



MEMORANDUM

To: Nick Warnecke and Nic Crowder, AIC; Nida Khan, CAMI Energy; Seth Craigo-Snell, SCS Analytics; and Elizabeth Horne, ICC Staff

From: Opinion Dynamics Evaluation Team

Date: September 25, 2024

Re: Ameren Illinois Virtual Commissioning™ Channel Net-to-Gross Results

INTRODUCTION

The Ameren Illinois Company (AIC) Virtual Commissioning™ (VCx) channel helps business customers in AIC’s service territory improve their facilities’ energy efficiency through the implementation of low- and no-cost energy-saving measures. The channel is implemented by Power TakeOff, whose energy advisors identify prospective participants by analyzing advanced metering infrastructure (AMI) data through internal software that identifies sites with high savings potential. Power Takeoff’s energy advisors then contact these businesses and provide them with suggestions on how to reduce energy consumption by adjusting the operation of their heating, ventilation, and air conditioning (HVAC) and lighting equipment.

As part of the 2023 and 2024 evaluations of the VCx channel, the evaluation team conducted research with participants to update the net-to-gross ratio (NTGR) for this channel.¹ The evaluation team used the net-to-gross (NTG) methodology prescribed in version 12.0 of the Illinois Technical Reference Manual (IL-TRM V12.0) Attachment A (Illinois Statewide Net-to-Gross Methodologies) to design this research. Specifically, we used the IL-TRM’s Study-Based Protocol² to calculate free ridership (FR). Additionally, the evaluation team followed IL-TRM guidance to identify potential spillover (SO)³ associated with the VCx channel. The results of this research are based on self-reported information collected through a web survey conducted with customers who participated in the channel in 2022, 2023, and the first half of 2024. This memo presents the evaluation team’s research findings.

SUMMARY OF NTG RESULTS

Table 1 summarizes the results of the VCx NTG analysis, including FR scores and SO scores, based on responses from six participants.

Table 1. 2023- 2024 Virtual Commissioning™ NTG Research Results

FR	SO	NTG $([1 - FR] + SO)$
0.074	0.005	0.931

¹ The evaluation team originally fielded this research as part of the 2023 evaluation. Due to a low number of responses, we decided to re-field the research with additional sample in 2024.

² IL-TRM V12.0 - Attachment A: Illinois Statewide Net-to-Gross Methodologies, Section 3.4: Study-Based Protocol.

³ Participant spillover refers to the installation of energy-efficient improvements by program participants who were influenced by the program but did not receive an incentive or rebate.

DATA COLLECTION AND SAMPLING METHODOLOGY

The evaluation team conducted a web survey with customers who participated in the channel in 2022, 2023, and the first half of 2024. The evaluation team first fielded the survey in August of 2023 with customers who participated in the channel in 2022 and the first half of 2023. Due to the low number of responses to the first round of research, the evaluation fielded a second round of research in July 2024 with customers who participated in the channel in the second half of 2023 and first half of 2024. The evaluation team contacted participants via email to invite them to complete the survey. As part of the outreach strategy, the evaluation team sent out an initial email invitation to participants in the sample, and up to three follow-up emails. Additionally, Power Takeoff also reached out to participants via email to encourage them to complete the survey. Participants were offered a \$50 e-gift card as an incentive for their participation.

The VCx channel’s tracking data included 98 projects across 93 unique facilities, associated with 70 unique contacts with a valid email address across the mentioned timeframe. Of the 93 unique facilities that participated in the channel, 15 were eligible under the NTG Ratio for Disadvantaged Areas policy defined in section 7.4 of the Illinois Policy Manual,⁴ and are therefore excluded from the population for the purposes of this research. In total, the survey population consisted of 82 projects across 80 unique facilities, associated with 59 unique contacts with a valid email address. The evaluation team attempted a census sampling approach and created a sample composed of 59 projects (one project per valid contact). As presented in Table 2, we received six valid responses to the survey (i.e., participants who passed screening and are not associated with facilities eligible under the NTG Ratio for Disadvantaged Areas policy), resulting in a response rate of 10%.⁵ Table 2 below shows the number of projects and the percentage of savings that were captured in the sample and the survey responses.

