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| To: | Vincent Gutierrez; ComEd;  Randy Opdyke, Bruce Liu, Nicor Gas;  Christina Pagnusat, Omy Garcia, Victoria Nielsen, Kathia Benitez, Desiree Vasquez, Peoples Gas, North Shore Gas |
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| From: | Guidehouse Evaluation Team |
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| CC: | Jennifer Morris; ICC Staff; Celia Johnson, Illinois SAG |
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| Date: | October 16, 2020 |
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| Re: | Adjusting Home Energy Report Program Savings for the Effects of COVID-19 - Approaches and Considerations |

# Introduction

For CY2020, the Illinois Stakeholder Advisory Group (SAG) has agreed that the evaluation teams should normalize savings for changes caused by the coronavirus pandemic across the utilities’ energy efficiency programs. This memorandum details the evaluation team's considerations for normalizing Home Energy Report (HER) program savings.[[1]](#footnote-1) After review, the evaluation team recommends *not* normalizing savings for HER programs due to the limited options for normalizing accurately and complications with the year-over-year persistence framework for this program.

# Relevant Program Background

Across the utilities, HER program waves vary in maturity from over a decade of continued treatment to less than a year of treatment. The programs feature a randomized control trial (RCT) design and rely on custom savings calculations using regression modeling.[[2]](#footnote-2) The program's measure life in CY2020 is five years for both gas and electric savings per Version 8.0 of the Illinois Technical Reference Manual (TRM)[[3]](#footnote-3) with program effects diminishing in persistence over the five-year life according to the TRM-prescribed trajectory. Because the program treats the same customers over time and because of program effects persisting over multiple years following treatment, the framework for calculating lifetime savings (and cumulative persisting annual savings [CPAS] in the case of ComEd) includes subtracting persisting savings associated with the previous years' treatment from each year’s impacts. In other words, each year’s savings persisting from the previous years are subtracted from the custom calculated total savings for that year.

The impact analysis involves regression modeling which results in electric energy savings estimates for each treated wave. Only Nicor Gas has a wave for which the pre-treatment period partially falls during the coronavirus pandemic. This context is important for framing our considerations regarding normalizing HER energy savings estimates for the effects of the coronavirus pandemic.

Stay at home orders, social distancing, and sustained work-from-home behaviors across Illinois caused by the coronavirus pandemic have likely led to a change in usage patterns for CY2020 starting in March.[[4]](#footnote-4) Notably, the pandemic may have limited the program's ability to have an impact on energy efficiency behaviors that participants are willing and able to take. In fact, for some implementer’s, the pandemic changed the very nature of the energy efficiency recommendations that customers received as part of the reports in CY2020. For instance, based on the interviews with ComEd program staff, the CY2020 reports focused on low-cost and no-cost energy efficiency adjustments, as opposed to higher cost improvements which have been recommended in previous years and program channeling efforts were greatly reduced due to other program interruptions.

The HER programs are designed as RCTs wherein customers are randomly assigned to either the treatment group (who receives reports) or the control group (who does not). The random assignment means the two groups are statistically equivalent in all ways except that one receives the program’s home energy reports. If the pandemic affects the treatment and control groups equally (and the base assumption is that it does because of the RCT), our regular evaluation methods will result in an unbiased estimate of the savings during the pandemic.

# Normalization Considerations

Normalization can help eliminate a variety of factors that impact energy savings and that are inconsistent with “business as usual” normal trends. Such factors can include weather, natural disasters, and changes in home energy consumption and customer behaviors in response to external events and shocks. For CY2020, the SAG has agreed that the evaluation teams should normalize savings for changes caused by the coronavirus pandemic across the utilities’ energy efficiency programs.

However, unlike some energy efficiency programs where isolating and adjusting the factors of interest to reflect normal operation is relatively straightforward,[[5]](#footnote-5) the nature of the custom consumption data analysis savings calculation approach and the whole-home behavioral changes targeted for HER makes normalization challenging. Changes to energy consumption due to the pandemic instead of routine changes to energy conservation behaviors are not easily discernable in customers’ monthly energy usage. This makes it very difficult to normalize using the current year’s data.

Furthermore, the above-described design and implementation changes deployed as part of the programs during CY2020 may have impacted customer response to the programmatic interventions. For example, a greater focus on no- and low-cost adjustments may have led to a higher instance of those adjustments rather than high cost adjustments as compared to previous years. **The evaluation team does not believe it is appropriate to adjust the program impacts due to programmatic design and implementation changes, even though they are directly a result of COVID-19. This would be akin to adjusting another program for lower participation that occurred as a result of the pandemic.** Accurately isolating the effect of these program design changes from other influences is very difficult.

Another important consideration when deciding whether or not to normalize is the impact of normalization on the lifetime savings given the year-over-year adjustments for persistence. Consider a scenario of the pandemic resulting in lower than normal savings in CY2020. Normalizing the savings in this case will result in higher persisting savings in future years. If normalization is then not continued in future years,[[6]](#footnote-6) this could lead to low or even negative savings for the program in the future. This introduces uncertainty for program staff when planning future years’ impacts.

