EnergyPlus prototype (.idf) files for residential buildings (single-family, multifamily, and double-wide mobile homes)
- Excel files documenting the prototype characteristics, noting all characteristics changed from the previous ex ante team's prototypes

1.7 PY2021 Evaluator Guidance

Effective Program Year: 2021. 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 on the CEDARS Deemed Measure Archive.[16] 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 1-8 lists the measure package that falls under that exception:

Table 1-8. PY2021 EM&V Exceptions for Measure Savings Evaluation

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

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

1.8 Hard-to-Reach/Direct-Install Net-to-Gross Ratios

Effective Program Year: 2024. The default 0.85 net-to-gross (NTG) ratio for hard-to-reach (HTR) customers served through direct install (DI) programs was introduced to the DEER database in 2008, but this was not addressed in a CPUC-approved decision or resolution approving the default HTR NTG ratio. The 2015 Energy Savings Performance Incentive (ESPI) Resolution (G-3510) stated that the 0.85 NTG ratio for HTR customers is limited to programs, projects, and measures that utilize a DI delivery channel. The CPUC first approved an HTR definition in D.01-11-066, which was fairly broadly applied; this definition was narrowed in Resolution G-3497, which caused confusion among program administrators using different definitions. D.18-05-041 clarified the definition of HTR customers, but it did not address whether the default NTG ratio applied to

[15] https://cedars.sound-data.com/deer-resources/deemed-measure-packages/guidance/file/1485/download
[16] https://cedars.sound-data.com/deer-resources/deemed-measure-packages/measure-package-archive/

energy efficiency measures delivered to HTR customers. After D.18-05-041 was adopted, in 2018, the 2020 DEER Update Resolution (E-4952) addressed the default 0.85 NTG ratio for HTR customers served through DI program delivery, stating that the NTG value was not supported by evaluation evidence, but they retained the default NTG—subject to review of future evaluation results.

Since D.21-05-031 adopted a portfolio segmentation approach—where equity and market support programs are not counted towards a PA's portfolio cost-effectiveness—the higher NTG ratio is no longer needed to bolster PAs' ability to serve HTR customers and should instead be based on empirical evidence (i.e., EM&V results). CPUC released guidance on February 3, 2022 titled "CPUC Guidance on Use of default net-to-gross ratio for hard-to-reach customers" stating "Staff has determined that the 0.85 NTG ratio for HTR customers in California eTRM only applies to HTR customers as defined in D.18-05-041, Section 2.5.3 and must use a direct install (DI) delivery channel." Section 1.11.1 of this document broadens the measure application types (MAT) that are eligible to use the HTR-DI NTGRs and Section 1.11.2 clarifies the definition of the direct-install delivery channel.

Resolution E-4952 called into question the NTGR of 0.85 but did not examine data specific to HTR customers. CPUC staff is considering whether HTR-specific NTGRs should differ from default NTGRs. Under consideration is whether:

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

1.9 Fuel Substitution Calculator Updates

Effective Program Year: 2024. In accordance with Decision 19-08-009, CPUC developed Fuel Substitution Technical Guidance Document v.1 and Fuel Substitution Calculator v1.1 using the retail energy sales, emissions, and heat rates, from avoided cost calculator (ACC) 2019.[17] The Decision states:

> "The Commission should utilize the electric Avoided Cost Calculator heat rates and the natural gas Avoided Cost Calculator, run through the Cost Effectiveness Tool, to estimate the carbon dioxide equivalent GHG emissions as a proxy for environmental impact of fuel substitution measures. Commission staff should update this guidance from time to time, as additional information becomes available, and within the policy parameters outlined in this decision."

[17] https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization/fuel-substitution-in-energy-efficiency

The CPUC staff established a working group with stakeholders with plans to update the guidance document and calculator by June 1, 2023. The updated calculator shall be used to update all fuel-substitution measure packages to become effective for PY2026-27.

1.10 Structural Changes to DEER Tables

The changes proposed in the subsections to follow will be made to the structures of some new and existing DEER database tables.

1.10.1 New Table for Fuel Substitution Measures

Effective Program Year: 2024. CPUC staff proposes adding a new table to DEER's "costeff" schema titled "FuelSub." Since the Total System Benefit calculation differs for fuel-substitution measures, this new field will serve to signal to CEDARS and the CET that a given measure involves fuel substitution. The table and its contents will include the key fields shown in Table 1-9.

Table 1-9. Fields in FuelSub Table for DEER2024

FuelSub_ID	Description
Elec_to_Gas	Fuel substitution measure to replace primarily electric equipment with primarily natural gas equipment
Gas_to_Elec	Fuel substitution measure to replace primarily natural gas equipment with primarily electric equipment
None	Same fuel energy-efficiency measure

1.10.2 Net-to-Gross (NTG) Table

Effective Program Year: 2024. Ever since the creation of the NTG_2020 table per Resolution E-4952 DEER2020 Update, Program Administrators have been asking for improvements to this table. To this end, a new table—serving as a companion to the NTG_2020 table—is proposed to clarify when a given NTG ID may be used. The planned companion table will contain a complete list of all valid combinations of NTG IDs, Measure Application Types, Measure Impact Types, and Delivery Types for deemed and custom measures. Within the NTG_2020 table itself, however, the existing string-type fields that contain sometimes-vague descriptions of which Measure Application Types, Measure Impact Types, and Delivery Types they can be used for will be deleted. The California eTRM (eTRM) and CEDARS shall synchronize with this new companion table nightly.

1.10.3 Effective Useful Life (EUL) Table

Effective Program Year: 2024. Program Administrators have also been asking for improvements to this table. To this end, a new table—serving as a companion to the EUL_basis table—is proposed to clarify when a given EUL ID may be used. The planned companion table will contain a complete list of all valid combinations of EUL IDs, Measure Application Types and Building Types for

deemed and custom measures. Within the EUL_basis table itself, however, the existing string-type fields contain sometimes-vague descriptions of which Measure Application Types and Building Types they can be used for will be deleted. The eTRM and CEDARS shall synchronize with this new companion table nightly.

1.10.4 Measure Table

Effective Program Year: 2024. CPUC staff plans to add two new fields:

- WeatherSim to the Measure table to track the typical meteorological year (TMY) weather data that were used to model weather-sensitive measures.
- FuelSub_ID to indicate whether a given measure is a fuel-substitution measure and what type.

Also under consideration, is adding flags to indicate whether a given measure requires inclusion of one of the following supplemental workbooks with its measure package: Fuel Substitution, RACC, or WEN. The eTRM and CEDARS will continue to synchronize with this table nightly.

1.10.5 Energy Impact Table

Effective Program Year: 2024. CPUC staff plans to make significant changes to DEER's EnergyImpact table to accommodate updates to load shapes. Plans include adding new fields and populating them, as appropriate, and no longer maintaining those fields that are no longer needed as shown in Table 1-10. The eTRM will continue to synchronize with this table nightly.

Table 1-10. Changes to EnergyImpact Table for DEER2024

Update Type	Field Name	Description
New field	APreUseEUkWh	Annual electric end-use-specific consumption for pre-existing baseline, kWh
	APreUseEUtherm	Annual natural gas end-use-specific consumption e for pre-existing baseline, therm
	AStdUseEUkWh	Annual electric end-use-specific consumption for standard/code baseline, kWh
	AStdUseEUtherm	Annual natural gas end-use-specific consumption for standard/code baseline, therm
	AMsrUseEUkWh	Annual electric end-use-specific consumption for measure case, kWh
	AMsrUseEUtherm	Annual natural gas end-use-specific consumption for measure case, therm

Update Type	Field Name	Description
No longer in use	ElecImpactProfileID	Electric impact profile ID; TechIDs used for load shape identification
	GasImpactProfileID	Natural gas impact profile ID; TechIDs used for load shape identification
	Flag	unknown
	SourceDesc	Measure package ID and version

1.11 Updates to DEER Support Table Values

The following changes to the DEER support table values are planned.

1.11.1 Expand MATs for HTR-DI NTGRs

Effective Program Year: 2022. According to the NTG_2020 table, the four default NTG_IDs available for hard-to-reach (HTR) customers—and restricted to direct install deliveries—are only available for use with the Normal Replacement (NR) or Accelerated Replacement (AR) Measure Application Types (MAT). These are listed here:

- Agricult-Default-HTR-di
- Com-Default-HTR-di
- Ind-Default-HTR-di
- Res-Default-HTR-di

CPUC staff proposes that Add-on Equipment (AOE) and Building Weatherization (BW) MATs can reasonably be offered via direct -install delivery to HTR customers. Retro-commissioning measures (BRO-RCx) may be categorized as being direct install if the vendor, as part of the program, performs the installation. Whether a given measure can be categorized as direct install will need to be determined on a case-by-case basis. For example, an energy audit is not an installation. It is proposed that if the measure installation is performed by the customer—or the customer's contractor—then the BRO-RCx measure cannot be categorized as direct install.

1.11.2 Updates to Delivery Types

Effective Program Year: 2026. The Delivery Type options no longer meet the needs of CPUC Staff and EM&V. Going forward, the Delivery Types shown in Table 1-11 are proposed for use.

Table 1-11. DEER2026 Delivery Types

Delivery Type	Change	Description of Delivery Type
Up-Manuf	Was UpDeemed[18]	Incentivizes an energy-efficient technology through a program administrator partnership with the manufacturer
Mid-Distr		Incentivizes an energy-efficient technology through a program administrator partnership with the distributor
Mid-Retail		Incentivizes an energy-efficient technology through a program administrator partnership with the retailer
Down	Was DnDeemed and DnCust	Incentivizes an energy-efficient technology or service to a participating customer for them to install or have installed
DI	Was DnDeemDI and DnCustDI	Incentivizes the installation of an energy-efficient technology or service at a customer property by a program implementer managed third-party contractor or installer
C&S	None	Codes and Standards (C&S advocacy and related programs)

The reasons for these updates include:

- Most of the previously available delivery types introduced the potential for conflicts since Measure Impact Types already account for whether measures are deemed or custom. The distinction between Deemed and Custom delivery types was redundant since that distinction is made in the Measure Impact Type (MeasImpactType). This update removes all references to whether measures are deemed or custom from the Delivery Type field.
- Since midstream programs were previously using the UpDeemed Delivery Type, the additional customer data that is typically tracked by product distributors was unavailable or difficult to collect for EM&V purposes. Creating two midstream delivery types enables distinguishing between the types of customer data that can be required for programs to collect and make available for EM&V.