Table 2. Data Collection and Sample Development

Population		Sample			Responses		
Number of Projects	Total kWh Savings	Number of Projects	% of Projects	% of kWh Savings	Number of Projects	% of Sampled Projects	% of Sampled kWh Savings
82	14,639,313	59	72%	82%	6	10%	2%

NTGR METHODOLOGY

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 an NTGR, is made up of FR – the portion of the program-achieved gross savings that would have been realized absent the program – and SO – additional energy-saving actions taken by participants that were influenced by their participation in the program but did not receive direct program support. The NTGR is calculated as:

$$NTGR = 1 - FR + SO$$

The evaluation team used the NTG methodology prescribed for study-based programs in the IL-TRM V12.0, Attachment A (Illinois Statewide Net-to-Gross Methodologies) to estimate FR. Additionally, the evaluation team followed the Core Participant Spillover protocol to estimate SO associated with the VCx channel. The following subsections describe the detailed methodology we applied to calculate both of these NTGR components.

⁴ <https://www.icc.illinois.gov/docket/P2023-0761/documents/344226/files/601129.pdf>

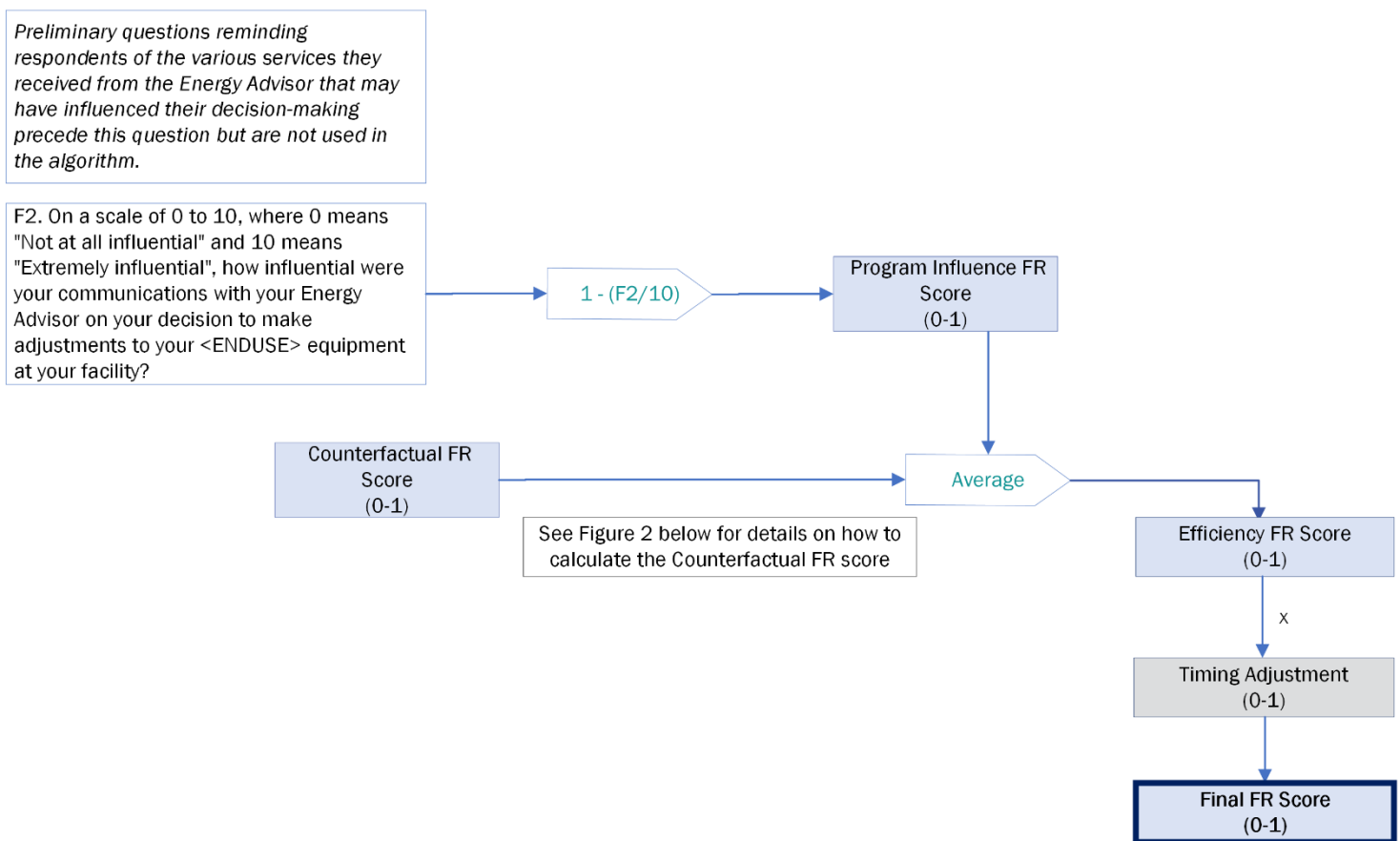
⁵ We received 10 total responses to the survey, but 4 were located in a qualifying disadvantaged area.

