

Questions on the Data Analysis of HVAC and Refrigerator Installs in the AE Low Income Weatherization Program. (Memo date 01/09/2015) as submitted by Tim Arndt

- 1. How were the 857 homes of the 1886 homes retrofitted under the Federal WAP program chosen for the analysis?**
 - a. The group of homes for the analysis was pulled from an ARRA funded low income program where work was completed between the dates of 4/2010 and 4/2012, some 1730 homes were identified as potential evaluation candidates.

- 2. What is the expected life of the product installed?**
 - a. Life of product depends on product itself. Lighting is five years, A/C is 15 years. Envelope measures can be 20 years.

- 3. How many of the HVAC systems were electric heat or heat pump and how many were gas furnaces? What was the SEER/EER rating?**
 - a. The current analysis was based on a request to assess the savings for AC installs, refrigerator replacements, and AC and refrigerator replacements as compared to weatherization only measures. The analysis did not include equipment-specific details. Adding that level of detail to the analysis will not impact the overall findings of the analysis.

- 4. What was the age, size, and operating condition of the appliance or HVAC unit and what was installed?**
 - a. The current analysis was based on a request to assess the savings for AC installs, refrigerator replacements, and AC and refrigerator replacements as compared to weatherization only measures. The analysis did not include equipment-specific details. Adding that level of detail to the analysis will not impact the overall findings of the analysis.

- 5. Why does this data contradict the AE commissioned GDS conducted a study of the WAP program in 2012 and showed that:**

The top five packages currently installed as part of Austin Energy's WAP Program that generate the most savings according to annual kWh reductions are:

 - 1) Replace Central AC – 14.5 SEER, Upgrade Attic Insulation to R29, Repair Ducts, Add Solar Screens, Install Programmable Thermostat, Replace Furnace
 - 2) Replace Central AC – 14.5 SEER, Upgrade Attic Insulation to R29, Repair Ducts, Install Programmable Thermostat, Replace Furnace
 - 3) Replace Central AC – 14.5 SEER, Upgrade Attic Insulation to R29, Install Programmable Thermostat
 - 4) Replace Central AC – 14.5 SEER, Repair Ducts

5) Air and Duct Sealing, Upgrade Attic Insulation to R38, Install Programmable Thermostat, Replace Domestic Hot Water Heater

- a. There is not a contradiction. Both the current analysis and the GDS study showed average savings (with the exception of AC replacement in the single family, one occupant group in the current analysis). The primary finding from the analysis focused on the limited amount of savings from AC and refrigerator replacements in the population that does not use much energy to begin with. This limited amount of energy savings may not result in significant utility bill savings.
- 6. Was this kWh use data weather normalized from the baseline? Was the baseline one year from the date of the retrofit?**
- a. Process for evaluation included 12 months prior to retrofit as a baseline utilizing regression of monthly data against heating and cooling degree days for corresponding billing period. Only models that represented predictable energy use patterns, regression R value of 0.6 or better, were included in the evaluation. The same requirements for post retrofit were imposed on the group and only those residences that reflected both correlated energy use to weather patterns for pre and post installation periods were used in the report.
- 7. What other measures were performed in these homes along with the replacement of the HVAC and refrigerator?**
- a. Other measures were the standard weatherization measures as outlined in the ARRA grant.
- 8. How was the size of the HVAC units installed determined?**
- a. At the time of assessment the size of the existing equipment was documented as well as the size of the home. All other pertinent information that would impact the sizing was also obtained including shading, insulation levels, orientation the home and window placement and type of construction. The data was input into the NEAT audit which contained a manual J calculation that recommended the unit size based on the existing condition of the home and inclusion of the proposed measures in the calculation. The process was required to comply with the federal requirements contained in the grant.
- 9. How many of these homes failed the QC process one or more times at installation?**
- a. The program recorded just over 3 percent of the homes required a second inspection to pass weatherization and 15 percent of the homes required a return inspection for HVAC.