It is also noted that the Upstream Flag used by CEDARS may have become redundant since Delivery Type was added to the required reporting fields for all measures.

[18] "Upstream (at the manufacturer level) and midstream (at the distributor or retailer level, but not the contractor or installer level) interventions are required to be delivered statewide. Some, but not all, downstream (at the customer level) approaches are also appropriate for statewide administration." D.16-08-019, O.P. 5, pp. 109-110

1.11.3 Updates to Measure Impact Types

Effective Program Year: 2022-2025.[19] Since NMEC and SEM measures that involve fuel substitution require their own Measure Impact Types (MITs) for claims in PY2022-2025, new MITs will be added for use in program year 2022 as shown in Table 1-12.

Table 1-12. DEER2022-2025 Measure Impact Types

Measure Impact Type	Change	Description of Measure Impact Type
Cust-FuelSub	None	Custom Fuel Substitution: site-specific calculation using approved tool or method
Cust-Gen	Updated description	Custom Generic: generic, site-specific calculation or using approved tool or method and/or metered data (excluding NMEC, SEM, or RCT offerings)
Cust-NMEC-Pop	None	Population-level Normalized Metered Energy Consumption (NMEC) energy impacts are specified on a custom basis.
Cust-NMEC-Pop-FuelSub[19]	New	Population-level Normalized Metered Energy Consumption (NMEC) energy impacts for fuel-substitution measures are specified on a custom basis.
Cust-NMEC-Site	None	Site-level Normalized Metered Energy Consumption (NMEC) energy impacts are specified on a custom basis.
Cust-NMEC-Site-FuelSub[19]	New	Site-level Normalized Metered Energy Consumption (NMEC) energy impacts for fuel-substitution measures are specified on a custom basis.
Cust-RCT	None	Custom RCT: uses a randomized-control trial (RCT) or experimental design method
Cust-SEM	None	Custom SEM: uses a strategic energy-management method
Cust-SEM-FuelSub[19]	New	Custom SEM: uses a strategic energy-management method involving fuel substitution
Deem-DEER	None	Deemed DEER: uses DEER-adopted values
Deem-DEER-FuelSub	None	Deemed DEER Fuel Substitution: uses DEER-adopted values
Deem-WP	None	Deemed Workpaper: uses values from an approved workpaper
Deem-WP-FuelSub	None	Deemed Workpaper Fuel Substitution: uses values from an approved workpaper

[19] As indicated in Table 1-12, footnoted new MITs are needed for DEER2022 (retroactive to January 1, 2022).

Effective Program Year: 2026. Since there is no longer a distinction between DEER and non-DEER measures and it is proposed that a FuelSub_ID field will be added to the Measure table for DEER2024, it is proposed that the Measure Impact Types will be consolidated as shown in Table 1-13.

Table 1-13. DEER2026 Measure Impact Types

Measure Impact Type	Change	Description of Measure Impact Type
Cust-Gen	Encompasses FuelSub and energy efficiency measures	Custom Generic: generic, site-specific calculation or using approved tool or method and/or metered data (excluding NMEC, SEM, or RCT offerings)
Cust-NMEC-Pop	Encompasses FuelSub and energy efficiency measures	Population-level Normalized Metered Energy Consumption (NMEC) energy impacts are specified on a custom basis.
Cust-NMEC-Site	Encompasses FuelSub and energy efficiency measures	Site-level Normalized Metered Energy Consumption (NMEC) energy impacts are specified on a custom basis.
Cust-RCT	Encompasses FuelSub and energy efficiency measures	Custom RCT: uses a randomized-control trial (RCT) or experimental design method
Cust-SEM	Encompasses FuelSub and energy efficiency measures	Custom SEM: uses a strategic energy-management method
Deem	Consolidates Deem-DEER, Deem-WP, Deem-DEER-FuelSub, and Deem-WP-FuelSub	Deemed measure

1.11.4 NTGR Updates

In the past, NTGR were sometimes rounded to the nearest 0.05, sometimes rounded to the next higher 0.05, and sometimes rounded to 0.01. Given the variation of practices used to update NTGRs and the preceding guidance from Decision 12-05-015, proposed clarification is provided as follows:

- NTGRs resulting from EM&V studies and approved via dispositions shall round all results to the nearest 0.05 in DEER.

- NTGRs results from EM&V studies shall only be updated in DEER when the rounded NTGR 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. In such cases, PAs shall update the relevant measure package to utilize said default NTG ID.

2 Research Needs for PY2026-27

The focus of future research needs center around forecasting important updates that will have significant impact on deemed measure savings. Future codes and standards and emerging technologies are two broad categories that influence how measure baseline definitions evolve resulting from new codes and standards. Additional research may be needed to bridge from case studies to a reliable sample or pilot evaluation that can be used to create a new measure. Beyond the baseline research and that to support new measures, further research will support newer policies that use assumptions that can be updated with research. These items may not be measure specific and could affect default parameters such as NTG or EUL.

2.1 EnergyPlus Prototypes, Commercial

The transition to EnergyPlus prototypes for commercial measures will begin in summer 2022 with anticipated completion 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. We will prioritize the grocery and refrigerated warehouse prototypes since the refrigeration system performance curves are out of date in the current DOE-2 prototype.

2.2 Research to Improve Water Heater Measures

CPUC released a new version of the water heater calculator, "DEER WaterHeater Calculator v5.0.xlsm," on January 24, 2022. This version 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) for the 2022 update to Title 24, CBECC-Res 2022 (RV)
- Heat pump water heater (HPWH) performance curves
- 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

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
    - Update sizing assumptions to minimize use of electric resistance mode
- Investigate how efficiency of HPWH is influenced by hot water temperature setpoint

The timing for the listed enhancements is expected to be finalized in time for the DEER2024 update resolution that is expected to be posted for comment August 1, 2022.

2.3 High-SEER Heat Pump and AC Performance Curves

Currently, gaps exist in the knowledge of field performance of high SEER inverter-driven heat pumps, yet many of these systems are being installed and claimed as fuel substitution measures under rate payer supported PA programs. Research is needed to inform parameter updates to high efficiency (above SEER 18) equipment including measured performance curves to inform 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.

This research would be needed by December 2023 to inform PY2026-27 updates to measure packages.

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

For a boiler to run in condensing mode, the return water temperature must be below 140°F. CPUC has approved measures for condensing boilers, but 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 gasses? The CPUC welcomes research to inform updates to measure packages to answer 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?

3 Measure Adoption

This resolution will adopt and lock 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 mid-cycle and this will be tracked with start and expiry dates of those measures in the eTRM.

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

3.1 Guidance Based on Industry Standard Practice 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. The ISP studies can inform the proper standard practice baseline to use in measure packages. Completed ISP studies included:

1. Industry Standard Practice Study of Unitary AC and HP Study, SDG&E
2. Market Impacts of Low-GWP Refrigerants for Refrigeration Equipment, SCE
3. Industrial Standard Practice Study of Commercial Domestic Hot Water Boilers for Commercial and Multifamily Sectors, PG&E
4. Retrofit Modulating Gas Dryer Valve for Commercial Dryers, SCG
5. Industry Standard Practice Study of Residential Low Flow Showerheads and Aerators, SCG

3.1.1 Unitary AC and HP Study

This study was lacking in sufficient data to be useful in establishing an ISP. CPUC staff did find that—in some cases—the offerings did not increase the efficiency by a large percentage. CPUC staff does not recommend updating the DEER2024 baselines with the results from this study. ISP should be kept up-to-date with future minimum efficiency standards.

3.1.2 Refrigerants: Low Global Warming Potential Refrigerants for Refrigeration

This study focused on low global warming potential (LGWP) refrigerants used in refrigeration equipment. It provided information on the current state of the market and concluded that LGWP refrigerants were not ISP. No update will be required for DEER2024. Low GWP Refrigeration is a developing market with codes, standards and availability of product changing rapidly.

3.1.3 Boilers and Water Heaters

The ISP report states that "Measure Packages SWWH005-02 (Boiler, Commercial), SWWH007-03 (Storage Water Heater, Commercial), SWWH010-01 (Boiler, Commercial), and SWWH011-01 (Central Storage Water Heater, Multifamily) would need to be updated to reflect current state codes." The study concluded that high efficiency Domestic Hot Water (DHW) boilers were not yet ISP, but the study did not define high efficiency. While the study did not specify a specific efficiency for the ISP, we note that a new federal minimum efficiency standard for hot water boilers, ≥300 kBtuh and ≤2,500 kBtuh will be set at 84% thermal efficiency and will become effective on January 10, 2023. Based on data in the report, these would seem to be close to the efficiency of non-condensing boilers sold on the market.

3.1.4 Gas Dryer Modulating Valves

The ISP study shows that the commercial dryer market is aided by program intervention to make modulating gas valve retrofit kits/installations available to customers. CPUC staff agrees that gas dryer modulating valves are not ISP. No update is required in DEER2024.

3.1.5 Low-Flow Showerheads and Aerators

This study concluded that low flow fixtures are not yet ISP but are trending towards that. The study included showerheads and faucets. Previous code requirements included lower flow showerheads, but newer product offerings include even lower flow showerheads. No update is required in DEER2024. CPUC staff recommends Water Sense specifications be included as a measure offering requirement to ensure customer satisfaction with the product.

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

The 2019 CIAC study[20] found lower NTGRs than the defaults reported in the DEER database. Evaluated NTGRs were determined based on surveys with decision makers in the organizations that implemented custom projects. The updates shown in Table 3-1 will be made in DEER for custom measures offered in PY2024.

Table 3-1. Default Custom NTGR Parameter Updates in DEER Based on EM&V Studies

Default Statewide NTG_IDs to be Updated or Added*	Current NTGR		Evaluated NTGR (if different)		DEER2024 NTGR	
	Elec.	Gas	Elec.	Gas	Elec.	Gas
NonRes-sAg-mCust-ci	0.70	0.70	0.47	0.47	0.50	0.50
NonRes-sAll-mCust	0.60	0.50	0.50	-	0.50	0.50

[20] https://pda.energydataweb.com/api/downloads/2583/GroupD-CIAC 2019 Ex Post Evaluation PDF Final 2.pdf

Default Statewide NTG_IDs to be Updated or Added*	Current NTGR		Evaluated NTGR (if different)		DEER2024 NTGR	
	Elec.	Gas	Elec.	Gas	Elec.	Gas
NonRes-sAll-mCust-Elec	0.60	0.60	0.50	0.50	0.50	0.50
NonRes-sAll-mCust-Lighting-di (new)	N/A	N/A	0.45	0.45	0.45	0.45

* NonRes-sAll-mCust-Gas will remain available and unchanged with electric and gas NTGRs of 0.50.

