Memorandum

To: Erin Daughton, ComEd

CC: Elizabeth Horne, David Brightwell, ICC Staff; Parini Shah, Jeff Erickson, Nishant Mehta, Guidehouse

From: Kumar Chittory, Trace O'Rorke, Verdant Associates

Date: August 29, 2025

Re: Net-to-Gross Research Results for the ComEd Custom Program

Guidehouse
167 N. Green Street, 12th Floor
Chicago, IL 60607

1. Executive Summary

This memo presents the findings from the Net-to-Gross (NTG) study of the ComEd Custom Program, which also includes the Data Center projects. The NTG research uses the self-report approach to estimate free ridership (FR) and spillover (SO), and the methodology for estimating the scores is consistent with the Core Non-Residential algorithms in the Illinois Technical Reference Manual (TRM) v13.0. The results from this analysis will inform Guidehouse's September 2025 draft recommendations to the Illinois SAG of NTG values to be used for this program in CY2026.

The findings are derived from in-depth telephone interviews and web surveys conducted with customers who participated in the ComEd Custom Program during CY2024. These interviews and surveys included research for both free ridership and spillover effects. Altogether, the CY2024 Custom Program results are based on nine in-depth interviews and nine web surveys, representing 31 total projects and accounting for 60% of the total CY2024 ex ante Program savings.

An outcome of the CY2020 evaluation was that SAG approved using a three-year rolling NTG weighted average for Custom and Data Center Projects. The FR and NTG ratios for each researched year, along with the recommended three-year values for each measure type, are provided in Table 1 and Table 2. Note that none of the projects assessed qualified for spillover.

Due to differences in project design, implementation, and NTG research findings, the recommendations for both the New Construction Data Center measures and LED Streetlighting measures are reported separately from other Custom projects. In previous years, we reported "Data Center Other" projects separately from "Data Center New Construction" measures. The evaluation team has removed this category going forward, as there are not enough completed projects in that category to report results independently.[1] All "Data Center Other" projects are included under the "Custom – Non-DC NC" category as presented in this research. Also, CY2024 research was not conducted for LED Streetlight measures and thus the recommended NTG values are based on previous research.

[1] There was only one completed "Data Center Other" project in CY2023 and no projects in CY2022 and CY2024.

Table 1. Three Year Combined kWh Free Ridership and NTG Research Results, Custom Program

Measure Type	Researched Year	Savings Type	Free Ridership	Spillover	NTG Ratio
Custom Projects – Non-DC NC	CY2022	kWh	0.34	0.00	0.66
Custom Projects – Non-DC NC	CY2023	kWh	0.32	0.00	0.68
Custom Projects – Non-DC NC	CY2024	kWh	0.33	0.00	0.67
Custom Projects – Non-DC NC	**3 Year Average***	**kWh**	**0.33**	**0.00**	**0.67**
Data Center New Construction	**3 Year Average+**	**kWh**	**0.95**	**0.00**	**0.05**
LED Streetlighting	**CY2018#**	**kWh**	**0.19**	**0.00**	**0.81**

** For CY2024, the "Data Center Other" projects are merged with the "Custom – Non-DC" projects. The combined group is now collectively referred to as "Custom Projects – Non-DC NC".*
+ Because there is only one CY2023 Data Center New Construction Project in the population, the individual results for each year are not provided to ensure anonymity.
 # No new research was conducted for the LED Streetlighting measures, therefore the existing deemed values from CY2018 are recommended for those measures.
Table Source: Evaluation team analysis.

Table 2. Three Year Combined kW Free Ridership and NTG Research Results, Custom Program

Measure Type	Researched Year	Savings Type	Free Ridership	Spillover	NTG Ratio
Custom Projects – Non-DC NC	CY2022	kW	0.44	0.00	0.56
Custom Projects – Non-DC NC	CY2023	kW	0.28	0.00	0.72
Custom Projects – Non-DC NC	CY2024	kW	0.34	0.00	0.66
Custom Projects – Non-DC NC	**3 Year Average***	**kW**	**0.32**	**0.00**	**0.68**
Data Center New Construction	**3 Year Average+**	**kW**	**0.95**	**0.00**	**0.05**
LED Streetlighting	**CY2018#**	**kW**	**0.19**	**0.00**	**0.81**

**For CY2024, the "Data Center Other" projects are merged with the "Custom – Non-DC" projects. The combined group is now collectively referred to as "Custom Projects – Non-DC NC".*
+ Because there is only one CY2023 Data Center New Construction Project in the population, the individual results for each year are not provided to ensure anonymity.
 # No new research was conducted for the LED Streetlighting measures, therefore the existing deemed values from CY2018 are recommended for those measures.
Table Source: Evaluation team analysis.

