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- **CC:** Elizabeth Horne, ICC; Jeff Erickson, Nishant Mehta, Guidehouse
- From: Christopher Frye, David Bluestein, Guidehouse; Mike Frischmann, EcoMetric Consulting
- Date: September 23, 2024
- **Re:** Net-to-Gross Research Results for the Incentives Standard Program Final

1. Executive Summary

This memo presents findings from the net-to-gross (NTG) study of the ComEd Incentives – Standard Program. The NTG results for this program are based on the NTG algorithms specified in the Illinois Technical Reference Manual (TRM) version 12.0 and rely on free ridership (FR) and spillover (SO) research gathered via an online survey. The survey was administered to two populations: program participants, to assess the participant perspective, and Energy Efficiency Service Providers (EESPs), to assess the service provider perspective. The participant and EESP free ridership surveys covered participants in the CY2023 program. The participant spillover survey covered customers who participated in CY2022 and first half of CY2023, and the EESP spillover covered qualified respondents that generated savings in CY2023.

Table 1 summarizes the Standard Incentive Program FR and SO research findings based on the participant and EESP research. As indicated in the footnote in Table 1 related to LED Streetlights – Municipal, due to the very low response associated with that stratum, we are recommending reverting to the previously researched values for free ridership and NTG as indicated. The participant results include the remaining two strata (Lighting & Non-Lighting) by project type detailed in the sample design. NTG ratios by measure are a triangulated value of the participant and EESP NTG results, as directed by the TRM and explained in Combining Participant and EESP Free Ridership. Guidehouse expects to recommend to the Illinois Stakeholders Advisory Group (SAG) these values be used for this program in CY2025. Net-to-Gross Research Results for the ComEd Standard Incentive Program Page 2 Soptember 23, 2024

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Table 1. Net-to-Gross Research Results for the Incentives – Standard Program

Program Measure	Free Ridership	Participant Spillover	Non- Participant Spillover	Active EESP Spillover	NTG Ratio*
Lighting	0.19	0.01	-	0.03	0.86
Non-Lighting	0.18	0.01	-	0.03	0.86
LED Streetlights – Municipal ¹	0.19				0.81

* Numbers may not sum due to rounding. The NTG ratio is calculated by triangulation and so the NTG ratio in this table cannot be calculated from the components in this table using 1-FR+SO. This is explained in the *Final NTG Results and Recommendations* section below.

Source: Evaluation team analysis

2. Free Ridership and Spillover Research Sample Disposition

Guidehouse administered online web surveys to program participants and EESPs active in the ComEd service territory to gather free ridership and spillover feedback. For free ridership, the team surveyed program participants and EESPs from CY2023. For spillover, the team surveyed program participants from CY2022 and the first half of CY2023, and EESPs active in CY2023. To maximize survey response rates, the team offered customers \$25 to complete the survey and EESPs \$50. The survey opened on July 1, 2024, and closed on August 1, 2024. In addition to the initial invitation, Guidehouse sent three reminders with the third (and final) reminder sent on July 29, 2024.

Table 2 presents the sample disposition for the two categories of web surveys.

Category	Sample of Unique Participant s	Target Completes †	Actual Completes	Analysed Completes*	Response Rate	Respondent Share of Program Savings (kWh)
Participant	1,436	140	148	140	10%	9%
Lighting	1,194	70	125	118	10%	10%
Non- Lighting	242	70	23	22	10%	5%
EESP	344	Census	91	88	28%	37%

Table 2. Free Ridership Sample Disposition

*The evaluation team removed eight participant respondents from the FR analysis because they did not answer the timing questions required by the Core FR algorithm. The team also removed 3 EESPs from the FR analysis because they did not answer the counterfactual questions.

[†] Approximate Target Precision/Confidence: Lighting & Non-Lighting, 90/10.

Source: Evaluation team analysis

¹ Note on LED Streetlights – Municipal: Due to the very low response we received for this measure segment (3 responses), we are recommending that this value be unchanged from the previously researched estimates as indicated in the table (based on CY2024 recommendations; research based on CY2018 participating customer survey).

