ComEd Programs NTG Approach for CY2021

Final

September 30, 2020

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Business Programs

	Agricultural Program
CY2020	NTG Lighting Measures: 0.83, based on Standard PY9 Research Non-Lighting Measures: 0.78, based on Standard PY9 Research Custom Measures: 0.70 kWh, 0.63 kW, based on Custom CY2018 Research
CY2021	**NTG: 0.80** NTG Source: Guidehouse secondary research

	BILD and MidStream Incentives
EPY1	N/A No Program
EPY2	N/A No Program
EPY3	N/A Pilot Program – no data collection
EPY4	**Retroactive application of NTG** of 0.63 **Free-Ridership** 39% **Spillover** 2% **Method**: Customer self-report. 51 surveys completed from a population of about 5,000 (contact information available for only a small subset of participants). 11 Trade ally surveys also conducted resulting in a NTG of 0.56 but this result was not factored in to the customer free ridership calculation.
EPY5	SAG Consensus: • 0.74
EPY6	SAG Consensus: • 0.63
EPY7	**NTG CFL: 0.64** (EPY4 and EPY5 weighted average. EPY5 CFL NTG is 0.66) **NTG LED/HID: 0.70** **NTG Linear FL: 0.56** **NTG Other: 0.67** **Free Ridership:** CFLs 0.41; LEDs 0.38; Linear Fluorescents 0.47; other 0.40. **Participant Spillover:** CFLs 0.07; LEDs 0.08; Linear Fluorescents 0.03; Other 0.07 **Nonparticipant Spillover:** Negligible. There are very few (perhaps as few as 1 or 2) midstream lighting programs offered around the country and the others are very small and new, have not yet been evaluated, and thus provide no research on nonparticipant spillover. Given how this program is administered it is likely that nonparticipant spillover would be very small. Source: PY5 participant and distributor self-report surveys. Notes: In PY5, Midstream Incentive Lighting was renamed BILD.
EPY8	**Recommendation (based upon PY6 research):** **NTG CFL: 0.68** **NTG LED/HID: 0.77** **NTG Linear FL: 0.61** **NTG Other: 0.68** ***Research NTG ratios calculated from PY6 participants:*** PY6 NTG CFL: 0.68 Free Ridership CFL: 0.39 Spillover CFL: 0.07

	BILD and MidStream Incentives
	PY6 NTG LED/HID: 0.77 Free Ridership: 0.30 Spillover LED/HID: 0.07 PY6 NTG Linear FL: 0.61 Free Ridership: 0.45 Spillover Linear FL: 0.07 PY6 NTG Other: 0.67 Free Ridership: 0.40 Spillover: 0.07 In PY6, two primary methods were used to estimate the NTGR: 1. Customer self-report approach based on the end-user telephone surveys of 282 participants and in-depth interviews with 9 BILD end-user participants. **2.** Supplier self-reports based on in-depth interviews with program lighting distributors.
EPY9	**NTG CFL: 0.64** **Spillover, CFL: 0.10** **Free-Ridership, CFL: 0.46** **NTG LED: 0.78** **Spillover, LED: 0.10** **Free-Ridership, LED: 0.32** **NTG Linear FL: 0.75** **Spillover, Linear FL: 0.10** **Free-Ridership, Linear FL: 0.35** **NTG Other: 0.78** **Spillover, Other: 0.10** **Free-Ridership, Other: 0.32** **NTG Research Sources:** PY7 Research – Free-Ridership and Spillover: Customer self-report research via telephone and web surveys, plus web surveys sent to all participating distributors. Note: Recommended values are PY7 Researched values (not three year averages).
CY2018	**NTG LED Lamps and Fixtures: 0.78** **Spillover, LED Lamps and Fixtures: 0.10** **Free-Ridership, LED Lamps and Fixtures: 0.32** **NTG Linear FL: 0.75** **Spillover, Linear FL: 0.10** **Free-Ridership, Linear FL: 0.35** **LED Exit Signs, Linear LED, Battery Chargers, and all "Other": NTG of the default value of 0.80 until research can be done.** **NTG Research Sources:** For LED Lamps and Fixtures and for Linear FL: PY7 Research – Free-Ridership and Spillover: Customer self-report research via telephone and web surveys, plus web surveys sent to all participating distributors. Note: Recommended values are PY7 Researched values (not three year averages).
CY2019	**NTG LED Lamps and Fixtures: 0.83** **Spillover, LED Lamps and Fixtures: 0.14**

	BILD and MidStream Incentives
	Free-Ridership, LED Lamps and Fixtures: 0.31 **NTG Linear FL: 0.67** **Spillover, Linear FL: 0.14** **Free-Ridership, Linear FL: 0.47** **LED Exit Signs, Linear LED, Battery Chargers, and all "Other": NTG of the default value of 0.80 until research can be done.** **NTG Research Sources:** For LED Lamps and Fixtures and for Linear FL (Free-Ridership and Spillover): Customer self-report research via telephone and web surveys, plus web surveys sent to all participating distributors.
CY2020	**NTG LED Lamps and Fixtures: 0.83** **Spillover, LED Lamps and Fixtures: 0.14** **Free-Ridership, LED Lamps and Fixtures: 0.31** **NTG Linear FL: 0.67** **Spillover, Linear FL: 0.14** **Free-Ridership, Linear FL: 0.47** **LED Exit Signs, Linear LED, Battery Chargers, and all "Other": NTG of the default value of 0.80 until research can be done.** **NTG Research Sources:** For LED Lamps and Fixtures and for Linear FL (Free-Ridership and Spillover): Customer self-report research via telephone and web surveys, plus web surveys sent to all participating distributors.
CY2021	**NTG LED Screw-In: 0.72** **Participant Spillover, LED Screw-In: 0.10** **Non-Participant Spillover, LED Screw-In: 0.05** **Free-Ridership, LED Screw-In: 0.43** **NTG Linear FL: 0.67** **Participant Spillover, Linear FL: 0.10** **Non-Participant Spillover, Linear FL: 0.05** **Free-Ridership, Linear FL: 0.48** **NTG Linear LED: 0.76** **Participant Spillover, Linear LED: 0.10** **Non-Participant Spillover, Linear LED: 0.05** **Free-Ridership, Linear LED: 0.39** **LED Exit Signs, LED Fixtures, Battery Chargers: NTG of the default value of 0.80 until research can be done.** **NTG Research Sources:** For LED Screw-In, Linear FL, and Linear LEDs (Free-Ridership and Spillover): CY2018/2019 customer self-report research via web surveys. Non-Participant Spillover is from 9/18/2020 SAG Consensus.