2. Free Ridership and Spillover Survey Disposition

For CY2024, the evaluation team conducted a combination of in-depth telephone interviews and web surveys with key decision makers. For Data Centers New Construction projects, the evaluation reached out to do in-depth interviews for all five projects. One in-depth interview was completed and one customer opted to fill out the web version of the survey. Additionally, one customer had completed an in-depth interview for their Data Center New Construction project in a previous cycle, and the evaluation team confirmed with this customer that their prior responses are still valid. These three projects represent 95% of the ex ante population savings for CY2024 Data Center New Construction projects.

The rest of the population was grouped as Custom Non-DC NC projects, and the entire population was stratified into three categories based on ex ante savings (Stratum 1 – Large projects, Stratum 2 – Medium projects, and Stratum 3 – Small projects). In-depth interviews were attempted for the 23 unique participants, and web surveys were emailed to 34 total Stratum 2 and Stratum 3 decision makers who were not included in the in-depth interview sample.

In the CY2024 population, there were several customers who had participated in multiple projects across multiple locations (such as corporate customers). In such cases, rather than implementing the full survey again, the survey asked the customers if their responses were also applicable to other similar projects. When applicable, the responses for these CY2024 projects were also applied to the other similar CY2024 projects.

A total of 28 Custom Non-DC NC projects from the overall CY2024 population were incorporated into the analysis based on the completion of seven in-depth interviews and eight web surveys. These projects represented 38% of the total CY2024 Custom Program ex ante savings for Non-DC NC projects. Table 3 presents the survey representation for these Custom Non-DC NC projects.

Table 3. Custom Non-DC NC Projects Research Representation

Interview Type	Actual Completes	Analyzed Completes*	Projects Represented	Share of Ex Ante Savings Represented by Analyzed Completes
In-Depth	7	7	20	29%
Web Surveys	8	8	8	9%
Total	**15**	**15**	**28**	**38%**

** Analyzed completes represents the count of responses used to develop the free ridership and spillover estimates. It excludes responses that failed consistency checks or lacked required data. For CY2024, all completed survey responses were analyzed and incorporated into research.*
Table Source: Evaluation team analysis.

3. Free Ridership and Spillover Protocols

This section discusses the FR and SO approaches used for the CY2024 research.

3.1 Participant Free Ridership Estimation

Figure 1 describes the Illinois Stakeholder Advisory Group (SAG) NTG Working Group algorithm that Guidehouse used to calculate the FR for Custom Projects. The questions and analysis are based on the Illinois SAG NTG Working Group consensus in 2020 which is consistent with the Core Non-Residential Free Ridership Algorithm from the Illinois TRM v13.0.