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Category	Sample of Unique Participants	Target Completes	Actual Completes	Made Additional Efficiency Improvements	Qualified for Spillover	Share of Program Savings Represented by Qualified Spillover
Participant	1,262	Census	77	45	7	0.1%
EESP	344	Census	91	87	15	1.0%

 Table 3. Spillover Sample Disposition

*The evaluation team removed 4 EESPs from the spillover analysis because they skipped the spillover portion of the NTG survey.

Source: Evaluation team analysis

3. Free Ridership and Spillover Protocols

The evaluation team applied the participant FR, SO, and EESP protocols from the TRM v12.0, developed by the Illinois SAG NTG Working Group. The results from the two sets of surveys were combined using the methodology laid out in TRM v12.0 Section 5.1, "Combining Participant and EESP Free Ridership Scores."

3.1 Participant Free Ridership Estimation

Figure 1 describes the Core Free Ridership Algorithm for participant FR developed by the Illinois SAG NTG Working Group that the evaluation team used to calculate FR for the C&I Incentive - Standard program participant surveys.



Figure 1. Incentive – Standard Core Free Ridership Algorithm

Source: Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 12.0, Volume 4, page 44 of 149 (Figure 3-1).

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3.2 Participant Spillover Estimation

Guidehouse calculated participant spillover based on TRM v12.0 Section 3.1.2, "Core Participant Spillover Protocol," summarized in Figure 2.



Figure 2. Core Non-Residential Participant Spillover Protocol

Source: Evaluation team representation of Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 12.0, Volume 4, page 48 of 149.

3.3 EESP Free Ridership Estimation

TRM v12.0 does not specify an approach for measuring the EESP perspective of participant FR. For this study, Guidehouse used the following method to assess participant FR from an EESP perspective. This methodology is summarized in Figure 3 below.





Source: Guidehouse interpretation of SAG NTG WG Consensus of participant Core FR algorithm applied to contractors, Fall 2023

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3.4 EESP Spillover Estimation

The evaluation team quantified the EESP's perspective of participant spillover using the methodologies laid out in IL TRM v12.0. The team assessed EESP spillover by estimating the percentage of high efficiency equipment EESPs sold during the evaluation period either incentivized or not incentivized through the Incentives - Standard program.

The process to calculate spillover from the EESP perspective includes the following steps (as defined in the TRM v12.0, Section 5.2.1.1):

1. Calculate the percentage of an individual EESP's high efficiency equipment sales that received an incentive.

% of Total Sales that are HE, received incentive

(% of Total Sales that are HE, received incentive + HE % that did NOT receive incentive)

- 2. Calculate the energy savings of the high efficiency equipment sales that did not receive an incentive.
- $= \frac{\sum TA \ savings \ from \ Program \ Database}{1) \ \% \ of \ TA's \ HE \ Sales \ that \ received \ an \ incentive} \sum TA \ savings \ from \ Program \ Database \ * \ Size \ Adjustment$
- Develop the spillover ratio for sampled EESPs by summing individual EESP spillover savings and dividing that total by program-tracked savings achieved by the sampled EESPs.
- 4. Develop spillover savings for the population of active EESPs by applying the spillover ratio from step 3 to all program savings associated with active EESPs.
- 5. Develop the overall spillover ratio for active EESPs by dividing the EESP spillover estimate from step 4 by total program savings.

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= \frac{4) Total TA tracked program savings * 3) \frac{2) \sum_{1}^{n} TA reported spillover savings}{\sum_{1}^{n} TA sample tracked program savings}
5) Total Program Savings
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3.5 Free Ridership Consistency Check Analysis

The evaluation team checked for consistency in free rider responses. Respondents were asked to describe in their own words any influence that the ComEd Incentive program had on their decision to implement the measures at their facilities, or what they would have done if the program and its technical assistance and financial incentives, did not exist (see Figure 1).

According to the IL TRM v12.0, Volume 4, Attachment A page 46 of 149, a program Influence/Counterfactual consistency check is triggered when either of the following conditions are met:

A Program Influence/Counterfactual consistency check is triggered when either of the following conditions are met:

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1) The Program Influence FR Score is greater than 0.7 AND the Counterfactual FR Score is less than 0.3.

