STATE OF CALIFORNIA
PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

Gavin Newsom, Governor

Date: April 21, 2020

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; Pete Skala; Jennifer Kalafut; Paula Gruendling; Peter Biermayer

Subject: **Solicitation for Comments on Scope of Update for Database of Energy Efficiency Resources for program year 2022 (DEER2022) and error corrections for program years 2020 and 2021**

California Public Utilities Commission (CPUC) Staff invite comments on this proposed scope to update the Database of Energy Efficiency Resources for program year 2022 (DEER2022) to be scheduled for adoption by a Resolution in Q3 2020.[1] Our scoping effort for this memo 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 program year 2022, but due to evolving regulatory requirements, some error corrections and clarifications are also needed for the previous 2021 and 2020 DEER updates.

In addition to the business-as-usual DEER update, the convergence of significant changes offers a unique opportunity to take a fresh look at options for improving the overall "DEER- workpaper ecosystem." Significant developments include the shift from utility-specific to statewide workpapers, development of the electronic technical reference manual (eTRM), changes to the fuel substitution test, and upcoming needs for third-party programs. The dynamic and evolving California energy environment also requires anticipating and preparing for future needs such as decarbonization and integration of EE and the integrated resources planning (IRP) process.[2] To proactively address issues that will likely impact future DEER updates, we briefly discuss some of the most pressing issues in this memo. Commission staff will take further action on these items based on stakeholder comments and feedback.

1 See D15-10-028, OP 17, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M155/K511/155511942.pdf.
2 *Staff Proposal for Incorporating Energy Efficiency into the SB 350 Integrated Resource Planning Process (EE-IRP),* https://pda.energydataweb.com/#!/documents/2083/view.

1 DEER Update Schedule, Topic Areas and Submitting Comments

Comments on this scoping memo are due May 04, 2020. Table 1-1 presents the proposed timeline for this year's DEER update cycle.

Table 1-1. DEER update timeline

Schedule	Activities
04/21/2020	DEER Scoping Memo notice
05/04/2020	Scoping memo comments due
06/01/2020	Draft Resolution & webinar notice release
TBD	Public webinar
06/20/2020	Party comments due (20 days after draft Resolution release)
08/27/2020 (last commission voting meeting in August)	Deadline for Resolution to be considered by Commission.

CPUC Staff identified many topic areas in need of an update. A summary of the update topic areas and items within each topic area are provided in Table 1-2 with details presented in Attachment A. Table 1-2 also includes our assessment of the priority and level of effort needed to accomplish each item. The final list of updates to be implemented for the DEER2022 Update will be based on Commission priorities and resources, time available to meet the DEER update Bus Stop,[3] and stakeholder comments. What cannot be accomplished for the 2020 Bus Stop can be considered for the next DEER update cycle, or raised elsewhere via an appropriate procedural vehicle, such as a proceeding. The updates fall into seven topic areas and most are consistent with past updates, but we have also added a new area to address future needs. Finally, CPUC staff plans to kick off planning and implementation activities for transitioning development and storage of deemed values into the eTRM environment in 2021. The topic areas addressed in this memo are categorized under:

1. DEER methodology updates
2. DEER error corrections
3. Review of energy efficiency Evaluation, Measurement, and Verification (EM&V) studies
4. Review of Codes and Standards
5. Review of market and research studies
6. New measure additions
7. Support table updates
8. Transition DEER and workpaper ecosystem to eTRM
9. Considerations for future DEER update cycles

[3] DEER Resolution is to be adopted by September 1 of each year.

CPUC Staff is seeking input for the following questions:

- Do you agree with the DEER2022 update priorities listed in Table 1-2?
- Are there additional topic areas and/or issues that should be prioritized for the current update cycle to meet 2022 program needs or correct previous errors?
- For the topic areas listed in Table 1-2 and Attachment A, what resources or methods should we consider? Please support recommendations with publicly vetted data and studies.

Please post comments to http://www.energydataweb.com/cpuc/search.aspx after searching for "DEER Scoping Memo for PY2022 (DEER2022)" in the "Search Text" field.

Contact Peter Biermayer at Peter.Biermayer@cpuc.ca.gov with any questions or clarifications.

Table 1-2. Draft DEER2022 update priorities

Priority	Effort	DEER Version	Update Topic Area	Sector		Measure/Tech Group					Forecasted Value				
				Res	Non-Res	Lighting	HVAC	DHW	Envelope	Plug/Process	UES	NTG	EUL	Measure Cost	Other
DEER methodology updates															
!!!!	$$	2022	Modifications to accommodate load shape updates	X	X	X	X	X	X	X					X
!!!	$	2022	Effective useful life (EUL) update process revision	X	X		X		X	X			X		
!!!	$	2022	Chiller measure tier definitions		X		X				X				
!!!	$	2022	Single database (ExAnte becomes official and single dB)	X	X	X	X	X	X	X					X
!!!	$	2021	Clarification of BRO measure application type	X	X	X	X	X	X	X			X		
!	$	2022	Reclassify Duct Sealing for pre-2006 buildings	X			X						X		
DEER error corrections															
!!!	$$$	2021	Corrected/updated water heater calculator	X	X			X			X				
!!	$$	2020	Added missing values for ceiling and wall insulation	X					X		X				
!!	$	2020	Added missing values for Com building type chiller		X		X				X				
!!	$	2020	Expired DEER2020 lighting measures	X	X	X					X				
!!	$	2020	Corrected interactive effects table		X	X									X
Review of EM&V studies															
!!!H	$$$	2022	Residential EM&V (including Home Upgrade; water fixtures; pool pumps)	X			X	X		X	X	X			
!!!	$$	2022	Lighting EM&V (upstream and downstream studies)	X	X	X					X	X		XU	
!!H	$$$	2022	HVAC EM&V (including duct seal; unitary RTUs; chillers; and boilers)	X	X		X				X	X			
!!	$$	2022	Small Commercial EM&V (including food service; refrigeration; irrigation; and DHW)		X			X		X	X	X			
Review of codes & standards															
!!		2022	Codes and standards changes, California and Federal								X				
Review of market and research studies															
!!	$	2022	Review completed IOU studies								X	X	X		
New measure additions															
!!!	$	2020	Fuel-substitution measure framework/adjustments	X	X		X	X			X	X	X		X
!!!	$	2020	New NTG IDs and values	X	X	X	X	X	X	X		X			
!!	$$	2021	New efficient water heater thresholds	X	X			X			X				
!!	$$	2022	Residential heat pumps for SEER ≥19	X			X								
Support table updates															
!!	$	2020	New BldgType, EUL, MeasImpactType, and TechType values	X	X			X	X	X			X		X

Priority	Effort	DEER Version	Update Topic Area	Sector		Measure/Tech Group					Forecasted Value				
				Res	Non-Res	Lighting	HVAC	DHW	Envelope	Plug/Process	UES	NTG	EUL	Measure Cost	Other
Transition to eTRM as ex ante database of record															
!!!!	$$$$	2020	Implement eTRM Transition Plan (Includes User testing/acceptance Plan, Ex ante data Compliance Plan, Governance plan, IOU co-funding plan, IT Administration plan, systems integration plan); establish CPUC position on CalTF governing board.												
!	$	Ongoing	Support DEEResources/READi/WPA infrastructure until transition to eTRM platform complete.												

