

I Energy Arrearage and Disconnect Study

I.1 Introduction

The primary goal of this study is to quantify and monetize the impact of arrearage and disconnect-related benefits for use in the New Orleans Technical Resource Manual (TRM). ADM estimated several outcomes related to arrearages and disconnections for participants of two Energy New Orleans Energy Smart energy efficiency (EE) programs, Home Performance with Energy Star (HPwES) and Income Qualified (IQ), by comparing outcomes before and after EE measure installation.

Key Findings:

- Customers participating in both programs (HPwES + IQ) and installing at least one High Impact Measure (HIM) had the highest reductions in Disconnects/Year and Average Past Due (arrears).
- Statistically significant reductions in Disconnects/Year and Average Past Due amounts occur for Home Performance with Energy Star (HPwES) participants.
- Statistically significant reductions in Disconnects/Year and Average Past Due amounts occur for HPwES + IQ participants (enrolled in both programs).
- Statistically significant reductions in Disconnects/Year and Average Past Due amounts occur for customers with Low Impact Measures (LIMs).
- Statistically significant reductions in Disconnects/Year and Average Past Due amounts occur for customers with Electric Resistance (ER) heating.

Table 1-3 provides the regression results overall, across all programs and measure types. All five outcomes are statistically significant at the 95% level. Disconnects/Year decreased by 0.013 for the average participant, or 1.3 fewer disconnects per year for each 100 participants. The average participant had \$12.9 less in arrears and saw 0.3 fewer past due bills per year. Normalizing the past due amounts by 365 days resulted in \$4.9 less in arrears per year for the average participant.

Table 1-1 provides monetized program benefits from reduced disconnects and arrears utilizing the overall regression results.

Table 1-1 Monetized Program Benefits from Reduced Disconnects and Arrears

| Monetized Program Benefits | |
|--|---------|
| Total benefit per customer/year (utility perspective) | \$1.41 |
| Total benefit per customer/year (customer perspective) | \$0.70 |
| Total benefit per customer/year | \$2.10 |
| NPV per customer | \$19.37 |

I.2 Methodology

I.2.1 Data Collection

ADM utilized the following participant data for participants enrolled in the Home Performance with Energy Star (HPwES) and Income Qualified (IQ) programs in Program Year (PY) 7, PY8, and PY9. Actual measure installation dates span from September 2017 through April 2020. Participant billing and arrearage data spanned from January 2016 to April 2020.

Table 1-2 shows the participant data utilized for the analysis and the primary data fields. For the billing data, the Past Due Dummy (1 = past due; 0 otherwise) identified whether the account was past due during the billing interval. For disconnects and arrearage data, dummy variables identified whether an account had a Disconnection or a Disconnection Notice and the associated date. In addition, a Past Due amount was listed for each Disconnection and Disconnection Notice. The tracking data provided the program name, measure, and installation date. Lastly, the heating type was listed in the tracking data for 15% of participants.

Table 1-2 Study Data

| Participant Data | Data Fields |
|--------------------------------|--|
| Billing Data | Account ID, Premise ID, Address, Start Date, End Date, Usage, Past Due Dummy |
| Disconnects and Arrearage Data | Account ID, Premise ID, Address, Disconnect Dummy, Disconnect Notice Dummy, Past Due, Date |
| Tracking Data | Account ID, Address, Program, Measure, Install Date, Heating Type, kW/kWh Savings |

I.2.2 Cohort Creation

ADM estimated outcomes with a treatment only variance-in-adoption model. With variance-in-adoption, participants that have yet to participate in Energy Efficiency (EE) programs serve as controls for participants that have already participated. Variation in program enrollment in the study comes from two sources, 1) new participant participation across program years, and 2) new participant participation within a given program year.

ADM assessed program impacts by estimating outcomes overall, by program, by measure type (high-impact vs. low-impact), and by primary heating type (gas vs. electric). Figure 1-1 and Figure 1-2 provide measure counts for the HPwES and IQ programs. For HPwES, LED, Aerators, and Showerheads accounted for the majority of measures, with 31,443 of the above measure being distributed through EE Kits. For IQ, LED and Duct Sealing were the most common measures.