Figure 1. Custom Program Free Ridership Overview

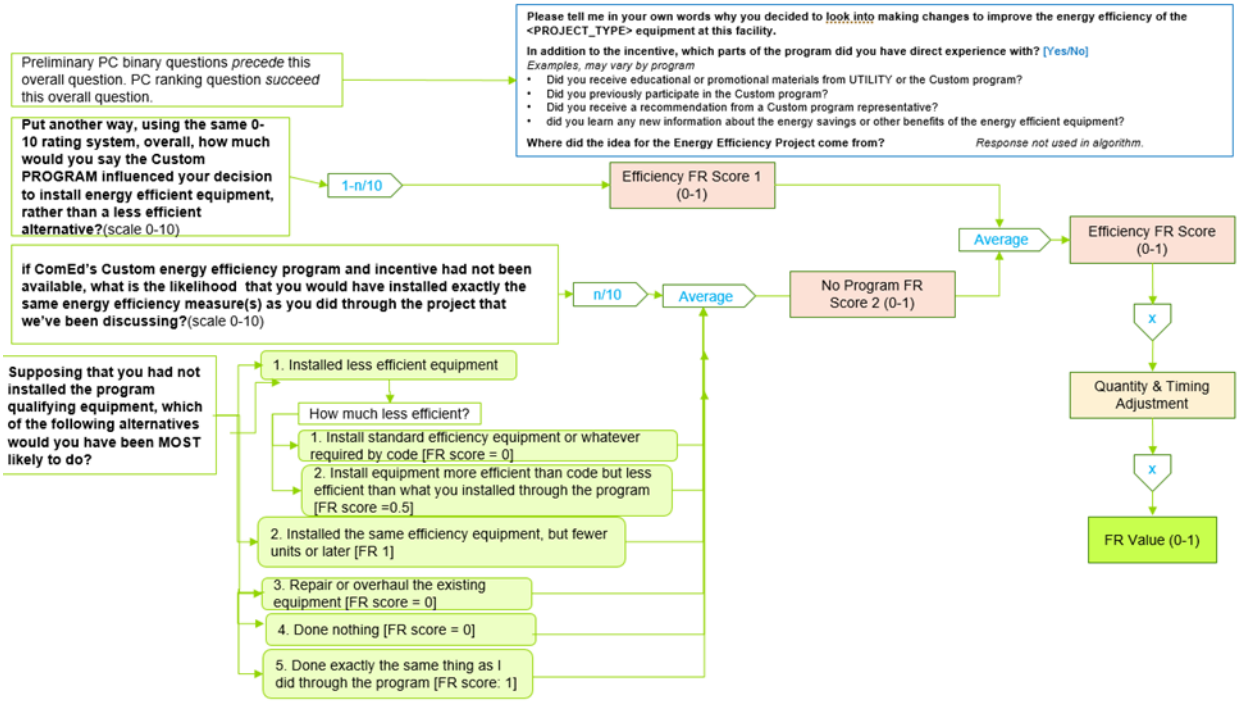

Figure Source: Based on Illinois Non-Residential NTG Working Group consensus algorithm discussion in 2020.

The Quantity and Timing adjustment shown in the NTG algorithm above is estimated using the equations from the Illinois TRM v13.0.

$$\textit{3-year Time Horizon Timing Adjustment} = 1 - (\textit{Number of Months Expedited} - 6)/30$$

$$\textit{Q\&T Adjustment} = (\%\ \textit{Not Installed at Same Time} * \textit{Timing Adjustment}) + \%\ \textit{Installed at Same Time}$$

Figure Source: IL-TRM Version 13.0 Volume 4: Cross-Cutting Measures and Attachments, page 48.

3.2 Participant Spillover Estimation

The evaluation team used the Core Non-Residential Participant Spillover protocol as specified in Illinois TRM v13.0 (Section 3.2.1) to qualify non-rebated energy efficiency improvements as spillover. This protocol

is applicable to most commercial, industrial, and public sector programs. illustrates the spillover qualification screening process for the Custom Projects as recommended by TRM v13.0.