[H] High-Impact Measures (HIM) only; [U] Upstream lighting measures

2 Considerations for Future DEER Update Cycles

Table 2-1 provides a list of items staff has identified that could be considered in future DEER updates. If any of the items in Table 2-1 are determined to be a priority for stakeholders, then we will assess them for inclusion in a future update cycle, but they are currently not scoped or budgeted as DEER update activities. Further descriptions of these issues are provided in Section 9 of the Attachment. Commission staff will consider taking further action on these items based on stakeholder comments and feedback.

Table 2-1. Draft DEER future updates

Effort	Update Topic Area	Sector		Measure/Tech Group					Forecasted Value				
		Res	Non-Res	Lighting	HVAC	DHW	Envelope	Plug/Process	UES	NTG	EUL	Measure Cost	Other
DEER methodology updates													
$	Update refrigerated warehouse prototypes		X		X		X	X	X				
$$	Increase EUL for Add-on Equipment measures	X	X	X	X	X					X		
$$	Custom Projects Guidance: improve DEER tables for EUL and NTG	X	X	X	X	X	X	X		X	X		
$$	Weather file update (2022: some measures; 2023: remainder)	X	X		X		X		X				
$$$	Peak definition revisions	X	X	X	X	X	X	X	X				X
$$$$	Reduce savings permutations	X	X	X	X	X	X	X	X			X	
Review of EM&V studies													
$$	Smart Controllable Thermostat EM&V study results (workpaper measure)	X			X				X	X			
Review of market and research studies													
$$	On-Bill Financing study underway by PG&E	X	X	X	X	X	X	X					
$$$$	RASS/CEUS update anticipated	X	X	X	X	X	X	X	X	X	X	X	X

3 Glossary of Terms[4]

A glossary of the terms used in Attachment A is provided for reference.

Deemed measure	Also referred to as a prescriptive energy-efficiency measure and is generally used for mass-market technologies. Measure values are predefined and/or stipulated for a group (market, segment, customer, etc.) rather than using site-specific parameters. Values that are stipulated and/or pre-defined include baseline assumptions and eligibility, savings values and/or calculation approach used for savings, operating hours, measure costs, installation rates, delivery approach, and other key measure attributes like net-to-gross (NTG) and effective useful life (EUL).
DEER	Database for Energy Efficiency Resources
Workpaper	Technical engineering documents that prescribe pre-determined values for energy savings, measure costs, and other forecasted values.
Workpaper disposition	The final result of the workpaper review process that labels the workpaper as "approved" or "rejected."
EnergyPlus™	EnergyPlus™ is a building simulation program from the Department of Energy (DOE) that can be used to model building energy use. It is intended primarily to simulate weather-sensitive loads such as space heating, space cooling, ventilation, and associated auxiliary equipment (e.g., pumps, cooling towers) loads. It can also be used to simulate other end-uses.
DEER data tables	Four tables in the DEER that contain the measure definition information, the energy impact and savings data, the measure cost data, and the implementation approach data (e.g., measure application type, delivery channel, etc.). Note: the implementation tables in DEER are currently inactive and not viewable and have not been updated in recent DEER versions.
Workpaper Ex Ante Data (EAD) tables	Similar in format to the DEER Data Tables, these are four worksheets in an Excel workbook that are used to provide the data used to claim a measure. The information is the same as for the four DEER Data tables and includes the measure definition information, the energy impact and savings data, the measure cost data, and the implementation approach data (e.g., measure application type, delivery channel, etc.).

[4] Some definitions are original but were derived from the *Energy Efficiency Policy Manual* and *PG&E Resource Savings Rulebook* whenever possible.

DEER support tables	Forty-two tables in DEER that provide the allowed values for supporting parameters such as climate zone, building vintage, building type, effective useful life, NTG ratio, delivery type, and measure application type. Twenty-two of these tables are shared with CEDARS for verification purposes.
Measure application type (MAT)	"A categorization of energy efficiency measures based on measure attributes – each measure application type has its own baseline treatment, cost basis, eligibility, and documentation requirements. There are six approved measure application types, which include: Accelerated Replacement, Add-On Equipment, Behavioral, Retrocommissioning and Operational, New Construction/New Capacity, Normal Replacement, and Weatherization. Each of these measure application types is further defined below." A major change to MAT types was made in Resolution E-4818 then restated and clarified in the E-4952 resolution for the DEER2020 Update.
Effective useful life (EUL)	An estimate of the median number of years that energy-efficiency measures installed under a program are still in place and operable.
Incremental measure cost (IMC)	The difference between the cost of existing or baseline equipment or service and the cost of alternative energy-efficient equipment or service.
Net-to-gross ratio (NTGR)	A ratio or percentage of net program impacts divided by gross or total impacts. NTGRs are used to estimate the net savings by excluding those savings attributable to the free ridership that may be occurring among energy efficiency program participants.
Unit energy savings (UES)	The energy *or demand* savings (kWh, kW, or therm) associated with a single unit of a given energy-efficiency measure.

Attachment A
DEER2022 Update Summary

Contents

List of Tables

1 Introduction and background

Decision D.15-10-028, Ordering Paragraph 17 established the general approach to be used for the annual DEER update: "Commission Staff shall propose changes to the Database of Energy Efficient Resources once annually via Resolution, with the associated comment/protest period provided by General Order 96-B. However, Commission staff may make changes at any time without a Resolution to fix errors or to change documentation." The updates fall into seven topic areas and most are consistent with past updates, but we've also added a new area to address future needs. The topic areas addressed in this memo are categorized under:

1. DEER methodology updates
2. DEER error corrections and clarifications
3. Review of energy efficiency Evaluation, Measurement, and Verification (EM&V) studies
4. Review of codes and standards changes
5. Review of market and research studies
6. New measure additions
7. Support table updates
8. Transition to eTRM
9. Considerations for future DEER update cycles

2 DEER methodology updates

DEER methodology updates affect the methods and approaches used to generate measures savings and support table values. Examples include changes that would alter the database structure, building prototype models, use of DEER database measures in workpapers, or the effort to move away from utility-specific to statewide measures.