	Business Custom Incentive
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** 0.61 for kWh and 0.64 for kW **Free-Ridership** 39% **Spillover** 0% **Method**: Customer self-reports. 63 surveys completed from a population of 367.
EPY5	SAG Consensus: • 0.56
EPY6	SAG Consensus: • 0.61 kWh (deemed by SAG for PY6) • 0.64 kW (deemed by SAG for PY6) Values for kWh and kW are derived from PY4 evaluation research results and are based on the SAG-approved values.
EPY7	**Custom NTG: 0.64** **Free-Ridership: 0.36** **Participants Spillover: Negligible** **Nonparticipants Spillover: Negligible** **Data Centers 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 quite small as discussed below in the spillover section. Therefore, a quantification of spillover was not included in the calculation of NTGR for EPY5. Notes: In PY5, Data Centers was combined with Custom, while in PY6, Data Centers was managed separately from with Custom. Interviews were completed with 5 of 11 Data Center projects.
EPY8	**Recommendation (based upon PY6 research):** **Custom NTG: 0.67** **Custom Free Ridership: 0.33** **Custom Spillover: 0.005** Custom: The above values are from the PY6 research results. NTG research methods in PY6 consisted of participant and trade allies survey data collection and analysis (n=32). NTG research methods in PY6 combined participant and service provider survey results. The existence of participant spillover was examined in PY6 but no significant spillover activity was reported by participants, and, therefore, quantification was not warranted.

	Business Custom Incentive
EPY9	**Custom NTG: 0.58** **Custom Free Ridership: 0.42** **Custom Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY7 Participant and vendor research Spillover: PY7 Participant self-report data
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: 0.56** **Custom NTG kW: 0.58** **Custom Free Ridership kWh: 0.44** **Custom Free Ridership kW: 0.42** **Custom Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY8 and PY9 Participating customer surveys Spillover: PY8 and PY9 Participating customer surveys The evaluation team performed telephone surveys in PY8, but deferred analysis until PY9. The recommended values are based on the combined PY8/9 results.
CY2020	**Custom NTG, Private Sector kWh: 0.70** **Custom NTG, Private Sector kW: 0.63** **Custom NTG, Public Sector kWh: 0.70** **Custom NTG, Public Sector kW: 0.63** **Custom NTG, Public Sector-DCEO kWh: 0.24** **Custom NTG, Public Sector-DCEO kW: 0.23** **Custom Free Ridership, Private Sector kWh: 0.30** **Custom Free Ridership, Private Sector kW: 0.37** **Custom Free Ridership, Public Sector kWh: 0.30** **Custom Free Ridership, Public Sector kW: 0.37** **Custom Free Ridership, Public Sector-DCEO kWh: 0.76** **Custom Free Ridership, Public Sector-DCEO kW: 0.77** **Custom Spillover: Negligible** **NTG Research Source:** Free-Ridership: CY2018 Participating customer surveys Spillover: CY2018 Participating customer surveys *Participating public sector projects surveyed were exclusively legacy DCEO, due to this, the private sector values are recommended for future public sector projects.

	Business Custom Incentive
CY2021	**Custom NTG, All but Street Lights, Data Centers: 0.51** **Custom NTG, LED Street Lights: 0.81** **Custom NTG, Data Centers, Co-location New Construction: 0.43** **Custom NTG, Data Centers, Other projects: 0.72** **Custom Free Ridership, Data Center Co-Location: New Construction: 0.57** **Custom Spillover: 0.00** **NTG Research Source:** Values based on 2018 and 2019 Guidehouse participant research results. Street Lights NTG from the Municipal street lights in the LED Street Lights program.

	Business New Construction Service
EPY1	NTG was not evaluated for EPY1 because program began in EPY2.
EPY2	**NTG** 0.59 **Free-Ridership** 41% **Spillover** 0% **Method**: Customer self-report. 14 projects were assessed from a population of 16. Enhanced method. NTG scores were adjusted for standard design national retail stores.
EPY3	**NTG** 0.65 (0.69 for Systems Track and 0.54 for Comprehensive Track) **Free-Ridership** 35% **Spillover** 0% **Method**: Customer self-report. 13 interviews with individuals representing 15 projects out of population of 37 projects. Enhanced method. NTG scores were adjusted for standard design national retail stores.
EPY4	**Compressive Track – Retroactive application of NTG of 0.54** **Systems Track used PY2 value of 0.59** **NTG 0.57** (based on weighted avg. of 0.59 for Systems Track and 0.54 for Comprehensive Track) **EPY4 Research Comprehensive Track 0.54** **EPY4 Research Systems Track 0.59** **Free-Ridership** 43% **Spillover** 0% **Method**: EPY3 deemed value for Systems Track projects. Customer self-report for Comprehensive Track projects. Interviews with individuals representing 5 of 6 Comprehensive Track projects. Enhanced method. NTG scores were adjusted for standard design national retail stores and LEED projects.
EPY5	SAG Consensus: • 0.65
EPY6	SAG Consensus: • 0.52
EPY7	**Full Program NTG: 0.59** **Comprehensive NTG: 0.59** **Systems Projects NTG: 0.64** **Free-Ridership 0.43** **Spillover (all types) 0.05** **Source**. The NTG from estimate is from the EM&V EPY4 participant survey.

