CPUC Comments on SWWH028-01 Large HPWH, MF (workpaper plan dated May 19, 2021)

Lead PA: SCE

Workpaper Plan Submittal Date: 5/19/2021

CPUC Review Date: 06/14/2021

Please note responses to comments in the table below, revise workpaper, and upload the entire package to the WPA. If needed, please reach out to Workpaper Review Team to set up a call to discuss.

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| CPUC Comment | PA Response |
| The DWHC that was submitted with this WPP (dated May 19, 2021) contained only the MFM measures (SWWH028A through D). There was a previous submittal that contained both Res and Com measures (A through H). Based on the WPP, it appears that the NormUnit was changed to “Cap-Kbtuh” for both Res and Com measures**. Can you provide the other DWHC that contains the Com measures with the adjusted NormUnit = “Cap-kBtuh”?** | All changes described in our responses will be made in draft workpaper submission.  We will submit 3 different calculations which separate the Res, Com and Ind measures and submit with the workpaper. |
| This comment is in response to the request for CPUC input on the WPP   1. Either NormUnit may be used. The v.4.2 DWHC was released with Res measures having NormUnit = “Each” and Com measures having NormUnit = “Cap-kBtuh”. Cap-kBtuh is the rated input capacity (in kBtuh) of the water heater. 2. Conceptually, the 54-dwelling unit multiplier appears reasonable as a means to estimate a central multi-family hot water profile. The replacement of the “Asm” building type hot water profile with the 54-unit MFM profile can be confusing and must be obviously noted in the calculator and the workpaper. The EAD tables created from the EnergyImpact outputs from the “\_Add Mfm” DWHC will also need to replace the “Asm” building type with “MFm”. 3. The referenced sources appear appropriate for additional cost data to account for the “one-to-many” scenario that is very likely to be encountered for replacement of gas-fired heaters with HPWHs.   Other costs not noted in the WPP may include   * more involved electrical service expansion to accommodate for additional circuits (e.g., not only 240V wiring but sub-panel installations if physical breaker positions or ampacity limits exist, high ampacity circuit breakers for backup electric elements, etc.) * additional storage tanks * modular heat pump units (compressor only with tanks sold separately or split system HPWHs) * intake and exhaust venting options | State that we will use CASE paper costing.   1. We will move forward with the “Cap-kBtuh” capacity for the measures. 2. We will update all MFm measure savings to use the MFm building type instead of Asm in final calculations. 3. We were not able to get much installed information from our original sources. However, we will leverage data and supporting calculations from the “2021 All-Electric Multifamily Compliance Pathway”[[1]](#footnote-1) which calculates installation costs for central HPWH systems including the electrical, storage tank, and modular setups that you noted. These costs will be included in the analysis. Electrical infrastructure costs will be reported separately based on fuel substitution measure requirements. |
| No response is necessary  The sizing method used in the v.4.2 calculator sizes the number of technology units necessary to satisfy peak hot water load (in gallons/hour) according to a combination of heating capacity and hot water storage volume. The HPWH technology IDs currently in the v.4.2 DWHC are structured around stand-alone packaged units and not built-up systems that would typically be found in central multifamily heat pump water heater systems, especially those with 10 or more dwelling units. | Based on our research, central DHW systems can be set up with several standalone tanked water heaters or the built-up systems that you mentioned.  For this version of the workpaper, we will leverage existing v4.2 tech IDs for the savings. |
| No response is necessary  The DWHC provided with the WPP multiplies the DEER2014 res use schedule (column AI) by 54 to estimate the central MF hot water profile. In the DWHC v.4.2, the DEER2014 schedule/profile was utilized for demand reduction estimates while the normalized NREL event schedule (column AC) is used for annual energy savings.  Both profiles have the same annual hot water usage and average gallons/day (the NREL profile are normalized to the DEER2014 profile), but the NREL profile has a much larger peak/max hourly value. This has a very abrupt impact on the sizing calculation. For example, using the WPP-supplied DWHC, the NumUnits (number of units needed to satisfy peak HW load) for SWWH028B is 2. If, however, the NREL profile is used as the “shape” of the central MFM profile, the NumUnits for SWWH028B becomes 49. Realistically, for the assumed 163.50 person, 54-dwelling unit multifamily building, the number of units would be greater than 2 but less than 10-15 (the number of units depends heavily on storage tank volume).  Had the “added” central MFM profile in the 028-01 DWHC used column AC (the NREL profile), it would have technically followed precedent for the other residential sector building types. However, under the sizing method and scope of the v.4.2 calculator, we believe the more reasonable selection for the central multifamily profile is the profile that was selected by this WPP (DEER2014 - column AI).  The DEER2023 updates will include an update to the water heater calculator. The update intends on adding a central multifamily hot water profile and applicable technologies | Noted – will include that the savings are planned to be updated in future revisions based on the new DEER2023 updates. |