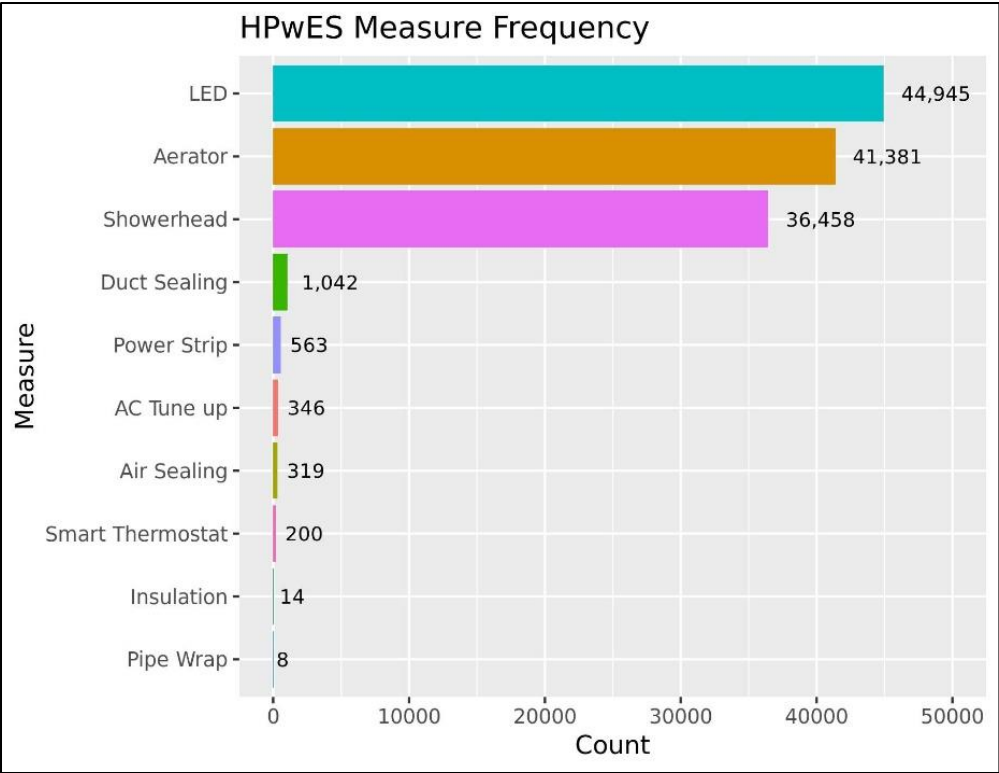


Figure 1-1 HPwES Measure Frequency

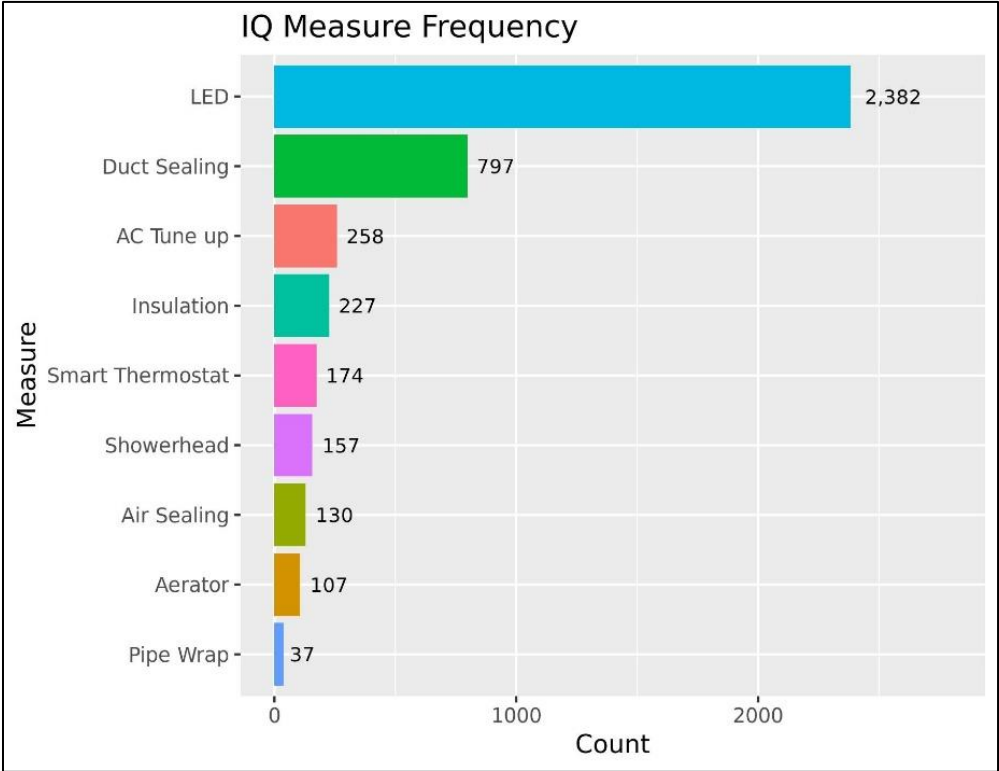


Figure 1-2 IQ Measure Frequency

In order to facilitate comparison of outcomes, ADM divided measures into two categories: 1) High Impact Measures (HIMs), and 2) Low Impact Measures (LIMs).

HIMs include: Duct Sealing, Air Sealing, AC Tune up, and Insulation. LIMs include: All other measures.

If a participant installed a single HIM during the analysis period, the participant was identified as a HIM participant. All other participants were identified as LIM participants.

In addition, ADM identified which programs participants belonged to during the analysis period. If a participant belonged to both HPwES and IQ during the analysis period, the participant was identified as a HPwES_IQ participant. All other participants were associated with a single program and were identified as either HPwES or IQ participants. Figure 1-3 provides participant counts for each combination of program and measure type during the analysis period. Due to the high frequency of HPwES_LIM participants (mostly Kit installs), ADM took a 10% random sample of this subgroup when evaluating outcomes. Figure 1-4 shows the starting cohort sizes for each subgroup after sampling.