Given these considerations, the evaluation team has limited ability to effectively normalize the savings. Due to the entanglement of the pandemic effects and the savings of the HER programs in the current year, the evaluation team does not have an acceptable approach to normalize savings using the current year’s data. One approach that the evaluation team considered is using past program performance to develop CY2020 savings estimates. This approach presents several challenges as well, namely 1) determining the best savings value for waves not previously treated or still experiencing ramp-up[[7]](#footnote-7) and 2) selecting the most appropriate past value given variability in programmatic impacts associated with continued treatment. Using past performance also does not solve the issue relating to savings persistence.

Notably, the nature of a well-constructed RCT design, however, is such that it should eliminate all observed and unobserved factors that may explain differences in outcomes. Balanced and equivalent treatment and control groups therefore offer assurance that the effects of COVID-19, namely changes in energy consumption and energy management behaviors due to lockdowns and economic downturn, will be addressed. The custom approach to calculating savings, continued treatment of customers over time, and persistence of savings over time should correct for any potential over- or under-estimates of savings in a given year. Given the limitations of normalization, the evaluation team recommends producing savings estimates for the CY2020 program year, rather than under normalized conditions.

# Evaluation Recommendations

Given the lack of normalization approaches available for CY2020 savings, the evaluation team does not recommend pursuing savings normalization. Rather, we recommend estimating savings given CY2020 conditions, which is consistent with our evaluation of this program in any other year, and adding some evaluation activities focused on confirming the fidelity of the RCT design to ensure minimum bias of savings estimates.

To that end, we will complete several checks to ensure the equivalency of the treatment and control groups. We will perform these checks independently for each utility program wave.

* **Equivalency of the pre-period consumption data.** As part of this analysis, we will check equivalency of pre-treatment consumption patterns among participants in the treatment and control group active in CY2020. This analysis will ensure that customer attrition over the course of 2020 did not result in an overall RCT design imbalance.
* **Composition of the treatment and control groups across sociodemographic characteristics of interest (to the extent data is available).** Different customer segments likely respond to the coronavirus pandemic differently. For instance, it is likely that customers of older age and with lower incomes have been disproportionately affected by the pandemic. Unbalanced composition of the treatment and control groups across such key customer characteristics can result in biased savings estimates. We will leverage secondary data to explore the balance across key available sociodemographic characteristics of active treatment and control customers to ensure that the treatment and control groups are equivalently composed. We anticipate leveraging data available through the utilities[[8]](#footnote-8) as well as through other sources, such as the Census.[[9]](#footnote-9) We will also compare pre-treatment consumption of active customers across segments of interest.[[10]](#footnote-10)

If the results from these analyses show a balanced and equivalent experimental design, the evaluation team will not deploy any additional adjustment steps and instead rely on the standard practice approach to developing impact estimates. Should we find differences and lack of balance, we will explore approaches to adjust savings for this imbalance. If this occurs, we will discuss our proposed methods with the utilities and ICC Staff prior to pursuing them.

1. These programs are run by ComEd, Nicor Gas, Peoples Gas, and North Shore Gas. Ameren does not have an HER program in CY2020. [↑](#footnote-ref-1)
2. Program savings historically have not been normalized, including for weather. The evaluation team has previously explored weather normalization and found that it does not make a considerable difference to the savings. See: https://s3.amazonaws.com/ilsag/Illinois\_HER\_Weather\_Normalization\_Results\_Memo\_FINAL\_2018-01-22.pdf [↑](#footnote-ref-2)
3. See Measure 6.1.1 in Volume 4, Version 8.0 of the TRM. [↑](#footnote-ref-3)
4. Phase 1 of Illinois’ pandemic response began the week of March 16, 2020. [↑](#footnote-ref-4)
5. Consider an example of a commercial facility that installed program discounted energy efficient upgrades but dramatically altered facility operating hours over the course of CY2020 in response to the pandemic. Using normal operating hours can help adjust for the pandemic induced changes when calculating savings. [↑](#footnote-ref-5)
6. Normalization for the effects of the pandemic has not been agreed to beyond CY2020. [↑](#footnote-ref-6)
7. Savings tend to ramp up over the first 12-36 months of the program for each wave of customers. [↑](#footnote-ref-7)
8. For example, we understand that ComEd has PRIZM segment codes associated with its customer population. [↑](#footnote-ref-8)
9. We will use the most recent 5-year American Community survey and match geocoded HER participant data to the census block groups. We will use sociodemographic and household information for the census block groups to complete this analysis. To support this analysis, we will need to request and obtain HER participant service addresses. [↑](#footnote-ref-9)
10. If utilities are interested, we can expand this analysis to include exploration of trends in the post-period consumption by segment to understand how those trends compare pre- and during-COVID-19 and to explore whether and how different customer segment usage has been affected by the pandemic. [↑](#footnote-ref-10)