3.3 Guidance from 2022 EM&V Review

Effective Program Year: 2024. EM&V market sector evaluation results and/or special studies will continue to be some of the primary sources for DEER measure and measure package updates. Evaluation results with sufficient rigor and precision will be used to update DEER and measure package assumptions. Parameters in need of data to reduce uncertainty or increase accuracy will also be identified and fed back into the next EM&V cycle. The current evaluation is focused on PY2020 claims. While one of these studies is still in draft form, final study results informed the rest of the values provided in the tables that follow.

The DEER team has examined the 2020 EM&V draft and final impact evaluation reports and other studies to identify findings that may result in updates to deemed measure parameters and/or savings estimation approaches.

The list of studies reviewed is provided in Table 3-2 along with links to where they are stored on the Energy Project Status Reporting System. Also, a complete list of the studies to consider is provided in Appendix E of the CPUC's 2019-2021 EM&V Plan and the Energy Project Status Reporting System.[21]

Table 3-2. Final and Draft EM&V Studies Reviewed

Study	Study Title (with link)	Evaluated PY2020 Measures
1	EMV Group A, Deliverable 16 EUL Research – Residential Insulation	SWBE006 - Ceiling Insulation, Residential SWBE007 - Wall Insulation, Residential SWWB006 - Insulation/Sealing for Crawl Space, Residential
2	Impact Evaluation of Residential HVAC Measures Residential Sector - Program Year 2020	SWHC029 - Fan Controller for Air Conditioner, Residential SWHC038 - Brushless Fan Motor Replacement, Residential SWHC039 - Smart Thermostat, Residential SWSV001 - Duct Seal, Residential

[21] https://psr.energydataweb.com/#!/project-status

Study	Study Title (with link)	Evaluated PY2020 Measures
3*	Group A Draft Impact Evaluation PY2020 HVAC Fuel Substitution	SWHC044 - Ductless HVAC, Residential, Fuel Substitution SWHC045 - Heat Pump HVAC, Residential, Fuel Substitution
4	Impact Evaluation Report Commercial HVAC Sector – Program Year 2020	SWHC004 - Space Heating Boiler, Commercial & Multifamily SWWH005 - Boiler, Commercial SWWH008 - Boiler, Process SWWH010 - Boiler, Multifamily SWHC013 - Unitary Air-Cooled Air Conditioner, Over 65 kBtu/hr, Commercial SWHC014 - Unitary Air-Cooled Air Conditioner or Heat Pump, Under 65 kBtu/hr, Commercial SWHC043 - Multiple Capacity Unitary Air-Cooled Commercial Air Conditioners Between 65 and 240 kBtu/hr
5	PY20 Non-Res Lighting Impact Evaluation Report	SWLG009 - LED, Tube SWLG011 - LED, High or Low Bay SWLG012 - LED Ambient Fixtures and Retrofit Kits, Commercial
6	Program Year 2020 Nonresidential Deemed Pump and Food Service Impact Evaluation	SWFS011 - Fryer, Commercial SWPR002 - VFD for Glycol Pump Motor SWWP002 - VFD on Well Pump, <= 300 hp SWWP004 - Water Pump Upgrade SWWP005 - Enhanced Variable Frequency Drive on Irrigation Pump

* This study has not been finalized.

We only considered EM&V studies that were expected to be final by April 2022. A summary of the recommended updates to gross unit energy savings (UES), remaining useful life (RUL) values, and NTGRs resulting from PY2020 impact evaluations is provided in Table 3-3, Table 3-4, and Table 3-5, respectively.

Table 3-3. Proposed UES Parameter Updates Based on EM&V Studies

Study	Measure		Previous UES	DEER2024 UES
2	SWHC039 - Smart Thermostat, Residential	SFm, direct install	Varies	For electric UES, see Table 3-10; for gas, see Table 3-11
		MFm, direct install		
		DMo, direct install		
		Res, rebate		See Table 3-9
4	SWHC013 - Unitary Air-Cooled Air Conditioner, Over 65 kBtu/hr, Commercial		Single Com UES	Must vary by building type
	SWHC014 - Unitary Air-Cooled Air Conditioner or Heat Pump, Under 65 kBtu/hr, Commercial		Single Com UES	Must vary by building type
	SWHC043 - Multiple Capacity Unitary Air-Cooled Commercial Air Conditioners Between 65 and 240 kBtu/hr (see section 3.3.4)		Savings based on higher IEER (part- load) rating, only	Increase savings to account for higher EER(full-load)

* This study has not been finalized.

Table 3-4. RUL Parameter Updates Based on EM&V Studies

Study	Measure (see Section 3.3.1)	Previous RUL, years	DEER2024 RUL, years
1	SWBE006 - Ceiling Insulation, Residential (EUL_ID: BS-CeilIns)	6.70	20.00
	SWBE007 – Wall Insulation, Residential (EUL_ID: BS-WallIns)	6.70	20.00
	SWWB006 - Insulation/Sealing for Crawl Space, Residential (EUL_ID: BS-FlrIns)	6.70	20.00

Table 3-5. NTGR Parameter Updates Based on Final and Draft EM&V Studies for PY2020

Study	Measure	Evaluated NTGR	DEER2024 NTGR
2	SWHC039 - Smart Thermostat, Residential (rebate) .	0.51 (average of PY2018, PY2019, and PY2020)	0.50
3*	SWHC045 - Heat Pump HVAC, Residential, Fuel Substitution (midstream only)	0.57	0.55 (New ID: Res-sAll-mHVAC-HP-MidDistr-FuelSub)
4	SWWH005 - Boiler, Commercial .	0.11	0.10 (New ID: Com-sAll-mSWH-NGBoiler)
	SWWH010 - Boiler, Multifamily	0.11	0.10 (New ID: Res-sMFm-mSHW-NGBoiler)
5	LED Tubes, Indoor	0.67 downstream; 0.64 midstream	0.65 downstream and midstream (retailer and distributor)
	LED Fixtures, Indoor (including High/Low Bay)	0.57 downstream; 0.64 midstream	0.55 downstream; 0.65 midstream (retailer and distributer)
6	SWWP002 - VFD on Well Pump, ≤ 300 hp and SWWP005 - Enhanced Variable Frequency Drive on Irrigation Pump (direct install and downstream)	0.39	0.40
	SWFS011 - Fryer, Commercial (downstream only)	0.34	0.35 (New ID: Com-sAll-mFS-Fryer-dn)

* This study has not been finalized.

3.3.1 EM&V Group A, Deliverable 16 EUL Research, Residential Insulation

Updates to the remaining useful life (RUL) of building-shell insulation are based on a report by Guidehouse.[22] The study found that the recommended effective useful life of building-shell wall insulation is 31 years. The EUL is maintained at 20 years in the table below because of CPUC's 20-

[22] EMV Group A, Deliverable 16 EUL Research – Residential Insulation," by Guidehouse, for CPUC, June 2021.

year cap on EUL values for deemed measures.[23] The report makes a convincing argument to increase the RUL above the default value of one-third the EUL value:

> "Because new insulation work restores the original or existing insulation up to a brand-new state and fixes any gaps or flaws, the retrofit likely pushes the failure or end-of-life date back to the full EUL value rather than being limited to the RUL of the original or existing insulation."

D.12-05-015, p. 347[24] recommends using one-third of the effective useful life as the remaining useful life until further study results are available to establish more accurate values. This study constitutes further study results hence the RUL values for floor and wall insulation will be updated as shown in Table 3-6.

Table 3-6. Modified EULs for Residential Insulation Retrofits

EUL_ID	Description	EUL, years	RUL, years	Start Date	Expiry Date
BS-FlrIns	Floor Insulation, Residential	20.00	6.70	2013-01-01	2023-12-31
		20.00	20.00	2024-01-01	
BS-WallIns	Wall Insulation, Residential	20.00	6.70	2013-01-01	2023-12-31
		20.00	20.00	2024-01-01	

3.3.2 Residential HVAC Measures Impact Evaluation

The Residential HVAC Measures report evaluates gross and net-to-gross savings through a billing analysis and participant surveys respectively. Gross UES savings are changed only for Smart Thermostat measures and are described below.

NTG ratio updates are only for Smart Thermostats delivered through downstream rebates. Participation in downstream rebate programs remained steady throughout the pandemic leading to robust evaluation results for the rebate program. Evaluated NTG ratios shown in Table 3-7 for the past three evaluation cycles do not show a trend in one direction but show fluctuation around an average value of 0.50. This value is significantly different from the existing NTGR of 0.60 so an updated is proposed for DEER2024.

[23] D.14-10-046, p. 67 at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M129/K228/129228024.pdf
[24] Decision 12-05-015 at http://www.calmac.org/events/Decision_12-05-15.pdf

Table 3-7. Historic Evaluated NTG Ratio Results for a Rebated Smart Thermostat Measure

Measure	Evaluated PY2018 NTGR	Evaluated PY2019 NTGR	Evaluated PY2020 NTGR	DEER2024 NTGR
Smart Thermostat, Residential (rebate/downstream) NTG History: · DEER2019 ID: Res-Default>2, NTGR = 0.55 · DEER2021 ID: Res-sAll-mHVAC-SCT-dn, NTGR = 0.55 · DEER2022 ID: Res-sAll-mHVAC-SCT-dn, NTGR = 0.60	kWh: 0.48 therm: 0.48	kWh: 0.60 therm: 0.51	kWh: 0.46 therm: 0.47	0.50

All the direct install programs experienced decreased participation in PY2020 due to the pandemic and have evaluated NTG ratios lower than those for PY2019. The NTG ratio values for fan controllers and brushless fan motor replacement shown in Table 3-8 changed less than 0.05 from the previous evaluated result so CPUC staff will not make a change to these values. Although the ratios for direct installed thermostats and duct sealing changed more than 0.05, the 2020 evaluation results are inconsistent with the trend over the past three years; since they deviated from previously stable results, CPUC staff will not make a change based on the 2020 evaluation results per section 1.11.4.