OR

2) The Program Influence FR Score is less than 0.3 AND the Counterfactual FR Score is greater than 0.7.

For respondents that failed the consistency checks, the evaluation team reviewed the verbatim responses to determine the weight of the program influence against the counterfactual responses and timing adjustments to arrive at a free ridership score.

The evaluation team determined that 25 of the 148 participant respondents failed the consistency check, which triggered a detailed review of the verbatim responses. Seventeen out of the 25 respondents gave answers to the verbatim question that were inconsistent with their Counterfactual score. As a result, and in accordance with the TRM, the evaluation team removed the Counterfactual score from the calculation (which means the Program Influence scores drove the free ridership score since the respondents mentioned verbatim that program incentives were key for installing their projects). The team left the remaining nine inconsistent responses untouched as the verbatim responses did not provide adequate reason to adjust scores.

The evaluation team also removed eight respondents from the FR analysis because they did not provide answers to the timing question required by the Core FR Algorithm. The team did not have any basis for assuming the timing of these projects and decided to remove them from analysis altogether.

For EESP free ridership, the team received "Don't Know" responses to one or both of the counterfactual (no program) questions for 21 respondents² and therefore removed those responses in concordance with IL TRM guidance.

The evaluation team also found two inconsistencies in the FR responses for the EESPs and, based on verbatim responses, removed one counterfactual score and one influence score for those two respondents. Additionally, three EESPs skipped the spillover portion of the NTG survey so the evaluation team removed them from the final analysis.

4. Combining Participant and EESP Free Ridership

Guidehouse calculated a combined participant and EESP FR estimate utilizing the triangulation approach outlined in IL TRM v12.0, Volume 4, Section 5.1 (page 92 of 149). This approach calculated a weighted average of the participant and EESP FR results using the weighting approach shown in Table 4 below.

This approach rates the participant and EESP survey data on three aspects: accuracy, validity, and representativeness, using a scale where 100% means "extremely so" and 0% means "not at all."

² Nineteen respondents (21%) answered "Don't Know" to the first counterfactual question and 25 respondents (28%) answered "Don't Know" to the second counterfactual question. These responses are removed as "missing" from the analysis. Twenty-one respondents (24%) answered "Don't Know" to both counterfactual questions so the FR score for that group is based solely on the program influence result.

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- 1. Accuracy: How likely is the approach to provide an accurate estimate of FR?
 - a. Guidehouse calculated the participant and EESP portions of accuracy (50% and 50%, respectively) based on a comparison of the relative precision (RP) associated with the participant and EESP FR estimates. The relative precision for both groups was approximately 4% so the team calculated each share as: Participant or EESP RP/sum of (Participant RP + EESP RP)
- 2. Validity: How valid are the data collected and analysis?
 - a. Guidehouse assigned the participant portion a score of 80% because the research closely followed the TRM approach. However, the 9% response rate may have produced some nonresponse bias.
 - b. Guidehouse assigned the EESP portion a score of 80% because the research closely followed the TRM approach. The response rate was 28%, and the responses are quantitative estimates that rely on best estimates covering an entire program year made at the time the survey was completed.
- 3. Representativeness: How representative is the sample?
 - a. Guidehouse assigned the participant portion a score of 6% representing the percentage of Standard Incentive Program savings in the Participant Free Ridership survey sample to the total savings of the program.
 - b. Guidehouse assigned the participant portion a score of 37% representing the percentage of Standard Incentive Program savings in the EESP survey sample to the total savings of the program.

Table 4. Free Ridership Triangulation Weighting Approach for Standard Incentive Program

Free Ridership Triangulation Data and Analysis	Participant	EESP
How likely is this approach to provide an accurate estimate of free ridership?	50%	50%
How valid is the data collected/analysis?	80%	80%
How representative is the sample?	6%	37%
Average Score	45%	55%
Sum of Averages	101	%
Weight	45%	55%

Source: Evaluation Team analysis

Applying these participant and EESP weights to the FR estimates by strata yields the blended FR estimates shown in the equation below.