To ensure a proper pre- and post-period comparison of outcomes (some of which rarely occur), ADM required participants to have at least 6 months of billing data in each period. Since 90% of participants with disconnects are eventually reconnected and show billing data at some point after the disconnection, any bias from requiring 6 months of post-period billing data is likely to be low. Without this requirement, many participants (19%) do not have sufficient post-period data to observe any outcomes, and this would likely result in significant bias to the outcome estimates as these participants would not have a proper pre-post comparison. In addition, since several outcomes are measured on a per year basis, a very short post-period would lead to increased imprecision in the measurement of those outcomes.

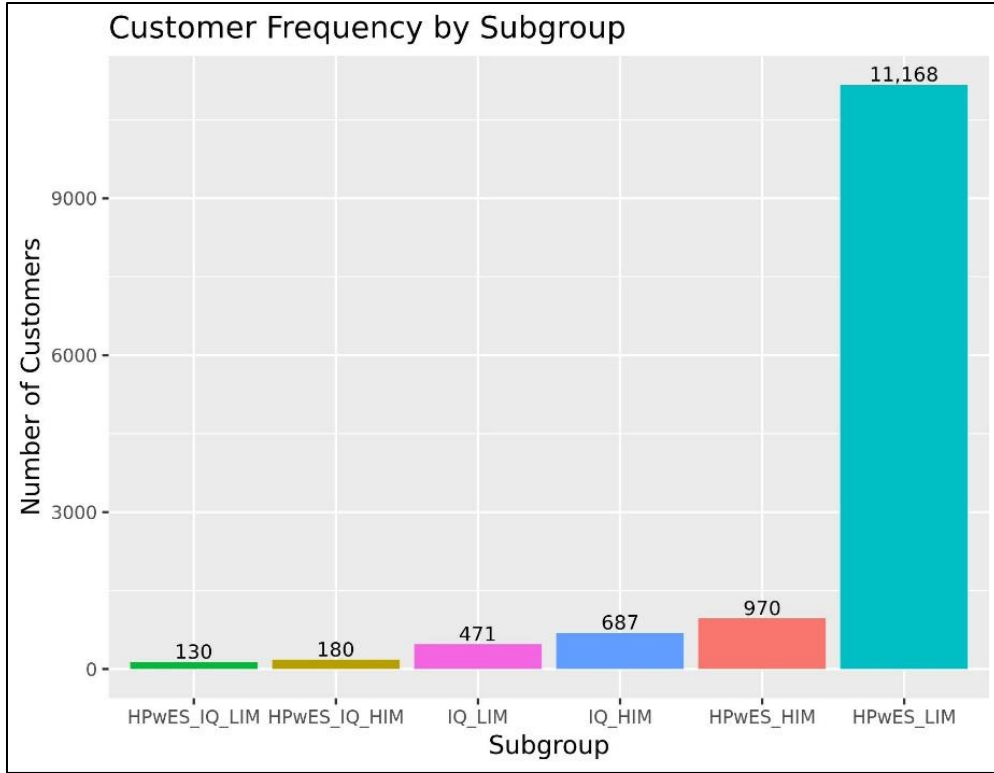


Figure 1-3 Participant Frequency by Program and Impact Type

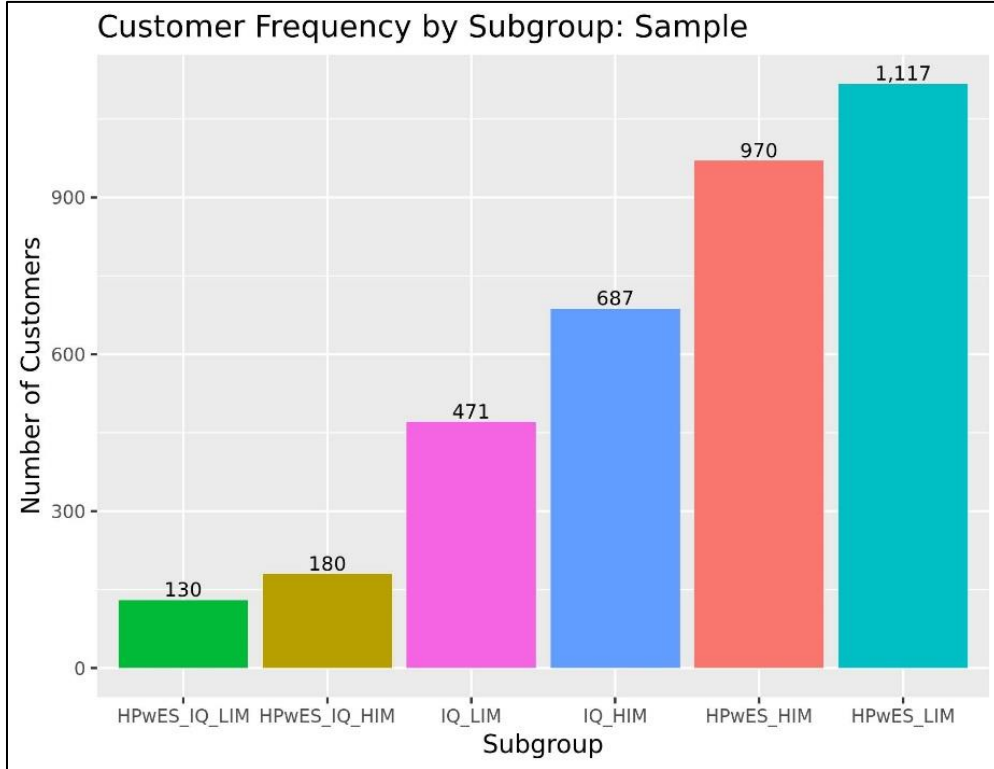


Figure 1-4 Participant Frequency by Program and Impact Type, Regression Cohort

1.2.3 Identifying Electric Resistance Heating Participants

ADM identified potential participants with Electric Resistance (ER) heating by utilizing billing data usage. The following ratios were calculated for each participant with at least 12 months of billing data:

