CPUC Comments on SWWH005-04 Boiler, Commercial

Lead PA: SCG

Workpaper Submittal Date: 9/20/2021

CPUC Review Date: 10/04/2021

SCG Response Date: 10/15/2021  
CPUC Review Date: 11/1/2021  
SCG Response Date: 11/18/2021  
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| CPUC Comment | PA Response |
| The Technology Summary has a couple sentences that sound contradictory:  “The commercial boiler has a relatively high energy efficiency levels  because standby losses of a storage tank is essentially eliminated.”  “A hot water boiler is most efficient in combination with a large hot water storage tank”  “The commercial boiler is inefficient for applications without a storage tank due to the temperature loss in the circulation system, which causes the instantaneous water heater to run without water demand.”  The sentences read like boilers are efficient because they don’t have standby losses from storage tanks but are more efficient when combined with storage tanks. Obviously, this section doesn’t affect measure/tech definition or UES but I recommend the summary be refined. | We will work to clarify these statements.  Boilers are more efficient than storage water heaters due to the elimination of a storage tank, but should utilize an intermediary storage tank when the building has a hot recirculation water loop. |
| I think it’s important to differentiate between commercial hot water supply boilers and commercial instantaneous water heaters. And to differentiate between hot water supply boilers and commercial packaged boilers. There is some vague terminology in state and federal code that creates some overlap.  CA Code of Regulations (20 CCR Section 1602.f) defines commercial hot water supply boilers as:  **A packaged boiler that is industrial equipment and that:**  **(1) has an input rating from 300,000 Btu/hour to 12,500,000 Btu/hour and of at least 4,000 Btu/hour per gallon of stored water;**  **(2) is suitable for heating potable water; and**  **(3) meets either or both of the following conditions:**  **(A) it has the temperature and pressure controls necessary for heating potable water for purposes other than space heating; or**  **(B) the manufacturer's product literature, product markings, product marketing, or product installation and operation instructions indicate that the boilers intended uses include heating potable water for purposes other than space heating.**  This workpaper (SWWH005) is meant to cover the commercial hot water supply boilers, but also includes instantaneous water heaters.  I bring this up because depending on future federal/state code and their definitions of these technologies, there may need to be some separation in these technology and measure descriptions.  I also bring this up because I recommend there needs to be eligibility criteria (under “eligible products”) that further stresses the need for equipment to “be used primarily for domestic hot water”; however, I recognize the program exclusions section does make clear that “water heaters or hot water boilers used for space conditioning, process end-use applications, pools, or spas” are not included.  The UES for all DEER water heater measures use hot water loads associated with domestic hot water only. If boilers serve other loads their savings can be underestimated.  This comment is not asking anything specific to be changed in the workpaper, but I wanted to express my thoughts and maybe hear back from your team. | Agree, there could be some overlap in the QPL between space and water heating boiler workpapers SWWH005 and SWHC004.  The workpaper is very clear that these measures are only for boilers that serve Domestic Hot Water, and this is verified as part of the rebate process. |
| Include a “DEER Measure Codes” table in the “Gas Savings (therms)” section of the workpaper. Include mapping from the statewide measure offering ID (e.g., SWWH005A) to the Energy Impact ID (e.g., NG-WtrHt-SmlBoiler-Gas-lt200kBtuh-lt2G-MD-0p84UEF). See the table in SWWH006-06 for context. Have the measure description and comments re: the DEER version or adaptation of the DEER version.  Also, within the gas savings section, explain the UES calculation of the large boilers (C,D, and E) in a little more detail. Mention that since the base case technologies of the (DEER2014 and DEER2021 DWHC v.4.2a) large instantaneous water heaters were all 0.8Et gas storage, you could reasonably subtract the “base case” UES of NG-WtrHt-LrgInst-Gas-gt200kBtuh-0p80Et from the “measure case” UES (e.g., NG-WtrHt-LrgInst-Gas-gt200kBtuh-0p90Et) to estimate savings for scenario where base case = 0.80Et instantaneous and measure case = 0.90Et instantaneous. | Agreed. We will add clarification to the Gas savings section. |