FREE RIDERSHIP ALGORITHM

FREE RIDERSHIP COMPONENTS

The IL-TRM's Study-Based Free-Ridership protocol consists of two sub-scores: (1) program influence FR score, and (2) counterfactual FR score. Each sub-score serves as a separate estimator of FR and can take on a value between 0 and 1, where a higher score means a higher level of FR. The protocol also includes a timing adjustment—when applicable—ranging from 0 to 1, where a smaller value means that the program resulted in a greater acceleration of the project timeline, therefore, reducing FR. The overall FR score for a project is the average of the two sub-scores multiplied by the timing adjustment. The overall FR algorithm is shown in Figure 1 below.

Figure 1. Study-Based Free Ridership Algorithm



Note: The <ENDUSE> variable is populated as "HVAC" or "lighting" depending on the energy-saving improvements the respondent implemented.

PROGRAM INFLUENCE (PI) FR SCORE

The VCx channel focuses on two primary end uses: HVAC and lighting. The channel's typical interventions include schedule changes for HVAC and lighting equipment and set point adjustments for HVAC systems via an advanced thermostat or the facility's building or energy management system (BMS/EMS). As part of the survey, respondents were reminded of the services they received from the Energy Advisor through the VCx channel, including the end use-specific recommendations they received. Then respondents were asked to score how influential their communication with the Energy Advisor was in their decision to make adjustments at their facility on a scale from 0 to 10. Per IL-TRM guidance, we designed the survey such that respondents whose projects included both lighting and HVAC adjustments would have been asked to provide a single program influence score covering both end uses. Of the six respondents who completed the survey, five had projects that only included one end use and one respondent's project included both end uses.