	Business New Construction Service
	Spillover is an EM&V estimate based on our literature review. In 50 participant interviews from EPY2-4 we found 2 spillover projects. Some of those interviews were early in the program's life when spillover is less likely. We also looked at existing literature on past studies and a wide range of spillover values. For example, in September of 2012, National Grid Rhode Island published a study: "2011 Commercial and Industrial Programs Free-Ridership and Spillover Study." For commercial new construction, they found 78% participant spillover and 0% non-participant spillover. Southern California Gas recently did a study to estimate spillover for its 2013 and 2014 Savings By Design program by looking at past studies. They only found a couple of older California studies relevant to commercial new construction. The 2003 BEA reported 11% participant spillover and 1% non-participant spillover. A 2002 study by the same evaluator showed 13% participant spillover and 5% non-participant spillover. Finally, they also looked at the NYSERDA New Construction Program Impact Evaluation Report from 2007-2008, which found participant spillover of 20% and non-participant spillover of 61%. This study has been questioned and we understand that NYSERDA is reevaluating its validity. Our conclusion is that, given the ComEd program design and implementation approach, it is reasonable to expect that a meaningful amount of spillover is being created and should be credited to the program. Given the range of spillover amounts we found in our literature review, we believe a spillover amount of 5% is probably a realistic and probably conservative estimate. That spillover is probably occurring through the action of architects, engineers, and builders who have had exposure to the program and, to a lesser degree, building owners who had a building go through the program. Given that mix, we have not tried to differentiate between participant and nonparticipant spillover.
EPY8	**Recommendation (based upon PY6 research):** **Full Program NTG: 0.80 – Preliminary, updated number to be provided later** **Free-Ridership: 0.20** **Spillover: 0.00** The researched NTGRs are being developed using a "real-time" approach where the evaluation team conducts interviews with program participants both after each project passes the reservation phase, and again after it passes the verification phase.
EPY9	**Full Program NTG: 0.77** **Free-Ridership: 0.23** **Spillover: 0.00** **NTG Research Source:** Free-Ridership: Participant and service provider self-report through real time EMV Spillover: NTG real time research methods in EPY6 combine participant and service provider survey results.
CY2018	**Full Program NTG: 0.60** **Free-Ridership: 0.40** **Spillover: 0.00** **NTG Research Source:** Free-Ridership: PY8 Participant and service provider self-report through real time EMV Spillover: NTG real time research methods in EPY6 combine participant and service provider survey results.
CY2019	**Full Program NTG: 0.68** **Free-Ridership: NA** **Spillover: NA** **NTG Research Source:**

Business New Construction Service

Year of Research	Electric
EPY6/GPY3	0.80
EPY7/GPY4	0.77
EPY8/GPY5	0.60
EPY9/GPY6	0.54
4-Year Average	**0.68**

Average of four most recent years of NTG research, as per SAG consensus

CY2020

Full Program NTG: 0.59
Free-Ridership: NA
Spillover: NA

NTG Research Source:

Year of Research	Electric
PY7	0.77
PY8	0.60
PY9	0.54
CY2018	0.45
Recommended Value (4-Year Average)	**0.59**

Source: Navigant team analysis

Average of four most recent years of NTG research including CY 2018 participating customer survey, as per SAG consensus

CY2021

Full Program NTG: 0.53
Free-Ridership: 0.49
Spillover: NA

NTG Research Source:

Program Year	Electric Researched Value / SAG Value
PY8 (GPY5)	0.60 / 0.80
PY9 (GPY6)	0.54 / 0.77
CY2018	0.45 / 0.60
CY2019	0.51 / 0.68
CY2020	NA / 0.59
Recommended Value for CY2021 (4-Year Average)	NA / **0.53**

Source: Guidehouse team analysis

Average of four most recent years of NTG research, as per SAG consensus

	Business Standard Incentive
EPY1	**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.
EPY2	**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 trade allies called for 11 participants and their responses factored in to the customer free ridership calculation.
EPY3	**NTG 0.72** **Free-Ridership 28**% **Participant Spillover** 0% (qualitative evidence observed, not quantified) **Method**: Customer self-report. 108 interviews completed covering 292 projects from a population of 3,794 projects. Enhanced method. Two trade allies and three account managers were called for five participants and their responses factored in to the customer free ridership calculation.
EPY4	**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 trade allies 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/±14%) Non-Lighting = 0.63 (90/±16%).
EPY5	SAG Consensus: • Lighting: 0.74 • Non-Lighting: 0.62
EPY6	SAG Consensus: • Lighting: 0.70 • Non-Lighting: 0.63
EPY7	**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 Trade Allies: Measured and equal to 0.05 Justification: EPY5 ComEd Standard Program research, participating trade ally sample 55 Participant and Non-Participant Spillover Identified by Non-Participating Standard Program Trade Allies: 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).

	Business Standard Incentive
	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 Trade Allies: Measured and equal to 0.06 Justification: EPY5 ComEd Standard Program research, participating trade ally sample 10. Participant and Non-Participant Spillover Identified by Non-Participating Standard Program Trade Allies: 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).
EPY8	**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, trade allies and business customers were interviewed in a separate study to estimate spillover broadly across the C&I market. The results of the cross-cutting C&I spillover study will be reported separately.
EPY9	**Recommendation (based upon PY7 research):** **NTG Lighting: 0.70** **NTG Non-Lighting: 0.69** **Free-Ridership, Lighting: 0.31** **Free-Ridership, Non-Lighting: 0.32** **Spillover, Lighting: 0.01** **Spillover, Non-Lighting: 0.01** NTG Research Source: FR = PY7 Participant Customers and Trade Allies SO = PY6 C&I NTG study
CY2018	**Recommendation (based upon PY7 and PY8 research):** **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 Trade Allies SO = PY8 TA and Contractor Self-Report
CY2019	**Recommendation (based upon PY9 research):** **NTG Lighting: 0.83**

	Business Standard Incentive
	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
CY2020	**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** NTG Research Source: FR = PY9 Participating Customer Surveys SO = PY9 Participating Customer Surveys
CY2021	**Recommendation:** **NTG Lighting: 0.80** **NTG Non-Lighting: 0.70** **NTG Thermostats: 0.86** **Free-Ridership, Lighting: 0.22** **Free-Ridership, Non-Lighting: 0.32** **Participant Spillover, Lighting: <0.01** **Participant Spillover, Non-Lighting: <0.01** **Nonparticipant Spillover, Lighting: 0.02** **Nonparticipant Spillover, Non-Lighting: 0.02** **Thermostat TRM savings is between net and gross so thermostat NTG defined as:** **1 – (free ridership * 0.5) + nonparticipant spillover** **(Using the non-lighting free ridership)** NTG Research Source: FR = CY2019 Participating Customer Surveys Participant SO = CY2019 Participating Customer Surveys Nonparticipant spillover: PY8 TA and Contractor Self-Report