Figure 2. Core Non-Residential Participant Spillover Protocol

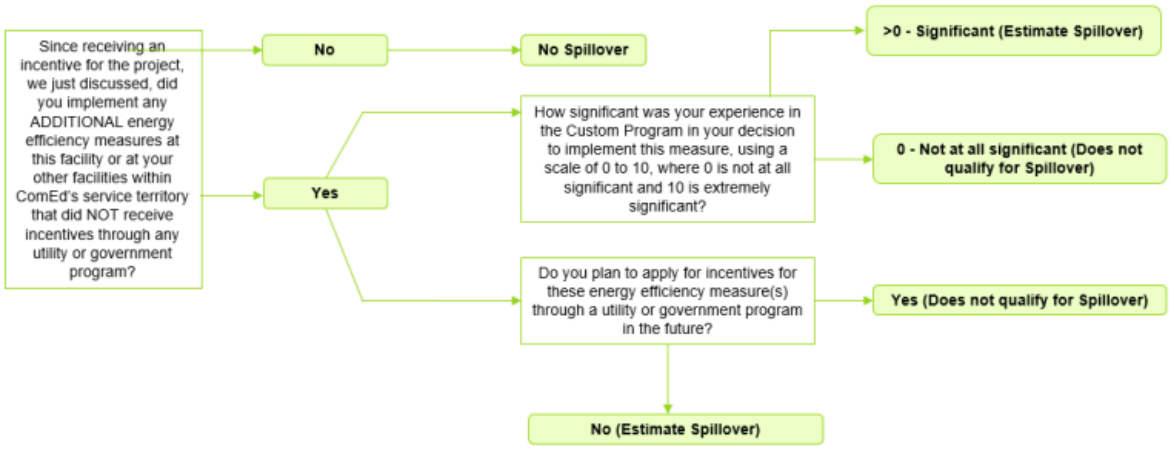

Figure Source: Evaluation team representation of TRM v13.0, Section 3.1.2.

4. Detailed NTG Results

The NTG results from the research conducted on the CY2024 population for the Non-DC NC Projects are provided in this section.

4.1 Precision

Table 4 describes all NTG components and the relative precision of the FR estimates at 90% Confidence Interval (CI) for kWh and kW savings. None of the respondents who completed an in-depth telephone interview or web survey completed additional non-incentivized high efficiency improvements that qualified as spillover; thus, the SO value incorporated into the NTG ratios is zero.

Table 4. Summary of FR, SO, and NTG Results for the CY2024 Custom Non-DC NC Projects

Measure Type	Researched Year	Savings Type	Free Ridership	Relative Precision at 90% CI	Spillover	NTG Ratio
Custom Projects – Non-DC NC	CY2024	kWh	0.33	7%	0.00	0.67
Custom Projects – Non-DC NC	CY2024	kW	0.34	8%	0.00	0.66

Source: Evaluation team analysis.

4.2 Custom NTG Results by Stratum

This section discusses the FR scores for all Custom Non-DC NC measures broken down by stratum. For CY2024, customer FR scores varied from zero to 0.75 across 15 responses. Table 5 summarizes FR findings for all Custom Projects across the three strata. Stratum 1 represents the largest (L) projects, Stratum 2 consists of medium (M) projects, and Stratum 3 contains the smallest (S) projects.

Table 5. CY2024 Custom Program Projects Breakdown by Sampling Strata

Stratum	Ex Ante Projects	Ex Ante kWh in Population	Number of Projects in Survey Sample	Number of Projects Analyzed	Ex Ante kWh Analyzed	Percent of Savings	FR	NTG Ratio
Stratum 1 – L	8	6,754,619	8	4	2,669,852	40%	0.29	0.71
Stratum 2 – M	18	6,640,812	16	8	2,972,754	45%	0.18	0.82
Stratum 3 – S	96	6,916,431	52	16	1,977,487	29%	0.51	0.49
All Projects	**122**	**20,311,861**	**76**	**28**	**7,620,092**	**38%**	**0.33**	**0.67**

Table Source: Evaluation team analysis.

4.2.1 Stratum 1 Custom Projects Summary

The evaluation team attempted to complete in-depth interviews for all eight projects in Stratum 1 for CY2024. In-depth interviews were completed for three projects, which were included in the analysis. One additional project had the same decision-making process as a project interviewed during CY2023 research, and, after discussing with the customer, was assigned the same FR value of 0.15 from that interview. For the four Stratum 1 projects in this research, FR values ranged from 0.15 to 0.68.

- Three Stratum 1 projects had low FR ranging from 0.15 to 0.23. The customers reported strong program influence and the customer also indicated that they would have installed only standard efficiency equipment without the program.
- One Stratum 1 project had a high FR of 0.68. The customer stated that the incentive only slightly accelerated project implementation and that they would have been very likely to move forward with the same project in the absence of the program.

4.2.2 Stratum 2 Custom Projects Summary

The evaluation team conducted phone or email outreach for 16 of the 18 projects in Stratum 2 and achieved five responses representing eight projects completed in CY2024. Results for these five respondents were collected through one in-depth interview and four web surveys, with FR scores ranging from zero to 0.38.