$$\text{Ratio 1} = \frac{\text{Average January Usage/Day}}{\text{Average January HDD/Day}}$$

$$\text{Ratio 2} = \frac{\text{Average January Usage/Day}}{\text{Average Baseline Usage/Day}}$$

Where,

Average January Usage/Day = Average kWh per day in January;

Average January HDD/Day = Average HDD per day in January;

Average Baseline Usage/Day = Average usage per day in lowest usage month (April);

Outliers for each ratio were considered to have ER heating, specifically, if Ratio 1 ≥ 5 (75th percentile) and Ratio 2 ≥ 2.5 (85th percentile). ADM examined the share of derived ER heating participants identified as having “Forced Air (Gas)” in the tracking data through the primary heating type field. Roughly 2% of derived ER heating participants with primary heating type listed in the data had gas heating. This error rate in classification represents either an error in the coding of the primary heating type data field and/or the error from the derived ER heating type method. Increasing Ratio 1 and/or Ratio 2 did not result in a decrease in this error rate and only served to drive down the size of the cohort. ADM removed all derived ER heating participants identified as having gas heating from the ER heating cohort.

1.2.4 Modeled Outcomes

ADM estimated five principal outcomes for each utility using OLS regressions: Disconnects/Year, Disconnect Notices/Year, Average Past Due (arrears), Total Arrears/Year and the number of past due bills/year. ADM normalized four of the five outcome variables into per year values for each period for each participant by dividing the outcome of interest by the billing duration and multiplying by 365. Normalization is necessary because each participant has varying bill durations and different lengths for the pre- and post-periods. ADM estimated two methods for calculating duration and the associated outcomes. The first method calculates duration for each period (pre and post) as the difference between the first and last observed bill date. Any outcomes that occur during this period are included. The second method calculates duration for each period as the difference between the maximum bill or disconnection date and the minimum bill or disconnection date, and any outcomes that occur during this period are valid. The second method always captures more outcomes and has a longer duration than the first method. Since outcomes are scaled by the duration, both methods tend to result in similar outcome estimates. The second method has the advantage of capturing outcomes that occur after the last available bill or that

are close to the installation date (since bills that overlap the installation date are dropped for a participant), therefore, this method was selected by ADM. All outcomes reported in Section 1.3 are derived from method two.

For disconnects, period t represents the pre- and post-period, and the number of disconnects per year for participant i in period t is,

$$Disconnects/Year_{it} = \left(\frac{\sum Disconnect\ Dummy_{it}}{\sum Bill\ Duration_{it}} \right) \times \frac{365.25\ Days}{Year}$$

For disconnect notices, period t represents the pre- and post-period, and the number of disconnect notices per year for participant i in period t is,

$$Disconnect\ Notices/Year_{it} = \left(\frac{\sum Disconnect\ Notice\ Dummy_{it}}{\sum Bill\ Duration_{it}} \right) \times \frac{365.25\ Days}{Year}$$

For average past due (arrears), period t represents the pre- and post-period, and average arrears are calculated for participant i in period t as,

$$Average\ Past\ Due\ (Arrears)_{it} = mean(Past\ Due_{it})$$

For total arrears/year, period t represents the pre- and post-period, and the total arrears per year for participant i in period t is,

$$Total\ Arrears\ (Past\ Due)/Year_{it} = \left(\frac{\sum Past\ Due_{it}}{\sum Bill\ Duration_{it}} \right) \times \frac{365.25\ Days}{Year}$$

For number of past due bills/year, period t represents the pre- and post-period, and the number of past due bills per year for participant i in period t is,

$$\#\ of\ Past\ Due\ Bills/Year_{it} = \left(\frac{\sum Past\ Due\ Bill\ Dummy_{it}}{\sum Bill\ Duration_{it}} \right) \times \frac{365.25\ Days}{Year}$$

1.2.5 Regression Specifications

ADM ran ordinary least-squares (OLS) regressions to model various outcomes before and after program participation. The model specification is shown below.

$$Outcome_{it} = \alpha_0 + \beta_1 Post_{it}$$

Where,

α_0 is the intercept term;

β_1 captures the change in the outcome of interest during the post-period relative to the pre-period;

$Post_{it}$ is a dummy variable that captures whether time period t is in the post-period for participant i ;

In the case of total arrears/year, an additional independent variable was added to account for the number of disconnection notices. Notices are predictive of the total arrearage since arrears are listed whenever there is a disconnection notice.