2.1 Load shape update process revision

Effective Program Year: 2021 and 2022. Resolution E-4867 ordered a working group to develop a proposal for how the DEER peak period methodology should be adjusted. The working group recommended an adjustment of the peak period times which was implemented in Resolution E-4952. They also recommended a longer-term adjustment called a "no-peak" methodology which would involve eliminating the peak kilowatt savings reporting and would move toward a dynamic peak. This 2022 DEER update lays some of the groundwork necessary to incorporate updated measure savings loadshapes, a first step toward a long-term dynamic peak goal.

A new table (or tables) will be added to DEER to contain summary-level measure savings load shapes and/or load-shape characteristics once updated through Deliverable 17 or EM&V efforts and publicly vetted and reviewed by the DEER team. Some new load shapes, applicable to the measures shown in Table A-2-1 that were updated in E-5009, will be available for use in 2021. Load shapes applicable to measures updated through 2019 EM&V efforts or via DEER 2022 will be available for use in 2022. The

new tables will also indicate the sources of the summary-level load shape such as simulation-based tools or AMI analysis, which could originate from impact evaluations or from studies conducted to support workpapers.

Table A-2-1. Measures from DEER 2021 to have updated load shapes

Measure_ID
NE-HVAC-RefChg-Dec-Typ-ntxv
NE-HVAC-RefChg-Dec-Typ-txv
NE-HVAC-RefChg-Inc-High-ntxv
NE-HVAC-RefChg-Inc-High-txv
NE-HVAC-RefChg-Inc-Low-ntxv
NE-HVAC-RefChg-Inc-Low-txv
NE-HVAC-RefChg-Inc-Typ-txv
RE-HV-RefChrg-Inc-NTXV-16pct
RE-HV-RefChrg-Inc-NTXV-4pct
RE-HV-RefChrg-Inc-TXV-16pct
RE-HV-RefChrg-Inc-TXV-4pct
RE-HV-RefChrg-Dec-TXV-typ
RE-HV-RefChrg-Dec-NTXV-typ
RE-HV-RefChrg-Inc-TXV-typ
RE-HV-RefChrg-Inc-NTXV-typ
NE-HVAC-airAC-SpltPkg-65to134kBtuh-12p5eer-woutPreEcono
NE-HVAC-airAC-SpltPkg-65to134kBtuh-12p5eer-wPreEcono
NE-HVAC-airAC-SpltPkg-240to759kBtuh-10p8eer_MZ
NE-HVAC-airAC-SpltPkg-240to759kBtuh-10p8eer_SZ

2.2 Effective useful life (EUL) updates and process revision

Effective Program Year: 2022. Updates or additions to the EUL table are typically drawn from evidence presented in workpapers or results from vetted studies and become official via resolution or workpaper disposition. Going forward, two changes to existing processes are proposed:

- All requests for new EUL IDs—other than for those measures categorized as Behavioral, Retrocommissioning, and Operations (BRO)—may either be included in a workpaper submittal or submitted separately to DEERsupport@dnvgl.com. Either way, the request must include all supporting documentation and a completed copy of the "EUL-HOU_Proposal_Form_v1.1.xlsx" workbook available for download from the DEER website.[5] All parameters for a new EUL ID must be available in DEER prior to the approval of a workpaper using the new ID.

[5] See http://deeresources.com/index.php/non-deer-workpapers/deer-update-requests.

- A field will be added to the EUL table in DEER to show that studies are planned or under way—such as CPUC studies, IOU studies, and other relevant research—that may result in updates to existing EUL values.

2.3 Chiller measure tier definitions

Effective Program Year: 2022. For all liquid chillers, tiers 1 and 2 currently require that qualifying chiller part- and full-load efficiencies each exceed Title 24 requirements by at least 10% and 15%, respectively. SCE proposed a non-DEER Chiller workpaper plan in 2019 for use by programs not covered by DEER or custom programs—including upstream HVAC—to propose changing the efficiency criteria. For air-cooled chillers, the proposed workpaper would exceed Title 24 requirements as follows:

- Tier 1 at 7% full-load efficiency improvement and 10% part-load efficiency improvement
- Tier 2 at 7% full-load efficiency improvement and 20% part-load efficiency improvement

Separately, PG&E proposed revised efficiency tiers for variable-speed, centrifugal-compressor water-cooled chillers and variable-speed, centrifugal, frictionless compressor water-cooled chillers in 2019 as follows:

- Tier 1 at 5% full-load efficiency improvement and 8% part-load efficiency improvement
- Tier 2 at 10% full-load efficiency improvement and 14% part-load efficiency improvement

Full-load efficiency data is often of little value because chillers rarely run at full load; integrated part-load data is provided at too few operating points to give an accurate indication of performance. In 2019, SCE performed a market study to ascertain the proportion of sales of chillers of varying efficiency levels and delivered the results in a memo. CPUC Staff reviewed the market data provided by SCE and find the case for modifying Tiers 1 and 2 compelling and a decision is expected in the coming month (to be presented here).

Effective Program Year: 2023. For air-cooled liquid chillers, there have been several requests to create DEER measures that utilize Path-B-compliant efficiency requirements[6] and simulate part-load operations. Without market data to ascertain the proportion of Path-B-compliant chillers of various sizes, it is not yet possible to generate weighted averages of building simulation UES results for Path-A- and Path-B-compliant chillers.

2.4 Single database

Effective Program Year: 2022. DEER currently includes two similar databases, one frozen with official values and one being updated continuously, referred to as the ExAnte (EA) and the Preliminary Ex Ante Review (PEAR) databases, respectively. The EA database—often referred to as the "DEER" database—will become the single database of record and will be updated continuously and the PEAR database will no longer be updated/maintained. To retain the functionality of the dual databases, the following steps will be taken:

[6] Two efficiency compliance paths are available for chillers. Path A is used for chillers designed primarily to run at full-load and Path B is used for chillers designed to operate primarily at part-load. For example, for a <150-ton air-cooled chiller, Path A efficiency minimums are 10.1 EER/12.7 IPLV and Path B efficiency minimums are 9.7 EER/15.8 IPLV.

- The "Status" field that was intended to communicate whether additions were "Proposed"—until the adoption of an upcoming resolution—or "Available" will be added to the relevant tables as they had existed in the PEAR database.
- The reports that presently are provided to the California Energy Data and Reporting System (CEDARS) by the PEAR database—for claims validation purposes—will be replicated in the ExAnte database.

2.5 Clarification of BRO measure application type

Effective Program Year: 2021. There has been some confusion around EULs associated with Behavioral, Retrocommissioning, or Operational (BRO) measure application type (MAT) classification established in Resolution E-4818 and amended in E-4952. The BRO classification was established with an EUL of one to three years. On page 9, E-4818 states:

> *The savings from restored maintenance, configuration, and usage behave differently over time, and have a shorter effective useful life than the equipment they address. BRO programs have an effective useful life of one to three years; Decision 16-08-019 adopted a two-year life for behavioral programs in nonresidential settings and a three-year effective useful life for retrocommissioning and operational programs*[7].

