MEMORANDUM

TO: Low Income Consumer Advisory Task Force

FROM: Liz Jambor, EdD, Manager, DABI

DATE: March 6, 2015

SUBJECT: Responses to Lanetta Cooper's Questions RE: HVAC Analysis

Please find attached the responses to questions Lanetta Cooper submitted regarding the HVAC and refrigerator data presented at an earlier LICATF meeting.

The following questions relate to the memo AE provided the Low Income Consumer Advisory Task Force dated January 9, 2015 involving the "Data Analysis on Impact of HVAC and Refrigerator Installs in AE Low Income Weatherization Program."

1. Please identify the sources AE, or its agent, relied upon in preparing Table 1 and Table 2. If some or all of the sources is a study, report, memo or such other summary document, please provide a copy of each such document.
2. Please provide the median values for the data provided in Table 1 and Table 2 in the same format as the data provided in these tables that reported mean values.
3. What was the two year period that AE utilized in reviewing this program?
4. Please provide the steps AE, or its agent, performed in developing Table 1 and Table 2. If AE, or its agent, relied upon actual kWh billing histories at the service addresses related to the weatherized dwellings, did AE normalize the kWh for weather? If not, why not. And if not, please provide the data reflected in Table 1 and Table 2 with normalized kWh usage for both mean and median values. If AE "estimated" the kWh usage, please provide the workpapers underlying the estimated kWh usage calculations. Also, please address how AE derived the base values for the study—that is, the usage characteristics for each weatherized dwelling before the weatherization and if those kWhs were normalized for weather, and please provide the time period over which the dwellings reflected in Table 1 and 2 were weatherized. (ARRA funded weatherization activities occurred over several years for AE. How was this diverse set of time-data points accounted for in the study?).
5. In Table 2, SF dwellings with refrigerator retrofit show only an increase of $174 over the mean actual job cost for SF dwellings with only weatherization. Please explain why the additional cost of a refrigerator retrofit appears to be only $174.
6. In Table 2, SF dwellings with refrigerator and AC retrofits show a decrease of about $200 over the mean actual job cost for SF dwellings with only AC retrofits. Please explain why the additional cost of a refrigerator retrofit appears to decrease the mean job cost that was being done for SF dwellings with only AC retrofits?
7. Please provide the total kWh savings for all dwellings weatherized that are reflected in Table 1.
8. Please provide the total kWh savings for all dwellings weatherized that are reflected in Table 2.
9. Please provide the total KW savings for all dwellings weatherized that are reflected in Table 1.
10. Please provide the total KW savings for all dwellings weatherized that are reflected in Table 2.

1. All data was secured from CIS and CCB billing data, the information is confidential and can only be disseminated in summary format. Weather data is from Camp Mabry.
2. See attached table.
3. The two year period was the year just prior to the retrofit beginning on the billing cycle prior to the inspection date and the year after the inspection date so the two year window was different for each person and the billing month in which the work was performed was not included in the analysis.
4. All bills were weather normalized employing Heating and Cooling Degree Day method using a linear regression on a variable heating and cooling balance point. Only equations with sufficient degrees of freedom, more than six, and an R value of greater than 0.6 for both the pre and post retrofit period were used in the final analysis. These homes are considered to have behaviorally consistent patterns for which any potential savings can be gleaned. All weather normalized regression data is then converted back to energy use using TMY3 data from National Renewable Energy Lab (this weather information is considered to be reflective of the current changes in climate than previous versions). A comparison between the two annual energy profiles provided energy savings.
5. The data was analyzed in the aggregate and not by individual home or project. When assessing data across the aggregate, it cannot be evaluated on an individual basis. Numbers provided are based on the average.
6. The data was analyzed in the aggregate and not by individual home or project. When assessing data across the aggregate, it cannot be evaluated on an individual basis. Numbers provided are based on the average.
7. Total kWh savings for Table 1 = 406,146 across 679 homes, or approximately 598 kWh per year.
8. Total kWh savings for Table 2 = 106,751 across 178 homes, or approximately 599 kWh per year.
9. Total kW savings, based on deemed savings, for Table 1 = 195 kW across 679 homes, or approximately 0.29 kW per year.
10. Total kW savings, based on deemed savings, for Table 2 = 43 kW across 679 homes, or approximately 0.24 kW per year.

Owner Occupied for 2 years (1=yes)	Dwelling Type	AC (1 = yes)	Fridge (1=yes)	Number of Dwellings	Mean Annual Energy Savings (kWh)	Mean Peak Reduction (kW)	Mean Actual Job Cost	Median Annual Energy Savings (kWh)	Median Peak Reduction (kW)	Median Actual Job Cost
0	SF	0	0	233	643	0.27	$2,864	526	0.26	$2,737
0	SF	0	1	72	1412	0.49	$2,897	1309	0.37	$3,101
0	SF	1	0	164	31	0.19	$4,794	71	0.06	$4,955
0	SF	1	1	35	547	0.32	$4,653	329	0.00	$4,805
0	Duplex	0	0	16	1012	0.19	$2,091	812	0.07	$1,619
0	Duplex	0	1	29	381	0.19	$1,780	599	0.18	$1,413
0	Duplex	1	0	22	357	0.27	$4,208	772	0.09	$4,209
0	Duplex	1	1	16	612	0.22	$3,789	730	0.06	$3,900
0	MF	0	0	58	1029	0.37	$2,986	1157	0.32	$2,065
0	MF	0	1	18	-235	None	$2,171	-140	None	$1,740
0	MF	1	0	9	2402	0.84	$4,535	1596	0.79	$4,326
0	MF	1	1	7	1228	0.62	$4,418	820	0.49	$4,289
1	SF	0	0	51	316	0.08	$2,898	418	0.19	$2,549
1	SF	0	1	15	1416	0.68	$3,072	835	0.20	$2,913
1	SF	1	0	18	-784	None	$4,724	-1062	None	$4,951
1	SF	1	1	6	3080	1.01	$4,457	3191	0.78	$5,040
1	Duplex	0	0	5	1315	0.09	$1,754	1320	0.11	$1,628
1	Duplex	0	1	16	467	0.19	$1,976	539	0.18	$1,708
1	Duplex	1	0	9	890	0.26	$3,952	1192	0.01	$3,897
1	Duplex	1	1	9	382	0.11	$3,350	-584	0.04	$3,605
1	MF	0	0	33	517	0.31	$2,986	1097	0.34	$2,326
1	MF	0	1	9	44	0.21	$2,523	-416	0.16	$1,769
1	MF	1	0	5	4067	1.22	$4,950	4249	1.40	$4,605
1	MF	1	1	2	869	0.25	$4,476	869	0.25	$4,476