1.3 Results

Table 1-3 provides the regression results overall, across all programs and measure types. All five outcomes are statistically significant at the 95% level. Disconnects/Year decreased by 0.013 for the average participant, or 1.3 fewer disconnects per year for each 100 participants. During the pre-period which had an average length of 2.7 years, 7.7% of participants saw at least one disconnect. The average participant had \$12.9 less in arrears and saw 0.3 fewer past due bills. Normalizing the past due amounts by 365 days resulted in \$4.9 less in arrears per year for the average participant.

Table 1-3 Regression Results, Overall

| Outcome | Coefficient | Std Error | T Stat | P-Value | CI Upper | CI Lower | Average (Pre) | Average (Post) |
|---------------------------------|-------------|-----------|--------|---------|----------|----------|---------------|----------------|
| Disconnects/Year | -0.013 | 0.003 | -4.484 | 0.000 | -0.018 | -0.008 | 0.040 | 0.027 |
| Disconnect Notices/Year | 0.052 | 0.015 | 3.430 | 0.001 | 0.027 | 0.076 | 0.275 | 0.326 |
| Average Past Due | -12.908 | 1.197 | 10.786 | 0.000 | 14.876 | 10.939 | 38.739 | 25.832 |
| Total Past Due/Year | -4.905 | 1.618 | -3.032 | 0.002 | -7.566 | -2.244 | 71.402 | 80.033 |
| Number of Past Due Bills/Year | -0.274 | 0.057 | -4.825 | 0.000 | -0.367 | -0.181 | 3.927 | 3.653 |
| Number of Participants = 10,320 | | | | | | | | |

As shown in Table 1-4, for participants with pre-period arrears, their average past due decreased from \$195.4 to \$127.7. In addition, participants with pre-period arrears during any point of the pre-period accounted for 19.7% of pre-period participants.

Table 1-4 Past Due for Participants with Pre-Period Arrears

| Period | Average Past Due |
|------------|------------------|
| Post | \$127.7 |
| Pre | \$195.4 |
| Difference | \$67.7 |

Table 1-5 provides regression results by program across all measure types. Reductions in Disconnects/Year and Average Past Due (arrears) were highest for participants who participated in both programs (HPwES_IQ), while reductions were higher for HPwES compared to IQ.

Table 1-5 Regression Results by Program

| Program | Outcome | Number of Participants | Coefficient | Std Error | T Stat | P-Value | CI Upper | CI Lower | Average (Pre) | Average (Post) |
|----------|-------------------------------|------------------------|-------------|-----------|--------|---------|----------|----------|---------------|----------------|
| HPwES | Disconnects/Year | 9,554 | -0.013 | 0.003 | -4.505 | 0.000 | -0.017 | -0.008 | 0.036 | 0.024 |
| HPwES | Disconnect Notices/Year | 9,554 | 0.051 | 0.015 | 3.416 | 0.001 | 0.027 | 0.076 | 0.254 | 0.306 |
| HPwES | Average Past Due | 9,554 | -13.159 | 1.210 | 10.872 | 0.000 | 15.149 | 11.168 | 36.784 | 23.626 |
| HPwES | Total Past Due/Year | 9,554 | -5.243 | 1.564 | -3.353 | 0.001 | -7.815 | -2.671 | 65.353 | 73.323 |
| HPwES | Number of Past Due Bills/Year | 9,554 | -0.259 | 0.059 | -4.422 | 0.000 | -0.356 | -0.163 | 3.826 | 3.567 |
| HPwES_IQ | Disconnects/Year | 179 | -0.059 | 0.018 | -3.318 | 0.001 | -0.089 | -0.030 | 0.059 | 0.000 |
| HPwES_IQ | Disconnect Notices/Year | 179 | -0.047 | 0.080 | -0.580 | 0.562 | -0.179 | 0.086 | 0.246 | 0.200 |
| HPwES_IQ | Average Past Due | 179 | -15.672 | 8.113 | -1.932 | 0.054 | 29.052 | -2.292 | 36.111 | 20.439 |
| HPwES_IQ | Total Past Due/Year | 179 | -13.516 | 6.169 | -2.191 | 0.029 | 23.690 | -3.343 | 70.403 | 45.421 |
| HPwES_IQ | Number of Past Due Bills/Year | 179 | -0.461 | 0.420 | -1.099 | 0.273 | -1.153 | 0.231 | 3.732 | 3.270 |
| IQ | Disconnects/Year | 587 | -0.004 | 0.021 | -0.186 | 0.853 | -0.039 | 0.031 | 0.087 | 0.083 |
| IQ | Disconnect Notices/Year | 587 | 0.082 | 0.093 | 0.890 | 0.374 | -0.070 | 0.235 | 0.615 | 0.697 |
| IQ | Average Past Due | 587 | -7.979 | 6.640 | -1.202 | 0.230 | 18.910 | 2.952 | 71.363 | 63.384 |
| IQ | Total Past Due/Year | 587 | 4.635 | 11.846 | 0.391 | 0.696 | 14.865 | 24.136 | 170.145 | 199.803 |
| IQ | Number of Past Due Bills/Year | 587 | -0.455 | 0.245 | -1.858 | 0.063 | -0.859 | -0.052 | 5.628 | 5.172 |

As shown in Table 1-6, reductions in Disconnects/Year and Average Past Due (arrears) were higher for LIM vs. HIM. However, the differences were minor between the two groups and not statistically significant. This result is somewhat counterintuitive and suggests underlying differences between participants for the two measure types.