| **Can you elaborate on what types of HPWHs (make/model) you realistically expect to be claimed through the program(s)? Do you expect to have stand-alone units like the ones modeled and selected in the calculator (e.g., 80 gallon residential-style unit with UEF, 120-gallon CHP-120, etc.)?**  If the program expects to install more custom-type built-up units typical with larger multi-family HPWH systems (e.g., single pass ganged systems that have multiple compressors serving multiple large primary storage tanks) serving the ~54 unit 164 person building estimated by the hot water profile, **we may recommend that new TechIDs be developed that represent these types of built-up systems**. TechID development may involve performing research to determine what combinations of compressor + storage volumes are typically implemented for a variety of building and occupancy types.  **We may also request additional product eligibility requirements to be added to the workpaper**  The DEER2023 updates intend on developing TechIDs that represent built-up systems using multiple compressors and storage tanks | Noted – we will continue to use the existing v4.2 tech IDs for the current version of the workpaper. However, we will include that the savings are planned to be updated in future revisions based on the new DEER2023 updates.  We will also update the eligibility requirements to be inclusive of built up systems, stating that capacities and efficiencies should be representative of the full system, not simply the components. |
| Comment added from March 01, 2021 CPUC review and comments  For downstream deemed and downstream direct install, it is recommended that more data be collected than what is described in the workpaper:   * Heat pump water heater UEF or COP * First-hour rating (FHR) or maximum GPM of the heat pump water heater * Installed location (conditioned, unconditioned space) * For installations in conditioned space, the building heating and cooling type (e.g., Packaged AC with gas furnace, packaged heat pump, central plant CHW/HW) * Is heat pump water heater exhaust ducted to outside or unconditioned space? (Yes/no)   Is heat pump water heater intake ducted to outside or unconditioned space? (Yes/no) | We will add this requirement to the eligibility section of the workpaper. |
| Regarding the Sector = “Ind” measures (SWWH028I, J, K, and L), for mid- and upstream claims, is it the intent to use building type = “Com”? See the other comments below regarding the “Ind” sector designation. | For Ind sector we will state that the building type with more conservative savings should be used to claim upstream /midstream savings. Based on the current analysis, the MLI building type has lower savings on average. |
| Comment added from March 01, 2021 CPUC review and comments  The electric savings (kWh) section mentions that *“The DEER Water Heater Calculator tool version 4.2 includes a Com building list which includes two building types which are classified as Industrial (MBT and MLI).* ***These two building types were removed*** *from the Com results and new Energy Impact IDs and Measure IDs were created for Industrial sector using the DEER Water Heater Calculator tool version 4.2 results for MBT and MLI building types.”*  However, the included water heater calculator workbook does not appear to have modified the Com building list removing the MBT and MLI weights. Additionally, the Com Energy Impact IDs and Measure IDs (e.g., SWWH028H) still contain the MBT and MLI building types in the EAD table workbook. Please add clarification regarding what building type will be applied for upstream/midstream industrial installations, and whether retaining MBT and MLI building weights in the Com building type was intentional. | We will remove the MLI and MBT building weights from the Com sector savings calculation to recalculate the weighted sector savings and clarify in the workpaper document. |
| Comment added from March 01, 2021 CPUC review and comments  If Com weights were altered or any other alterations were made (other than changing Normalization unit from Cap-kBtuh to Each) to the attached Water heater calculator, please note them in the DEER Difference Summary table.  If additional weighting was performed outside of the water heater calculator, please mention those steps in the DEER Difference Summary table. | We will note the changes in the DEER Difference Summary table. |

1. Pande, A. et al. TRC. 2021. Codes and Standards Enhancement (CASE) Initiative 2022 California Energy Code, All-Electric Multifamily Compliance Pathway. Prepared for California Energy Codes and Standards statewide utility program. 2022-MF-AEP-F [↑](#footnote-ref-1)