

Memorandum

Ameren Illinois Online Store NTG Results

To: Fernando Morales, AIC, and David Brightwell, ICC Staff
From: Opinion Dynamics Evaluation Team
Date: August 24, 2020
Re: 2019 Online Store NTG Results

Introduction

In 2019, the evaluation team conducted research with Ameren Illinois Online Store participants to update the program's net-to gross ratio (NTGR) for future application, with a primary focus on lighting-related measures.¹ Consistent with prior program years, we developed the NTGR using self-reported information from a web survey with program participants. The evaluation team also conducted follow-up telephone interviews with survey respondents to inform the spillover analysis. We used both participant survey and follow-up telephone interview responses to develop estimates of free-ridership (FR) and participant spillover (PSO). We applied our estimate of non-participant spillover (NPSO) from our PY7 research.

Summary of NTGR

Table 1 summarizes the Online Store NTGR results. Throughout this memo, NTG results discussed do not include advanced thermostats, which are discussed separately at the end of this memo.

Table 2. Updated Online Store NTGR from 2019 Research

Free-Ridership (FR)	Participant Spillover (PSO)	Non-Participant Spillover (NPSO) ^a	NTGR (1-FR+PSO+NPSO)
0.263	0.419	0.00	1.156

^a From PY7 research.

Data Collection and Sampling Methodology

The evaluation team conducted a web survey with customers who participated in the Online Store in 2019, attempting a census of unique contacts. The survey focused on installation verification, satisfaction with program processes, and attribution (free-ridership and spillover). The sample of Online Store participants came from an extract of the participant database in October 2019, which included 908 unique Online Store purchases. Advanced thermostats were a particularly popular measure among Online Store customers. Among

¹ This analysis focused on all Online Store measures with the exception of advanced thermostats. While this primarily encompasses lighting measures, our analysis also includes advanced power strips.

the total purchases, 709 (78%) included advanced thermostats and 663 (73%) included advanced thermostats as the only item purchased.

We developed the sample frame based on unique purchase contacts (n=690), rather than unique purchases, since many customers made multiple purchases and generally submitted the same contact information across purchases. To reduce respondent burden, we asked each customer only about a single purchase. We selected which purchase to include by prioritizing the least common end use in the purchase and then by total savings. If the same customer made multiple purchases with the same end uses and total savings, we selected the purchase to be verified in the survey randomly. For example, if a single customer ordered lighting controls in one purchase and advanced thermostats in another, we asked that customer about their purchase of lighting controls because lighting controls are a less common end use than advanced thermostats.

To reduce survey length, we asked the FR and PSO battery for a single end use purchased by each participant from the Online Store. We assigned the NTG end use based on the least common end use in each purchase. Although this NTG analysis focuses on lighting measures, we included purchases of advanced thermostats in the survey for contextual purposes and to gather information about customer satisfaction. Table 2 presents the population values, sample frame information, and completed survey information by NTG end use. There were only a small number of completes for lighting measures, as advanced thermostats comprised a majority of Online Store purchases in our data.

Table 3. Data Supporting 2019 Online Store NTGR Research

Total Online Store Purchases	Participants in Survey Sample	Advanced Thermostat End Use in Survey Responses	Lighting End Use in Survey Responses ^b	% of Online Store Purchases Covered in Survey	Survey Response Rate
908	690	41	19	6.6%	9.8%

^b Includes one advanced power strip.

NTGR Overview

Net impact evaluation is generally described in terms of determining program attribution. Program attribution accounts for the portion of gross energy savings associated with a program-supported measure or behavior change that would not have been realized in the absence of the program. The share of program-induced savings, indicated as the NTGR, is made up of FR and SO. FR is the portion of the program-achieved verified gross savings that would have been realized absent the program and its interventions. SO is generally classified into participant and non-participant spillover. PSO occurs when participants take additional energy-saving actions that are influenced by the program interventions but did not receive program support. NPSO spillover is the reduction in energy consumption and/or demand by customers who did not participate in the program yet were influenced by it.

The formula to calculate the NTGR is:

$$\text{NTGR} = 1 - \text{FR} + \text{PSO} + \text{NPSO}$$

The Illinois evaluation teams have worked with the Illinois Commerce Commission (ICC) and the Illinois Stakeholder Advisory Group (SAG) to create a standard Illinois Statewide NTG approach for use in Illinois energy efficiency evaluation, measurement, and verification work. Per the NTG Methods attachment to the

Illinois TRM², all NTG data collection and analysis activities for program types covered by the attachment that began after January 1, 2020 must conform to the statewide NTGR methods. While data collection occurred in 2019, our survey covered all inputs required by TRM Version 8.0. Therefore, this evaluation conforms with the requirement of Version 8.0 of the TRM.

Free-Ridership (FR)

Methodology

Free-riders are program participants who would have installed the same energy-efficiency measure(s) or taken the same energy-saving actions without program support. FR estimates are based on a series of questions that explore the influence of the program on participants' purchasing decisions as well as actions the participant likely would have taken had the program not been available.

The evaluation team implemented the FR algorithm as prescribed by the TRM version 8.0 Small Business Protocol. The algorithm consists of two scores: (1) influence of program components (PC) score and (2) no-program (NP) score (counterfactual), as well as a timing adjustment. Each sub-score serves as a separate estimator of FR and can take on a value of 0 to 1, where a higher score means a higher level of FR. The overall free-ridership score for a project is the average of the two scores, with the timing adjustment applied to the NP score.

The two scores included in the algorithms and the timing adjustment are described below.

