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Memorandum

To: Fernando Morales, Ameren Illinois Company (AIC), Jennifer Morris (ICC Staff)
From: The Opinion Dynamics Evaluation Team
Date: September 4, 2019
Re: 2018 Multifamily Initiative Tenant and Property Manager Survey NTGR Results

Introduction

In 2018, the evaluation team conducted research with participating property managers to update the Multifamily Initiative's NTGRs for select new measures including advanced power strips, advanced thermostats, and LEDs for future application. Consistent with prior program years, we developed the NTGRs using self-reported information from Computer-Assisted Telephone Interviewing (CATI) surveys with participating property managers. We used this participant survey data to develop estimates of free-ridership (FR) and participant spillover (PSO).

Key Findings

Table 1 presents the results of our 2018 net-to-gross ratio (NTGR) analysis for prospective application. Overall, the team found very low levels of FR among property managers participating in the Multifamily Initiative and no cases of spillover. As shown below, the updated electric and gas NTGRs ranged from 0.89 to 0.98 for LEDs, advanced power strips and advanced thermostats. The evaluation team attempted to reach a census of all participating property managers, which means there is no sampling error associated with our estimates.

Table 1. Updated Multifamily NTGRs from 2018 Research with Participating Property Managers

Component	FR	PSO	NTGR (1 – FR + SO)
Electric (kWh)			
LEDs	0.04	0.00	0.96
Advanced power strips	0.02	0.00	0.98
Advanced thermostats	0.11	0.00	0.89
Gas (therms)			
Advanced thermostats	0.02	0.00	0.98

AIC Multifamily Initiative Overview

The Ameren Illinois Multifamily Initiative offers incentives and services that enable energy savings and lower operating costs in market-rate multifamily housing (buildings with three or more units managed by a private entity). The Initiative implementer, CMC Energy (CMC), conducts all outreach and recruitment, performs audits to identify installation opportunities, and provides direct installation of energy-saving measures for building

common areas and tenant units. Measures are provided free-of-charge. The types of measures that property managers[1] and tenants are eligible to receive through the Initiative are as follows:

- **In-unit:** Initiative offerings for tenant units include standard and specialty LEDs, low-flow showerheads, faucet aerators, programmable thermostats, advanced thermostats, pipe wrap, and Tier 1 advanced power strips. The implementer is responsible for installing LEDs, low-flow showerheads, faucet aerators, and pipe wrap in tenant units while delivery methods for the advanced and programmable thermostats vary by property. In most cases, property management staff install the thermostats under CMC supervision. However, CMC occasionally leaves thermostats behind for property management staff to install later. Before projects are completed, CMC staff verify the installation of all thermostats that were left behind by visiting the units. Similarly, delivery methods for the advanced power strips also vary by property as CMC Energy staff either provide tenants with in-person tutorials about how to use their advanced power strips or they leave the power strips behind for tenants to install.
- **Common Areas:** The Initiative provides light bulb replacements in common areas. More specifically, the implementer offers properties medium screw-based standard and specialty LED replacements for incandescent or halogen lamps in interior and exterior settings. The implementation contractor conducts all common area lighting upgrades.

Leidos also provides several implementation services to support the Multifamily Initiative including developing marketing materials, providing Initiative oversight, conducting QA/QC inspections, and managing Initiative tracking data.

Sampling and Survey Completes

Sample Development Methodology

Property managers have primary control over decisions about whether to install the measures offered through the Multifamily Initiative in the properties they manage. As such, we used the property manager survey to measure FR and PSO.

The evaluation team developed the property manager telephone survey sample frame based on the list of property managers who completed projects during 2018 and for whom the program-tracking data included adequate contact information. We combined observations with the same contact name or phone number into one contact (resulting in 51 contacts) and dropped one for whom there was no phone number. For the survey, we attempted to contact a census of the remaining fifty property managers.

To minimize respondent burden, we asked property managers about one property (if they had completed upgrades at multiple) and focused the FR battery on one type of measure. We took the following steps to select the property and measure type for each property manager:

[1] We use the term "property manager" to refer to both property managers and property owners.

