Guidehouse

ComEd Utility Non-Energy Impacts Research

Overview

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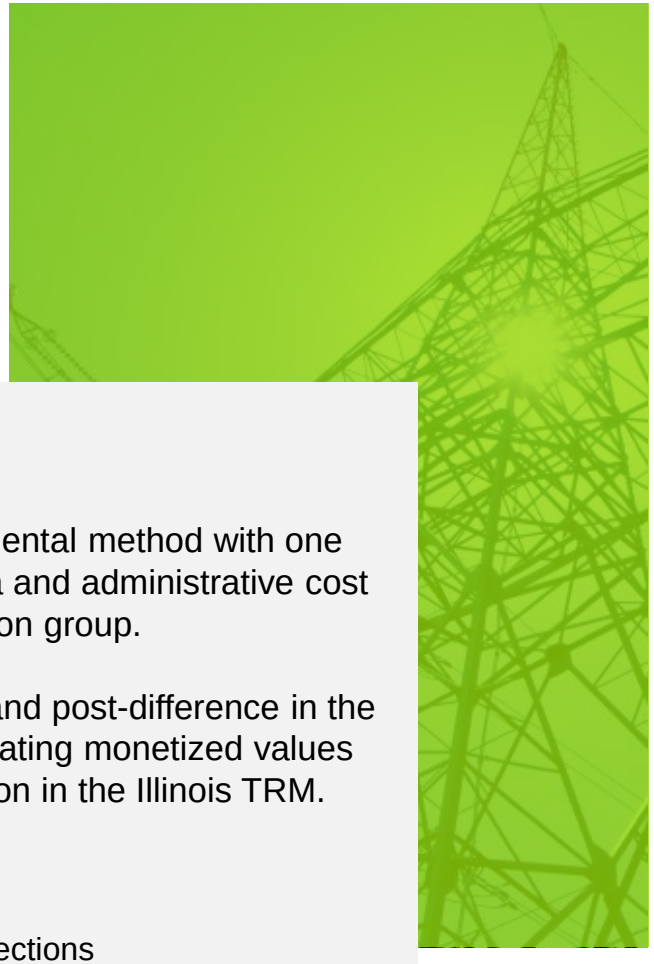
Utility NEI Research Scope

Guidehouse performed utility NEI analysis to assess the magnitude of selected metrics and to assess the potential inclusion of these metrics in cost-effectiveness tests. This analysis may also be used to inform ComEd's outreach and marketing efforts.



In response to FEJA, ComEd directed Guidehouse to conduct research to quantify and monetize non-energy impacts (NEIs) to use in cost-effectiveness tests (FEJA 2016).

Subsequently, ComEd and the Illinois Stakeholder Advisory Group (SAG) prioritized researching NEIs associated with ComEd's income eligible programs.

Guidehouse used a quasi-experimental method with one year of pre-and post-program data and administrative cost data for a treatment and comparison group.

Guidehouse researched the pre- and post-difference in the metrics below, in addition to calculating monetized values and assessing potential for inclusion in the Illinois TRM.

- Number of reconnections
- Average carried arrearage
- Reduced customer calls and collections
- Portion of households receiving payment arrangements
- Portion of each payment covered by bill assistance
- Number of late payments

Key Takeaways

In our analysis of utility NEI metrics, Guidehouse did see statistically significant differences between the participant and non-participant groups.

01 Both participant and non-participant groups had **higher bills post-treatment**, but the **treatment group** had a **significantly smaller** increase.

02 The percentage of customers in the Single Family Retrofit -CBA participant group with a **disconnection notice increased significantly.** The incidence of disconnections and reconnections is relatively low (2-5%), which may make it difficult to see significant changes in future analysis.

03 There were **no significant differences** between participant and non-participant groups within the **late payment metric**, and this is likely to remain the case even with a larger sample size.

04 There were **no significant differences** between participant and non-participant groups within the **arrearage metric,** though this may change with a larger sample size or a more precise evaluation strategy.

Utility NEI Methodology

Guidehouse used a quasi-experimental method to analyze participants in ComEd's Income Eligible Single Family Retrofit Program, which included weatherization measures[1].

Treatment

- Treatment group (participants) are customers who participated in the weatherization program in 2018.

Comparison

- Comparison group (non-participants) selected from database of customers who received payment assistance in 2018 from either ComEd or outside entities.

Timeline

- Guidehouse requested two years of data, one-year pre (2017) and one-year post (2019) for both the treatment and comparison group.
- This analysis timelines means that the COVID-19 pandemic did not have an impact on our results.

Calculation

- Guidehouse calculated the difference-in-difference between 2017 and 2019 and between the two groups to isolate impacts from the weatherization program.

Subgroups

- Two program implementers: Chicago Bungalow Association (CBA) and the Illinois Home Weatherization Assistance Program (IHWAP) – use different income criteria for program inclusion.
- Guidehouse analyzed the financial-related NEIs separately for these two groups.