1. **Influence of Program Components.** This score is based on a series of questions that ask respondents to rate the importance of program components in their decision to install the energy-efficient equipment, using a scale of 0 to 10 (where 0 is "Not at all important" and 10 is "Very important").

Program Components considered³ include such items as the availability of the incentive, information from program marketing materials, free shipping, the convenience of online shopping, and recommendation from Ameren Illinois staff. We estimate the Program Components score as follows:

Equation 1. Program Components Score

$$PC\ Score = 1 - \left(\frac{PF_{max}}{10} \right)$$

where:

- PF_{max} is the highest score given to a program factor.

Greater importance of the program components means a lower level of FR. In this approach, if a respondent rated the program rebate 10 out of 10, the free shipping 8 out of 10, and the information from program materials 8 out of 10, PF_{max} would be 10 and the PC score would be 0.

² Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 8.0. Volume 4: Cross-Cutting Measures and Attachments. Dated: October 28, 2019. Effective: January 1, 2020.

³ The evaluation team also considered Non-Program factors including corporate policy or guidelines, previous experience with the product, and recommendation from a contractor.

2. **No-Program Score.** This score is based on the likelihood that the exact same energy-efficient equipment would have been installed without the program, using scale of 0 to 10 (where 0 is “Not at all likely” and 10 is “Very likely”) and is calculated as follows:

Equation 2. No-Program Score

$$NP\ Score = \left(\frac{\text{Likelihood to Install Same Equipment}}{10} \right)$$

A greater likelihood of participating without the program means a higher level of FR. For example, if the participant provides a likelihood rating of 7 to install the same equipment in the absence of the program, their NP FR score would be a 0.70.

In the FR algorithm for the Small Business Protocol, the NP score incorporates a timing adjustment (discussed next) as follows:

$$NP\ Score\ Adjusted = \left(\frac{\text{Likelihood to Install Same Equipment}}{10} \right) * \text{Timing Adjustment}$$

3. **Program Timing Adjustment.** The program timing adjustment incorporates information from a survey question that asks (1) whether the installation would have occurred at the same time without the program; and (2) if the installation would have occurred later, how much later.

In the timing adjustment, later purchases without the program means a lower level of FR. This adjustment is calculated on a 0 to 1 scale. A timing adjustment of 1 means that there is no evidence that the program changed the time frame in which the project would have occurred, while a lower value of the timing adjustment means that the program caused the project to occur sooner. The timing adjustment provides the program with some credit for accelerating the project. The timing adjustment is calculated as follows⁴:

$$\text{Timing Adjustment} = 1 - (\text{Number of Months Expedited} - 6) / 18$$

This timing adjustment is used in the Online Store NTGR algorithm and is multiplied by the No-Program FR score.

This evaluation implemented and analyzed the following FR algorithm:

$$(\text{PC FR Score} + [\text{NP Score} * \text{Timing Adjustment}]) / 2$$

FR Results

Using the algorithm outlined above, the FR estimate for the Online Store program is 0.263.

⁴ Please note that the TRM Version 8.0 prescribes a divisor of 42 and a “number of months expedited” that can range up to 48 months. In these implementations of the algorithm, we allow “number of months expedited” to range up to only 24 months and adjust the divisor appropriately in order to provide responses that are more realistic for the type of purchase (lighting products) captured in this assessment.

Participant Spillover

Methodology

Participant Spillover (PSO) refers to the installation of energy-efficient measures by program participants who were influenced by the program but did not receive an incentive. An example of PSO is a customer who installed incented equipment in one facility and, as a result of the positive experience, installs additional equipment at another facility but does not request an incentive (outside PSO). In addition, the participant may install additional equipment, without an incentive, at the same facility because of the program (inside PSO).

We examined both inside and outside PSO in projects from lighting and non-lighting end uses using participant responses to the web surveys and follow-up telephone interviews. We conducted an engineering analysis of participant responses to determine the savings associated with measures identified as SO.

After calculating the PSO savings reported by participants in our sample, we used Equation 3 to develop the program PSO rate.

Equation 3. Participant Spillover Rate

$$PSO\ Rate = \frac{Total\ Net\ PSO\ Savings_{Participant\ Sample}}{Total\ Ex\ Post\ Gross\ Program\ Savings_{Participant\ Sample}}$$

Spillover Results

Based on results from the Online Store participant survey, spillover was present for four survey respondents. Our engineering analysis of the spillover projects completed by these four participants determined total spillover savings of 53,209 kWh for the participant sample. These savings are presented in Table 3.

Table 4. Online Store Participant Spillover Savings

Participant	kWh	SO Measures
Participant 1	26,360	LED tube lights, LED lamps, Smart Thermostats
Participant 2	18,804	LED tube lights, Room Air Conditioners, Smart Thermostats
Participant 3	1,542	LED tube lights, LED lamps, Smart Thermostats
Participant 4	6,503	LED tube lights
Total	53,209	

Dividing the estimated total spillover for the four participants (53,209 kWh) in our sample by total program gross savings of the overall participant sample (126,959 kWh) yields a spillover rate of 0.419.

Advanced Thermostats

The evaluation team also estimated free ridership for advanced thermostats as a standalone measure. As per current SAG agreement, no NTGR is applied to advanced thermostat savings, we do not currently recommend this FR estimate for future application. However, we provide this estimate for contextual purposes to help AIC and implementation staff understand the current effects of advanced thermostat incentives on purchase behaviors. Using the algorithm outlined previously, the FR estimate for the advanced thermostat measure is 0.240. The evaluation team did not estimate a separate PSO score for the advanced thermostat measure.