- Where property managers had completed upgrades at multiple properties, we asked property managers about the property with the highest ex ante net electric savings.
- We selected the specific measure to ask about considering both the volume of the measures that the participant received, as well as the deemed savings per measure. Generally, our goal was to ask participants about measures that contributed a relatively large amount of savings while ensuring that sample sizes per measure were relatively large compared to the total participant population, specifically:
  - Advanced thermostats have the highest deemed savings value of the three priority measures and therefore, we asked about advanced thermostats for any participant that received more than ten. Power strips have the second highest deemed savings value, so we asked about power strips for any property manager who received more than 180 (property managers received a range of 2 to 341 per property). We asked all remaining property managers about LEDs.
  - We reviewed results of this sampling strategy and adjusted the prioritization based on the measure quantities each property manager received. So, if a property manager had received an unusually large amount of any given measure type, we prioritized asking about that measure type. To illustrate, if the initial sample prioritization dictated a property manager should receive questions about advanced thermostats, but they had also received 2,500 LEDs then we adjusted the sampling strategy to prioritize asking about LEDs for that property manager.

Table 2 shows the count of measures and unique contacts in the population relative to the count of measures and unique contacts for which we collected NTGR data through the property manager survey for LEDs, advanced power strips, and advanced thermostats. These results show that the NTGR data we collected through the property manager survey was generally representative of the population of unique contacts and measure counts for each of these measure types.

Table 2. Property Manager Survey Representation

	Count of Measures in Population	Count of Measures in Survey Data	Survey Measure Representation	Unique Contacts in Population	Unique Contacts in Survey Data	Survey Contact Representation
LED	13,827	976	7%	35	9	26%
Advanced Power Strip - Tier 1	3,316	889	27%	42	11	26%
Advanced Thermostat	2,247	798	36%	26	8	31%
Total	**19,390**	**2,663**	**14%**	**54**	**16**	**30%**

Note: The total population of unique property managers is the number of unique phone numbers.

Survey Response Rate

The survey response rate is the number of completed surveys divided by the total number of potentially eligible respondents in the population. We calculated the response rate using standards and formulas set by the American Association for Public Opinion Research (AAPOR) using Response Rate 3 (RR3). The tenant and property manager survey response rates and inputs used to calculate these response rates are included in Table 3. We also include the formulas used to calculate RR3 below. The letters used in the formulas are defined in the survey disposition table that follows.

Equation 1. Formula for RR3

$$RR3 = \frac{I}{\left(I + N + e1(U1 + e2 * U2)\right)}$$

Where:

$$e1 = \frac{(I + N)}{(I + N + X1)}$$

$$e2 = \frac{(I + N + X1 + U1)}{(I + N + X1 + U1 + X2)}$$

Table 3. Tenant and Property Manager Survey Dispositions and Response Rates

I	Disposition Code	Property Manager Survey
N	Complete	16
X1	Partial complete - survey eligibility confirmed	0
U1	Refused	5
U2	No response	23
Incidence/e1	Ineligible to participate	4
e2	Bounced mail/phone	2
CR	**Cooperation Rate**	**76%**
RR3	**Response Rate**	**42%**

NTG Methods

Free-Ridership Methodology

Free-riders are Initiative participants who would have implemented the incented energy efficient measure(s) even without the Initiative. FR estimates are based on a series of questions that explore the influence of the Initiative on participants' decisions to make the energy efficient installations, as well as actions the participant likely would have taken had the Initiative not been available.

The Residential Multifamily NTGR Protocol in the IL-TRM V6.0 consists of two main scores: An Initiative Influence Score and a No-Program Score (counterfactual). The algorithms employ supplementary adjustments that account for an order effect (when the customer learned about the Initiative relative to deciding to complete the upgrade), as well as the Initiative's influence on the upgrade timing and quantity.

The two scores included in the algorithm and their adjustments are described below.