Lighting

Free Ridership

= (Participant FR) * (Participant Weight) + (EESP FR) * (EESP Weight)= 0.193 * 0.45 + 0.182 * 0.55 = 18.7%

Non-Lighting

Free Ridership

= (Participant FR) * (Participant Weight) + (EESP FR) * (EESP Weight)= 0.186 * 0.45 + 0.182 * 0.55 = 18.4% Net-to-Gross Research Results for the ComEd Standard Incentive Program Page 8 September 23, 2024

The evaluation team used this formula to combine the lighting strata (0.193) participant free ridership with the 0.182 EESP free ridership to produce the combined free ridership of 18.7%, and the non-lighting strata (0.186) participant free ridership with the same EESP free ridership (0.182) to produce the combined result of 18.4%.

5. Participant and EESP Free Ridership Results

Using the protocols detailed above and data collected during the participant and EESP surveys, the evaluation team calculated FR estimates for the Incentive program participants and EESPs. Table 5 below presents the FR estimates and the relative precision of the estimates. As this table shows, participant-based FR estimates varied only slightly across the two strata, ranging from 0.186 to 0.193 with a weighted average of 0.194. The EESP-based weighted average FR estimate was 0.182. The combined weighted FR value was 0.188.

Population	Strata	Free Ridership	Relative Precision @90% CI
Participant	Lighting	0.193	4%
	Non-Lighting	0.186	12%
Overall Participant FR		0.194	4%
Overall EESP FR		0.182	4%
Combined Results		0.188	3%

Table 5. Participant and EESP Free Ridership Research Results

Note: Due to the low response associated with LED Streetlighting – Municipal, we are not recommending using this research, but rather reverting to the previously researched values, or 0.19 (free ridership) and 0.81 (NTG). *Source: Evaluation Team Analysis*

6. Participant and EESP Spillover Results

Of the 77 participant survey respondents included in the participant spillover analysis, 45 reported that they had installed additional energy efficient measures and of those, 27 indicated they had not received any program incentives for the spillover project. Of the 27, 7 passed the spillover screening criteria³ and the evaluation team estimated gross energy savings from these non-rebated spillover measures at 170,469 kWh. The gross energy savings of the 77 participants who responded to the survey was 14,614,538 kWh, which resulted in a participant spillover rate of 1.2%.

³ Respondents who did not receive a rebate or received a rebate but not from ComEd and answers to the program influence and counterfactual questions resulted in a spillover score greater than 5.

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Figure 4. Qualified Participant Spillover Screening Results



Of the 87 EESPs included in the EESP spillover analysis, 40 reported selling additional nonprogram incented high efficiency equipment. Twenty-three of these 40 reported strong influence from the program, but only 15 passed all spillover screening criteria to estimate spillover savings. The estimated gross energy savings from these non-rebated spillover measures was 1,949,307 kWh. The gross energy savings from the 87 EESPs who responded to the survey was 64,492,353 kWh which resulted in a EESP spillover rate of 3.1%.



Figure 5. Qualified EESP Spillover Screening Results

To ensure that spillover from the participant and EESP sources did not lead to double counting, the evaluation team examined the data to exclude any reported spillover transactions from participants who purchased their measure from a EESP who reported spillover. The team found no participant who qualified for spillover was a customer of the qualified EESP spillover respondents.

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Table 6 presents the participant and EESP spillover results, as well as the total spillover calculated, which is the sum of those results. This is then combined with the FR rate to estimate the NTG ratio.

Table 6. Spillover Research Results

Population	Spillover Results
Participant Spillover	0.012
EESP Spillover	0.031
Total Spillover	0.043

Source: Evaluation Team Analysis

7. Final NTG Results and Recommendations

The final NTG value is calculated as 1- free ridership + spillover, using savings-weighted values from participants and EESPs using the **Error! Reference source not found.**following formula:

NTG = 1 - [(Participant FR * Participant Weight) + (EESP FR * EESP Weight)] + Participant Spillover + EESP Spillover

The final, combined components of the NTG are shown in Table 7. As indicated, the LED Streetlighting – Municipal values appearing below are based on the previous researched value given the very low response for that measure segment.