	Grocery
CY2020	NTG: 0.97 Based upon ComEd SBES CY2019
CY2021	**Unchanged from CY2020** NTG: 0.97 Based upon ComEd SBES CY2019

	Industrial Systems Optimization Compressed Air in EPY4
EPY1	Program did not exist
EPY2	Program did not exist

	Industrial Systems Optimization Compressed Air in EPY4
EPY3	Program did not exist
EPY4	**Retroactive application of NTG** of 0.67 for kWh and 0.72 for kW (EPY4 Compressed Air) **Free-Ridership** 33% kWh and 0.28 kW **Spillover** 0% **Method**: Customer self-report. 7 surveys completed from a population of 9.
EPY5	SAG Consensus: • 0.67
EPY6	SAG Consensus: • 0.67
EPY7	**NTG: 0.68** **Free-Ridership: 0.33** **Participant Spillover: 0.01** **Nonparticipant Spillover: Negligible** Free Ridership and participant spillover was measured in a participant survey on 35 projects. Interviews were completed with 5 of 11 Data Center projects.
EPY8	**Recommendation (based upon PY6 research):** **NTG, kWh: 0.74** **Free Ridership, kWh: 0.26** **Spillover, kWh: Negligible** **NTG, kW: 0.83** **Free Ridership, kW: 0.17** **Spillover, kW: Negligible** NTG research methods in PY6 consisted of participant and technical service provider survey data collection and analysis (n=17). The net program impacts were quantified solely on the estimated level of Free-Ridership. Information regarding participant spillover was also collected, but ultimately did not support a finding of any spillover.
EPY9	**Industrial Systems NTG: 0.80** **Industrial Systems Free Ridership: 0.20** **Industrial Systems Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY7 Participant and vendor self-report data Spillover: PY7 Participant and vendor self-report data
CY2018	**Industrial Systems NTG kWh: 0.80** **Industrial Systems NTG kW: 0.81** **Industrial Systems Free Ridership kWh: 0.20** **Industrial Systems Free Ridership kW: 0.19** **Industrial Systems Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY7 Participant and vendor self-report data Spillover: PY7 Participant and vendor self-report data The evaluation team performed telephone surveys in PY8, but the analysis will be performed and combined with PY9 findings.

	Industrial Systems Optimization Compressed Air in EPY4
CY2019	**Industrial Systems NTG kWh: 0.77** **Industrial Systems NTG kW: 0.78** **Industrial Systems Free Ridership kWh: 0.23** **Industrial Systems Free Ridership kW: 0.22** **Industrial Systems Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY8 and PY9 Participating customer surveys Spillover: PY8 and PY9 Participating customer surveys The evaluation team performed telephone surveys in PY8, but deferred analysis until PY9. The recommended values are based on the combined PY8/9 results.
CY2020	**Industrial Systems NTG kWh: 0.77** **Industrial Systems NTG kW: 0.78** **Industrial Systems Free Ridership kWh: 0.23** **Industrial Systems Free Ridership kW: 0.22** **Industrial Systems Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY8 and PY9 Participating customer surveys Spillover: PY8 and PY9 Participating customer surveys
CY2021	**Unchanged from CY2020** **Industrial Systems NTG kWh: 0.77** **Industrial Systems NTG kW: 0.78** **Industrial Systems Free Ridership kWh: 0.23** **Industrial Systems Free Ridership kW: 0.22** **Industrial Systems Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY8 and PY9 Participating customer surveys Spillover: PY8 and PY9 Participating customer surveys

	LED Street Lighting
CY2018	NTG: 1.0
CY2019	NTG: 1.0, Will conduct primary NTG research in CY2018 on municipally-owned lights
CY2020	**NTG Municipality-Owned: 0.81** FR Municipality-Owned: 0.19 PSO Municipality-Owned: Not studied **NTG ComEd-Owned Poles: 1.0** Sources: FR based on CY2018 EM&V Research. ComEd-Owned Poles based on SAG approved value for CY2018.
CY2021	**Unchanged from CY2020** **NTG Municipality-Owned: 0.81** FR Municipality-Owned: 0.19 PSO Municipality-Owned: Not studied **NTG ComEd-Owned Poles: 1.0**

	LED Street Lighting
	Sources: FR based on CY2018 EM&V Research. ComEd-Owned Poles based on SAG approved value for CY2018.

	Nonprofit Organizations
CY2020	NTG: 0.97 Based upon ComEd SBES CY2019
CY2021	**Unchanged from CY2020** NTG: 0.97 **New for CY2021** **NTG Thermostats: 1.0** **Thermostat TRM savings is between net and gross so thermostat NTG defined as:** **1 – (free ridership * 0.5) + nonparticipant spillover** Based upon ComEd SBES CY2019

	Facility Assessments Formerly known as Operational Savings or Operational Efficiency (OEP).
CY2018	NTG: 0.91 Similar to RCx.
CY2019	NTG: 0.94 Free-Ridership: 0.06 Spillover: 0.00 Source: RCx PY9 Research
CY2020	**Unchanged from CY2019** **NTG:** 0.94 Free-Ridership: 0.06 Spillover: 0.00 Source: RCx PY9 Research
CY2021	**Unchanged from CY2020** **NTG:** 0.94 Free-Ridership: 0.06 Spillover: 0.00 Source: RCx PY9 Research

	Public Buildings in Distressed Communities
CY2020	NTG: 0.97 Based upon ComEd SBES CY2019
CY2021	**Unchanged from CY2020** NTG: 0.97 **New for CY2021** **NTG Thermostats: 1.0** **Thermostat TRM savings is between net and gross so thermostat NTG defined as:** **1 – (free ridership * 0.5) + nonparticipant spillover**

