



State of California

M e m o r a n d u m

Date: December 16, 2021

To: California Energy Efficiency Program Administrators

CC: Paula Gruendling, CPUC; Jennifer Kalafut

From: Peter Biermayer P.E., Utilities Engineer, EE Planning & Forecasting Section, Energy Division, CPUC

Subject: REQUEST FOR PROGRAM ADMINISTRATOR RESIDENTIAL MEASURE DETAILS

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## 1 INTRODUCTION

As prescribed in Resolution E-5152 DEER2023 Update, DNV conducted a feasibility assessment for migrating DEER residential building prototypes from using the eQUEST/DOE2™ engine to the EnergyPlus™ engine. Since our assessment found the migration to EnergyPlus was feasible, that migration is now underway for the residential prototypes. However, a user-friendly, publicly accessible EnergyPlus-based system replacing MASControl3® (MC3) is not expected until late 2022. Since it is a priority to include all residential weather-dependent measures on the PY2024-25 approved measure list in this migration, those that are currently modelled by program administrators (PAs) will be migrated and modelled by the CPUC in the interim. The unit energy savings results for all EnergyPlus-modelled residential measures will be uploaded to DEER and synchronized with eTRM for use in updates to existing measure packages. To that end, we require detailed simulation information from the PAs for residential simulated measures that will be updated and submitted for approval before the June 2022 deadline for PY2024-25 approved measures.

## 2 MODELLED RESIDENTIAL MEASURES

A list of the residential measures that will be transitioned from eQUEST models to EnergyPlus models are listed in Table 1 and Table 2. The measures listed in Table 1 reference DEER MeasureIDs and will not require PA input. Updates to measures marked as “priority” will be performed first and will be uploaded to DEER by February 1, 2022 to facilitate inclusion of the updates in measure packages due by March 1, 2022. The “Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/h” measure package submission deadline will be June 1, 2022 even though it contains some commercial measures.

**Table 1. Residential eTRM measures referencing DEER MeasureIDs**

MeasureID	Measure Name	Priority
SWAP001	Refrigerator or Freezer, Residential	
SWAP004	Clothes Washer, Residential	x
SWAP006	Dishwasher, Residential	x
SWHC027	Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/h	
SWHC029	Fan Controller for Air Conditioner, Residential	
SWHC030	Whole House Fan, Residential	
SWHC044	Ductless HVAC, Residential, Fuel Substitution	
SWHC049	SEER Rated AC and HP HVAC Equipment, Residential	
SWSV001	Duct Seal, Residential	

The measures listed in Table 2 do not reference DEER MeasureIDs, and simulations to support these measures have historically been performed by the PAs. As mentioned above, since a publicly accessible EnergyPlus-based system replacing MC3 will not be available ahead of the measure package submission date, we are requesting information from the PAs so we can perform the simulations. Where the measure includes both commercial and multifamily building types, we propose delaying the transition to EnergyPlus until the commercial prototypes are ready except in the case of the “Heat Pump Water Heater, Fuel Substitution” measure. For that measure, the water heater calculator will be updated using an EnergyPlus-based hot water load profile by February 1, 2022 to facilitate measure package submission by March 1, 2022. We request that the PAs review the tables for accuracy.

**Table 2. Additional residential eTRM measures using building simulation methodology**

MeasureID	Measure Name	Priority	Notes
SWHC004	Space Heating Boiler, Commercial & Multifamily	N/A*	Maintain in eQUEST until PY2026-27
SWHC038	Brushless Fan Motor Replacement, Residential		
SWHC050	Ductless Heat Pump, Residential		
SWWB006	Insulation/Sealing for Crawl Space, Residential		Uses CBECC-Res
SWWH015	Demand Control for Centralized Water Heater Recirculation Pump, Multifamily and Commercial	N/A*	Maintain in eQUEST until PY2026-27
SWWH016	Domestic Hot Water Loop Temperature Controller, Multifamily and Commercial	N/A*	Maintain in eQUEST until PY2026-27
SWWH024	Central Boiler Dual Setpoint Temperature Controller, Multifamily		Uses OpenStudio
SWWH028	Heat Pump Water Heater, Commercial and MF, Fuel Substitution	x	Only MFm updates based on EnergyPlus

\* These measures may require savings updates due to the new weather files but will not transition to EnergyPlus models until the commercial prototypes are completed. The measure package submission date for these measures remains March 1, 2022.

### 3 REQUESTED INFORMATION

For the measures listed in Table 2, we request that PAs submit a full set of eQUEST model files in advance of the measure package submission that we will transform and run in EnergyPlus to support residential measure package submission in June 2022. In addition, as part of this detailed simulation information, we request a written summary of the parameters modified and any other modifications made to the model. This will help us understand the reasoning behind the modifications and reduce communication around clarifying questions.

We request the following information from the PAs:

- 1) Review the list of measures in Table 1 and Table 2 for accuracy and inform us of any revisions.
- 2) Summarize the parameters varied and any other modifications made to the simulation models for measures listed in Table 2 and not marked N/A in the Priority column.
- 3) Provide the associated DOE2/eQUEST, CBECC Res or OpenStudio files provided with the measure packages (MPs) using the directory structure shown in Figure 1. These files will be used to validate the parameters and reproduce the results submitted with the MPs.

