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| **To:** | Sue Haselhorst, Ex Ante Review Team |
| **From:** | Chan Paek, SoCalGas |
| **Date:** | March 22, 2019 |
| **cc:** | Peter Biermayer, Energy Division Kerri-Ann Richards, Ex Ante Review Team; Martha Garcia, SoCalGas; Paul Deang, SoCalGas |

**Response to Ex-Ante Review Comment on WPSCGREWH180305A-Rev00**

This memo addresses a comment from Ex-Ante Review of the workpaper WPSCGREWH180305A-Rev00 Multi-Family Central Boiler Dual Setpoint Temperature Control.

On February 25, 2019, the CPUC provided following comment about the workpaper.

The assumption that most pipe in a building is not insulated seems like a very large assumption to make especially since half of the savings in this measure comes from uninsulated pipes. It would be good to see some reference on how well or not pipes are insulated in multi-family buildings.

**SoCalGas’ Response**

In response to above comment on the workpaper, SCG provided following initial response on February 27, 2019.

* Modeling assumptions were chosen to calibrate the simulation results with reasonable MF baseline consumptions.
* It is needed to investigate the source/reference and the effect of recirculation pipe assumption.
* SoCalGas will notify the EAR team by Friday, March 22nd, 2019 whether the workpaper can be updated with minor changes in the description or needs re-calculation with revised model assumptions.

SoCalGas reviewed the workpaper and related documents to provide further explanation about the uninsulated pipe assumption. The MF hydronic system in the workpaper was modeled using OpenStudio which is based on EnergyPlus software program. Baseline energy usage were calibrated for accuracy using the DEER Water Heating Calculator spreadsheet, DEER Thermostat spreadsheet, as stated in the workpaper page 16.

According to a study done by KEMA Energy Services in 2008[[1]](#footnote-1) (Multifamily Boiler Controls – Process Evaluation, page 4-16, Figure 3), 80% of inspected hot water heating systems were found to have uninsulated piping.

In Best Practices for Efficient Hot Water Distribution in Multifamily Buildings[[2]](#footnote-2), it is stated that “after the hot water has been generated, 49% of that heat energy radiates off the pipes and into the surrounding air, most often into unconditioned space” (page 2-16).

2019 Residential Compliance Manual[[3]](#footnote-3) is another good source for a rough percentage about distribution loss. Page 5-3 states, "In a typical multifamily building, distribution losses can account for more than 30 percent of total water heating energy use."

In agreement with above references, Table 12 in the workpaper shows pipe heat loss of 48.9%, 48.4%, and 33.8% as simulated under different weather conditions in CZ06, CZ09, and CZ16. These values are results of various modeling assumptions, including bare pipe mostly located within the building. The multi-family model in the workpaper includes 12 dwelling units, 1,000 sq. ft. per each, and over 600 ft of indoor piping for hot water recirculation.

SoCalGas believes the model assumptions in the workpaper, such as “copper with no insulation” for piping material, were necessary to produce reasonable simulation results that align with multiple references and studies. SoCalGas appreciates Energy Division Staff’s attention and response to this matter and looks forward to continuing collaboration with the Energy Division in updating this workpaper. Please contact Chan Paek (CPaek@semprautilities.com), or Paul Deang (PDeang@semprautilities.com) for any further questions.

1. Multifamily Boiler Controls – Process Evaluation, KEMA Services Inc,  <http://www.calmac.org/publications/MFR_Boiler_Controls_Final_Report_April_22_08.pdf>, Figure [↑](#footnote-ref-1)
2. 2012 ACEEE Summer Study on Energy Efficiency in Buildings, Gabriel D. Ayala and Derek Zobrist, <https://aceee.org/files/proceedings/2012/data/papers/0193-000030.pdf> [↑](#footnote-ref-2)
3. 2019 Residential Compliance Manual, Title 24, Part 6, CEC, <https://www.energy.ca.gov/2018publications/CEC-400-2018-017/CEC-400-2018-017-CMF.pdf> [↑](#footnote-ref-3)