1. **Initiative Influence Score**. The Preliminary Initiative Influence Score is based on the importance of Initiative components and an order adjustment. The Initiative components portion of the score is based on a series of questions that ask respondents to rate the importance of five different Initiative 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"). Initiative components considered include the availability of the free measures, recommendations from a contractor (if appropriate), recommendations from Initiative staff,

recommendations from an AIC account manager, and information from Initiative marketing materials. As seen below in the Final Initiative Influence Score, a greater importance of the Initiative components signifies a lower level of FR.

In addition to Initiative components, the Preliminary Initiative Influence Score incorporates an Order Adjustment (i.e. a temporal sequence adjustment) to account for the order in which a participant learned about the Initiative and decided to perform upgrades. This adjustment is based on a question that asks respondents to indicate whether they decided to have the upgrades installed before or after they learned about the Initiative. When a customer decides to have the upgrades installed before learning about the Initiative, this signifies the Initiative was less influential on the participant's decision to undertake the project. As such, the customer is more likely to be a free-rider. On the other hand, when a customer decides to have the upgrades installed after learning about the Initiative this signifies a lower level of FR. We applied the order adjustment score as a scaling factor (0.5) on the Preliminary Initiative Influence Score (maximum Initiative component rating) as follows:

Preliminary Initiative Influence Score

= *(Maximum Initiative Component Rating), if decided to complete upgrade* after *learning about the Initiative*

= *(Maximum Initiative Component Rating) * 0.5, if decided to complete upgrade before learning about the Initiative*

The Final Initiative Influence Score is an inverse of the Preliminary Initiative Influence Score, so the order adjustment decreases Preliminary Initiative Influence Score, which results in an increased Final Initiative Influence Score reflecting higher levels of FR. The Final Initiative Influence FR Score is calculated as:

Final Initiative Influence FR Score

= 10 − (Preliminary Initiative Influence Score)

2. **No-Initiative Score.** This score is based on the participant's self-reported likelihood to have installed the exact same type and quantity of energy efficient equipment at the same time without the Initiative.

   Timing Score*:* Even if the participant was highly likely to have installed the same type of equipment without the Initiative, the Initiative still might have influenced the participant to undertake the project sooner than they would have otherwise. The Timing Score is measured as a customer's likelihood to purchase upgrades within six months of when they received them through the Initiative.

   Timing Score = Likelihood to Install Measures in Similar Time Frame

   Quantity Score: Similarly, even if the participant was highly likely to have installed the same type of equipment without the Initiative, the Initiative still might have influenced the participant to install a larger quantity of the equipment. The Quantity Score is measured as a customer's likelihood to purchase fewer of the same pieces of equipment if the Initiative was not available. We calculate the Quantity Score as an inverse of the response to this question because a lower score means a greater likelihood the respondent would have installed the same number or more measures.

   Quantity Score = 10 − Likelihood to Install Fewer Measures

Efficiency Score: The Initiative may have influenced participants to install equipment that is more energy efficient in comparison to the type of equipment they would have selected without the Initiative. The Efficiency Score is measured as a customer's likelihood to purchase the exact same equipment if the Initiative was not available.

Efficiency Score = Likelihood to Install the Exact Same Measures

The No-Initiative Score is comprised of the minimum of the Timing, Efficiency, and Quantity Scores, which are all measured on 0 to 10 scales from "not at all likely" to "very likely".

No-Initiative Score = Minimum (Timing Score, Efficiency Score, Quantity Score)

This evaluation team implemented and analyzed the following FR algorithm:

FR Algorithm: FR = (Average (Final Initiative Influence Score + Final No-Initiative Score)) / 10

The formula to calculate the NTGR is:

NTGR Algorithm: NTGR = 1 – FR + SO

Addressing Triggered Consistency Checks

The IL-TRM V6.0 incudes recommendations for developing consistency checks to address the possibility of conflicting responses to FR elicitation questions. We implemented this guidance by using six consistency checks to determine whether participants provided consistent responses across the Initiative Influence Score, the No-Initiative Score, and the order in which they learned about the Initiative and decided to install the upgrades. Two respondents triggered consistency checks (Table 4). As recommended in the IL-TRM V6.0, we examined these two responses.