Table 1-6 Regression Results by Measure Type

| Measure Type | Outcome | Number of Participants | Coefficient | Std Error | T Stat | P-Value | CI Upper | CI Lower | Average (Pre) | Average (Post) |
|--------------|-------------------------------|------------------------|-------------|-----------|--------|---------|----------|----------|---------------|----------------|
| HIM | Disconnects/Year | 1,152 | -0.007 | 0.013 | -0.570 | 0.569 | -0.029 | 0.014 | 0.068 | 0.060 |
| HIM | Disconnect Notices/Year | 1,152 | 0.044 | 0.058 | 0.757 | 0.449 | -0.052 | 0.140 | 0.478 | 0.522 |
| HIM | Average Past Due | 1,152 | -8.972 | 4.853 | -1.849 | 0.065 | 16.957 | -0.987 | 57.441 | 48.469 |
| HIM | Total Past Due/Year | 1,152 | 3.856 | 6.948 | 0.555 | 0.579 | -7.577 | 15.288 | 130.733 | 147.567 |
| HIM | Number of Past Due Bills/Year | 1,152 | -0.437 | 0.175 | -2.491 | 0.013 | -0.725 | -0.148 | 4.814 | 4.377 |
| LIM | Disconnects/Year | 9,168 | -0.014 | 0.003 | -4.867 | 0.000 | -0.018 | -0.009 | 0.036 | 0.023 |
| LIM | Disconnect Notices/Year | 9,168 | 0.052 | 0.015 | 3.452 | 0.001 | 0.027 | 0.077 | 0.249 | 0.301 |
| LIM | Average Past Due | 9,168 | -13.402 | 1.196 | 11.208 | 0.000 | 15.369 | 11.435 | 36.389 | 22.987 |
| LIM | Total Past Due/Year | 9,168 | -5.787 | 1.577 | -3.669 | 0.000 | -8.382 | -3.193 | 63.946 | 71.547 |
| LIM | Number of Past Due Bills/Year | 9,168 | -0.254 | 0.060 | -4.236 | 0.000 | -0.352 | -0.155 | 3.815 | 3.562 |

Table 1-7 provides regression results by heating type. These results are for participants who had primary heating type identified in the data. Only two heating types had large enough sample sizes for regression estimates: 1) Forced Air (Electric), and 2) Forced Air (Gas). Forced Air (Electric) participants showed larger reductions in Disconnect/Year and Average Past Due.

Table 1-7 Regression Results by Heating Type

| Heating Type | Outcome | Number of Participants | Coefficient | Std Error | T Stat | P-Value | CI Upper | CI Lower | Average (Pre) | Average (Post) |
|-----------------------|-------------------------------|------------------------|-------------|-----------|--------|---------|----------|----------|---------------|----------------|
| Forced Air (Electric) | Disconnects/Year | 729 | -0.013 | 0.014 | 0.929 | 0.353 | -0.037 | 0.010 | 0.069 | 0.056 |
| Forced Air (Electric) | Disconnect Notices/Year | 729 | 0.038 | 0.074 | 0.512 | 0.609 | -0.084 | 0.159 | 0.494 | 0.532 |
| Forced Air (Electric) | Average Past Due | 729 | -13.325 | 6.621 | 2.012 | 0.044 | -24.224 | -2.427 | 63.266 | 49.941 |
| Forced Air (Electric) | Total Past Due/Year | 729 | -5.964 | 7.562 | 0.789 | 0.430 | -18.411 | 6.482 | 138.858 | 143.577 |
| Forced Air (Electric) | Number of Past Due Bills/Year | 729 | -0.511 | 0.221 | 2.306 | 0.021 | -0.875 | -0.146 | 5.041 | 4.530 |
| Forced Air (Gas) | Disconnects/Year | 755 | -0.001 | 0.015 | 0.072 | 0.943 | -0.026 | 0.023 | 0.048 | 0.047 |
| Forced Air (Gas) | Disconnect Notices/Year | 755 | 0.049 | 0.061 | 0.794 | 0.428 | -0.052 | 0.150 | 0.354 | 0.403 |
| Forced Air (Gas) | Average Past Due | 755 | -6.781 | 4.614 | 1.470 | 0.142 | -14.375 | 0.813 | 41.908 | 35.127 |
| Forced Air (Gas) | Total Past Due/Year | 755 | 3.863 | 7.904 | 0.489 | 0.625 | -9.146 | 16.872 | 93.901 | 112.012 |
| Forced Air (Gas) | Number of Past Due Bills/Year | 755 | -0.245 | 0.208 | 1.175 | 0.240 | -0.588 | 0.098 | 3.965 | 3.720 |

Table 1-8 provides regression results for customers identified through their usage patterns as having Electric Resistance (ER) heating. The results of this group are similar to Forced Air (Electric) participants in the table above, where the heating type for Forced Air (Electric) participants was identified in the data.