Table 7. Summary of Free Ridership, Spillover, and NTG Research Results for the Standard Incentive Program

Program Measure	Free Ridership	Participant Spillover	Non- Participant Spillover	Active EESP Spillover	NTG Ratio*
Lighting	0.19	0.01	-	0.03	0.86
Non-Lighting	0.18	0.01	-	0.03	0.86
LED Streetlighting - Municipal⁺	0.19				0.81

* Numbers may not sum due to rounding. ⁺Based on CY2024 recommended values.

Source: Evaluation team analysis

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Appendi	A. Standard Incentive NTG History
Effective	Standard Incentive Offer
Year	
PY1	NTG 0.67
	Free-Ridership 33%
	Participant Spillover 0% (qualitative evidence observed, not quantified)
	Method: Customer self-report. 95 interviews completed covering 101 projects
	from a population of 455 projects.
PY2	NTG 0.74
	Free-Ridership 27%
	Participant Spillover 1%
	Method: Customer self-report 90 interviews completed covering 114 projects
	from a population of 1 739 projects
	Enhanced method. Ten EESPs called for 11 participants and their responses
	factored in to the customer free ridership calculation
DV3	
115	Free-Ridershin 28%
	Participant Spillover 0% (qualitative evidence observed, not quantified)
	Method: Customer colf report, 108 interviews completed covering 202 projects
	from a population of 2 704 projects
	Figure a population of 5,794 projects.
	Enhanced method. Two EESPS and three account managers were called for five
	participants and their responses factored in to the customer free indership
	calculation.
PY4	Deemed using PY2 values.
	PY4 Research NTG 0.70
	Free-Ridership 31%
	Participant Spillover 1%
	Method: Customer self-report. 110 interviews completed covering 166 projects
	from a population of 4,603 projects.
	Enhanced method. Two EESPs called for two participants and their responses
	factored in to the customer free ridership calculation.
	NTGR (Free-Ridership only): All lighting =0.70 (90/±5%); Lighting, no T12s
	reported in base case 0.66 (90/±9%); Lighting, T12s reported in base case 0.80
	$(90/\pm 14\%)$ Non-Lighting = 0.63 (90/ $\pm 16\%$).
PY5	SAG Consensus:
	Lighting: 0.74
	Non-Lighting: 0.62
PY6	SAG CONSENSUS:
	• Lighting: 0.70
	Non-Lighting: 0.63

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Effective	Standard Incentive Offer
Year	
PY7	Lighting NTG: 0.81
	Free Ridership: Measured and equal to 0.26 Justification: EPY5 ComEd Standard Program research, 63 participants
	Total Recommended Spillover = 0.07
	Participant and Non-Participant Spillover Identified by Participating Standard Program EESPs: Measured and equal to 0.05 Justification: EPY5 ComEd Standard Program research, participating EESP sample 55
	Participant and Non-Participant Spillover Identified by Non-Participating Standard Program EESPs: Not measured for ComEd; a value of 0.02 is recommended Justification: Based on GPY2 results from Nicor Gas (0.02), and Peoples Gas
	and North Shore Gas (0.02).
	Non-Lighting NTG: 0.77
	Free Ridership: Measured and equal to 0.31 Justification: EPY5 ComEd Standard Program research, 64 participants
	Total Recommended Spillover = 0.08
	Participant and Non-Participant Spillover Identified by Participating Standard Program EESPs: Measured and equal to 0.06 Justification: EPY5 ComEd Standard Program research, participating EESP sample 10.
	Participant and Non-Participant Spillover Identified by Non-Participating Standard Program EESPs: Not measured for ComEd; a value of 0.02 is recommended
	Justification: Based on GPY2 results from Nicor Gas (0.02), and Peoples Gas and North Shore Gas (0.02).