Furthermore, in Ordering Paragraph 2 Resolution E-4818 states that the EUL for BRO measure application types is not to exceed three years:

> *We direct the Program Administrators to ensure that all program activities and installations resulting in performance that does not exceed the nominal efficiency (i.e., rated, intended, or original efficiency) of the pre-existing condition are offered through a behavioral, retrocommissioning or operational program framework, with an effective useful life not to exceed three years.*

However, Decision D.16-08-019 also states on pg. 46:

> *Because there is a wide variation in evidence to support various expected useful lives, we will still err on the conservative side and allow a two-year life for behavioral programs in non-residential settings, and a three-year life for retrocommissioning and operational programs. This may be revisited as we gain further experience with these types of programs. We invite the program administrators or implementers to provide us with further evidence in the future if they ask us to lengthen these estimates.*

Resolution E-4952 amends the BRO classification to break it into 3 sub-classifications: BRO-Behavioral, BRO-Retrocommissioning and BRO-Operational, but it did not change the EULs previously defined for those classifications. The EULs for BRO measures can only be updated by a future decision.

2.6 Reclassify duct sealing for pre-2006 buildings

Effective Program Year: 2022. Resolution E-4952 updated the measure application type (MAT) of the duct sealing measure to a Behavioral, Retrocommissioning, or Operational (BRO) measure and

[7] Only residential behavioral programs have an effective useful life of one year, per D.16-08-019.

changed the EUL value to three years because Resolution E-4818 directed that "all measures which utilize a degraded performance baseline and/or are restorative of performance in nature be classified as retrocommissioning." This is true for residential and non-residential buildings that were constructed after January 1, 2006 when the 2005 California Building Energy Efficiency Standards (2005 CA T-24) introduced a requirement for ≤6% duct leakage rate in new buildings with some exceptions in certain climate zones. The exceptions were later removed. The 2005 CA T-24 standards also introduced a requirement for duct sealing in building alterations when a furnace or air conditioner was replaced or when more than 40 feet of ductwork was replaced.

Buildings constructed prior to 2006 were not required to have ducts sealed and research shows that ducts in these older homes had leakage rates on the order of 20%. For pre-2006 buildings, duct sealing is not restorative in nature, but is an improvement—much like building-shell air sealing and upgrading attic insulation. Since Resolution E-4818 indicated that measures involving non-mechanical building components such as ductwork are eligible for building weatherization treatment, duct sealing at pre-2006 buildings shall be categorized as a building weatherization (BW) measure.[8] This classification should be retained for duct sealing measures installed in residential and non-residential buildings constructed before January 1, 2006.

This establishes that there shall be two types of duct-sealing measures: those classified with MAT of retrocommissioning (BRO-RCx) that are installed in residential or non-residential buildings constructed January 1, 2006 or later and those with MAT of BW installed in residential or non-residential buildings built before January 1, 2006. Mobile homes do not have a requirement for duct sealing under the federal HUD code, so duct sealing measures in all mobile homes should be classified as BW types.

This change allows for different unit energy savings (UES) for the two types of duct sealing measures where the BRO-Rx measures would be expected to have lower baseline leakage rates than the BW duct sealing measures. The current DEER duct sealing savings are appropriate for duct sealing installed as a BW measure because the baseline leakage is 40% for the high-leakage measure and 25%/28% (residential/commercial) for the medium/low-leakage measure. Hence, the current measures shall be reclassified as BW measures, and will only be eligible in buildings constructed pre-2006. Some buildings in the BW classification will have had their ducts sealed due to permit compliance requirements at the time of furnace, air conditioner, or duct system replacement[9]—again, much like some older homes have had their attic insulation upgraded since initial construction. Program implementation will establish the criteria for when ducts in those buildings are eligible to be re-sealed.

The EUL for duct sealing, classified as a BW measure shall revert to the previous value of 18 years, provided the materials and quality of the duct sealing installation is consistent with industry best

[8] Resolution E-4818, page 69, duct sealing is specifically mentioned as a building weatherization measure "…non-mechanical building efficiency improvements (e.g. windows, insulation, air sealing, **duct sealing**…"

[9] The 2014-16 HVAC Permit and Code Compliance Market Assessment (Work Order 6) showed low levels of compliance with duct sealing requirements. (http://calmac.org/publications/HVAC_WO6_FINAL_REPORT_VolumeI_22Sept2017.pdf)

practice.[10] The duct connections must not be sealed with duct tape (cloth-backed rubber adhesive tapes.) Mastic or aerosol sealant materials are preferred, and butyl tape can be used where mastic or aerosol are impractical. The previously established 18-year EUL for duct sealing was based on two IOU-conducted retention studies,[11,12] both finding a higher EUL than the forecasted value of 18 years. These findings are substantiated by LBNL's laboratory research that found only duct tapes showed significant duct leakage after accelerated aging tests were performed.[13]

3 DEER error corrections

DEER error corrections or clarifications are those that typically impact the actual DEER values or application of the values. Corrections to the DEER database are often needed due to the complexity of the DEER ecosystem and decisions and resolutions, the quick pace of the Rolling Portfolio timeline, and today's dynamic energy environment. Major changes were made to the DEER system under the DEER2020 Update; for example, the building prototypes and modeling approach were completely redone, and the peak demand period was changed, but without a chance to thoroughly vet those updates. Although many errors and issues identified after the adoption of Resolution E-4952 DEER2020 Update were previously addressed, several more issues were uncovered or remain as described in the sub-sections that follow.

3.1 Update to water heater calculator and resulting energy impacts

Effective Program Year: 2021. The PAs have been actively working with CPUC Staff to identify the corrections and improvements needed for DEER water heating measures that were discovered during the Phase 1 review of the 2019 Residential and Commercial Small Water Heaters. The PAs reported several issues and submitted a memo[14] to CPUC Staff describing requested updates, improvements, and error corrections to the 2019 water heater calculator.[15] The issues include but are not limited to completing the update of measures from Energy Factor (EF) to Uniform Energy Factor (UEF) efficiency ratings for heat-pump water heaters, updating the UEF values using data from current data sources, determining savings for the "Com" building type at all climate zones for all water heater categories, and providing statewide savings for each climate zone. Consideration for improving diversity in operation for residential versus commercial water heaters and combining multiple measures that represent varying draw patterns (low, medium, high) into a single measure was also requested, but