Table 1-8 Regression Results, ER Heating

| Outcome | Coefficient | Std Error | T Stat | P-Value | CI Upper | CI Lower | Average (Pre) | Average (Post) |
|--------------------------------|-------------|-----------|--------|---------|----------|----------|---------------|----------------|
| Disconnects/Year | -0.017 | 0.010 | -1.767 | 0.077 | -0.033 | -0.001 | 0.048 | 0.030 |
| Disconnect Notices/Year | 0.018 | 0.045 | 0.406 | 0.685 | -0.056 | 0.092 | 0.273 | 0.291 |
| Average Past Due | -20.026 | 4.260 | -4.700 | 0.000 | 27.037 | 13.015 | 49.510 | 29.485 |
| Total Past Due/Year | -3.627 | 7.159 | -0.507 | 0.613 | 15.408 | 8.155 | 75.136 | 76.968 |
| Number of Past Due Bills/Year | -0.364 | 0.175 | -2.077 | 0.038 | -0.652 | -0.076 | 4.134 | 3.770 |
| Number of Participants = 1,007 | | | | | | | | |

I.4 Additional regression results for each subgroup (program + measure type) are shown in the Monetization

The tables below provide an example of monetizing impacts from reduced disconnects and arrears from the utility perspective, the customer perspective, and the EE program overall. The calculations assume the overall average reductions of 0.013 disconnects/year and \$12.90 in average past due. From the utility perspective, the total per customer savings are \$1.41. From the customer perspective, the total per customer savings are \$0.70. As show in Table 1-11, assuming a 15-year EUL, the Net Present Value (NPV) of the benefit stream per customer is \$19.37.

Table 1-9 Entergy Benefits from Reduced Disconnects and Arrears

| Utility Perspective | |
|--|---------|
| Disconnects | |
| Cost to disconnect | \$20.87 |
| Cost per notice | \$1.60 |
| Disconnects reduced per-participant per year | 0.013 |
| NEB adder per-participant | \$0.29 |
| Arrears | |
| Total in arrears | \$12.90 |
| Interest rate | 8.65% |
| NEB adder per-participant | \$1.12 |
| Total per customer | \$1.41 |

Table 1-10 Participant Benefits from Reduced Disconnects

| Customer Perspective | |
|--|---------------|
| Shutoffs | |
| Time spent restoring power | 2 |
| Minimum wage | \$7.25 |
| Disconnects reduced per-participant per year | 0.013 |
| NEB adder per-participant | \$0.19 |
| Reconnects | |
| Avoided reconnects | 0.013 |
| Reconnect Fee | \$39.00 |
| Reconnects per customer | \$0.51 |
| Total per customer | \$0.70 |

Table 1-11 Program Benefits from Reduced Disconnects and Arrears

| Program Benefits | |
|--------------------------|-------------|
| EUL | 15 |
| Inflation | 2% |
| Year 1 Customer benefit | \$2.10 |
| NPV benefit stream | \$19.37 |
| PY8 participant count | 6,064 |
| Total annual benefit | \$8,538 |
| Total life cycle benefit | \$117,435 |
| PY8 TRC fuel benefits | \$3,750,493 |
| % Adder | 3.1% |

Appendix. Customers participating in both programs and installing at least one HIM had the highest reductions in Disconnects/Year and average past due amounts.

I.5 Monetization

The tables below provide an example of monetizing impacts from reduced disconnects and arrears from the utility perspective, the customer perspective, and the EE program overall. The calculations assume the overall average reductions of 0.013 disconnects/year and \$12.90 in average past due. From the utility perspective, the total per customer savings are \$1.41. From the customer perspective, the total per customer savings are \$0.70. As show in Table 1-11, assuming a 15-year EUL, the Net Present Value (NPV) of the benefit stream per customer is \$19.37.

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| Arrears | |
| Total in arrears | \$12.90 |
| Interest rate | 8.65% |
| NEB adder per-participant | \$1.12 |
| Total per customer | \$1.41 |

Table 1-10 Participant Benefits from Reduced Disconnects

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| Minimum wage | \$7.25 |
| Disconnects reduced per-participant per year | 0.013 |
| NEB adder per-participant | \$0.19 |
| Reconnects | |
| Avoided reconnects | 0.013 |
| Reconnect Fee | \$39.00 |
| Reconnects per customer | \$0.51 |
| Total per customer | \$0.70 |

Table 1-11 Program Benefits from Reduced Disconnects and Arrears

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|--------------------------|-------------|
| EUL | 15 |
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| Total life cycle benefit | \$117,435 |
| PY8 TRC fuel benefits | \$3,750,493 |
| % Adder | 3.1% |