	Public Buildings in Distressed Communities
	Based upon ComEd SBES CY2019

	Public Housing Authority
CY2019	NTG: 1.0
CY2020	NTG: 1.0
CY2021	NTG: 1.0

	Retro-Commissioning
EPY1	**NTG** 0.8 **Free-Ridership** 0% **Spillover** 0% **Method**: Program *ex ante* assumption. Customer self-report. Two completed surveys from a population of four participants bracketed the assumed NTG. Basic method.
EPY2	**NTG** 0.916 **Free-Ridership** 8.4% **Spillover** 0% **Method**: Customer self-report. Five surveys completed from an attempted census of a population of thirteen. Basic method.
EPY3	**NTG** 0.71 **Free-Ridership** 28.7% **Spillover** 0% **Method**: Customer self-report. Eight surveys completed from an attempted census of a population of 34 participants. Basic method.
EPY4	**Deemed NTG of 0.916 from EPY2** **Research NTG** 1.04 **Free-Ridership 0.097** **Spillover 0.136** **Method**: Program *ex ante* assumption and stipulated for EPY4. NTG based on EPY2 research. EPY3 research rejected due to small ratio of completed surveys.
EPY5	SAG Consensus: • 0.71
EPY6	SAG Consensus: • 1.04
EPY7	**NTG: 1.04** There was no new NTG research in EPY5. The most recent NTG research is from PY4. **Free-Ridership: 0.10.** The PY4 Free-Ridership ratio is an equally weighted average of savings-weighted participant and service provider Free-Ridership scores. **Participant spillover: 0.14.** Source: Participant and trade ally surveys. (Includes spillover from trade allies that account for 94% of program participation) **Nonparticipant spillover: Negligible.** There is no evidence of non-participant spillover. Service providers are dropped from the program if they are not generating projects. If they are not generating projects in the program, they are probably not generating them outside the program.
EPY8	**Recommendation (based upon PY6 research):** **NTG: 0.95 (electric)** **Free Ridership: 0.09 (electric)** **Spillover: 0.04 (electric)**

	Retro-Commissioning
	Spillover and Free-Ridership were calculated from self-report interviews with participants and service providers (n=18). The final EPY6 Free-Ridership ratio is an equally weighted average of savings-weighted participant and RSP Free-Ridership. Interviewed service providers account for 92% of electric savings. NTG research was not conducted for the gas companies.
EPY9	**NTG: 0.95 (electric)** **Free Ridership: 0.09 (electric)** **Spillover: 0.04 (electric)** **NTG Source:** Free-Ridership and Spillover: PY6 NTG Research
CY2018	**NTG: 0.95 (electric)** **Free Ridership: 0.09 (electric)** **Spillover: 0.04 (electric)** **NTG Source:** Free-Ridership and Spillover: PY6 NTG Research Due to limited sample size of PY8 NTG research, EPY8 results will be included in EPY9 research and analysis.
CY2019	**NTG: 0.94 (electric)** **Free Ridership: 0.06 (electric)** **Spillover: 0.00** **NTG Source:** Free-Ridership and Spillover: PY9 participating customer surveys and PY9 service provider surveys Note: Applies to all program paths.
CY2020	**NTG: 0.94 (electric)** **Free Ridership: 0.06 (electric)** **Spillover: 0.00** **NTG Source:** Free-Ridership and Spillover: PY9 participating customer surveys and PY9 service provider surveys Note: Applies to all program paths.
CY2021	**Unchanged from CY2020** **NTG: 0.94 (electric)** **Free Ridership: 0.06 (electric)** **Spillover: 0.00** **NTG Source:** Free-Ridership and Spillover: PY9 participating customer surveys and PY9 service provider surveys Note: Applies to all program paths.

	Retro-Commissioning: Energy Advisor Monitoring-based Commissioning (VCx, PowerTakeoff)
EPY9	NTG: 1.00 Based upon ComEd program detail outlining behavioral program and assumes impact analysis is based on regression analysis.
CY2018	NTG: NA

	Retro-Commissioning: Energy Advisor Monitoring-based Commissioning (VCx, PowerTakeoff)
	Based upon ComEd program detail outlining behavioral program and assumes impact analysis is based on regression analysis.
CY2019	**NTG: 1.00** **NTG Source:** NTG SAG Consensus which acknowledges that the program is similar to RCx except that participants are customers who have consistently demonstrated having taken no EE actions.
CY2020	**Unchanged from CY2019** **NTG: 1.00** **NTG Source:,** NTG SAG Consensus which acknowledges that the program is similar to RCx except that participants are customers who have consistently demonstrated having taken no EE actions.
CY2021	**Unchanged from CY2020** **NTG: 1.00** **NTG Source:** NTG SAG Consensus which acknowledges that the program is similar to RCx except that participants are customers who have consistently demonstrated having taken no EE actions.

	Small Business Previously known as Small Business Energy Savings
EPY1	No Program
EPY2	No Program
EPY3	No Program
EPY4	**Retroactive application of NTG** of 0.95 **Free-Ridership** 5% **Spillover** 0% **Method**: Customer self-report. 84 NTG surveys completed from a population of 181. Basic method of NTG analysis was used. No spillover was found. Customer participant self-reported Free-Ridership was 17 percent for ComEd. Individual trade ally responses to Free-Ridership questions were weighted by their respective fuel-specific program savings contributions and combined for a fuel-specific overall Free-Ridership rate. This approach resulted in an evaluation estimate of 5 percent Free-Ridership for electric measures and was used to calculate the NTG of 0.95 for this ComEd program.
EPY5	SAG Consensus: 0.90
EPY6	SAG Consensus: 0.95
EPY7	**NTG: 0.95** No new NTG research in PY5. **Free Ridership: 5%.** Customer self-report survey. **Participant Spillover: 0%** Customer and trade ally self-report survey. **Nonparticipant Spillover: 0%** Trade ally survey Three small participant spillover projects were included in the ComEd NTGR, but the impact (about 0.003 added) was not significant at the two-digit level. Trade allies provided anecdotal evidence of non-participant spillover for electric measures, but they did not provide enough information to quantify it.
EPY8	**Recommendation (based on average of PY7 Participant Survey & PY4 TA Interviews):** **NTG: 0.91** **Free-Ridership: 0.11** (based upon average of PY7 Participant Survey of FR 0.16 and PY4 TA Interviews FR 0.05) **Participant Spillover: 0.02** (based upon PY7 SO research)