Table 3-8. Historic Evaluated NTG Ratio Results for Measures Without Updates

Measure	2018 Evaluated NTGR	2019 Evaluated NTGR	2020 Evaluated NTGR
SWHC029 - Fan Controller for Air Conditioner, Residential NTG History: · DEER2019 ID: Res-Default>2, NTGR = 0.55 · DEER2023 ID: Res-sAll-mHVAC-FanCtrl, NTGR = 0.88	N/A	0.88	0.86

Measure	2018 Evaluated NTGR	2019 Evaluated NTGR	2020 Evaluated NTGR
SWHC038 - Brushless Fan Motor Replacement, Residential (direct install) NTG History: · DEER2019 ID: Res-Default>2, NTGR = 0.55 · DEER2022 ID: Res-sAll-mHVAC-FanMotor, NTGR = 0.85	0.85	0.90	0.89
SWSV001 - Duct Seal, Residential NTG History: · DEER2019 ID: Res-Default>2, NTGR = 0.55 · DEER2019 ID: Res-sAll-mDuctSeal, NTGR = 0.78 · DEER2022 ID: Res-sAll-mHVAC-DuctSeal, NTGR = 0.95	0.94	0.95	0.79
SWHC039 - Smart Thermostat, Residential (direct install) NTG History: · DEER2019 ID: Res-Default>2, NTGR = 0.55 · DEER2021 ID: Res-sAll-mHVAC-SCT-di, NTGR = 0.90 · DEER2022 ID: Res-sAll-mHVAC-SCT-di, NTGR = 0.95	0.89	0.94	0.80

The most up to date gross savings estimates, include thermostat optimization (TO) that requires the customer to opt in to "eco" settings which include energy-saving features such as "auto-away" that lowers the thermostat setpoint when it detects that the customer is not home and slight weather-informed adjustments to occupied thermostat setpoints. The TO feature was negatively affected by COVID due to customers working from home, limiting the times that the auto-away feature could be used. At this point we have two possible estimates of SCT savings that include TO.

- SWHC39-04 values - 2018 and 2019 evaluation results adjusted to include TO. These values were not affected by residential occupancy due to COVID. A TO adjustment was made to the existing values (see Figure 3-1, Figure 3-2, and Figure 3-3 in black).
- 2020 evaluation results—which included TO as part of the delivered measure—but were likely reduced compared to a typical year due to COVID (see Figure 3-1, Figure 3-2, and Figure 3-3 in light blue).

These are both valid estimates of SCT savings with extremes of no-COVID and all-COVID periods. From an ex ante perspective, it is reasonable to believe that, in the future, we will fall somewhere between these two states, as occupancy rates are unlikely to return to pre-COVID levels. The approach the makes the most sense would be to take the midpoint between the black and light blue bars shown in navy blue in Figure 3-1, Figure 3-2, and Figure 3-3. The UES values shown in these figures are listed in tabular form in Table 3-9 Proposed DEER2024 Deemed Savings for Downstream (Rebate) Delivery of SCT Table 3-10, and Table 3-11.

Figure 3-1. Deemed, Evaluated, and Proposed Electric and Gas Savings for Downstream (Rebate) Delivery of SWHC39-04 Smart Thermostat

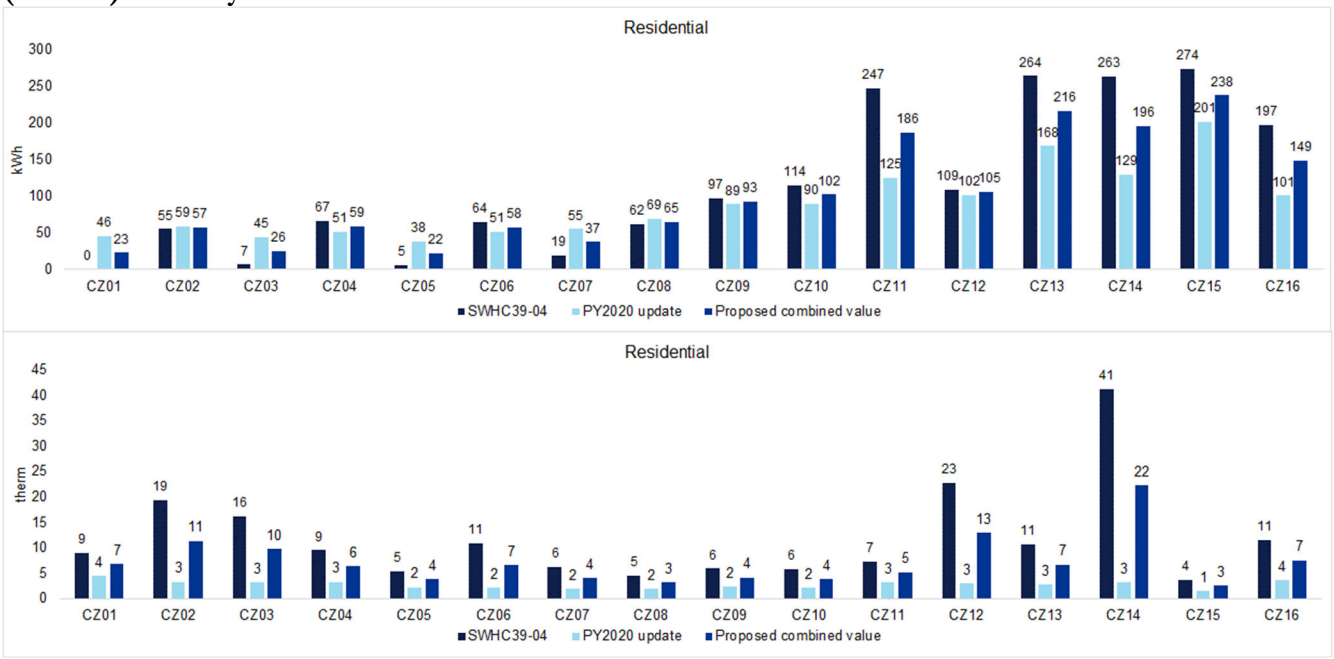

Figure 3-2. Deemed, Evaluated, and Proposed Electric Savings for Direct Install Delivery of SWHC39-04 Smart Thermostat

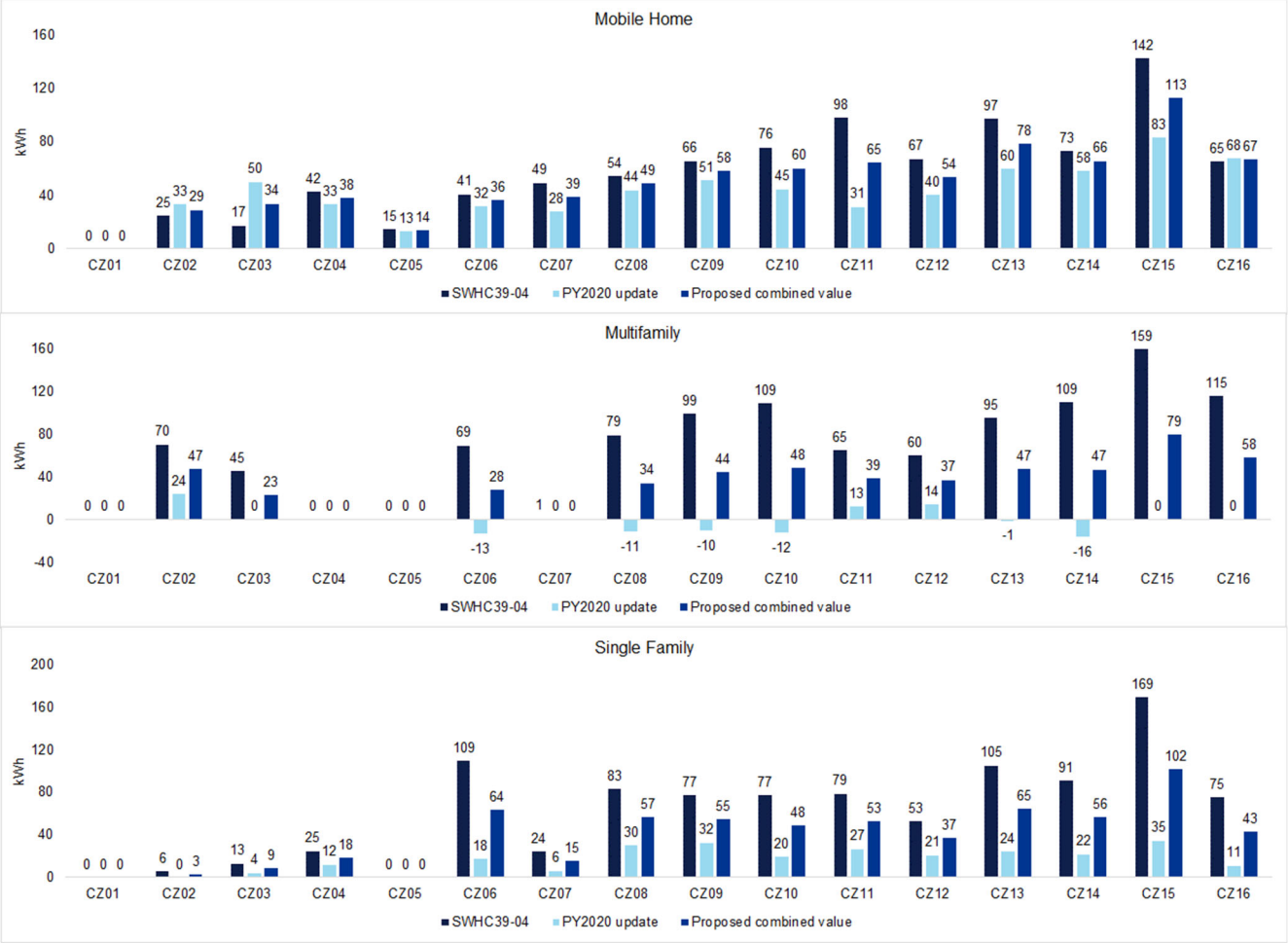

Figure 3-3. Deemed, Evaluated, and Proposed Gas Savings for Direct Install Delivery of SWHC39-04 Smart Thermostat