| The DEER Difference Summary table (located in the DEER Differences Analysis section) requires updates. There is a bit of interpretation to consider for:   * Modified DEER Methodology * Scaled DEER measure   The DEER methodology is technically followed because either DEER database values or the DWHC tool was used, but we’ve had precedent by labeling “custom” measures generated in DWHC as modifying DEER methodology. Please keep “Modified DEER Methodology” as “Yes”, but explain it’s specifically for the small boilers and adding those custom measures in the DWHC v.4.2 tool. You can also re-iterate the “scaling” language change I bring up, below.  The DEER measures are also not really scaled in the intent of the word, but you have taken differences of measure UES to effectively change the baseline of the EnergyImpact IDs / measures. I would qualify “Scaled DEER measure” as “No”, but explain the re-baselining.   * DEER version   Mention DEER2021 (DWHC v.4.2a) for the 0.96Et large boiler   * Reason for Deviation from DEER   Remove “scale” and replace with “rebaseline” or something similar.   * DEER Run and Measure IDs   Include the EnergyImpact / MeasureIDs used to describe the SW IDs:   |  |  | | --- | --- | | A | NG-WtrHt-SmlBoiler-Gas-lt200kBtuh-lt2G-MD-0p84UEF | | B | NG-WtrHt-SmlBoiler-Gas-lt200kBtuh-lt2G-MD-0p87UEF | | C | NG-WtrHt-LrgBoiler-Gas-gte200kBtuh-lt2G-0p84Et | | D | NG-WtrHt-LrgBoiler-Gas-gte200kBtuh-lt2G-0p90Et | | E | NG-WtrHt-LrgBoiler-Gas-gte200kBtuh-lt2G-0p96Et | | Done. |
| I referenced the workbook “DEER-WaterHeater-Calculator-v4.2 SoCalGas Custom measures.xlsm” from the SWWH005-03 submittal. There are measures in that workbook that are not applicable for SWWH005-04. Can you remove those measures (the large boilers) and technologies (the four “custom” gte200 kBtuh instantaneous entries), and supplement the new workbook with the SWWH005-04 submission? In other words, the SWWH005-04 submission should have a “custom” version of the DWHC that adds only measures used in the -04 submission. | We can add the edited custom calculator with only the small boiler measures added in with the submission. We didn’t include initially because it is so large. |
| SWWH005 (Hot Water Supply Boilers) and SWWH006 (tankless/instantaneous water heaters) use similar measure technologies to estimate savings. Is there a reason why these two packages are separate? Besides the base case assumptions, savings are derived from similar sources and assume DHW-only hot water loads.   * Are there specific eligible product lists for SWWH005 and SWWH006? How are upstream claims binned in to either boilers or tankless i.e., when is the product designated a boiler or tankless in the program tracking system? * Are there specific applications encountered in buildings participating in the water heater programs where boilers are used over instantaneous water heaters? Have you encountered instances where a boiler is replaced by an instantaneous? Or vice-versa? If the program gets an application for a boiler to replace a gas storage heater, do you apply the SWWH006 measure (because that measure has the appropriate baseline tech)? | Historically they have been different workpapers due to the different baselines.  The next two questions may be more appropriate for the program implementation phase of the workpaper.  There are two QPLs for the midstream program based on how the water heaters are certified as boilers or tankless water heaters. The downstream claims are binned by asking the existing water heater type on the rebate application to determine the appropriate baseline.  We don’t see many (if any) boilers replacing storage water heaters in our downstream program. We do see boilers replacing boilers, and small tankless rack systems replacing boilers or large tankless systems |