	Small Business Previously known as Small Business Energy Savings
	Nonparticipant spillover: 0.0
EPY9	**NTG: 0.89** **Free-Ridership: 0.11** **Participant Spillover: 0.02** (based on PY7 SO Research) **Nonparticipant spillover: 0.0** **NTG Research Source:** PY 7 Research – Free-Ridership and Spillover: Participant and TA self-report, real-time approach **Free-Ridership: 0.11 –** (based upon average of PY7 Participant Survey of FR 0.16 and PY4 TA Interviews FR 0.05) **Participant Spillover: 0.02** (based upon PY7 SO research) **Nonparticipant spillover: 0.0**
CY2018	**NTG: 0.91** **Free-Ridership: 0.11** **Participant Spillover: 0.02** (based on PY7 SO Research) **Nonparticipant spillover: 0.0** **NTG Research Source:** PY 7 Research – Free-Ridership and Spillover: Participant and TA self-report, real-time approach **Free-Ridership: 0.11 –** (based upon average of PY7 Participant Survey of FR 0.16 and PY4 TA Interviews FR 0.05) **Participant Spillover: 0.02** (based upon PY7 SO research) **Nonparticipant spillover: 0.0**
CY2019	**NTG: 0.92** **Free-Ridership: 0.10** - (based upon 46/54 participant/TA weighting from TRM v7 method applied to PY7 research) **Participant Spillover: 0.02** (based on PY7 SO Research) **Nonparticipant spillover: 0.0** **NTG Research Source:** Participant and TA self-report (real time) - FR & SO are based upon PY7 Participant Surveys and updated TA interviews (PY8)
CY2020	**NTG: 0.97** **Free-Ridership: 0.077** **Participant Spillover: 0.005** **Nonparticipant spillover: 0.04** **NTG Research Source:** Participant self-report free ridership and spillover surveys.
CY2021	**Unchanged from CY2020** **NTG: 0.97** **Free-Ridership: 0.077** **Participant Spillover: 0.005** **Nonparticipant spillover: 0.04** **New for CY2021** **NTG Thermostats: 1.0** **Thermostat TRM savings is between net and gross so thermostat NTG defined as:** **1 – (free ridership * 0.5) + nonparticipant spillover** **NTG Research Source:** Participant self-report free ridership and spillover surveys.

	Small Business Kits Third Party
CY2020	NTG: 0.97 Based upon ComEd SBES CY2019
CY2021	**Unchanged from CY2020** NTG: 0.97 Based upon ComEd SBES CY2019

	Strategic Energy Management (SEM)
EPY9	NTG: 1.0 EM&V impact analysis (regression) will create net savings, not adjusted gross therefore EM&V does not calculate a NTG ratio that could be applied prospectively.
CY2018	**NTG: 0.95** **Free Ridership: 0.09** **Spillover: 0.04** **NTG Source:** Free-Ridership and Spillover: PY6 RCx NTG Research Determined to be more similar to RCx, with project-based impact analysis, than to a program amenable to regression analysis.
CY2019	**NTG: 1.0** **NTG Source:** No program-specific research available yet. The program approach is substantially more hands-on and long lasting and internal-capability building than RCx, which implies a higher NTG ratio than RCx (which is 0.94).
CY2020	**NTG: 1.0** **NTG Source:** No program-specific research available yet. The program approach is substantially more hands-on and long lasting and internal-capability building than RCx, which implies a higher NTG ratio than RCx (which is 0.94).
CY2021	**Unchanged from CY2020** **NTG: 1.0** **NTG Source:** No program-specific research available yet. The program approach is substantially more hands-on and long lasting and internal-capability building than RCx, which implies a higher NTG ratio than RCx (which is 0.94).

	Telecommunication Optimization
CY2020	NTG Co-Location: New Construction, kWh: 0.44 NTG Co-Location: New Construction, kW: 0.34 NTG Co-Location: Retrofit kWh: 0.78 NTG Co-Location: Retrofit kW: 0.82 NTG Non-Co-Location kWh: 0.67 NTG Non-Co-Location kW: 0.67 NTG Source: ComEd Data Centers CY2019

	Telecommunication Optimization
	NTG Lighting Measures: 0.83, based on Standard PY9 research NTG Other Standard Measures: 0.78, based on Standard PY9 research
CY2021	**NTG: 0.80** **Thermostat NTG: 0.90** NTG Source: TRM Default

	Voltage Optimization
CY2019	NTG: NA
CY2020	NTG: NA

Residential Programs

Elementary Energy Education

EPY4

Measure	Research Findings Nicor Gas-only FR	Research Findings Nicor Gas-only SO	Research Findings Nicor Gas-only NTG	Research Findings Nicor Gas-ComEd FR	Research Findings Nicor Gas-ComEd SO	Research Findings Nicor Gas-ComEd NTG
Showerheads	39%	7%	**68%**	22%	19%	**96%**
Kitchen Aerators	33%	2%	**69%**	18%	14%	**97%**
Bathroom Aerators	35%	7%	**71%**	22%	9%	**87%**
CFLs	NA	NA	**NA**	53%	31%	**78%**

Retroactive application of NTG of 0.68 – 0.96 (varies by measure and participant group)
Free-Ridership 18-53%
Spillover 7-19%
Method: Customer self-report, 223 surveys completed from a population of 9,972.

EPY5

SAG Consensus
- 0.76

EPY6

SAG Consensus
- 0.76

EPY7

NTG: 0.76
Free-Ridership: See EPY4 table
Participant spillover: see EPY4 table
Nonparticipant spillover: negligible
Source: EPY4 participant survey. No new evaluation research in EPY5.
No material changes to market or program.

EPY8

Recommendation (Avg.: NIPSCO, Nicor Rider 29 and PG/NSG GPY1 EEE program values):
CFL NTG: 0.83
Showerheads NTG: 1.05
Aerators NTG: 1.04

Based upon averaging NIPSCO, Nicor Rider 29, and Nicor Gas GPY1

EPY9

Recommendation – SAG Consensus:
CFL NTG: 1.0
Showerheads NTG: 1.0
Aerators NTG: 1.0

NTG Source:
NTG values of 1.0 based upon SAG consensus

Researched Values:
PY7 Research of participants and program managers and implementers:
Values are the average of NIPSCO, Nicor Rider 29 and PG/NSG GPY1 EEE program values:
CFL NTG: 0.67
Showerheads NTG: 0.82
Aerators NTG: 0.92