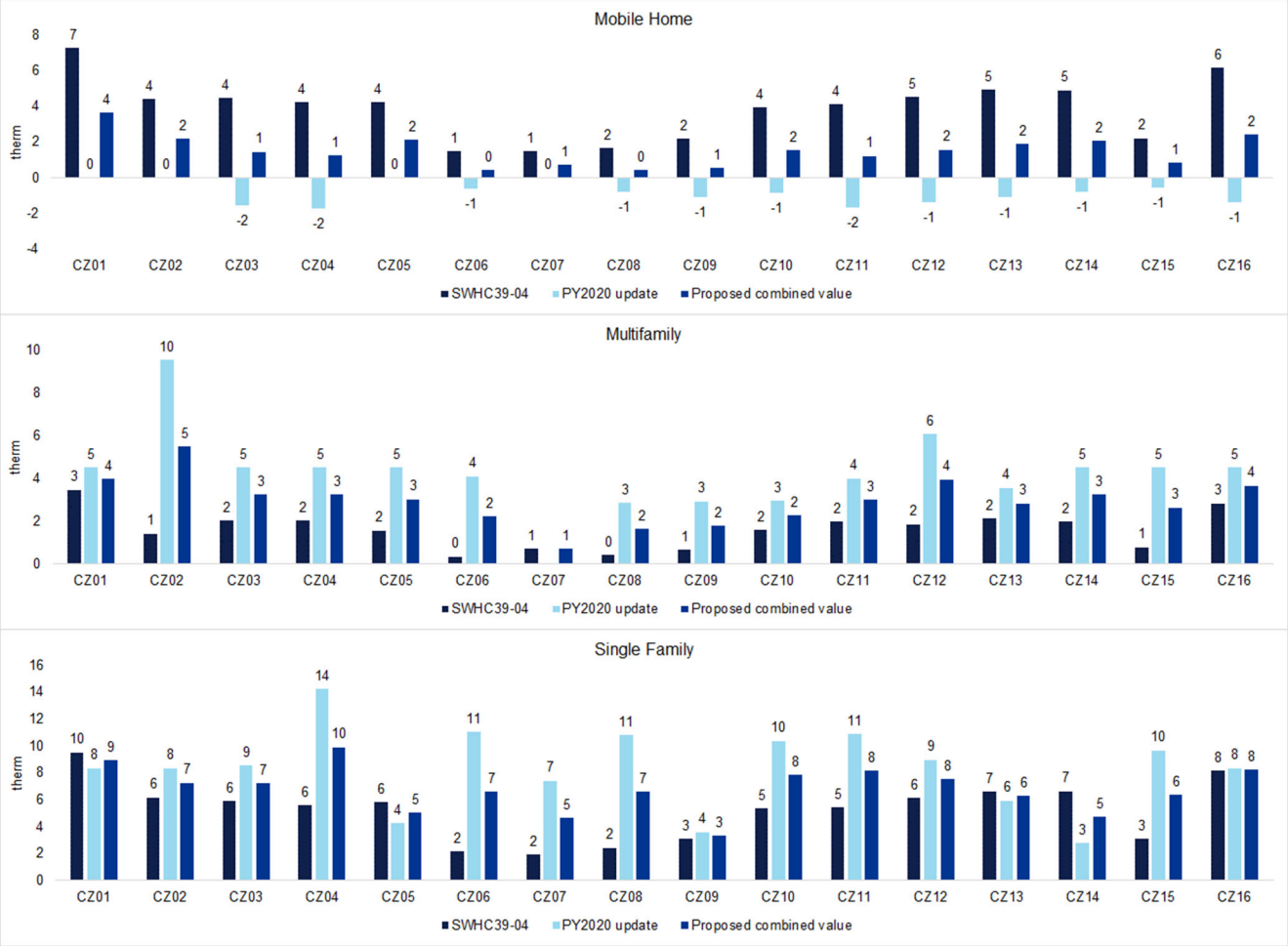

Table 3-9 Proposed DEER2024 Deemed Savings for Downstream (Rebate) Delivery of SCT

Climate Zone	Annual Electric Savings, kWh	Annual Gas Savings, therm
CZ01	22.9	6.74
CZ02	57.2	11.30
CZ03	25.6	9.72
CZ04	59.0	6.38
CZ05	21.6	3.74
CZ06	57.8	6.53
CZ07	37.4	4.06
CZ08	65.2	3.23

Climate Zone	Annual Electric Savings, kWh	Annual Gas Savings, therm
CZ09	92.8	4.11
CZ10	102.0	3.87
CZ11	186.0	5.18
CZ12	105.0	12.90
CZ13	216.0	6.65
CZ14	196.0	22.20
CZ15	238.0	2.53
CZ16	149.0	7.50

Table 3-10 Proposed DEER2024 Deemed Electric Savings for Direct Install Delivery of SCT

Climate Zone	Annual Electric Savings, kWh		
	DMo	MFm	SFm
CZ01	3.63	3.99	8.93
CZ02	2.19	5.47	7.25
CZ03	1.44	3.27	7.21
CZ04	1.26	0.00	9.90
CZ05	2.10	0.00	0.00
CZ06	0.43	2.23	6.58
CZ07	0.74	0.70	4.67
CZ08	0.44	1.64	6.60
CZ09	0.54	1.80	3.33
CZ10	1.54	2.29	7.86
CZ11	1.22	2.99	8.15
CZ12	1.57	3.96	7.54
CZ13	1.91	2.84	6.26
CZ14	2.06	3.24	4.70
CZ15	0.83	2.64	6.36
CZ16	2.40	3.67	8.24

Table 3-11 Proposed DEER2024 Deemed Gas Savings for Direct Install Delivery of SCT

	Annual Gas Savings, therm		
Climate Zone	DMo	MFm	SFm
CZ01	0.0	1.0	2.0
CZ02	29.1	47.2	2.9
CZ03	33.7	22.6	8.5
CZ04	38.0	0.0	18.4
CZ05	13.8	0.0	0.0
CZ06	36.2	28.0	63.6
CZ07	38.6	0.4	15.2
CZ08	49.1	34.0	56.5
CZ09	58.4	44.3	54.6
CZ10	60.2	48.1	48.5
CZ11	64.5	38.7	52.7
CZ12	53.7	37.1	36.7
CZ13	78.4	47.2	64.6
CZ14	65.6	46.8	56.3
CZ15	113.0	79.5	102.0
CZ16	66.5	57.7	43.1

3.3.3 HVAC Fuel Substitution Draft Impact Evaluation

The midstream-delivered ductless HVAC fuel substitution systems fell short of expectations for gas savings; this is likely because the evaluation survey results found they are often not being used to replace existing gas heating; they are supplementing the existing gas system. To ensure the gas savings expectations are met, ductless HVAC measure package 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. CPUC staff will maintain the 1.0 NTGR for the revised ductless HVAC measure package (where upstream/midstream measure delivery is discontinued) until it is further evaluated. No changes are recommended to UES values for ductless HVAC fuel substitution measures.

The PY2020 evaluation identified a NTGR of 57% for central HVAC fuel substitution systems delivered through the midstream design program (see Table 3-12). CPUC staff recommends the central HVAC fuel substitution measure package NTGR be revised to use a 55% NTGR, rounding the 57% finding from the evaluation, for the midstream delivery type. Since this measure used the default NTGR previously, it requires a new NTGR ID. No changes are recommended to UES values for central HVAC fuel substitution measures.

Table 3-12. NTGR Updates for Central Ducted HVAC Fuel Substitution Systems

Measure (with current NTGR values)	Evaluated NTGR	DEER2024 NTGR
SWHC045 - Heat Pump HVAC, Residential, Fuel Substitution (midstream only) NTG History: · DEER2020 ID: FuelSubst-Default, NTGR = 1.00	0.57	0.55 (New ID: Res-sAll-mHVAC-HP-MidDistr-FuelSub)

3.3.4 Commercial HVAC Measures Impact Evaluation

This study determined that energy savings vary significantly by building type. The measure package, however, does not provide savings by building type and offers only the "Com" average savings. The CPUC will require revisions to the three measure packages listed in Table 3-13 to include UES for each commercial building type.

Table 3-13. Measure Package Updates Must Include UES Values for Each Building Type

Measure ID	Measure Name
SWHC013	Unitary Air-Cooled Air Conditioner, Over 65 kBtu/hr, Commercial
SWHC014	Unitary Air-Cooled Air Conditioner or Heat Pump, Under 65 kBtu/hr, Commercial
SWHC043	Multiple Capacity Unitary Air-Cooled Commercial Air Conditioners Between 65 and 240 kBtu/hr

The evaluation also found that the reported savings for Multiple Capacity Unitary Air-Cooled Commercial Air Conditioners Between 65 and 240 kBtu/hr were based only on the improved part load savings (IEER) while the installed air conditioners also had improved full load efficiency (EER) from the measure package standard baseline condition. We recommend updating the measure package to reflect the improved full load efficiency found in the evaluated air conditioners.

The NTG ratio found in this study for replacement HVAC systems confirms the earlier finding so the existing NTGR of 0.70 will persist. Similarly, the NTG ratio found in this study for space heating boilers confirms the PY2018 finding so the DEER2022 NTGR of 0.20 will persist. The water heating boiler NTG ratio results, though based on a smaller sample than anticipated, are 11% ±4% and warrant a change from the 55% default NTG ratio currently used for these measures. Process boiler NTG ratio results were not statistically significant so no updates will be made to those measures based on this study.

Table 3-14. NTGR Updates Based on Results from the Commercial HVAC Measures Impact Evaluation Report

Measure (with current NTGR values)	Evaluated NTGR	DEER2024 NTGR
SWHC004 - Space Heating Boiler, Commercial & Multifamily NTG History: · DEER2019 ID: Com-Default>2yrs, NTGR = 0.60 · DEER2022 ID: NonRes-sAll-mHVAC-NGBoiler, NTGR = 0.20	0.17	0.20 will persist per DEER2022
SWWH005 - Boiler, Commercial NTG History: · DEER2019 ID: Com-Default>2yrs, NTGR = 0.60	0.11	0.10 (New ID: Com-sAll-mSWH-NGBoiler)
SWWH010 - Boiler, Multifamily NTG History: · DEER2019 ID: Res-Default>2, NTGR = 0.55	0.11	0.10 (New ID: Res-sMFm-mSHW-NGBoiler)

3.3.5 Non-Residential Lighting Impact Evaluation

The Non-Residential Lighting Sector Impact Evaluation studied indoor LED fixtures, indoor LED tubes and parking garage LEDs. It found overall higher fixture operating hours, particularly in some sectors such as retail establishments, and hotel/motels. PAs will update measure packages to reflect the higher HOU in these building types. It also found some inconsistencies between EUL values referenced in measure package wording and in the associated eTRM tables. These inconsistencies must be corrected in the next revision of the measure package.