- The Stratum 2 respondent with an FR score of zero indicated that the incentive allowed them to make the optimal choice for their specific industry over the more affordable alternative and helped finance other aspects of their new construction.
- Three of the Stratum 2 respondents had low FR scores ranging from 0.05 to 0.28. For these projects, customers reported that the incentive strongly influenced their decision to move forward with the project, and they would have been less than likely to perform the same project without the program.
- One of the Stratum 2 respondents had a moderate FR score of 0.38. The customer reported that the incentive helped expedite their project to an earlier date, but that they probably would have installed the same equipment without the program.

4.2.3 Stratum 3 Custom Projects Summary

The evaluation team conducted phone or email outreach for 52 of the 96 projects in Statum 3 and achieved seven responses representing 16 projects completed in CY2024. In total, data was collected from seven customers through three in-depth interviews and four web surveys, with FR scores ranging from 0 to 0.75.

- Two Stratum 3 respondents had low FR scores of 0 and 0.05. These customers reported high program influence and indicated that they would have been unlikely to install the same efficient equipment, describing how the program strongly expedited their project timelines.
- Three Stratum 3 respondents had moderate FR scores of 0.50 to 0.58. These customers reported some program influence on their decision to perform the project but reported an equally strong likelihood that they would have had the same work done without the program. Additionally, they did not report that the incentive expedited their project timelines and viewed the savings as a nice bonus to possibly reinvest back into future projects.
- Two Stratum 3 respondents had high FR scores of 0.75. These customers reported that they would have almost certainly done the exact same project without the program. They also reported a low program influence and primarily viewed the incentive as a convenient mode of offsetting costs for the efficient upgrades they were already looking to perform.

5. Final NTG Results and Recommendations

As an outcome of the CY2020 evaluation, SAG approved using a three-year rolling average NTG for Custom Projects. The values that Guidehouse will submit for consideration for NTG ratios for CY2026 are based on savings-weighted averages from the combined data for the past three program years (CY2022, CY2023 and CY2024) for all projects where research was conducted in CY2024. For each measure type, projects are assigned to strata based on their size relative to all projects completed in the past three program years and then weighted accordingly. If research was not conducted in 2024, then results from prior evaluation years were used (as noted in table notes in table below).

The combined NTG findings for Non-DC NC projects are based on data collected for 110 projects over 3 program years (CY2022 through CY2024), representing 50% of the ex ante savings from the population of 301 projects completed during the same three program years.

The combined NTG findings for Data Center projects are based on data collected for 6 projects over the 3 program years (CY2022 through CY2024), representing 95% of the ex ante savings from the population of 11 projects completed during the same 3 program years.

The FR and NTG ratios for each researched year, along with the recommended three-year values for each measure, are provided in Table 6 and Table 7 below. CY2024 research was not conducted for LED Streetlighting measure type and so the recommended NTG values are based on prior program years.

Table 6. Three Year Combined kWh Free Ridership and NTG Research Results, Custom Program

Measure Type	Researched Year	Savings Type	Free Ridership	Spillover	NTG Ratio
Custom Projects – Non-DC NC	CY2022	kWh	0.34	0.00	0.66
Custom Projects – Non-DC NC	CY2023	kWh	0.32	0.00	0.68
Custom Projects – Non-DC NC	CY2024	kWh	0.33	0.00	0.67
Custom Projects – Non-DC NC	**3 Year Average***	**kWh**	**0.33**	**0.00**	**0.67**
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LED Streetlighting	**CY2018#**	**kWh**	**0.19**	**0.00**	**0.81**

** For CY2024, the "Data Center Other" projects are merged with the "Custom – Non-DC" projects. The combined group is now collectively referred to as "Custom Projects – Non-DC NC".*
+ Because there is only one CY2023 Data Center New Construction Project in the population, the individual results for each year are not provided to ensure anonymity.
 # No new research was conducted for the LED Streetlighting measures, therefore the existing deemed values from CY2018 are recommended for those measures.
Table Source: Evaluation team analysis.