[10] California building codes require mechanical connections on metal to metal duct must be secured with at least three mechanical fasteners and flex to metal connections must be secured with at least three mechanical fasteners and two nylon straps: one on the inner liner and one on the outer liner. The code requires the ducts to be sealed with mastic, polymer, or certain tapes but industry best practice disallows tapes as the primary sealant material.
[11] Pacific Gas & Electric Company. 2006. Retention Study of Pacific Gas & Electric Company's 1996 and 1997 Residential New Construction Energy Efficiency Programs. PG&E Study ID number: 386R2 CALMAC Study ID number: PGE0247.01.
[12] Itron, Inc. 2004. 1994 Residential New Construction Ninth-Year Retention Evaluation (Energy Advantage Home Program) Study Number 716A. Prepared for Southern California Gas Company
[13] Walker, I.S. and Sherman, M.H. 2003. "Sealant Longevity for Residential Ducts," Durability of Building and Construction Sealants and Adhesives, ASTM STP 1453, A. Wolf Ed., American Society for Testing and Materials, West Conshohocken, Pa.
[14] "Recommendations for Update to the DEER Water Heater Calculator for Program Year(s) 2019 and 2020," issued by SoCalGas, 2019-03-06.
[15] DEER-WaterHeater-Calculatorv3.3.xlsm

could not be incorporated without having weights with which to generate weighted averages. Any corrected or previously missing measures will be updated in DEER and a corrected water heating calculator will be added to deeresources.com. Subsequently, statewide workpapers for DEER2021 will need to be updated and resubmitted.

3.2 Addition of missing energy impacts for ceiling and wall insulation

Effective Program Year: 2020. For DEER2020 ceiling and wall insulation measures with missing records for some climate zones, missing records will be added by April 1, 2020.

3.3 Addition of missing chiller records for Com building type

Effective Program Year: 2020. For DEER2020 air-cooled chiller measures that are missing the "Com" building type, a new aggregated "Com" value will be added by May 1, 2020.[16]

3.4 Expiration of all DEER2020 lighting measures

Effective Program Year: 2020. Since all lighting measures for the 2020 program year were approved via workpapers, those contained in the PEAR and ExAnte databases were no longer valid. Hence, 474 DEER2020 lighting measures having a start date of January 1, 2020 were later set to expire on March 18, 2020.

3.5 Corrections to DEER2020 interactive effects table

Effective Program Year: 2020. As part of the PA-consolidation effort—within each climate zone that contains services territories of more than one IOU—that was completed per Resolution E-5009 DEER2021 Update, numerous tables were updated. Among those were the commercial and residential interactive effects tables (2020-Com-InLtg and 2020-Res-InLtg, respectively) that contain the interactive effects factors for lighting measures installed within conditioned spaces. Some of the newly generated records in the commercial interactive-effects table were found to contain errors that were corrected and updated in February 2020.

4 Review of energy efficiency Evaluation, Measurement and Verification (EM&V) studies

EM&V Sector evaluation results and/or special studies will continue to be some of the primary sources for DEER measure and workpaper updates. Evaluation results with rigor and precision acceptable to support DEER measures will be used to update DEER and workpaper 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 DEER team will examine the findings of recently completed impact evaluation and other studies to identify those that indicate a substantial difference from current DEER values and are robust enough to be used to update key DEER parameters. A complete list of the studies to consider is provided in

[16] Note, we are also reviewing the HVAC EM&V study related to building types for chiller measure claims.

Appendix E of the 2018-2020 EM&V Plan.[17] Due to the DEER Update schedule, we can only consider studies completed by Q1 2020. The available studies from Appendix E include CPUC impact evaluation from PY2017 and PY2018 high impact ESPI measures and IOU studies are provided in Table A-4-1.

Table A-4-1. Summary of recent EM&V study results

Study	Measure	DEER or Workpaper	Gross Savings	NTG
Small Commercial	Refrigeration Case Lighting	DEER	X	X
Small Commercial	Tankless Water Heaters	DEER	X	X
Small Commercial	Process Pump VFD	Workpaper	X	X
Small Commercial	Agriculture Irrigation	Workpaper	X	X
Lighting	Upstream/Residential	Expired in 2020	X	X
Lighting	Downstream	Workpapers	UES, LS, EUL*	X
HVAC	Rooftop and Split System	DEER	X	X
HVAC	Duct Sealing	DEER	X	X
HVAC	Chillers	DEER	X	X
HVAC	HVAC Boiler	DEER		X
Residential	Hot Water Fixtures	DEER		X
Residential	Smart Thermostat	Workpaper	UES, LS	X
Residential	Pool Pump VFD	Workpaper		X

*UES=unit energy savings; LS=load shape; and EUL=effective useful life

4.1 Residential Sector 2018 EM&V reports

Effective Program Year: 2022. There were 4 Residential Sector Reports for PY2018 with the primary DEER measures being NTG for hot water saving fixtures. The Home Energy Reports, Smart Thermostat, and pool pump evaluations may impact workpapers for PY2021 and 2022, but these measures are not being considered for addition to DEER in 2022.

4.2 Upstream and Downstream Lighting 2018 EM&V reports

Effective Program Year: 2022. The PY2017 and PY2018 upstream lighting evaluations revealed significantly lower installation rates and PY2018 NTG confirm the all LED baseline and expiration of DEER lighting measures justified. The Downstream lighting evaluations include NTG and EUL information that will be incorporated in DEER. The load shape and savings are likely more applicable via statewide workpapers.

The information from the last several lighting evaluations will be considered in updating prototypes along with RASS and CEUS in the 2023 DEER update.

[17] "2018-2020 CPUC & Program Administrator Energy Efficiency Evaluation, Measurement and Verification Plan Version 9," California Public Utilities Commission, 12/19/2019, https://pda.energydataweb.com/api/view/2325/2018-20_EMV_Plan_Final.pdf.

4.3 HVAC Sector Program Year 2018 EM&V report

Effective Program Year: 2022. All measures reviewed for NTG. Most EM&V NTG are close to assume DEER NTG or those found in workpapers. This update will review the NTG trend across PY2013-PY2018 for rooftop and split systems and chillers. The gross savings for some rooftop and split measures needs to be clarified as EM&V shows workpapers claim use of DEER savings yet the savings significantly deviate from the possible range of savings from the prototype models. For Chillers and Duct Sealing the EM&V validates current deemed savings.

Results from the last several HVAC evaluations—along with RASS and CEUS—will be considered when updating prototypes in the 2023 DEER update.

4.4 Small and Medium Commercial 2018 EM&V report

Effective Program Year: 2022. Changes to the refrigerated case lighting and water heating measures for both unit energy savings and net to gross ratio are being considered.