[1] Guidehouse proposed research for the IE Single Family Retrofit program components (SFR-CBA and SFR-IHWAP) which included weatherization measures since information from the secondary research indicated that income eligible customers were more likely to see payment related benefits than non-income eligible customers. In addition, much of the secondary research covered weatherization programs at other utilities, which provided a better opportunity to compare our results.

Utility NEI Data Sources

For this analysis, Guidehouse utilized tracking data from on-going evaluation work and additional financial datasets provided by ComEd.

- One year of pre-program administrative data
- One year of post-program administrative data
- Payment data for participant group + non-participant group
  - Payment transaction amounts, types, and dates
  - Actual billed amounts by billing period
  - Source and amount of external payment assistance by billing period
  - Deferred payment agreement amounts
  - Reconnections by billing period
  - Customer call dates and types
- Additional dataset specific to overdue bill amounts (arrearages) for participant group + non-participant group
- Additional dataset specific to reconnections, disconnections, and disconnection notices

Analysis Sample Sizes

Metric	Sample Size*	
Program	Income Eligible Single Family Retrofits - CBA	Income Eligible Single Family Retrofits - IHWAP
2017 Participants	1,563	365
2017 Nonparticipants	207	206

*Sample size may vary slightly between metrics due to data availability

Research Considerations

During our analysis Guidehouse took various items into consideration.

The **Polar Vortex** in **2019** caused extremely low temperatures in ComEd territory (US Department of Commerce 2019). **Customer bills** in all groups **increased**, so tangential **bill-related benefits may not have occurred**. In addition, there was a **moratorium on** customer **disconnections** at that time.

Understanding **how** the **data** is **tracked** and **who** is **tracking** the data, in addition to **gaining access** to the correct data, can be **challenging**. This is something we come across frequently in evaluations related to payment metrics beyond average annual bills and is especially true when the data is housed in multiple systems or through third-party vendors.

The **quasi-experimental method** was most commonly used in the secondary research. However, it **leaves room for selection bias**, meaning that the participants in the weatherization program may have fundamentally different behavior and attitudes towards energy usage than non-participants. A **randomized control trial** (RCT) would be **more rigorous** but can be **challenging to implement**.

Difficulty in **selecting** a non-participant/**comparison group**. We chose to select our non-participant group from a customer group with **similar assistance patterns**, but that **may not capture** other **differences** very **well**. In future analysis, a comparison group using the same metric could be selected (i.e., a group with a similar arrearage incidence or percent of bills paid on time). We did not control for measures received so customers who received a large number of improvements or a small number of improvements are equivalent in this analysis.

Utility NEI Billing Results

Both participant and non-participant groups had higher bills post-treatment, but the treatment group had a significantly smaller increase.

Average Annual Bill Difference-in-Difference Results

Metric	Program	Nonparticipant Change (2019-2017)	Participant Change (2019-2017)	Difference (Participant - Nonparticipant)
Average Annual Bill ($)	Single Family Retrofits -CBA	100	41	-59*
	Single Family Retrofits IHWAP	136	13	-149*

*Indicates significance at the 90% level

Methodology – Calculate the average difference in pre- and post-annual billed amount between participants and non-participants

Dataset – Guidehouse received a credit and debit dataset containing (among other things) monthly billed amounts for participant and non-participants.

Results – While both participants and non-participants experienced an increase in average annual bills between 2017 and 2019, the participant group showed a significantly smaller increase than the non-participant group.

Additional Considerations – There was a period of extreme winter weather in 2019, which likely increased all ComEd customer bills and especially those in homes without much weatherization. This analysis covered the billed amount, not how the bill was paid (financial assistance, loans, etc.).

Utility NEI Disconnections Results

The percentage of customers in the Single Family Retrofits - CBA participant group with a disconnection notice increased significantly. The incidence of disconnections and reconnections is relatively low (2-5%), which may make it difficult to see significant changes in future analysis.

Reconnection and Disconnection Difference in Difference Results

Metric	Program Component	Nonparticipant Change (2019-2017)	Participant Change (2019-2017)	Difference (Participant – Nonparticipant)
Percentage with Disconnect Notice (%)	SFR-CBA	-6.5	1.9	8.4*
	SFR-IHWAP	-5.5	0.5	6.0
Percentage with Actual Disconnect (%)	SFR-CBA	-1.5	1.1	2.6
	SFR-IHWAP	1.2	1.9	0.7
Percentage with Reconnection (%)	SFR-CBA	-1.9	0.8	2.8
	SFR-IHWAP	0.3	1.6	1.3

*Indicates significance at the 90% level

Methodology – Compare the percentage of customers with disconnect notices, actual disconnections, and reconnections using a difference-in-difference methodology.
Dataset – Guidehouse received a dataset containing information on dates of disconnection notices, disconnections, and reconnections for 2017 and 2019.
Results – Significant increase in disconnection notices for SFR-CBA participants, additional increases in the other groups.
Additional Considerations – Customers who disconnect and reconnect under a different account are not tracked in this analysis. There are sometimes winter moratoriums on disconnections. In addition, there is some relationship between disconnection notices, disconnections, and reconnections that is not tracked explicitly here.

