

Memorandum

To: Lisa Skumatz and Bob Wirtshafter, Connecticut Energy Efficiency Board Evaluation Consultants

CC: Craig Diamond, CT EEB Executive Secretary

From: Glenn Reed, CT EEB Residential Technical Consultant

Date: January 30, 2018

Re: Residential Technical Consultant comments on the 12/22/17 Review Draft for Project R1613 and R1614 – HVAC and HPWH Process and Impact Evaluations

Provided below are summary and highlight comments on the December 22 review draft of the HVAC and HPWH Process and Impact Evaluations Report (R1613 and R1614). These comments supplement those contained in the marked-up draft report that was also submitted. Most of the comments below are included in the marked-up draft and are provided here as a high level summary and for emphasis.

1. Overall, consider:
 - Inclusion of a glossary of terms.
 - Defining winter and summer peak periods upfront in the report (not in a footnote).
2. Footnote 5 reads:

Historically, CEEB provided residential customers rebates for HVAC and water heating equipment through the Home Energy Solutions program, where customers required an audit to receive a rebate

This is incorrect, except possibly for higher resistance to HP rebate.
3. Future evaluations should consider assessing the adequacy of the Program's onsite QA/QC processes and the impact of financing on overcoming customer and contractor barriers to installing high efficiency HVAC and DHW equipment. There are multiple financing offers available to utility customers.
4. Boilers
 - While the proposed 85% AFUE baseline may be appropriate, there appear to be very few gas boilers available in the 86.0-89.9% AFUE range.

- A significant percentage of boilers (~40%) were not condensing in temperature bins ($\leq 30^\circ$) where many (most?) HDDs are, but the efficiency penalty was only two AFUE percentage points. Please confirm that this performance penalty is correct.

5. Circulating pumps

- There are two related comments in Section 8 (Conclusions and Recommendations) speaking to efficient pump hours of use:
 - i. many installed in low use locations
 - ii. Recommend standard pumps for applications where the circulating pump is not expected to be in regular use

However, there was no discussion of this in the ECM Pump impact discussion (Section 4.3). Was there evidence that metered ECM pumps were being installed in zones with lower than average hours of use? The presentation and discussion of the calculated FLHs in Section 4.3 does not imply this.

- There is a four-fold difference in efficient vs. baseline kW (Table 4-16). This needs some further explanation.

6. HPWH

- The 10% interactive penalty seems somewhat arbitrary. Does this factor need further research?
- 30% of units are self-installed (or by a friend or family member). Is this allowed by the program and/or by CT code?
- Need a PSD equation (similar to equation 4-7) to allow for varying (higher) program EFs/UEFs.
- Should footnote that the new federal DHW metric is now UEF, not EF. This comment is not in the marked-up draft report.

7. Furnace Fans

- Appears that all pre-installation billing data assumed a PSC motor (p. 4-34). If so, this may be incorrect. CT has had a nontrivial % of furnace sales at 90% AFUE and above for some time, many of which may have had ECM fans.

8. Baseline Method

- Distributor and contractor responses are given equal weights, but should they? One might argue that distributor responses (with a much better response rate) in an upstream program like CT's are more indicative of actual sales activity.