5 Review of Codes and Standards

Codes and Standards (C&S) changes often comprise the highest priority updates because they can significantly impact baselines. C&S updates consider both Federal and State requirements (Title 24, Title 20). However, for this update cycle there are no C&S changes. The 2019 Title 24 code cycle Standards which became effective 1/1/2020 were handled by Resolution E-4952. Since the 2022 code cycle is underway and would not be effective until 1/1/2023, it is not relevant for this DEER update cycle. Scheduled updates of Federal equipment Standards have all missed their intended deadlines, as shown on the Appliance Standards Awareness Project (ASAP) products summary web page.[18] Products that were supposed to get efficiency updates effective in 2022 include clothes dryers, refrigerators/freezers, fluorescent lamp ballasts, and metal halide lamp fixtures. These delays are added to the 2021 delay which included pool heaters, commercial water heaters, computer-room air conditioners (CRAC) and small electric motors. There are also many updates scheduled for 2023 including residential water heaters, commercial central air conditioner/heat pump water or evaporative-cooled units, commercial refrigeration equipment, walk-in coolers/freezers, and HID lamps. If the logjam of delayed updates is broken at the end of 2020, there could be a lot of updates required next year, though it may take time to get these updates back on track.

6 Review of market and research studies

Market and research studies, including baseline studies,[19] are a rich source of update information but are only periodically conducted. These types of studies can be used for calibration of whole site and end use energy use, establishing industry standard and/or best practices, developing operating hours, and developing model prototype characteristics. A critical issue in the past with these studies is the time lag between study completion and integration of the results into DEER. Towards that goal, we are

[18] https://appliance-standards.org/products-and-links

[19] For example, the Commercial End Use Study (CEUS), Residential Appliance Saturation Study (RASS), Commercial Saturation Study-Commercial Market Share Tracking (CSS-CMST) studies, and California Lighting and Appliance Saturation Study (CLASS).

tracking current sector-scale efforts and mention them in Section 9, considerations for future DEER update cycles, even if the results cannot be used for the current cycle.

7 New measure additions

CPUC Staff will be implementing several new DEER database measures for 2022. As a result of the statewide workpaper consolidation effort and the increased participation of third party (3P) implementers, we anticipate that new measures may be proposed via workpapers and in response to this Scoping Memo.

7.1 Normalized Metered Energy Consumption (NMEC) measures

The introduction of NMEC measures to the demand-side management portfolios requires the addition of new records to existing support tables in the DEER database. No other effects on the DEER databases are anticipated.

7.2 Fuel-substitution measures

The introduction of fuel substitution energy efficiency measures to the deemed portfolio may require the addition of new fields to the workpaper Ex Ante Data (EAD) tables and the DEER database—which largely share the same data specification. These fields are important for future reporting of California greenhouse gas (GHG) reduction goals and include lifecycle CO2 emissions reduction, lifecycle source energy savings, and infrastructure cost. The Fuel Substitution Technical Guidance for Energy Efficiency[20] issued in 2019 required careful review to determine the ways that DEER and workpapers would be affected. These effects are described in the sub-sections that follow.

7.2.1 Fuel-substitution measure impact type

Effective Program Year: 2020. The Fuel Substitution Technical Guidance for Energy Efficiency specifies the measure impact type to select when submitting a workpaper regarding a fuel-substitution measure. According to the technical guidance, the workpaper documentation should indicate that the measure impact type is "Fuel Sub-Deemed." This option—as well as two others—were added as described in Section 8.4.

7.2.2 Fuel-substitution measure EULs

Effective Program Year: 2020. The Fuel Substitution Technical Guidance for Energy Efficiency indicates that the measure EUL should be used to calculate lifetime source-energy savings and avoided CO_2 emissions in several places as follows:

- To calculate the life-cycle source energy savings, the fuel substitution calculator multiplies annual source energy factors from Table 2 and Table 3 (in Btu/kWh and Btu/therm for

[20] California Public Utilities Commission, October 31, 2019, "The Fuel Substitution Technical Guidance for Energy Efficiency," Version 1.1. (See: https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442463564.)

electricity and natural gas, respectively) by the site energy savings for each year of the measure's EUL.[21]

- Chapter 2, Section 2.3, p. 7: "Life-cycle CO_2 emissions are defined as the total CO_2 emissions over the EUL of the measure technology.[22]
- As with energy efficiency measures, the EUL and remaining useful life (RUL) values corresponds to the measure technology for the fuel substitution measures.[23,24]

Furthermore, all equations provided in Chapter 3 employ a single EUL variable. As a result, two EULs were added as listed in Section 8.3 to support the submission of a fuel-substitution workpaper for residential cooking appliance upgrades that was submitted in 2020.

7.2.3 Fuel-substitution measure NTG values

Effective Program Year: 2020. The Fuel Substitution Technical Guidance for Energy Efficiency indicates that—consistent with Decision 19-08-009[25]—fuel-substitution measures shall use a net-to-gross ratio of 1.00 until impact evaluation results become available. Details are provided in Section 8.1.

7.2.4 Future fuel-substitution measure considerations

Background:

- Lifecycle CO2 and lifecycle source energy savings are outputs of the cost-effectiveness tool (CET) and are available from CEDARS.
- Methodology for determining lifecycle CO2 emissions is currently being investigated for potential revisions, however these values will continue to be available from CEDARS.
- PAs are required to collect and report infrastructure cost data for downstream measures, but that data is not currently being used because there is no guidance yet on how these costs should be incorporated into the CET calculation or the avoided costs. (That said, it would still be useful to provide a field to collect infrastructure cost data.)

Effective Program Year: 2022. The introduction of fuel substitution energy efficiency measures to the deemed portfolio may require the addition of new fields to the workpaper Ex Ante Data (EAD) tables and the DEER database—which largely share the same data specification. These fields are important for future reporting of California avoided greenhouse gas (GHG) goals and include lifecycle avoided CO2 emissions, lifecycle source energy savings, and infrastructure cost. Discussion of this topic was initiated in 2019 with the Reporting and Data Management Project Coordination Group (Reporting PCG).

To facilitate the lifecycle source and CO2 savings, we are considering modifying the EnergyImpact tables in the DEER databases by adding new *annual* value fields to the existing sets of annual unit energy savings (UES) fields used to track kWh, kW, and therm savings. This change would increase

[21] CPUC. "The Fuel Substitution Technical Guidance for Energy Efficiency," Version 1.1, 2019-10-31, Chapter 2, Section 2.2, p. 6.
[22] Ibid, Chapter 2, Section 2.3, p. 7.
[23] Ibid, Chapter 3, Section 2.2, p. 14.
[24] Ibid, Chapter 3, Section 2.2, p. 16.
[25] CPUC Decision 19-08-009, August 5, 2019, p. 3.

transparency for users of DEER. Both the existing fields and the proposed fields to be added are shown in Table A-7-1.