Utility NEI Late Payments Results

There were no significant differences between participant and non-participant groups within the late payment metric, and this is likely to remain the case even with a larger sample size.

Late Payment Difference in Difference Results

Metric	Program Component	Nonparticipant Change (2019-2017)	Participant Change (2019-2017)	Difference (Participant – Nonparticipant)
Percentage with Late Payment (%)	SFR-CBA	0.7	-1.3	-2.0
	SFR-IHWAP	-3.2	-6.5	-3.3

The dataset we received clearly indicated late payment charges.

Late Payment Pre-Period Differences

Metric	Program Component	2017 Participants	2017 Nonparticipants
Percentage with Late Payment (%)	SFR-CBA	44%	19%
	SFR-IHWAP	29%	22%

All pre-period groups had late payment incidence prior to participating. If one group had a low incidence (<5%) we may fee less confident in the results.

Late Payment Confidence Intervals

Metric	Program Component	CI- 90 Lower	CI-90 Upper
Percentage with Late Payment (%)	SFR-CBA	-10%	6%
	SFR-IHWAP	-14%	8%

The confidence interval is fairly wide and centered approximately around zero. If the confidence interval were more skewed, we might expect significant results from larger sample sizes.

Methodology – compare the percentage of customers with late payments using a difference-in-difference methodology.
Dataset – Guidehouse received a credit and debit dataset containing (among other things) indicators for customers who received late payment charges.
Results – While the direction of the results indicates participants have fewer late payments, no groups had significant changes. Further investigation into the data suggests that larger sample sizes may not improve significance.

Utility NEI Arrearages Results

There were no significant differences between participant and non-participant groups within the arrearage metric, though this may change with a larger sample size or a more precise evaluation strategy.

Arrearage Difference-in-Difference Results

Metric	Program Component	Nonparticipant Change (2019-2017)	Participant Change (2019-2017)	Difference (Participant – Nonparticipant)
Average Annual per Customer Arrearage ($)	SFR-CBA	16.08	9.78	-6.30
	SFR-IHWAP	32.76	-16.96	-49.71
Carrying Cost on Arrearages ($)	SFR-CBA	0.45	0.27	-0.18
	SFR-IHWAP	9.92	-0.47	-1.39

Pulling a non-participant group by matching on a metric like average annual bill or average pre-period arrearage amount may lead to more statistical confidence in the results.

Arrearage Confidence Intervals

Metric	Program Component	CI-90 Lower	CI-90 Upper
Carrying Cost on Arrearages ($)	SFR-CBA	-1.22	0.86
	SFR-IHWAP	-3.30	0.52

The confidence interval for SFR-IHWAP participants is significantly skewed, implying that we may have seen significant results with larger sample sizes. The SFR-IHWAP 2018 participant group was small, but it may be possible to combine years for future iterations on this metric.

Methodology – Compare average annual arrearage per customer. This can be thought of as the average amount a customer owed over the course of the year. For example, if a customer owed $50 for the first half of the year and $0 for the other half of the year, their average annual arrearage was $25. The carrying cost is applied as the arrearage amount times a 2.8% discount rate.

Dataset – Guidehouse received a dataset for participants and non-participants group containing weekly overdue arrearage amounts.

Results – The participant group showed a decrease in arrearage amount compared to the non-participant group, though this change was not significant.

Future Considerations for ComEd

There are areas of additional research that may be of interest to program planners or stakeholders.

Billing

Nuanced look at the interaction of EE and financial assistance[1]

Analysis could be expanded to assess impacts for customers who received financial assistance but no EE and vice versa.

Whether participation in EE programs precedes participation in financial assistance programs or vice versa.

Whether customers in EE programs have lower participation in financial assistance over time.

Disconnections

Further research on disconnections and reconnections

Larger sample size, seasonal analysis to avoid disconnection restrictions, additional metrics like "percent of customers with disconnection *and* reconnection" compared to "percent of customers with disconnection *and no* reconnection".

Arrearages

Additional research on bad-debt write-offs

Arrearage research covered here was targeted towards producing a TRM dollar value, which meant that the focus was on carrying costs. Bad-debt write-offs would be a different metric.

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[1] All metrics should consider the level of participation (amount of financial assistance, expected energy savings through EE) in addition to the binary "participation"

References

FEJA (Illinois Future Energy Jobs Act). Public Act 099-0906. www.ilga.gov/legislation/publicacts/99/PDF/099-0906.pdf. (passed December 7, 2016).

US Department of Commerce, NOAA. “January 30-31, 2019: Record to near-Record Cold in Northern Illinois.” *January 30-31, 2019: Record to Near-Record Cold in Northern Illinois*, NOAA's National Weather Service, 4 Feb. 2019, https://www.weather.gov/lot/RecordColdJan2019#:~:text=Chicago%2C%20IL-,January%2030%2D31%2C%202019%3A%20Record%20to%20Near%2D,Record%20Cold%20in%20Northern%20Illinois&text=The%20coldest%20temperature%20in%20Chicago,31%C2%B0%20on%20January%2031.

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