The study found evaluated NTG ratios shown in Table 3-15 lower than claimed for both LED tubes and fixtures. The 0.67 TLED downstream value is based on a Direct Install program, as this was the only program offering downstream TLEDs. The study could not develop a non-DI downstream value because there was no program participation in that combination. The 0.57 for fixtures is based only on a non-DI downstream approach since there was no participation installing fixtures with a DI approach. Finally for midstream, distributors sell both fixtures and TLEDs, so for this reason, the study did not differentiate the NTG ratio between these two measure categories, they combined them.

Table 3-15. Statewide Evaluated NTGRs for Lighting Measures

Measure	Evaluated PY2020		Evaluated PY2019	
	Downstream	Midstream	Downstream	Midstream
Fixtures	0.57 (rebate)	0.64	0.67	0.63
TLEDs	0.67 (direct install)		0.71	

We examined the PY2019 results compared to PY2020 results in Table 3-15. Since the midstream savings are consistent between the two evaluations, we retain the NTG ratio to 0.65 for midstream distributer and retail program delivery types. The downstream TLED NTG ratios are also similar between the two evaluations, and we revise the TLED NTG ratio based on the average of the two evaluations at 0.69 rounded to 0.7. While further apart, we also recommend averaging the NTG ratios from the 2019 and 2020 evaluations for rebated fixtures delivered downstream, resulting in a 0.62 NTGR that rounds to 0.60. The NTGRs will be revised because of this study to the values shown in Table 3-16.

Table 3-16. NTGR Updates Based on Results from the Non-Residential Lighting Impact Evaluation Report

Measure (with current NTGR values)	Evaluated NTGR	DEER2024 NTGR
LED Tubes, Indoor NTG History: · DEER2019 ID: Com-Default>2yrs, NTGR = 0.60 · DEER2019 ID: All-Ltg-LED-WRR, NTGR = 0.91 · DEER2023 ID: NonRes-sAll-mLtg-TLEDLamp, NTGR = 0.65	0.67 downstream; 0.64 midstream	0.7 downstream (rebate and direct install) and 0.65 midstream (retailer and distributor)

Measure (with current NTGR values)	Evaluated NTGR	DEER2024 NTGR
LED Fixtures, Indoor (including High/Low Bay) NTG History: · DEER2019 ID: All-Ltg-LED-WRR, NTGR = 0.91 · DEER2019 ID: Com-InHB-Ltg-LEDFixt, NTGR = 0.91 · DEER2019 ID: NonRes-In-Ltg-LEDFixt, NTGR = 0.91 · DEER2023 ID: NonRes-In-Ltg-LEDFixt, NTGR = 0.65 · DEER2019 ID: Res-InCmn-Ltg-LEDFixt, NTGR = 0.91	0.57 downstream; 0.64 midstream	0.60 downstream (rebate and direct install); 0.65 midstream-retailer and distributor

3.3.6 Pump and Food Service Impact Evaluation

The three evaluated measures include VFD agricultural pumps, energy efficient clean water pumps and gas fryers. The VFD data collected in the evaluation and presented in the report should be used to update the measure package model inputs in SWWP002 and SWWP005. The energy efficient pumps had a 19% lifecycle gross savings realization rate because the actual efficiencies of installed pumps were 69% lower than that reflected in program deemed savings. The measure package shall be updated to reflect the characteristics of pumps rebated in 2020. Gas fryers do not require adjustments to the gross savings methodology based on this evaluation.

The VFD agricultural pump evaluated NTG ratio is stable over the past three evaluations, see Table 3-17, and the average (0.37) over that three-year period is more than 0.05 different from the NTG ratio currently used for this measure. The NTG ratio for agricultural pumping VFDs will be updated and will be assigned a value of 0.40.

Table 3-17. Historic Evaluated NTG Ratio Results for Downstream Agricultural Pump VFDs

Measure	Evaluated PY2018	Evaluated PY2019	Evaluated PY2020	DEER2024
Agricultural Pumping VFD (downstream)	0.39	0.34	0.39	0.40

The gas fryer evaluated NTG ratio (0.39) is more than 0.05 different from the default NTG ratio currently used for this measure. A new NTG ratio ID will be created for downstream gas fryers

(Com-sAll-mFS-Fryer-dn) and will be assigned a value of 0.40. The affected measure packages and the DEER NTG ratio history are summarized in Table 3-18 along with the new NTR ratios.

Table 3-18. NTGR Updates Based on Results from the Pump and Food Service Impact Evaluation Report Measure (with current NTGR values)

Measure	Evaluated NTGR	DEER2024 NTGR
SWWP002 - VFD on Well Pump, ≤ 300 hp and SWWP005 - Enhanced Variable Frequency Drive on Irrigation Pump (direct install and downstream) NTG History: · DEER2019 ID: Agric-Default>2yrs, NTGR = 0.60 · DEER2022 ID: NonRes-sAg-Irrig, NTGR = 0.30	0.39	0.40
SWFS011 - Fryer, Commercial (downstream only) NTG History: · DEER2019 ID: Com-Default>2yrs, NTGR = 0.60	0.34	0.35 (New ID: Com-sAll-mFS-Fryer-dn)

Appendices

DEER2024 Scoping Document

Contents

A1. PY2023 Measures

Expected PY2023 updates are listed in Table A1.1.

A1.1. PY2023 Measure Package Updates

Measure Package ID	Measure Name	Program Year	Lead IOU
SWAP001-03	Refrigerator or Freezer, Residential	2023	SDGE
SWAP003-04	Clothes Dryer, Residential	2023	SCG
SWAP004-03	Clothes Washer, Residential & Multifamily	2023	PG&E
SWAP005-02	Ozone Laundry, Commercial	2023	SCG
SWAP006-04	Dishwasher, Residential	2023	SCG
SWAP007-02	Room Air Conditioner, Residential	2023	SDGE
SWAP008-02	Room Air Cleaner, Residential	2023	SDGE
SWAP010-02	Smart Connected Power Strip, Residential	2023	SDGE
SWAP011-03	Vending and Beverage Merchandise Controller	2023	SCE
SWAP012-01	Gas Dryer Modulating Valve, Commercial and Multifamily	2023	SCG
SWAP013-02	Residential Cooking Appliances – Fuel Substitution	2023	SCE
SWAP014-01	Heat Pump Clothes Dryer, Residential, Fuel Substitution	2023	SCE
SWAP015-02	Induction Cooking Top with or without Electric Range, Residential	2023	SDGE
SWAP017-02	Oven, Gas, Residential	2023	SCG
SWBE001-02	Greenhouse Heat Curtain	2023	SCG
SWBE002-02	Greenhouse Infrared Film	2023	SCG
SWBE006-01	Residential Ceiling Insulation	2023	SCG
SWBE007-01	Residential Blow-In Wall Insulation	2023	SCG
SWCA001-03	Air Compressor VFD Retrofit	2023	SCE
SWCR001-03	Anti-Sweat Heat Controls	2023	SCE
SWCR002-03	Low-Temperature Display Case Doors with No Anti-Sweat Heaters	2023	SCE
SWCR003-02	High Efficiency Motor Retrofit for Refrigerated Display Case	2023	SCE
SWCR004-02	EC Motor Retrofit for A Walk-In Cooler or Freezer	2023	SCE
SWCR005-03	Auto Closer for Refrigerated Storage Door	2023	SCE
SWCR007-03	Floating Head Pressure Controls, Multiplex	2023	PG&E
SWCR008-03	Floating Suction Controls, Multiplex	2023	SCE
SWCR010-03	Bare Suction Pipe Insulation	2023	SCE
SWCR012-02	Compressor Retrofit, Multiplex	2023	PG&E
SWCR014-03	Medium or Low-Temperature Display Case	2023	PG&E
SWCR015-02	Medium-Temperature Case Doors	2023	PG&E
SWCR017-03	Ultra-Low Temperature Freezer	2023	PG&E

Measure Package ID	Measure Name	Program Year	Lead IOU
SWCR018-03	Reach-In Refrigerator or Freezer, Commercial	2023	PG&E
SWCR019-02	Low-Temperature Coffin to Reach-In Display Case Conversion	2023	PG&E
SWCR020-02	Medium-Temperature Open Display Case Retrofit	2023	PG&E
SWCR021-02	Medium or Low-Temperature Display Case with Doors	2023	PG&E
SWCR022-03	Efficient Adiabatic Condenser	2023	SCE
SWFS001-02	Commercial Convection Oven – Electric & Gas	2023	SCG
SWFS002-03	Door Type Dishwasher, Commercial	2023	SCG
SWFS003-02	Combination Oven, Commercial	2023	SCG
SWFS004-01	Commercial Griddle – Electric & Gas	2023	SCG
SWFS006-01	Commercial Ice Machine	2023	PG&E
SWFS007-03	Insulated Hot Food Holding Cabinet	2023	SCE
SWFS008-01	Conveyor Oven, Gas, Commercial	2023	SCG
SWFS009-02	Commercial Deck Oven, Electric	2023	SCE
SWFS010-02	Commercial Hand Wrap Machine	2023	SCE
SWFS011-04	Fryer, Commercial	2023	SCG
SWFS012-01	Exhaust Hood Demand Controlled Ventilation, Commercial	2023	SCE
SWFS013-02	Low-Flow Pre-Rinse Spray Valve	2023	SCG
SWFS014-02	Rack Oven	2023	SCG
SWFS016-02	Refrigerated Chef Base	2023	SCE
SWFS017-02	Automated Conveyor Broiler, Commercial	2023	SCG
SWFS018-04	Undercounter Dishwasher, Commercial	2023	SCG
SWFS019-02	Underfired Broiler, Commercial	2023	SCG
SWFS021-03	Commercial Fryer, Fuel Substitution	2023	SCE
SWFS022-02	Commercial Convection Oven, Fuel Substitution	2023	SCE
SWFS023-02	Conveyorized Toaster, Commercial	2023	SCE
SWHC001-02	Wall Furnace, Residential	2023	SCG
SWHC002-02	Intermittent Pilot Light, Residential	2023	SCG
SWHC004-04	Space Heating Boiler, Multifamily	2023	SCG
SWHC005-03	Water-Cooled Chiller	2023	SDGE
SWHC006-02	Demand Control Ventilation for Single Zone HVAC	2023	PG&E
SWHC008-01	VSD For Central Plant System	2023	SCE
SWHC009-03	Supply Fan Controls, Commercial	2023	SDGE
SWHC011-02	Furnace, Commercial	2023	SCG
SWHC012-02	Classroom HVAC Occupancy Sensor	2023	SCE
SWHC013-03	Unitary Air-Cooled AC and HP, over 65 kBtu/hr, Commercial	2023	SDGE