Table A-7-1. Proposed fields to add to EnergyImpact tables

Status	Category	Fieldname	Savings type		Baseline type	
			Whole building	End use	Pre-existing	Standard practice/ Code
Existing UES fields	Annual electric energy savings, kWh	APreWBkWh	X		X	
		AStdWBkWh				X
		APreEUkWh		X	X	
		AStdEUkWh				X
	Peak demand savings, kW	APreWBkW	X		X	
		AStdWBkW				X
		APreEUkW		X	X	
		AStdEUkW				X
	Annual natural gas savings, therm	APreWBtherm	X		X	
		AStdWBtherm				X
		APreEUtherm		X	X	
		AStdEUtherm				X
Proposed UES fields to add	Annual source energy, kBtu/h	APreWBkBtuh	X		X	
		AStdWBkBtuh				X
		APreEUkBtuh		X	X	
		AStdEUkBtuh				X
	Annual avoided CO2 emissions	APreWBCO2	X		X	
		AStdWBCO2				X
		AStdEUCO2		X	X	
		APreEUCO2				X

CPUC staff propose to write a script to calculate the annual source energy and avoided CO2 emissions using the existing annual electric energy and natural gas savings values. The script will employ the equations provided in the Fuel Substitution Technical Guidance for Energy Efficiency. A similar change will be recommended for the workpaper EAD EnergyImpact worksheet. This change will help automate and consolidate calculations that now need to be performed externally.

Fields that might be considered to track infrastructure costs in the MeasureCost table of DEER for fuel substitution measures include: FSInfraLaborCost, FSInfraMatlCost, and FSInfraInstallHrs.

7.3 Updated energy-efficiency thresholds for water heaters

Effective Program Year: 2021. As part of the effort to update the water heater calculator (described in Section 3.1), recent manufacturer data were downloaded from the Air-conditioning, Heating, and Refrigeration Institute (AHRI) website to verify that the energy-efficient measure requirements are appropriate given the availability of various product categories that are code compliant in the State of

California. A revised version of the water heater binning tool Excel workbook will be made available at the same time as the water heater calculator is released for stakeholder review (by May 1, 2020).

7.4 Residential HVAC heat pump measures for SEER≥19

Effective Program Year: 2022. New measures for high-efficiency heat pumps (SEER 19, 20, and 21) will be created using DEER2020 building prototypes and MASControl3.

8 Support table updates

Throughout the year, additions and modifications must be made to the PEAR database. Once the changes to the PEAR database have been adopted via resolution, these additions and modifications are migrated to the ExAnte database during the month following the resolution adoption. Events that typically trigger additions and modifications to the PEAR database include new IOU workpapers, new CPUC guidance documents, and new CPUC policies. As changes are made to the PEAR database, they are announced via the PEAR Change Log.[26] The changes in the subsections that follow were made since the adoption of Resolution E-5009 for DEER2021 Update.

8.1 New NTG IDs and values

Effective Program Year: 2020. In support of NMEC measures, three net-to-gross (NTG) IDs were added as shown in Table A-8-1 per Resolution E-4952 for DEER2020 Update. Also, in support of the introduction of fuel-substitution measures, an additional NTG ID was added per Decision 19-08-009[27] until impact evaluation results become available.

Table A-8-1. New net-to-gross ratios

Category	Subcategory	NTG_IDs	Electric NTGR	Gas NTGR
NMEC	All Non-Residential	NonRes-sAll-NMEC	0.95	0.95
	Residential Multifamily	Res-sMF-NMEC	0.55	0.55
	Residential Single family	Res-sSF-NMEC	0.85	0.85
Fuel Substitution	All Sectors	FuelSubst-Default	1.00	1.00

8.2 New building type

Effective Program Year: 2020. A new building type, called MFmCmn, was added to represent common areas within multi-family buildings.

8.3 New EUL values

Effective Program Year: 2020. EUL and RUL values were added to PEAR as shown in Table A-8-2.

Table A-8-2. Effective/remaining useful life values for various measures

EUL_IDs	Description	EUL	RUL	Starting
HV-BFMotor	Brushless fan motor at HVAC systems	5.0	1.67	2020-01-01

[26] Available at http://www.deeresources.com/files/deerchangelog/pearchangelog.html.
[27] CPUC Decision 19-08-009, August 5, 2019, p. 3.

EUL_IDs	Description	EUL	RUL	Starting
Appl-Elec_Cooking	Residential electric cooktop and/or oven	16.0	5.33	2020-01-01
Appl-Gas_Cooking	Residential gas cooktop and/or oven	13.0	4.33	2020-01-01
HV-SmartTstat	Smart communicating thermostat (SCT)	9.1	3.03	2019-07-06

The first of the added EUL_IDs was a provided because the EUL_ID that the IOUs were previously instructed to use—HV-ResRCx—was expired without provisions for blower fan motor replacements. A 2013 Disposition[28] states the following:

> *The blower motor is an addition to an existing system. Program rules limit the EUL of maintenance on an existing system to no more than system's RUL. By rule, this is 1/3 of the 15-year EUL for direct expansion HVAC system, or 5 years.*

The second and third of the EUL_IDs listed in Table A-8-2 were added by the Deemed Ex Ante Review team after review of a supplemental notice of proposed rulemaking regarding the life-cycle costs for residential conventional cooking products.[29] The EULs of 16 and 13 years for cooktops and/or ovens fueled by electricity or natural gas, respectively, were selected because this was the year of life through which 50% of units were still in operation.

The fourth and final EUL_ID listed in Table A-8-2 was added subsequent to a workpaper approval (SCE17HCO54 R1) for the smart communicating thermostat measure. The EUL was supported by results provided in a cited memo issued in 2019.[30]

8.4 New measure impact types

Effective Program Year: 2020. In support of fuel-substitution and NMEC measures, the measure impact types shown in Table A-8-3 were added to DEER.

Table A-8-3. Measure impact types for fuel-substitution and NMEC measures

MeasImpactType	Description
Cust-FuelSub	Custom Fuel Substitution: site-specific calculation using approved tool or method
Deem-DEER-FuelSub	Deemed DEER Fuel Substitution: uses DEER-adopted values
Deem-WP-FuelSub	Deemed Workpaper Fuel Substitution: uses values from an approved workpaper
Cust-NMEC-Pop	Population-level Normalized Metered Energy Consumption (NMEC) energy impacts are specified on a custom basis.
Cust-NMEC-Site	Site-level Normalized Metered Energy Consumption (NMEC) energy impacts are specified on a custom basis.

[28] CPUC, "Workpaper Disposition for Residential HVAC Quality Maintenance," May 2, 2013.
[29] Analytical Tools: "Life-Cycle Cost and Payback Period Analysis Spreadsheet.xlsm" provided with Energy Conservation Program: Energy Conservation Standards for Residential Conventional Cooking Products, September 2, 2016. https://www.regulations.gov/document?D=EERE-2014-BT-STD-0005-0049.
[30] "EUL Analysis of Residential Smart Communicating Thermostat – Vendor A and B," Cadmus memo, February 1, 2019.

8.5 New technology type

Effective Program Year: 2020. A new technology type for cooktop and/or oven measures was added that belongs to the pre-existing "Cook_equip" technology group—"Cooking."