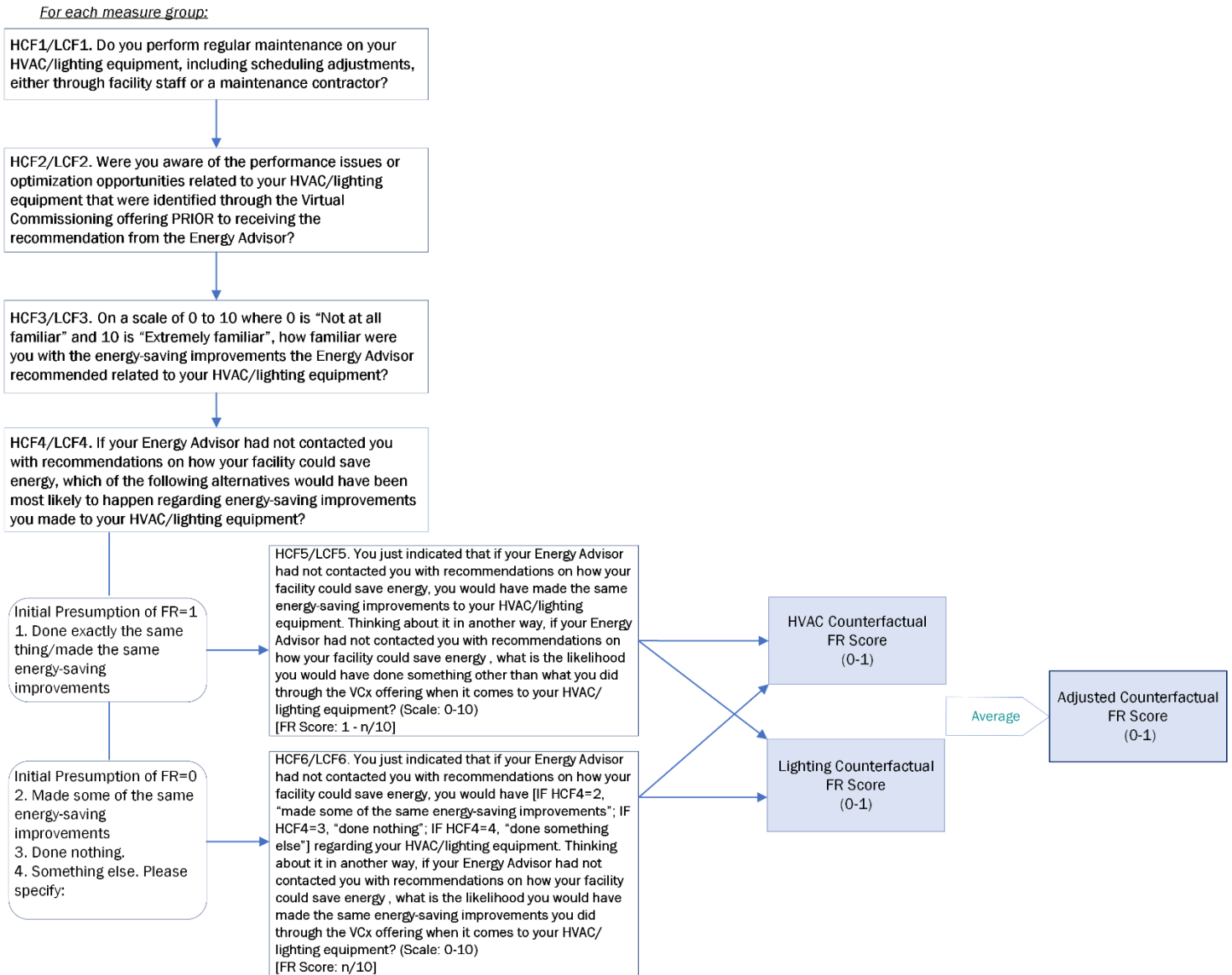
COUNTERFACTUAL (CF) FR SCORE

Based on guidance in the Study-Based Free-Ridership protocol, however, we designed the survey to estimate the counterfactual FR scores at the end use level by asking respondents separate batteries of questions covering their lighting and HVAC improvements to account for any variation in FR across the different end uses. Respondents were first asked about their facilities' regular maintenance when it came to the end use in question, and their awareness and familiarity with the issues and optimization opportunities identified by the Energy Advisor. Respondents were then asked to select the scenario that would have been most likely to happen regarding that end use if they had not been contacted by the Energy Advisor. Lastly, depending on their responses to the scenario question, respondents were steered to the appropriate counterfactual question where they provided a score (between 0 and 10) representing either the likelihood that they would have done exactly the same thing that they did through the VCx channel, or the likelihood that they would have done something different than what they did through the channel. This method for calculating the counterfactual FR score⁶ is depicted in Figure 2 below.

⁶ According to the Study-Based FR protocol in the IL-TRM, there are two options for calculating the counterfactual FR score, where Option 1 should be used in all cases for VCx programs. The main differences between Options 1 and 2 is that in Option 2, the counterfactual FR score not only depends on responses to the scenario question, but also on responses to additional questions. For more information, see Section 3.4: Study-Based Protocol of the IL-TRM Version 12.0 - Attachment A: Illinois Statewide Net-to-Gross Methodologies.