Table 7. Three Year Combined kW Free Ridership and NTG Research Results, Custom Program

Measure Type	Researched Year	Savings Type	Free Ridership	Spillover	NTG Ratio
Custom Projects – Non-DC NC	CY2022	kW	0.44	0.00	0.56
Custom Projects – Non-DC NC	CY2023	kW	0.28	0.00	0.72
Custom Projects – Non-DC NC	CY2024	kW	0.34	0.00	0.66
Custom Projects – Non-DC NC	**3 Year Average***	**kW**	**0.32**	**0.00**	**0.68**
Data Center New Construction	**3 Year Average+**	**kW**	**0.95**	**0.00**	**0.05**
LED Streetlighting	**CY2018#**	**kW**	**0.19**	**0.00**	**0.81**

** For CY2024, the "Data Center Other" projects are merged with the "Custom – Non-DC" projects. The combined group is now collectively referred to as "Custom Projects – Non-DC NC".*

+ Because there is only one CY2023 Data Center New Construction Project in the population, the individual results for each year are not provided to ensure anonymity.

 # No new research was conducted for the LED Streetlighting measures, therefore the existing deemed values from CY2018 are recommended for those measures.

Table Source: Evaluation team analysis.

6. APPENDIX A: CUSTOM AND DATA CENTERS PROGRAM NTG HISTORY

Effective Year	Business Custom and Data Centers Program
EPY1	**NTG** 0.72 **Free Ridership** 28% **Spillover** 0% **Method:** Customer self-reports. 24 surveys completed from a population of 88.
EPY2	**NTG** 0.76 **Free Ridership** 24% **Spillover** 0% **Method:** Customer self-reports. 20 surveys completed from a population of 345.
EPY3	**NTG** 0.56 for kWh and 0.46 for kW **Free Ridership** 44% **Spillover** 0% **Method:** Customer self-reports. 67 surveys completed from a population of 887.
EPY4	**Deemed using PY2 = 0.76** **PY4 Research NTG: kWh** 0.61 **kW** 0.64 **Free Ridership** 39% **Spillover** 0% **Method:** Customer self-reports. 63 surveys completed from a population of 367.
EPY5	**Illinois SAG Consensus:** • 0.56
EPY6	**Illinois SAG Consensus:** • 0.61 kWh (deemed by Illinois SAG for PY6) • 0.64 kW (deemed by Illinois SAG for PY6) Values for kilowatt-hours and kilowatts are derived from PY4 evaluation research results and are based on the Illinois SAG-approved values.

Effective Year	Business Custom and Data Centers Program
EPY7	**Custom NTG** 0.64 **Free Ridership** 0.36 **Participants Spillover** Negligible **Nonparticipants Spillover** Negligible **Custom NTG** 0.48 **Free Ridership** 0.52 **Participants Spillover** Negligible **Nonparticipants Spillover** Negligible Source: Participant self-report telephone survey. The spillover effects were examined in this evaluation and their magnitude was found to be small as discussed below in the spillover section. Quantification of spillover was not included in the calculation of the NTG ratio for EPY5. Interviews were completed with five of 11 Data Center projects. Note: In PY5, Data Center were combined with Custom, while in PY6, Data Center were managed separately from Custom.
EPY8	**Recommendation (based upon PY6 research):** **Custom NTG** 0.67 **Custom Free Ridership** 0.33 **Custom Spillover** 0.005 **NTG Research Source:** Free Ridership and Spillover: PY6 participant and vendor research
EPY9	**Custom NTG** 0.58 **Custom Free Ridership** 0.42 **Custom Spillover** Negligible **NTG Research Source:** Free Ridership and Spillover: PY7 participant and vendor research