Measure Package ID	Measure Name	Program Year	Lead IOU
SWHC014-03	Unitary Air-Cooled AC and HP, below 65 kBtu/hr, Commercial	2023	SDGE
SWHC018-03	VSD for HVAC Fan Controls, Commercial	2023	PG&E
SWHC020-03	Air Cooled Chiller	2023	SDGE
SWHC023-03	Enhanced Ventilation for Packaged HVAC	2023	PG&E
SWHC024-03	Cogged V-Belt for HVAC Fan, Commercial	2023	SCE
SWHC027-02	Packaged Terminal Air Conditioner or Heat Pump, Under 24kBtuh	2023	SCE
SWHC029-02	Fan controller for air conditioner, residential	2023	SCE
SWHC031-02	High-Efficiency Furnace, Residential	2023	SCG
SWHC038-02	Brushless Fan Motor Replacement, Residential	2023	SCE
SWHC039-05	Smart Thermostat, Residential	2023	SCE
SWHC041-03	Software-Controlled Switch Reluctance Motor	2023	SCE
SWHC042-03	Evaporative Pre-Cooler System and Controls For Packaged HVAC Unit	2023	SCE
SWHC043-03	Multiple Capacity Unitary Air-Cooled Commercial Air Conditioners Between 65 and 240 kBtu/hr	2023	SDGE
SWHC044-02	Ductless HVAC, Residential, Fuel Substitution	2023	SCE
SWHC045-01	Heat Pump HVAC, Residential - Fuel Substitution	2023	SCE
SWHC046-02	Heat Pump, Unitary Air-Cooled HVAC, Commercial - Fuel Substitution	2023	SCE
SWHC047-02	Gas Fireplace, Residential	2023	SCG
SWHC048-03	Packaged AC Heat Recovery	2023	SCG
SWHC049-02	HVAC, SEER-Rated AC and HP Equipment, Residential	2023	SCG
SWHC050-02	Ductless Heat Pump, HVAC, Residential	2023	SCE
SWHC052-02	Air-Cooled Chiller, Path B	2023	SDGE
SWLG009-04	LED, Tube, Type A	2023	SCE
SWLG011-04	LED, High or Low Bay	2023	SCE
SWLG018-03	LED, Tube Type B and Type C	2023	SCE
SWMI001-02	Water Energy Nexus	2023	SDGE
SWPR001-01	Ventilation Fan, Agriculture	2023	PG&E
SWPR002-02	VFD for Glycol Pump Motor	2023	PG&E
SWPR003-01	Steam Trap, Commercial	2023	SCG
SWPR004-03	Circulating Block Heater	2023	SCE
SWPR005-02	Dust Collection Fan VSD	2023	PG&E
SWPR006-02	VSD For Ventilation Fan	2023	PG&E
SWPR007-01	Steam Boiler Economizer, Industrial	2023	SCG
SWRE001-02	Pool Cover, Commercial	2023	SCG

Measure Package ID	Measure Name	Program Year	Lead IOU
SWRE003-02	Pool Heater, Commercial	2023	SCG
SWRE004-02	Pool or Spa Heater, Residential	2023	SCG
SWRE005-02	Heat Pump Pool Heater, Residential - Fuel Substitution	2023	SCE
SWSV001-04	Duct Seal, Residential	2023	PG&E
SWSV002-01	Refrigerant Charge, Commercial	2023	SDGE
SWSV003-01	Evaporator Coil Cleaning, Commercial	2023	SDGE
SWSV004-01	Condenser Coil Cleaning, Commercial	2023	SDGE
SWSV005-02	Economizer Repair, Commercial	2023	SDGE
SWSV006-01	Refrigerant Charge, Residential	2023	SCE
SWSV007-01	Condenser Coil Cleaning, Residential	2023	SCE
SWSV008-01	Evaporator Coil Cleaning, Residential	2023	SCE
SWSV009-01	Air Flow Adjustment, Residential	2023	SCE
SWSV010-02	Economizer Controls, Commercial	2023	SDGE
SWSV013-02	Duct Optimization, DMo	2023	PG&E
SWWB002-01	Universal Audit Tool	2023	PG&E
SWWB004-02	Home Energy Reports	2023	PG&E
SWWB006-03	High Performance Crawlspace	2023	SCE
SWWH001-03	Faucet Aerator, Residential	2023	SCG
SWWH002-03	Low-Flow Showerhead, Residential	2023	SCG
SWWH003-02	TSV with Low Flow Showerhead	2023	SCG
SWWH004-03	Laminar Flow Restrictor	2023	SCG
SWWH005-05	Boiler, Commercial	2023	SCG
SWWH006-07	Tankless Water Heater, Commercial	2023	SCG
SWWH007-05	Storage Water Heater, Commercial	2023	SCG
SWWH008-01	Boiler, Process	2023	PG&E
SWWH010-01	Boiler, Multifamily	2023	SCG
SWWH011-01	Central Storage Water Heater, Multifamily	2023	PG&E
SWWH012-03	Storage Water Heater, Residential	2023	SCG
SWWH013-03	Tankless Water Heater, Residential	2023	SCG
SWWH014-04	Heat Pump Water Heater, Residential	2023	SCE
SWWH015-03	Demand Control for Centralized Water Heater Recirculation Pump, Multifamily & Commercial	2023	SCG
SWWH016-03	Domestic Hot Water Loop Temperature Controller, Multifamily & Commercial	2023	SCG
SWWH017-03	Hot Water Pipe Insulation, Nonresidential and Multifamily	2023	SCG
SWWH018-03	Hot Water Tank Insulation, Nonresidential and Multifamily	2023	SCG
SWWH019-04	Faucet Aerator, Commercial	2023	SCG

Measure Package ID	Measure Name	Program Year	Lead IOU
SWWH020-04	Low-Flow Showerhead, Commercial	2023	SCG
SWWH021-01	Recirculation Pump Timer, Commercial	2023	SCG
SWWH022-01	Smart Pump, Residential	2023	PG&E
SWWH023-02	Tub Spout TSV	2023	SCG
SWWH024-02	Central Boiler Dual Setpoint Controller, Multifamily	2023	SCG
SWWH025-05	Residential Heat Pump Water Heater, Fuel Substitution	2023	SCE
SWWH026-02	Water Heater Pipe Wrap, Residential	2023	SCG
SWWH027-03	Heat Pump Water Heater, Commercial, Fuel Substitution	2023	SCE
SWWH028-02	Multi-Family and Commercial Large Heat Pump Water Heater– Fuel Substitution	2023	SCE
SWWH030-01	Tankless Combination Space and Water Heater, Residential	2023	SCG
SWWH031-02	Heat Pump Water Heater, Commercial	2023	SCE
SWWH032-01	Solar Thermal Water Heating System, Residential	2023	SCG
SWWP002-02	VFD on Ag Pump	2023	PG&E
SWWP004-02	Water Pump Upgrade	2023	PG&E
SWWP005-02	Enhanced VFD On Irrigation Pump	2023	PG&E

A2. PY2024-25 Measures

The list provided in Table A2.1 is preliminary and will be updated in the future; it is current as of this document. The table will be updated by April, 2022 when the PAs provide the 2024-25 Measure Update schedule.

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

Measure Package ID	Measure Name	Program Year	Lead IOU
SWAP001-03	Refrigerator or Freezer, Residential	2024	SDGE
SWAP003-04	Clothes Dryer, Residential	2024	SCG
SWAP004-03	Clothes Washer, Residential & Multifamily	2024	PG&E
SWAP005-02	Ozone Laundry, Commercial	2024	SCG
SWAP006-04	Dishwasher, Residential	2024	SCG
SWAP007-02	Room Air Conditioner, Residential	2024	SDGE
SWAP008-02	Room Air Cleaner, Residential	2024	SDGE
SWAP010-02	Smart Connected Power Strip, Residential	2024	SDGE
SWAP011-03	Vending and Beverage Merchandise Controller	2024	SCE
SWAP012-01	Gas Dryer Modulating Valve, Commercial And Multifamily	2024	SCG
SWAP013-02	Residential Cooking Appliances – Fuel Substitution	2024	SCE
SWAP014-01	Heat Pump Clothes Dryer, Residential, Fuel Substitution	2024	SCE
SWAP015-02	Induction Cooking Top with or without Electric Range, Residential	2024	SDGE
SWAP017-02	Oven, Gas, Residential	2024	SCG
SWBE001-02	Greenhouse Heat Curtain	2024	SCG
SWBE002-02	Greenhouse Infrared Film	2024	SCG
SWBE006-01	Residential Ceiling Insulation	2024	SCG
SWBE007-01	Residential Blow-In Wall Insulation	2024	SCG
SWCA001-03	Air Compressor VFD Retrofit	2024	SCE
SWCR001-03	Anti-Sweat Heat Controls	2024	SCE
SWCR002-03	Low-Temperature Display Case Doors with No Anti-Sweat Heaters	2024	SCE
SWCR003-02	High Efficiency Motor Retrofit for Refrigerated Display Case	2024	SCE
SWCR004-02	EC Motor Retrofit For A Walk-In Cooler Or Freezer	2024	SCE
SWCR005-03	Auto Closer for Refrigerated Storage Door	2024	SCE
SWCR007-03	Floating Head Pressure Controls, Multiplex	2024	PG&E
SWCR008-03	Floating Suction Controls, Multiplex	2024	SCE
SWCR010-03	Bare Suction Pipe Insulation	2024	SCE
SWCR012-02	Compressor Retrofit, Multiplex	2024	PG&E