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Effective Year	Standard Incentive Offer
PY8	Recommendation (based upon PY6 research): NTG Lighting: 0.74 NTG Non-Lighting: 0.63 Free-Ridership, Lighting: 0.27 Free-Ridership, Non-Lighting: 0.38 SO: 0.01
	Free Ridership was estimated in PY6 as 0.27 for lighting Free Ridership = 0.38 for non-lighting Both based on customer self-report data collected through phone interviews (n=59).
	In PY6, EESPs and business customers were interviewed in a separate study to estimate spillover broadly across the C&I market.
DVO	The results of the cross-cutting C&I spillover study will be reported separately.
F19	NTG Lighting: 0.70
	NTG Non-Lighting: 0.69
	Free-Ridership, Lighting: 0.31
	Spillover, Lighting: 0.01
	Spillover, Non-Lighting: 0.01
	NTG Research Source:
	FR = PY7 Participant Customers and EESPs
0)(0040	SO = PY6 C&I NTG study
CY2018	NTG Lighting: 0.71
	NTG Non-Lighting: 0.70
	Free-Ridership, Lighting: 0.31
	Free-Ridership, Non-Lighting: 0.32
	Spillover, Lighting: 0.02 Spillover, Non Lighting: 0.02
	NTG Research Source:
	FR = PY7 Participant Customers and EESPs
CV2010	SO = PY8 TA and Contractor Self-Report
612019	NTG Lighting: 0.83
	NTG Non-Lighting: 0.78
	Free-Ridership, Lighting: 0.19
	Free-Ridership, Non-Lighting: 0.24
	Spillover, Lighting: 0.02 Spillover, Non-Lighting: 0.02
	NTG Research Source:
	FR = PY9 Participating Customer Surveys
	SO = PY9 Participating Customer Surveys

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Effective	Standard Incentive Offer
Year	
CY2020	Unchanged from CY2019 Recommendation (based upon PY9 research): NTG Lighting: 0.83 NTG Non-Lighting: 0.78 Free-Ridership, Lighting: 0.19 Free-Ridership, Non-Lighting: 0.24 Spillover, Lighting: 0.02 Spillover, Non-Lighting: 0.02
	FR = PY9 Participating Customer Surveys SO = PY9 Participating Customer Surveys
CY2021	Recommendation (based upon CY2019 research): NTG Lighting: 0.80 NTG Non-Lighting: 0.70 NTG Thermostat: 0.86 Free-Ridership, Lighting: 0.22 Free-Ridership, Non-Lighting: 0.32 Free-Ridership, Thermostat: 0.32 Participant Spillover, All Measures: <0.01 Non-Participant Spillover, All Measures: 0.02
	NTG Research Source: FR = CY2019 Participating Customer Surveys SO = Participants: CY2019 Participating Customer Surveys SO = Non-Participants: PY8 TA and Contractor Self-Report
CY2022	Recommendation: NTG LED Streetlighting (ComEd-Owned): 1.00 (SAG Consensus Value) NTG LED Streetlighting (Municipality-Owned): 0.81 NTG Lighting: 0.99 NTG Non-Lighting: 0.89 NTG Thermostat: 0.95 Free-Ridership, LED Streetlighting (Municipality-Owned): 0.19 Free-Ridership, Lighting: 0.22 Free-Ridership, Non-Lighting: 0.32 Free-Ridership, Thermostat: 0.32 Active EESP Spillover, Lighting & Non-Lighting: 0.21 Active EESP Spillover, Thermostat: 0.11
	NTG Research Source:FR (LED Streetlighting Municipality-Owned) = CY2018 Participating CustomerSurveyFR = CY2019 Participating Customer SurveySO = CY2020 Active Service Provider Survey

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Effective	Standard Incentive Offer
Year	
Year CY2023	Unchanged from CY2022 Recommendation: NTG LED Streetlighting (ComEd-Owned): 1.00 (SAG Consensus Value) NTG LED Streetlighting (Municipality-Owned): 0.81 NTG Lighting: 0.99 NTG Non-Lighting: 0.89 NTG Thermostat: 0.95 Free-Ridership, LED Streetlighting (Municipality-Owned): 0.19 Free-Ridership, Lighting: 0.22 Free-Ridership, Non-Lighting: 0.32 Free-Ridership, Thermostat: 0.32 Active EESP Spillover, Lighting & Non-Lighting: 0.21 Active EESP Spillover, Thermostat: 0.11 NTG Research Source: FR (LED Streetlighting Municipality-Owned) = CY2018 Participating Customer Survey
	FR = CY2019 Participating Customer Survey
	SO = CY2020 Active Service Provider Survey
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Source: <u>https://www.ilsag.info/wp-content/uploads/ComEd-NTG-CY2023-Recommendations-Final-2022-09-30.xlsx</u> and current research