Effective Year	Business Custom and Data Centers Program
CY2018	**Custom NTG kWh** 0.58 **Custom NTG kW** 0.70 **Custom Free Ridership kWh** 0.42 **Custom Free Ridership kW** 0.30 **Custom Spillover** Negligible **NTG Research Source:** Free Ridership: PY7 participant and vendor research Spillover: PY7 participant self-report data The evaluation team performed telephone surveys in PY8, but the analysis will be performed and combined with PY9 findings.
CY2019	**Custom NTG kWh** 0.58 **Custom NTG kW** 0.70 **Custom Free Ridership kWh** 0.42 **Custom Free Ridership kW** 0.30 **Custom Spillover** Negligible **NTG Research Source:** Free Ridership and Spillover: PY7 participant and vendor research The evaluation team performed telephone surveys in PY8, but the analysis will be performed and combined with PY9 findings.
CY2020	**Custom NTG kWh** 0.56 **Custom NTG kW** 0.58 **Custom Free Ridership kWh** 0.44 **Custom Free Ridership kW** 0.42 **Custom Spillover** Negligible **NTG Research Source:** CY2018 participating customer surveys
CY2021	**Custom NTG, All but Street Lights, Data Center** 0.51 **Custom NTG, LED Street Lights** 0.81 **Custom Spillover** 0.00 **NTG Research Source:** Values based on 2018 and 2019 Guidehouse participant research results. *Streetlights NTG from the Municipal streetlights in the LED Street Lights program*

Effective Year	Business Custom and Data Centers Program
CY2022	**Custom NTG kWh: kWh** 0.39 **kW** 0.28 **Custom Free Ridership: kWh** 0.61 **kW** 0.72 **Custom Spillover** Negligible **LED Streetlighting NTG: kWh** 0.81 **kW** 0.81 **LED Streetlighting Free Ridership: kWh** 0.19 **kW** 0.19 **LED Streetlighting Spillover** Negligible **NTG Research Source:** Values based on 2020 Guidehouse participant research results. *Streetlights NTG from the Municipal streetlights in the LED Street Lights program*
CY2023	**Custom NTG: kWh** 0.53 **kW** 0.45 **Custom Free Ridership: kWh** 0.47 **kW** 0.55 **Custom Spillover** Negligible **LED Streetlighting NTG: kWh** 0.81 **kW** 0.81 **LED Streetlighting Free Ridership: kWh** 0.19 **kW** 0.19 **LED Streetlighting Spillover** Negligible NTG Research Source: Values based on PY9-CY2021 Guidehouse participant research results. *Streetlights NTG from the Municipal streetlights in the LED Street Lights program*
CY2024	**Custom Non-DC NTG: kWh** 0.56 **kW** 0.49 **Custom Free Ridership: kWh** 0.44 **kW** 0.51 **Custom Spillover** Negligible **Data Centers New Construction NTG: kWh** 0.09 **kW** 0.14 **Data Centers New Construction FR: kWh** 0.91 **kW** 0.86 **Data Centers New Construction Spillover** Negligible **NTG Research Source:** Values based on CY2020-CY2022 Guidehouse participant research results. **Data Centers Other NTG: kWh** 0.37 **kW** 0.31 **Data Centers Other FR: kWh** 0.63 **kW** 0.69 **Data Centers Other Spillover** Negligible **NTG Research Source:** Values based on CY2020-CY2022 Guidehouse participant research results. **LED Streetlighting NTG: kWh** 0.81 **kW** 0.81 **LED Streetlighting Free Ridership: kWh** 0.19 **kW** 0.19 **LED Streetlighting Spillover** Negligible **NTG Research Source:** *Streetlights NTG from the Municipal streetlights in the LED Street Lights program*.

Effective Year	Business Custom and Data Centers Program
CY2025	**Custom Non-DC NTG: kWh** 0.63 **kW** 0.57 **Custom Free Ridership: kWh** 0.37 **kW** 0.43 **Custom Spillover** Negligible **NTG Research Source:** SAG Approved Deemed value from CY2021-CY2023 research. **Data Centers New Construction NTG: kWh** 0.06 **kW** 0.06 **Data Centers New Construction FR: kWh** 0.94 **kW** 0.94 **Data Centers New Construction Spillover** Negligible **Data Centers Other NTG: kWh** 0.49 **kW** 0.40 **Data Centers Other FR: kWh** 0.51 **kW** 0.60 **Data Centers Other Spillover** Negligible **NTG Research Source:** SAG Approved Deemed value from CY2020, CY2021 and CY2023 research. **LED Streetlighting NTG: kWh** 0.81 **kW** 0.81 **LED Streetlighting Free Ridership: kWh** 0.19 **kW** 0.19 **LED Streetlighting Spillover** Negligible **NTG Research Source:** *Streetlights NTG from the Municipal streetlights in the LED Street Lights program*