Measure Package ID	Measure Name	Program Year	Lead IOU
SWCR014-03	Medium or Low-Temperature Display Case	2024	PG&E
SWCR015-02	Medium-Temperature Case Doors	2024	PG&E
SWCR017-03	Ultra-Low Temperature Freezer	2024	PG&E
SWCR018-03	Reach-In Refrigerator or Freezer, Commercial	2024	PG&E
SWCR019-02	Low-Temperature Coffin To Reach-In Display Case Conversion	2024	PG&E
SWCR020-02	Medium-Temperature Open Display Case Retrofit	2024	PG&E
SWCR021-02	Medium or Low-Temperature Display Case With Doors	2024	PG&E
SWCR022-03	Efficient Adiabatic Condenser	2024	SCE
SWFS001-02	Commercial Convection Oven – Electric & Gas	2024	SCG
SWFS002-03	Door Type Dishwasher, Commercial	2024	SCG
SWFS003-02	Combination Oven, Commercial	2024	SCG
SWFS004-01	Commercial Griddle – Electric & Gas	2024	SCG
SWFS006-02	Ice Machine, Commercial	2024	PG&E
SWFS007-03	Insulated Hot Food Holding Cabinet	2024	SCE
SWFS008-01	Conveyor Oven, Gas, Commercial	2024	SCG
SWFS009-02	Commercial Deck Oven, Electric	2024	SCE
SWFS010-02	Commercial Hand Wrap Machine	2024	SCE
SWFS011-04	Fryer, Commercial	2024	SCG
SWFS012-01	Exhaust Hood Demand Controlled Ventilation, Commercial	2024	SCE
SWFS013-02	Low-Flow Pre-Rinse Spray Valve	2024	SCG
SWFS014-02	Rack Oven	2024	SCG
SWFS016-02	Refrigerated Chef Base	2024	SCE
SWFS017-02	Automated Conveyor Broiler, Commercial	2024	SCG
SWFS018-04	Undercounter Dishwasher, Commercial	2024	SCG
SWFS019-02	Underfired Broiler, Commercial	2024	SCG
SWFS021-03	Commercial Fryer, Fuel Substitution	2024	SCE
SWFS022-02	Commercial Convection Oven, Fuel Substitution	2024	SCE
SWFS023-02	Conveyorized Toaster, Commercial	2024	SCE
SWHC001-02	Wall Furnace, Residential	2024	SCG
SWHC002-02	Intermittent Pilot Light, Residential	2024	SCG
SWHC004-04	Space Heating Boiler, Multifamily	2024	SCG
SWHC005-03	Water-Cooled Chiller	2024	SDGE
SWHC006-02	Demand Control Ventilation for Single Zone HVAC	2024	PG&E
SWHC008-01	VSD For Central Plant System	2024	SCE
SWHC009-03	Supply Fan Controls, Commercial	2024	SDGE
SWHC011-02	Furnace, Commercial	2024	SCG

Measure Package ID	Measure Name	Program Year	Lead IOU
SWHC012-02	Classroom HVAC Occupancy Sensor	2024	SCE
SWHC013-03	Unitary Air-Cooled AC and HP, over 65 kBtu/hr, Commercial	2024	SDGE
SWHC014-03	Unitary Air-Cooled AC and HP, below 65 kBtu/hr, Commercial	2024	SDGE
SWHC018-03	VSD for HVAC Fan Controls, Commercial	2024	PG&E
SWHC020-03	Air Cooled Chiller	2024	SDGE
SWHC023-02	Enhanced Ventilation For Packaged HVAC	2024	PG&E
SWHC023-04	Enhanced Ventilation for Packaged HVAC	2024	PG&E
SWHC024-03	Cogged V-Belt for HVAC Fan, Commercial	2024	SCE
SWHC027-03	Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/hr	2024	SDGE
SWHC029-02	Fan controller for air conditioner, residential	2024	SCE
SWHC031-02	High-Efficiency Furnace, Residential	2024	SCG
SWHC038-02	Brushless Fan Motor Replacement, Residential	2024	SCE
SWHC039-06	Smart Thermostat, Residential	2024	SCE
SWHC041-03	Software-Controlled Switch Reluctance Motor	2024	SCE
SWHC042-03	Evaporative Pre-Cooler System And Controls For Packaged HVAC Unit	2024	SCE
SWHC043-03	Multiple Capacity Unitary Air-Cooled Commercial Air Conditioners Between 65 and 240 kBtu/hr	2024	SDGE
SWHC044-02	Ductless HVAC, Residential, Fuel Substitution	2024	SCE
SWHC045-01	Heat Pump HVAC, Residential - Fuel Substitution	2024	SCE
SWHC046-02	Heat Pump, Unitary Air-Cooled HVAC, Commercial - Fuel Substitution	2024	SCE
SWHC047-02	Gas Fireplace, Residential	2024	SCG
SWHC048-03	Packaged AC Heat Recovery	2024	SCG
SWHC049-03	SEER Rated AC and HP HVAC Equipment, Residential	2024	SDGE
SWHC050-03	Ductless Heat Pump, Residential	2024	SDGE
SWHC052-02	Air-Cooled Chiller, Path B	2024	SDGE
SWLG009-05	LED, Tube, Type A	2024	SCE
SWLG011-05	LED, High or Low Bay	2024	SCE
SWLG018-04	LED, Tube Type B and Type C	2024	SCE
SWMI001-02	Water Energy Nexus	2024	SDGE
SWPR001-01	Ventilation Fan, Agriculture	2024	PG&E
SWPR002-03	VFD for Glycol Pump Motor	2024	PG&E
SWPR003-01	Steam Trap, Commercial	2024	SCG
SWPR004-03	Circulating Block Heater	2024	SCE
SWPR005-02	VFD for Dust Collection Fan	2024	PG&E

Measure Package ID	Measure Name	Program Year	Lead IOU
SWPR006-03	VSD For Ventilation Fan	2024	PG&E
SWPR007-01	Steam Boiler Economizer, Industrial	2024	SCG
SWRE001-02	Pool Cover, Commercial	2024	SCG
SWRE003-02	Pool Heater, Commercial	2024	SCG
SWRE004-02	Pool or Spa Heater, Residential	2024	SCG
SWRE005-02	Heat Pump Pool Heater, Residential - Fuel Substitution	2024	SCE
SWSV001-05	Duct Seal, Residential	2024	SDGE
SWSV002-01	Refrigerant Charge, Commercial	2024	SDGE
SWSV003-01	Evaporator Coil Cleaning, Commercial	2024	SDGE
SWSV004-01	Condenser Coil Cleaning, Commercial	2024	SDGE
SWSV005-02	Economizer Repair, Commercial	2024	SDGE
SWSV006-01	Refrigerant Charge, Residential	2024	SCE
SWSV007-01	Condenser Coil Cleaning, Residential	2024	SCE
SWSV008-01	Evaporator Coil Cleaning, Residential	2024	SCE
SWSV009-01	Air Flow Adjustment, Residential	2024	SCE
SWSV010-02	Economizer Controls, Commercial	2024	SDGE
SWSV013-03	Duct Optimization	2024	SDGE
SWWB002-01	Universal Audit Tool	2024	PG&E
SWWB004-02	Home Energy Reports	2024	PG&E
SWWB006-03	High Performance Crawlspace	2024	SCE
SWWH001-03	Faucet Aerator, Residential	2024	SCG
SWWH002-03	Low-Flow Showerhead, Residential	2024	SCG
SWWH003-02	TSV with Low Flow Showerhead	2024	SCG
SWWH004-03	Laminar Flow Restrictor	2024	SCG
SWWH005-05	Boiler, Commercial	2024	SCG
SWWH006-07	Tankless Water Heater, Commercial	2024	SCG
SWWH007-05	Storage Water Heater, Commercial	2024	SCG
SWWH008-01	Boiler, Process	2024	PG&E
SWWH010-01	Boiler, Multifamily	2024	SCG
SWWH011-01	Central Storage Water Heater, Multifamily	2024	PG&E
SWWH012-03	Storage Water Heater, Residential	2024	SCG
SWWH013-03	Tankless Water Heater, Residential	2024	SCG
SWWH014-04	Heat Pump Water Heater, Residential	2024	SCE
SWWH015-03	Demand Control for Centralized Water Heater Recirculation Pump, Multifamily & Commercial	2024	SCG
SWWH016-03	Domestic Hot Water Loop Temperature Controller, Multifamily & Commercial	2024	SCG
SWWH017-03	Hot Water Pipe Insulation, Nonresidential and Multifamily	2024	SCG

Measure Package ID	Measure Name	Program Year	Lead IOU
SWWH018-03	Hot Water Tank Insulation, Nonresidential and Multifamily	2024	SCG
SWWH019-04	Faucet Aerator, Commercial	2024	SCG
SWWH020-04	Low-Flow Showerhead, Commercial	2024	SCG
SWWH021-01	Recirculation Pump Timer, Commercial	2024	SCG
SWWH022-01	Smart Pump, Residential	2024	PG&E
SWWH023-02	Tub Spout TSV	2024	SCG
SWWH024-02	Central Boiler Dual Setpoint Controller, Multifamily	2024	SCG
SWWH025-05	Residential Heat Pump Water Heater, Fuel Substitution	2024	SCE
SWWH026-02	Water Heater Pipe Wrap, Residential	2024	SCG
SWWH027-03	Heat Pump Water Heater, Commercial, Fuel Substitution	2024	SCE
SWWH028-02	Multi-Family and Commercial Large Heat Pump Water Heater– Fuel Substitution	2024	SCE
SWWH030-01	Tankless Combination Space and Water Heater, Residential	2024	SCG
SWWH031-02	Heat Pump Water Heater, Commercial	2024	SCE
SWWH032-01	Solar Thermal Water Heating System, Residential	2024	SCG
SWWP002-03	VFD on Well Pump, <= 300 hp	2024	PG&E
SWWP004-03	Water Pump Upgrade	2024	PG&E
SWWP005-03	Enhanced VFD on Irrigation Pump	2024	PG&E

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.[25]

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

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.

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

Measure ID	Title	Date	Summary of Direction
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.
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.

Measure ID	Title	Date	Summary of Direction
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.
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.

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
2022-02-22	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	Guidance for Negative IMC Values and Rebates Greater than IMC for Fuel Substitution Measures	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.
[Approval by Management Pending]	Addendum to Measure Package Documenting Incentive Greater than Incremental Measure Cost	This guidance sets for 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
[Approval by Management Pending]	Measure Package Adoption by PAs	This guidance sets for the process for PAs and third-party implementers to upload and adopt PA implementation codes in eTRM.