Chris Williams follow up comments to PA responses. Follow up comments will require that the workpaper get amended with material/tables referenced below.

We do have a couple requests regarding your revisions:

* We were mistaken regarding one of our comments about naming some EnergyImpact/DEER Measure IDs. We had asked to add a DEER Measure ID table and gave an example of an entry as “NG-WtrHt-SmlBoiler-Gas-lt200kBtuh-lt2G-MD-0p84UEF”. We can only reference something as a EnergyImpact ID or DEER Measure ID if it exists in PEAR or the DEER database. Even though the SmlBoiler and LrgBoiler names would be suitable names for the DEER Measure ID, we can’t technically call them a “DEER Measure ID” until it exists in PEAR
* Because of this, we need to modify/add some table columns in to the “DEER Measure IDs” table that you added under the Gas Savings section. Just drop the table below in if you agree with its entries. **Please input this table into the next Measure Package submission if you agree with its entries.**

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| Statewide Measure Offering ID | Measure Description | Energy Impact ID\* | Relationship to EnergyImpact ID | DEER Version |
| SWWH005A | Small Gas Boiler < 200 kBtuh,  UEF ≥ 0.84 | NG-WtrHt-SmlInst-Gas-lt200kBtuh-lt2G-MD-0p81UEF-40g | Modified the baseline technology from storage to instantaneous and modified measure efficiency | DEER-WaterHeater-Calculator-v4.2 (Custom) |
| SWWH005B | Small Gas Boiler < 200 kBtuh,  UEF ≥ 0.87 | NG-WtrHt-SmlInst-Gas-lt200kBtuh-lt2G-MD-0p87UEF-40g | Modified the baseline technology from storage to instantaneous | DEER-WaterHeater-Calculator-v4.2 (Custom) |
| SWWH005C | Large Gas Boiler ≥ 200 kBtuh,  Et = 0.85 | NG-WtrHt-LrgInst-Gas-gt200kBtuh-0p85Et | Modified the baseline technology from storage to instantaneous | DEER2014 |
| SWWH005D | Large Gas Boiler ≥ 200 kBtuh,  Et = 0.90 | NG-WtrHt-LrgInst-Gas-gt200kBtuh-0p90Et | Modified the baseline technology from storage to instantaneous | DEER2014 |
| SWWH005E | Large Gas Boiler ≥ 200 kBtuh,  Et = 0.96 | NG-WtrHt-LrgInst-Gas-gte200kBtuh-lt2G-0p96Et | Modified the baseline technology from storage to instantaneous | DEER2014 and DEER-WaterHeater-Calculator-v4.2a |

\**All statewide measure offerings are modified from existing DEER EnergyImpact IDs or are customized using the DEER Water Heater Calculator. The IDs shown in this column are those that most closely resemble the statewide offering or were used as starting points for the statewide offering*

* We wanted a little more context and description in the DEER Difference Summary table. We updated your revised table and added some additional description, below.

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| DEER Item | Comment / Used for Workpaper |
| Modified DEER methodology | Yes – Modifications were made by: (1) Small boiler measures were custom added to *DEER-WaterHeater-Calculator-v4.2*; (2) large boiler measures modified DEER2014 and *DEER-WaterHeater-Calculator-v4.2a* EnergyImpact IDs by re-baselining from storage water heaters to instantaneous water heaters. |
| Scaled DEER measure | No. The large boiler measures use DEER2014 and *DEER-WaterHeater-Calculator-v4.2a* EnergyImpact ID UES values to effectively re-baseline from storage water heaters to instantaneous water heaters. |
| DEER Base Case | Yes |
| DEER Measure Case | Yes |
| DEER Building Types | Yes |
| DEER Operating Hours | Yes |
| DEER eQUEST Prototypes | n/a |
| DEER Version | DEER2014 – Large Boilers (85% & 90% TE)  DEER2014 and DEER2021 (*DEER-WaterHeater-Calculator-v4.2a*) – Large Boilers (96% TE)  DEER2021 (*DEER-WaterHeater-Calculator-v4.2*) – Small Boilers |
| Reason for Deviation from DEER | Added in modified versions of small and large units to create a lower “Tier 1” boiler.  Added new measures into the calculator to create savings for energy efficient instantaneous water heaters in replacement of code/standard instantaneous water heaters  Changed baseline of large tankless water heater measures using the 80% TE offering as the baseline for Boilers (DEER measures assume storage baseline) |
| DEER Run and Measure IDs Used  (original EF IDs used as UEF based IDs are not available) | Added: Instantaneous Water Heater, ≤ 200 kBtu/hr, Tier 1 (≥0.84 UEF) –  A - NG-WtrHt-SmlInst-Gas-lt200kBtuh-lt2G-MD-0p81UEF-40g (*modified baseline technology and measure efficiency*)  Added: Instantaneous Water Heater, ≤ 200 kBtu/hr, Tier 2 (≥0.87 UEF) –  B - NG-WtrHt-SmlInst-Gas-lt200kBtuh-lt2G-MD-0p87UEF-40g (*modified baseline technology*)  C - NG-WtrHt-LrgInst-Gas-gt200kBtuh-0p85Et (*modified baseline technology*)  D - NG-WtrHt-LrgInst-Gas-gt200kBtuh-0p90Et (*modified baseline technology*)  E - NG-WtrHt-LrgInst-Gas-gte200kBtuh-lt2G-0p96Et (*modified baseline technology*) |
| NTG | Source: DEER. NTG of 0.60 is associate with NTG ID: *Com-Default>2yrs* |
| GSIA | GSIA ID: *Def-GSIA* |
| EUL/RUL | The EUL of 20 years is associated with EUL ID: *WtrHt-Instant-Com* |