	Elementary Energy Education
	CFL FR: 0.51 Showerheads FR: 0.29 Aerators FR: 0.20 CFL SO: 0.18 Showerheads SO: 0.11 Aerators SO: 0.12
CY2018	**Recommendation:** **LED bulbs NTG: 1.0** **Showerheads NTG: 1.0** **Aerators NTG: 1.0** **Water Heater Setback NTG: 1.0** **Shower Timer NTG: 1.0** **NTG Source:** NTG values of 1.0 based upon PY7 SAG consensus
CY2019	**Recommendation:** **LED bulbs NTG: 0.84** **Showerheads NTG: 1.0** **Aerators NTG: 1.0** **Water Heater Setback NTG: 1.0** **Shower Timer NTG: 1.0** **LED bulbs FR: 0.20** **LED bulbs SO: 0.04** **NTG Source:** LED: Based on HEA PY9 and PY8 participant customer research. All Others: NTG values of 1.0 based upon PY7 SAG consensus.
CY2020	**Unchanged from CY2019** **Recommendation:** **LED bulbs NTG: 0.84** **Showerheads NTG: 1.0** **Aerators NTG: 1.0** **Water Heater Setback NTG: 1.0** **Shower Timer NTG: 1.0** **LED bulbs FR: 0.20** **LED bulbs SO: 0.04** **NTG Source:** LED: Based on HEA PY9 and PY8 participant customer research. All Others: NTG values of 1.0 based upon PY7 SAG consensus.
CY2021	**Unchanged from CY2020** **LED bulbs NTG: 0.84** **Showerheads NTG: 1.0** **Aerators NTG: 1.0** **Water Heater Setback NTG: 1.0** **Shower Timer NTG: 1.0** **LED bulbs FR: 0.20** **LED bulbs SO: 0.04** **NTG Source:** LED: Based on HEA PY9 and PY8 participant customer research.

	Elementary Energy Education
	All Others: NTG values of 1.0 based upon PY7 SAG consensus.

	Energy Star Rebate (Appliances)
EPY8	Clothes Washer = 0.68 based upon ComEd PY5 Evaluation Report
	Refrigerator = 0.86 based upon MA 2012 Home Energy Services Evaluation
	Air Purifier = 0.78 based upon Ameren IL Residential EE Products PY5
	Learning Thermostats = 0.90 Navigant researched value for Residential Programs
	Freezers = 0.86 based upon MA 2012 Home Energy Services Evaluation for refrigerators.
	Heat Pump Water Heater = 0.86 based upon Ameren IL Res EE Products PY5
	Clothes Dryer = 0.68 based upon ComEd Clothes Washer PY5 Evaluation Report
EPY9	**Clothes Washer = 0.68** – based upon ComEd PY5 Evaluation Report **Refrigerator = 0.86** – based upon MA 2012 Home Energy Services Evaluation **Air Purifier = 0.78** – based upon Ameren IL Residential EE Products PY5 **Learning Thermostats** = 0.90 – Navigant researched value for Residential Programs **Freezers = 0.86** – based upon MA 2012 Home Energy Services Evaluation for refrigerators. **Heat Pump Water Heater = 0.86** – based upon Ameren IL Res EE Products PY5 **Clothes Dryer = 0.68** – based upon ComEd Clothes Washer PY5 Evaluation Report **Dehumidifier = 0.78** – based upon Ameren PY4 researched value of 0.78 **Advanced Power Strips = 0.86** – Ameren primary research in PY4 **Dishwasher = 0.92** – based upon recent CO study; will be provided to SAG once it is public **Pool Pump = 1.00** – based upon recent CO study; will be provided to SAG once it is public **Bathroom Exhaust Fan = 0.80** – default value (secondary research didn't support a recommendation) **Water Cooler = 0.80** – default value (secondary research didn't support a recommendation) **Window AC = 0.80** – default value (secondary research didn't support a recommendation) NTG Source: Based upon EPY8 Recommendations for existing measures and secondary research for new measures.
CY2018	**Clothes Washer = 0.58** **Refrigerator = 0.57** **Air Purifier = 0.74** **Freezers = 0.54** **Heat Pump Water Heater = 0.74** **Clothes Dryer = 0.62** **Bathroom Exhaust Fan = 0.66** **Water Cooler = 0.83** **Window AC = 0.63** **Dehumidifier = 0.78** – based upon Ameren PY4 researched value of 0.78 **Advanced Power Strips = 0.86** – Ameren primary research in PY4 **Dishwasher = 0.80** – default value **Pool Pump = 0.80** – default value **Learning Thermostats =** NA. The savings value in the IL TRM is based on regression analysis on consumption data and thus is a net savings number. NTG Source: Based upon EPY8 participant self-report survey unless noted otherwise.

	Energy Star Rebate (Appliances)
CY2019	**NTG Clothes Washer:** 0.62 **NTG Refrigerator:** 0.61 **NTG Air Purifier:** 0.78 **NTG Freezers:** 0.58 **NTG Heat Pump Water Heater:** 0.78 **NTG Clothes Dryer:** 0.66 **NTG Bathroom Exhaust Fan:** 0.70 **NTG Water Cooler:** 0.87 **NTG Window AC:** 0.67 **Dehumidifier = 0.78** – based upon Ameren PY4 researched value of 0.78 **Advanced Power Strips = 0.86** – Ameren primary research in PY4 **Dishwasher = 0.80** – default value **Pool Pump = 0.80** – default value **Advanced Thermostats =** NA. The savings value in the IL TRM is based on regression analysis on consumption data and thus is a net savings number. FR Clothes Washer: 0.42 FR Refrigerator: 0.43 FR Air Purifier: 0.26 FR Freezers: 0.46 FR Heat Pump Water Heater: 0.26 FR Clothes Dryer: 0.38 FR Bathroom exhaust fan: 0.34 FR Water cooler: 0.17 FR Window AC: 0.37 SO: 0.04 (clothes washer, refrigerator, air purifier, freezers, heat pump water heater, clothes dryer, bathroom exhaust fan, water cooler, window AC) NTG Source: SO based upon EPY8 participant self-report survey; FR based upon EPY8 unless noted otherwise.
CY2020	**NTG Clothes Washer:** 0.63 **NTG Refrigerator:** 0.65 **NTG Air Purifier:** 0.79 **NTG Freezers:** 0.63 **NTG Clothes Dryer:** 0.67 **NTG Bathroom Exhaust Fan:** 0.66 **NTG Water Cooler:** 0.67 **NTG Window AC:** 0.72 **NTG Dehumidifier = 0.67** – based upon Ameren PY4 researched value of 0.78 **NTG Advanced Power Strips = 0.76** – Ameren primary research in PY4 **NTG Pool Pump = 0.80** – TRM default value **Advanced Thermostats =** NA. TRM v7 yields net savings and does not require NTG adjustment. FR Clothes Washer: 0.41 FR Refrigerator: 0.39 FR Air Purifier: 0.25 FR Freezers: 0.41 FR Clothes Dryer: 0.37 FR Dehumidifier: 0.37 FR Bathroom exhaust fan: 0.38