Opinion Dynamics

Figure 2. Study-Based FR Counterfactual Algorithm (Option 1)



While the Study-Based Protocol recommends aggregating end use-level counterfactual FR scores to the project level using savings-based weights, the nature of the VCx channel would not have allowed for this, given that savings are tracked at the project-level. Therefore, the evaluation team planned to calculate a simple average of the end use-level counterfactual FR scores to estimate the overall counterfactual FR score for any respondents whose projects included both lighting and HVAC adjustments.

As mentioned before, five respondents had projects that only included one end use; therefore, their overall counterfactual FR score was the same as their end use-level score. However, one respondent's project included both end uses; therefore, their overall counterfactual FR score was calculated as the simple average of the end use-level counterfactual FR scores.

CONSISTENCY CHECK

Respondents who would provide conflicting program influence and counterfactual FR scores (one reflecting high FR and the other low FR)⁷ would be asked a consistency check question requiring them to describe the influence of the VCx channel in their own words. The evaluation team would review all consistency check responses to determine how the FR scores should be manually adjusted to reflect the respondent’s sentiment based on their open-ended answers. None of the six survey respondents triggered a consistency check for this research.

TIMING ADJUSTMENT

The timing adjustment is based on a question that asks the respondent to provide their best estimate of when the energy-saving improvements would have been implemented at their facility if they had not been contacted by the Energy Advisor. The timing adjustment can range from 0 to 1 and can only reduce FR. A timing adjustment of 1 indicates that there is no evidence the program changed the timeframe in which the project was implemented, while a lower value of the timing adjustment indicates that the program caused the project to be implemented sooner. A lower timing adjustment value results in a greater reduction of FR. The timing adjustment is calculated using the midpoint of the date range selected by the respondent, also known as the “Number of Months Expedited”. The midpoint is estimated within a time frame between six months and two years, consistent with IL-TRM guidance.⁸ The timing adjustment is calculated using the following formula:

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

Table 3 provides detail on the timing adjustment value corresponding to the date ranges respondents could choose from when asked how much later they would have implemented the energy-saving improvements at their facility if they had not participated in the VCx channel. The evaluation team applied an average timing adjustment value for respondents who answered “Don’t know” to this timing-related question.

Table 3. Timing Adjustments

Participant Survey Response	Timing Adjustment
At the same time	1.0
Within 6 months	1.0
Between 6 months-1 year	0.83
Between 1-2 years	0.33
Between 2-3 years	0
Between 3-4 years	0
I would not have implemented the energy-saving improvements at all	0
Don’t know	Average Timing Adjustment

The evaluation team designed the survey to enable the calculation of end use-level timing adjustments. The evaluation team aggregated the end use-level timing adjustment values to the project level by averaging the two values together

⁷ The parameters that triggered a consistency check were: (PI_FR score<0.3 AND CF_FR score>0.7) or (PI_FR score>0.7 AND CF_FR score<0.3)

⁸ The evaluation team calculated the timing adjustments in accordance with updated guidance included in IL-TRM V12.0, published on September 21, 2023: https://www.ilsag.info/wp-content/uploads/IL-TRM_Effective_010124_v12.0_Vol_4_X-Cutting_Measures_and_Attach_09222023_FINAL.pdf. This updated guidance recommends considering a maximum timeframe of two years, instead of four years as prescribed in previous versions of the TRM.

for the one respondent whose project included the two end uses. For the other five respondents their overall timing adjustment was the same as their end use-level timing adjustment.

FINAL FREE RIDERSHIP

The final FR score for a given project was calculated as the average of the program influence FR score and the overall counterfactual FR score, multiplied by the overall timing adjustment. To determine the channel-level FR score, the evaluation team weighted the project-level FR scores based on each project's ex ante electric energy savings relative to the total ex ante electric energy savings across the projects for which we received survey responses.

PARTICIPANT SPILLOVER

Spillover occurs when a respondent's participation in an AIC Initiative influences future purchases/installations of high-efficiency measures beyond those directly incentivized through the Initiative. The evaluation team sought to estimate SO based on two participant responses following the protocols prescribed in the IL-TRM V12.0, Attachment A.