**Figure 1. Model files typically submitted with a measure package**

Name	Type	Compressed size	Password p...	Size	Ratio	Date modified
InpFiles	File folder					2/10/2021 1:33 PM
make_batch_runs	File folder					2/10/2021 1:33 PM
MC3 setup	File folder					2/10/2021 1:33 PM
post-processing	File folder					2/10/2021 1:33 PM
ProcessQueriesAndSupportTables	Compressed (zipped) Fol...	137 KB	No	137 KB	0%	2/10/2021 1:32 PM
reststatwt.sql	SQL File	11 KB	No	176 KB	94%	2/10/2021 1:32 PM

- 4) Also please provide the MAS Control input and output databases, **“MC2020.db”** and **“MC2020\_results.db”** for each measure, described in more detail in the text that follows.

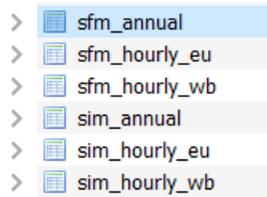
The **“MC2020.db”** input SQLite database contains measure technologies and their parameters that are varied within the eQUEST building simulation model(s) during a MC3 run to create the measure permutations (e.g., air conditioning technologies and their associated SEER ratings). MC3 executes macros to populate the database using the MC3 setup workbooks (files in “MC3 setup” folder in Figure 1).

The **“MC2020\_results.db”** output SQLite database is where MC3 stores the output data after each batch-run has finished. This file contains the following table(s) as shown in Figure 2:

- sfm\_annual (single-family specific annual outputs for “Res” measures; empty for “Com” measures)
- sfm\_hourly\_eu (single-family, end-use, hourly outputs for “Res” measures; empty for “Com” measures or in most cases)
- sfm\_hourly\_wb (single-family, whole building, hourly outputs for “Res” measures; empty for “Com” measures)
- sim\_annual (annual outputs for multi-family and mobile homes for “Res” measures; annual outputs of all building types for “Com” measures)
- sim\_hourly\_eu (end-use, hourly outputs for multi-family and mobile homes for “Res” measures; end-use, hourly outputs of all building types for “Com” measures). In most cases, this will be empty.

- sim\_hourly\_wb (whole building, hourly outputs for multi-family and mobile homes for “Res” measures; whole building, hourly outputs for all building types for “Com” measures)

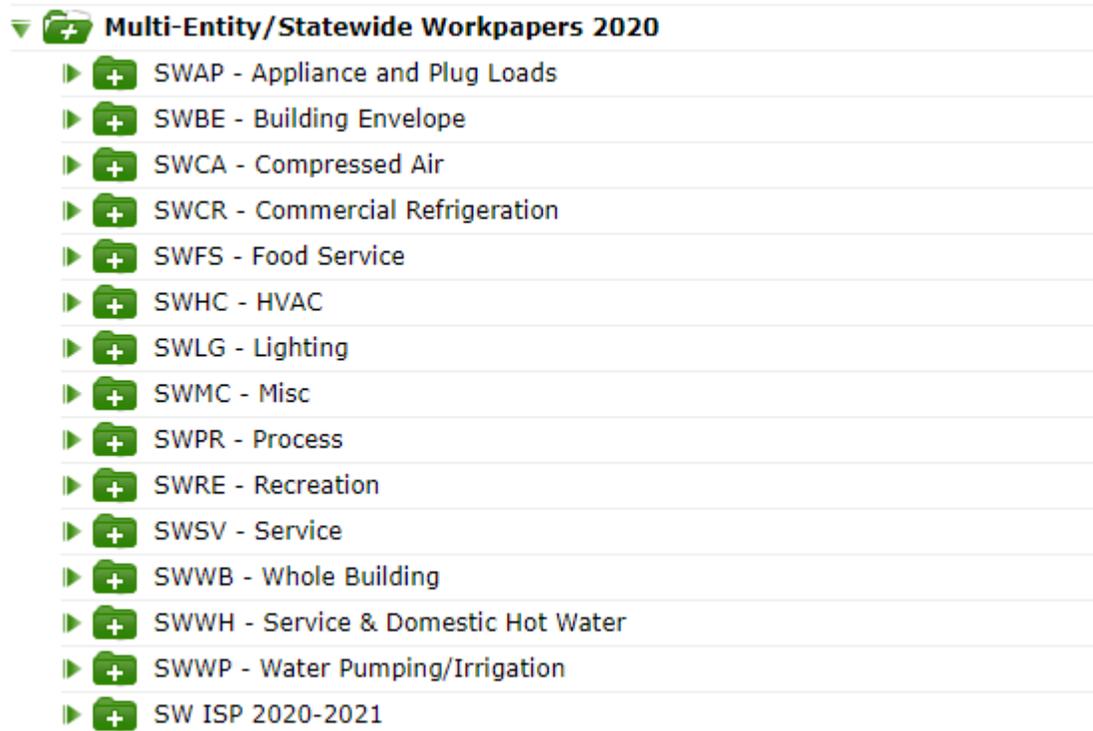
Figure 2. Screenshot of “MC2020\_results.db” tables



#### 4 TIMELINE

We ask that PAs provide their review of the list of measures in Table 1 and Table 2 by December 21, 2021. We will email the final list of measures on December 22.

The PAs then must provide the requested information (in 2, 3, and 4) for priority measures by January 10, 2022 and for non-priority measures by January 28 to ensure enough time for DNV to perform the simulations by February 1, for priority measures, and February 28, for non-priority measures. This information should be provided in a ZIP file and submitted via the Workpaper Project Archive (WPA) in the corresponding end-use folder as indicated below:



For **new** measures, PAs may submit the information after January 28, 2022 and simulated results for those measures will be uploaded to DEER within one month of the submission date.

As a reminder, Program Administrators have until March 1, 2022 to submit residential non-weather-dependent measure packages (indicated as priority measures) and until June 1, 2022 to submit residential weather-dependent measure packages for the PY2024-25 program cycle.