One respondent reported they learned about the Initiative after their decision to complete upgrades, but they also stated that without the Initiative they would have purchased fewer upgrades on their own and that Initiative factors were important in their decision to complete the upgrades. Furthermore, when asked how the Multifamily Initiative influenced their decision to have the upgrades installed, this respondent said, "we were able to do (the upgrades) all at once." Given this response, it is plausible that the respondent was planning to complete the upgrades before they learned of the Initiative, but the Initiative was still influential because it allowed them to install a greater quantity of measures than they originally planned. As such, we believe this respondent's answers make logical sense and we did not change them.

Another respondent reported they were highly likely to complete same upgrades without Initiative, but the Initiative factors were also important in their decision to complete the upgrades. We followed up with this respondent by phone and they explained they would have been likely to make the same upgrades without the Initiative, but the Initiative was still influential because it caused them to make these upgrades sooner than they would have if the free upgrades were not available through the Initiative. In response, we asked this respondent if they would like to change their response to the timing question. This respondent replied they would like to change their answer from being "very likely" that they would have purchased new upgrades of any efficiency within 6 months without the Initiative to "not at all likely."

Table 4. Consistency Checks

#	Consistency Check	Number of Respondents Triggering Check
1	Learned about Initiative after decision to upgrade: Initiative factors were important in decision to do the upgrade	1
2	Highly likely to do same upgrade without Initiative: Initiative factors were important in decision to do the upgrade	1
4	Learned about Initiative after decision to upgrade: Would be likely to install fewer equipment upgrades on own without Initiative	1

Spillover

Participant spillover refers to the installation of energy efficient measures by Initiative participants who were influenced by the Initiative but who did not receive an incentive. An example of participant spillover is a property manager who installed incented equipment in one property and, as a result of the positive experience, installs additional equipment at another property but does not request an incentive (outside SO). In addition, the participant may install additional equipment, without an incentive, at the same property because of the Initiative (inside SO). For the Multifamily Initiative, participants included in the SO calculations had to meet two criteria: the customer must have installed an energy efficient measure that did not receive a rebate and the customer must have reported that the Initiative had a high level of influence on his or her decision to install the measure. The evaluation team examined both inside and outside SO in projects from lighting and non-lighting end-uses using participant responses to the property manager survey and but did not find any instances of Multifamily Initiative participants installing spillover measures in 2018.

Supplemental NTGR Context from the Tenant Survey Results

Although we consider property managers to have primary control over decisions about whether to install the measures offered through the Multifamily Initiative in the properties they manage, tenants may also play a role in the decision to purchase certain measure types including lightbulbs and power strips. As such, we asked tenants about their purchasing decisions for these two measures to further develop an understanding of program attribution for these measures.

Tenant Experience with Advanced Power Strips

Supplemental results from the tenant survey indicate that most tenants (62%), who received an advanced power strip through the Initiative, would have been unlikely to purchase an advanced power strip without the Initiative, which is consistent with the low FR value from the property manager survey.

Tenant Lighting Purchase Decisions

Supplemental results from the tenant survey indicate the Multifamily Initiative may have a declining influence on the installation of efficient bulbs in tenant units as tenant natural adoption of LEDs is likely to continue to increase over time. Most tenants reported they are responsible for purchasing their own bulbs for their units and over half (54%) of the tenants that reported purchasing new bulbs in 2018 chose LEDs. This represents a sharp increase from the 11% of tenants that reported purchasing LEDs in 2016. These results indicate that market influences outside of the Initiative such as the decreased cost and increased availability of LEDs are likely motivating tenants to purchase LEDs on their own. As such, we expect the Initiative will have a diminishing influence on the type of bulbs installed in tenant units over time as the market penetration of LEDs increases. However, we can likely assume that the Initiative will have an enduring influence on the early

replacement of incandescent bulbs as we assume that tenants are unlikely to remove working bulbs in their units and replace them with LEDs without the Initiative. Quantifying tenant likelihood to replace working bulbs with LEDs through future research efforts can help to confirm this assumption.