



Subcommittee Tracking Sheet: Residential HVAC Quality Installation Data Sources

Meeting #4: June 10th, 2015

I. Agenda Items for Discussion/Materials

- a) Revisit subcommittee objectives to use best available data, how other comments outside scope will be captured and considered.
- b) Discuss outcomes from Cal TF discussion of Res QI on May 28th
 - i. Airflow performance (W/CFM) – question of why not using measured data for baseline instead of Title 24, comment that Title 24 value is reasonable.
 - ii. Duct leakage – numbers reasonable
 - iii. Suggestion to simplify modeling by condensing measure combination, look at Energy Upgrade California program approach and consider combining climate zones – Andres to discuss
- c) Review revised subcommittee deliverable draft
 - a. Cal TF staff recommended changes to data sources to be consistent and use measured data
 - i. Use WO32 results for airflow performance (W/CFM) baseline instead of Title 24 (0.569 instead of 0.58)
 - ii. Use WO32 results for airflow capacity (CFM/ton) measure instead of Title 24 (338 instead of 250)

II. Meeting Attendees

Jenny Roecks, Cal TF staff

Martin Vu, TF Member

Andres Fergadiotti, SCE

Scott Higa, SCE

Christin Hanhart, UCONS

Buck Taylor, Roltay Energy Services, Inc.

Raad Bashar, SCG

Chan Paek, SCG

Josephine Unverferth, SDG&E

Ed Reynoso, SDG&E

Justin Kjeldsen, PG&E

Chris Li, PG&E

Mark Modera, Western Cooling Efficiency Center

III. Key Issues Discussed

- Measure simplification
 - Considering reducing number of measure combinations by selecting 6 representative climate zones similar to the Energy Upgrade California (EUCA) workpaper
 - Consider selecting one vintage that is representative of majority of households
 - Reducing the number of building simulations may not be necessary because the Res QI program is a performance approach so the “measures” in the program are not simulated separately, whereas EUCA has thousands of potential measure combinations.
 - Commission staff feedback has not been received on the EUCA workpaper approach to combine climate zones.
 - Suggestion to use a bin analysis instead of DOE2 modeling software. Even a simple bin hour approach on project-by-project basis will estimate savings from decreasing load (improving ducts) and improving system efficiency – overall airflow and EER. Bin hours would give you the relative % of savings between before and after. Possibly more efficient use of resources for reasonably accurate results.
 - Res QI is not like EUCA – not changing the building envelope. With Res QI building loads are estimated using manual J, which is a peak method, so you can only do a bin hour analysis. DOE2 is thermal mass modeling by contrast
 - Simplification approaches will be discussed with the greater TF at June 25th meeting.
- Deliverable
 - Duct Leakage
 - Per Andres, EUCA data is similar to Res QI program data but is split out by vintage
 - Make note of EUCA data – look at weighted average of duct leakage from EUCA using RASS vintages (WO 32 suggested using RASS)
 - Other comments regarding Tom Eckhart concerns about energy savings viability of duct leakage reduction in California: Christine Hanhart to send Cadmus study for Avista

ACT: Christine Hanhart to send Cadmus study for Avista

- Other comments regarding modeling methodology:
 - The DEER DOE2 building prototype outputs for duct leakage should be compared to ASHRAE Standard 152.
 - Impact of new equipment, variable speed fans on duct leakage
 - Investigate laboratory efforts (EPIC) pursued by EPRI, Davis, PG&E

- Impact of continuous fan operation on duct leakage

ACT: Andres to connect with Mark Modera on EPIC project, SCE lab efforts

- Equipment oversizing
 - Energy Center of Wisconsin study also did not use manual S, but used nominal sizing in a simplified analysis
- Airflow performance (W/CFM)
 - Original subcommittee recommendation was to use 0.58 (T24), recommend using 0.569 from WO32 to be consistent with use of measured data to support assumptions (Cal TF was okay with 0.58 approximation)
 - Too many significant figures – should be two decimal places realistically
- Airflow capacity (CFM/ton)
 - Cal TF staff recommendation to use WO32 to support measure case instead of Title 24 value
 - Consideration that 350 CFM/ton is the middle range between WO32 results (338 CFM/ton) and Proctor study with 1990's results for Las Vegas new construction and California new (on range of 380 CFM/ton, sample sizes ~40 and 5, respectively) – recommend these two because they are both “new” equipment to represent measure case, and both reference same author (Proctor)
 - Adjusted capacity should be used and not nominal capacity
 - Subcommittee recommendation to use 350 as middle value between WO32 and Proctor ACEEE study.
- Refrigerant charge and adjustment
 - Chris Li recommends looking at a Mowris study (will send to Andres)

ACT: Chris Li to send Mowris information to Andres Fergadiotti

IV. Action Items

- Andres to connect with Mark Modera on EPIC project, SCE lab efforts
- Chris Li to send Mowris information to Andres Fergadiotti
- Christine Hanhart to send Cadmus study for Avista