8.6 New fields added to workpaper table

Effective Program Year: 2020. New startdate and expirydate fields were added to the source_status tables—in PEAR and ExAnte databases—containing approved workpapers to align with www.deeresources.net information and provide better information to CEDARS. This is categorized as a structural change and was announced at the Reporting and Data Management PCG meeting on January 22, 2020.

9 Transition to eTRM

CPUC staff is currently working on a multi-year transition plan to progressively transition DEER and workpaper activities to the eTRM environment with an ultimate objective of phasing out existing systems. CPUC staff expects to kick-off development, transition and adoption activities in late 2020/early 2021.

10 Considerations for future DEER update cycles

In this section we discuss some of the issues that will need to be considered for future DEER update cycles. Most of these changes will require significant assessment and planning efforts before they can be implemented. We will also need to coordinate with the Commission's IT staff, California Energy Data and Reporting System (CEDARS) staff, Cost-Effectiveness Tool (CET) staff, and the PAs. We will also strive to follow the Commission's internal Data Change Management Protocol which covers procedures to be followed when data system structural changes are needed. If any of these items are determined to be a priority for stakeholders, then we will assess them for inclusion in a future update cycle, but they are currently not scoped or budgeted as DEER update activities. Commission staff will take further action on these items based on stakeholder comments and feedback.

Issues that may be discussed and considered for future DEER updates include:

10.1 Update refrigerated warehouse prototypes

This is a PA recommendation to update the two DEER refrigeration prototypes: Grocery and Refrigerated Warehouse. For these measures the refrigeration system prototypes are modeled in the refrigeration-specific DOE-2.2R tool. New workpaper measures were developed for the Grocery building type. The PA suggested updates include using compressor performance curves to reflect the use of newer refrigerants, updates for stand-alone refrigerated cases and walk-ins, and an overall refresh of the Refrigerated Warehouse prototype similar to the research and updates conducted for the Grocery prototype. We encourage the PAs to conduct the needed research, modify the prototypes accordingly, and develop workpapers for any retired measures that need to be restored.

10.2 Increase EUL for Add-on Equipment (>1/3 EUL of host equipment)

Resolution E-4818 adopted the definition for Add-On Equipment (AOE) as presented in Section 2.2.5 of the Preponderance of Evidence guidance document.[31] The AOE definition states that the EUL of add-on equipment measures is capped at the RUL of the host equipment being retrofitted, and for deemed measure a default RUL is set at 1/3 the EUL. Both the default RUL and the complicated dependency of the AOE on the life of the device it's applied to (two EUL/RUL values need to be considered) have led to PA requests to review and reconsider this decision.

10.3 Custom Projects Guidance: improve DEER tables for EUL and NTG

The EUL and NTG tables in DEER could use some clean up, particularly in the fields that designate the applicability of the NTG records. If a set of categorical parameters was developed for each table that—when taken together—form a unique identifier for each row and required for all claims submitted to CEDARS, then the ID columns of the tables could be removed. In addition, a hard-to-reach (HTR) flag should be included as one of these categorical parameters in the NTG table.

10.4 Weather file update (2022: some measures; 2023: remainder)

The California Energy Commission (CEC) will likely be adopting new weather data for the Title 24 2022 code cycle, which would be effective 1/1/2023. Ideally, the new weather data should also be adopted for the energy efficiency ecosystem. A weather update will also have a major impact on the entire DEER and workpaper system savings values.

10.5 Peak definition revisions

Investigate the "no peak" option as recommended in Resolution E-4952 and by the peak period working group. The "no peak" methodology involves eliminating the peak kilowatt savings reporting. The values of demand reduction under this option would be embedded in the cost effectiveness calculation which would utilize hourly savings profiles along with hourly electric avoided costs applied to the annual savings. This would entail a move to demand savings calculated on a load shape basis with no specific peak period.

10.6 Reduce savings permutations

Although the transition from PA-specific to Statewide workpapers has helped immensely in reducing the number of permutations of savings values, more can be done especially for measures that are modeled with the building prototypes. Parameters targeted for reduced permutations include:

- Building vintages Ten vintage ranges are rolled into four "era" categories, but only two are typically used for claims
- Commercial building types There are 24 commercial and three residential building prototypes
- HVAC system types Some building prototypes are modeled with a variety of HVAC system types

[31] "Early Retirement Using Preponderance of Evidence" (also Resolution E 4818, p. 24) http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5325.

- Climate Zones The 16 CEC Standards climate zones are currently used but smaller regions (groups of similar climate zones[32]) have been used for other IOU and CPUC projects.

10.7 Smart Controllable Thermostat EM&V study results (workpaper measure)

Smart Controllable Thermostats (SCT) are a non-DEER measure but the previous estimate of savings used DEER residential prototype models to extrapolate metered results from a limited set of climate zones to other climates zones, so it was included in the previous DEER Resolution. Our 2018 program year evaluation[33] produced a much more robust savings estimate and load shapes for this measure, so the workpaper will be updated as soon as the evaluation results are vetted and finalized.

10.8 On-bill financing NTG values

Last year's DEER Resolution examined the findings from Opinion Dynamics' PY2015 California Statewide On-Bill Finance Impact Evaluation Study (CALMAC Study ID CPU0181)[34] and suggested that a new more comprehensive and consistent study was needed. A new study is currently being conducted for PG&E[35] and will not likely be available in time for incorporation into this update but should be available for the DEER 2023 cycle and will be considered at that time.

10.9 RASS/CEUS update anticipated

Historically, the Residential Appliance Saturation Study (RASS) and Commercial End Use Survey (CEUS) studies have been used to revise the building prototype models and reconcile annual energy use, as well as check measures savings and other energy use values within the DEER system. Both of these studies are still under way so the data will not be available for this update. The RASS study led by DNV GL is expected to be publicly available by Q4 2020 and available for consideration in 2021 as part of the Resolution for the DEER2023 update. The CEUS study will not be completed until March 2021 and probably will not be available for consideration early enough in 2021 to include in the Resolution for the DEER2023 update; instead, it will likely be considered as part of the Resolution for the DEER2024 update.

Commission staff will take further action on these items based on stakeholder comments and feedback about these issues and their prioritization.

[32] http://capabilities.itron.com/WO024/OtherPages/Information.aspx
[33] "Impact Evaluation of Smart Thermostats (Draft Report) - Residential Sector Program Year 2018", prepared for CPUC by DNV GL, March 11, 2020. https://pda.energydataweb.com/api/downloads/2345/CPUC_GroupA_SmartTstat_PY2018_webinar_updated.pdf
[34] "PY2015 California Statewide On-Bill Finance Impact Evaluation," Opinion Dynamics, 12/31/2017, Study ID CPU0181.01, www.calmac.org.
[35] "PG&E OBF-AP Net-to-Gross and Process Evaluation Study Workplan PROGRAM YEARS 2018-2019" for PG&E by Cadmus, September 2019.