Respondents answered a battery of questions regarding whether they had purchased/installed additional energy-efficient measures for their business at the same time as or since participating in the VCx channel, for which they did not receive an incentive. As part of this battery, the evaluation team collected basic information about the additional energy efficiency measures purchased/installed and assessed program attribution.

The evaluation team used the following questions to establish program attribution for each SO measure, per the IL-TRM:

- **Measure Attribution Score 1:** How important was your experience in the Virtual Commissioning offering in your decision to implement the <Energy-saving improvement>? Please use a scale of 0 to 10, where 0 is "Not at all Important" and 10 is "Extremely Important".
- **Measure Attribution Score 2:** If you had not participated in the Virtual Commissioning offering, how likely is it that your organization would still have implemented the <Energy-saving improvement>? Please use a 0 to 10, scale where 0 means you "Definitely WOULD NOT have implemented this measure" and 10 means you "Definitely WOULD have implemented this measure".

The IL-TRM lists two possible methods to calculate program attribution. The evaluation team determined that Method 1 was the appropriate method for calculating program attribution given the data collection and analysis approach. According to this method, "program attribution is established if the average of Measure Attribution Score 1 and (10 - Measure Attribution Score 2) exceeds 5.0. If the average is greater than 5.0, 100% of the measure energy savings referenced in the question are considered to be attributable to the program. If the average is not greater than 5.0, none of the measure energy savings are considered to be attributable to the program."⁹ ¹⁰

We asked respondents to provide additional information and technical specifications for SO measures with a program attribution greater than 5.0 to support the estimation of the corresponding SO savings, in accordance with the methods

⁹ IL-TRM V12.0 Attachment A: Illinois Statewide Net-to-Gross Methodologies, Section 3.1.2.2: Approach for Identifying and Quantifying Spillover.

¹⁰ The second method estimates an attribution rate that is equal to the sum of Measure Attribution Score 1 and (10 - Measure Attribution Score 2) divided by 20. The resulting attribution rate is then applied to the energy savings from the measure(s) in question to calculate the spillover savings attributable to the program. Following guidance from the IL-TRM and based on the survey design and data collected from respondents, the evaluation team used the first method to determine whether energy-saving actions taken by respondents outside of the VCx channel qualified as spillover.

and algorithms specified in the IL-TRM V12.0. The resulting participant spillover rate would then be calculated as depicted in the following formula:

$$\text{Participant Spillover Rate} = \frac{\text{Sum of Spillover estimates for respondents in the sample}}{\text{Ex Post Gross Impacts for all projects by respondents in the sample}}$$

Following these attribution criteria, the evaluation team determined that two of the survey respondents reported spillover actions attributable to the VCx channel. However, one respondent was not able to provide enough information for the evaluation team to calculate savings associated with their spillover measure. As such, the evaluation team estimated the spillover rate for the VCx channel based on one respondent.

NTG RESULTS

Table 4 presents the FR, SO, and NTGR results for the six projects covered in the completed surveys.

Table 4. Virtual Commissioning™ Project-Level Free Ridership and Net-to-Gross Ratio Results

ODCID	Project-Level Final FR	Project-Level SO	Project-Level NTGR
ODC842	0.100	0.000	0.900
ODC822	0.025	0.000	0.975
ODC706	0.075	0.000	0.925
ODC856	0.038	0.000	0.963
ODC130	0.079	0.061	0.982
ODC480	0.125	0.000	0.875

The evaluation team weighted these project-level FR scores based on their ex ante electric energy savings relative to the total ex ante electric energy savings across all projects represented in the survey responses, resulting in an overall FR score of 0.074. Similarly, the evaluation team estimated the channel-level spillover rate by dividing the spillover savings attributable to the VCx channel by the total ex ante electric energy savings across all projects represented in the survey responses, resulting in an overall spillover rate of 0.005. The resulting overall NTGR is 0.931.

Table 5. Virtual Commissioning™ Channel-level Net-to-Gross Ratio Results

FR	SO	NTGR (1 - FR) + SO
0.074	0.005	0.931