I.6 Appendix

Table 1-12 Regression Results by Subgroup

| Subgroup | Outcome | Number of Participants | Coefficient | Std Error | T Stat | P-Value | CI Upper | CI Lower | Average (Pre) | Average (Post) |
|--------------|-------------------------------|------------------------|-------------|-----------|--------|---------|----------|----------|---------------|----------------|
| HPwES_HIM | Disconnects/Year | 664 | -0.008 | 0.014 | -0.544 | 0.586 | -0.031 | 0.016 | 0.051 | 0.043 |
| HPwES_HIM | Disconnect Notices/Year | 664 | 0.026 | 0.068 | 0.385 | 0.700 | -0.086 | 0.139 | 0.407 | 0.433 |
| HPwES_HIM | Average Past Due | 664 | -9.387 | 6.587 | -1.425 | 0.154 | 20.230 | 1.456 | 50.359 | 40.973 |
| HPwES_HIM | Total Past Due/Year | 664 | -3.062 | 7.040 | -0.435 | 0.664 | 14.649 | 8.526 | 110.939 | 115.069 |
| HPwES_HIM | Number of Past Due Bills/Year | 664 | -0.336 | 0.230 | -1.459 | 0.145 | -0.714 | 0.043 | 4.448 | 4.112 |
| HPwES_IQ_HIM | Disconnects/Year | 105 | -0.059 | 0.024 | -2.473 | 0.014 | -0.099 | -0.020 | 0.059 | 0.000 |
| HPwES_IQ_HIM | Disconnect Notices/Year | 105 | -0.096 | 0.093 | -1.035 | 0.302 | -0.249 | 0.057 | 0.222 | 0.126 |
| HPwES_IQ_HIM | Average Past Due | 105 | -16.859 | 9.982 | -1.689 | 0.093 | 33.351 | -0.367 | 32.295 | 15.436 |
| HPwES_IQ_HIM | Total Past Due/Year | 105 | -12.114 | 6.368 | -1.903 | 0.058 | 22.635 | -1.594 | 68.266 | 29.987 |
| HPwES_IQ_HIM | Number of Past Due Bills/Year | 105 | -0.605 | 0.499 | -1.213 | 0.226 | -1.429 | 0.219 | 3.315 | 2.710 |
| HPwES_IQ_LIM | Disconnects/Year | 74 | -0.060 | 0.027 | -2.206 | 0.029 | -0.104 | -0.015 | 0.060 | 0.000 |
| HPwES_IQ_LIM | Disconnect Notices/Year | 74 | 0.023 | 0.143 | 0.164 | 0.870 | -0.213 | 0.260 | 0.281 | 0.304 |
| HPwES_IQ_LIM | Average Past Due | 74 | -13.987 | 13.600 | -1.028 | 0.305 | 36.501 | 8.526 | 41.525 | 27.538 |
| HPwES_IQ_LIM | Total Past Due/Year | 74 | -11.374 | 10.961 | -1.038 | 0.301 | 29.519 | 6.772 | 73.437 | 67.319 |
| HPwES_IQ_LIM | Number of Past Due Bills/Year | 74 | -0.257 | 0.716 | -0.359 | 0.720 | -1.443 | 0.929 | 4.322 | 4.065 |
| HPwES_LIM | Disconnects/Year | 8,890 | -0.013 | 0.003 | -4.607 | 0.000 | -0.018 | -0.008 | 0.035 | 0.022 |
| HPwES_LIM | Disconnect Notices/Year | 8,890 | 0.053 | 0.015 | 3.474 | 0.001 | 0.028 | 0.079 | 0.243 | 0.296 |
| HPwES_LIM | Average Past Due | 8,890 | -13.440 | 1.202 | 11.178 | 0.000 | 15.418 | 11.462 | 35.770 | 22.330 |
| HPwES_LIM | Total Past Due/Year | 8,890 | -5.337 | 1.593 | -3.349 | 0.001 | -7.958 | -2.716 | 61.949 | 70.205 |
| HPwES_LIM | Number of Past Due Bills/Year | 8,890 | -0.254 | 0.061 | -4.186 | 0.000 | -0.353 | -0.154 | 3.780 | 3.526 |
| IQ_HIM | Disconnects/Year | 383 | 0.007 | 0.030 | 0.241 | 0.809 | -0.042 | 0.056 | 0.099 | 0.106 |
| IQ_HIM | Disconnect Notices/Year | 383 | 0.114 | 0.126 | 0.906 | 0.365 | -0.093 | 0.320 | 0.673 | 0.786 |
| IQ_HIM | Average Past Due | 383 | -6.091 | 8.453 | -0.721 | 0.471 | 20.011 | 7.829 | 76.613 | 70.522 |
| IQ_HIM | Total Past Due/Year | 383 | 18.499 | 16.544 | 1.118 | 0.264 | -8.747 | 45.744 | 182.173 | 236.143 |
| IQ_HIM | Number of Past Due Bills/Year | 383 | -0.566 | 0.302 | -1.873 | 0.061 | -1.064 | -0.069 | 5.859 | 5.293 |
| IQ_LIM | Disconnects/Year | 204 | -0.025 | 0.025 | -0.982 | 0.327 | -0.067 | 0.017 | 0.065 | 0.040 |
| IQ_LIM | Disconnect Notices/Year | 204 | 0.024 | 0.124 | 0.190 | 0.849 | -0.181 | 0.228 | 0.506 | 0.530 |

| | | | | | | | | | | |
|--------|-------------------------------|-----|---------|--------|--------|-------|--------|--------|---------|---------|
| IQ_LIM | Average Past Due | 204 | -11.524 | 10.571 | -1.090 | 0.276 | 28.953 | 5.904 | 61.507 | 49.982 |
| IQ_LIM | Total Past Due/Year | 204 | -22.415 | 13.366 | -1.677 | 0.094 | 44.450 | -0.380 | 147.564 | 131.577 |
| IQ_LIM | Number of Past Due Bills/Year | 204 | -0.247 | 0.417 | -0.591 | 0.555 | -0.935 | 0.441 | 5.192 | 4.945 |