	Energy Star Rebate (Appliances)
	FR Water cooler: 0.37 FR Window AC: 0.32 FR Advanced Power Strip: 0.28 SO: 0.04 (clothes washer, refrigerator, air purifier, freezers, heat pump water heater, clothes dryer, bathroom exhaust fan, water cooler, window AC) NTG Source: FR based on CY2018 participating customers survey, unless otherwise noted SO based upon EPY8 participant self-report survey
CY2021	NTG Advanced Thermostat - cooling: 0.80 NTG Advanced Thermostat - heating: 0.90 **Unchanged from CY2020:** **NTG Clothes Washer:** 0.63 **NTG Refrigerator:** 0.65 **NTG Air Purifier:** 0.79 **NTG Freezers:** 0.63 **NTG Clothes Dryer:** 0.67 **NTG Bathroom Exhaust Fan:** 0.66 **NTG Water Cooler:** 0.67 **NTG Window AC:** 0.72 **NTG Dehumidifier = 0.67** – based upon Ameren PY4 researched value of 0.78 **NTG Advanced Power Strips = 0.76** – Ameren primary research in PY4 **NTG Pool Pump = 0.80** – TRM default value NTG Thermostat - Cooling: Policy Manual default NTG Thermostat – Heating: SAG decision. TRM savings are between net and gross therefore NTG should be between the default value (0.8) and 1.0. FR Clothes Washer: 0.41 FR Refrigerator: 0.39 FR Air Purifier: 0.25 FR Freezers: 0.41 FR Clothes Dryer: 0.37 FR Dehumidifier: 0.37 FR Bathroom exhaust fan: 0.38 FR Water cooler: 0.37 FR Window AC: 0.32 FR Advanced Power Strip: 0.28 SO: 0.04 (clothes washer, refrigerator, air purifier, freezers, heat pump water heater, clothes dryer, bathroom exhaust fan, water cooler, window AC) NTG Source: FR based on CY2018 participating customers survey, unless otherwise noted SO based upon EPY8 participant self-report survey

	Fridge Freezer Recycling Rewards
EPY1	**NTG** 0.70 for refrigerators, 0.83 for freezers, 1.0 for Room AC units **Free-Ridership** 30% for refrigerators, 17% for freezers, 0% for Room AC units **Spillover** 0% for all measure types

<table>
<tr><td></td><td>Fridge Freezer Recycling Rewards</td></tr>
<tr><td></td><td>Method: Customer self-report. 100 surveys completed (70 refrigerator respondents, 30 freezers), from attempted calls with 498 respondents</td></tr>
<tr><td>EPY2</td><td>NTG 0.73 for refrigerators, 0.82 for freezers, 0.72 for Room AC units
Free-Ridership 27% for refrigerators, 18% for freezers, 28% for Room AC units
Spillover 0% for all measure types
Method: Customer self-report. 152 surveys completed – 114 Refrigerator, 38 Freezer, 30 Room AC Recyclers, from attempted calls with 744 respondents</td></tr>
<tr><td>EPY3</td><td>NTG 0.67 for refrigerators, 0.75 for freezers, 0.70 for Room AC units
Free-Ridership 33% for refrigerators, 25% for freezers, 30% for Room AC units
Spillover 0% for all measure types
Method: Customer self-report. 202 surveys completed – 151 Refrig., 51 Freezer, 30 Room AC Recyclers, from attempted calls with 1,369 respondents</td></tr>
<tr><td>EPY4</td><td>Deemed using PY2 values NTG 0.73 for refrigerators, 0.77 for freezers, and 0.58 for Room AC units
EPY4 Research NTG of 0.77 for refrigerators and freezers, 0.58 for Room AC.
Free-Ridership 27% for refrigerators, 23% for freezers, 42% for Room AC units
Spillover 0% for all measure types
Method: Customer and participating retailer self-reports. Weighted average from combining results from both sources. 200 surveys completed with participating customers –150 Refrig., 50 Freezer, 19 Room AC Recyclers, from attempted calls with 2,225 respondents</td></tr>
<tr><td>EPY5</td><td>SAG Consensus:
Refrigerators: 0.67
Freezers: 0.75
Room AC: 0.70</td></tr>
<tr><td>EPY6</td><td>SAG Consensus:
Refrigerators: 0.73
Freezers: 0.82
Room AC: 0.72</td></tr>
<tr><td>EPY7</td><td>NTG:<table><tr><th>Unit Type</th><th>Non-Retailer</th><th>Retailer</th></tr><tr><td>Refrigerator</td><td>79%</td><td>17%</td></tr><tr><td>Freezer</td><td>59%</td><td>21%</td></tr><tr><td>Room ACs</td><td>50%</td><td></td></tr></table>Source: EPY5 participant surveys, participating retailer surveys, nonparticipating retailer surveys

Participant Spillover: Negligible
Nonparticipant spillover: Negligible
No spillover primary research done in EPY5. A literature review of other research does not support meaningful spillover.
Note: ODC-Ameren accepted the ComEd values.</td></tr>
<tr><td>EPY8</td><td>Recommendation (based upon PY6 research):
NTG Fridge, Retailer: 0.29 without Vendor #1
NTG Fridge, Non-Retailer: 0.77
NTG Fridge, Weighted Average Retailer and Non Retailer: 0.53

NTG Freezer, Retailer: 0.30 NTG without Vendor #1
NTG Freezer, Non-Retailer: 0.58
NTG Freezer, Weighted Average Retailer and Non Retailer: 0.57
NTG Room ACs: 0.50
NTG Room AC, Non-Retailer: 0.50</td></tr>
</table>

	Fridge Freezer Recycling Rewards
	FR Fridge, Retailer: 0.71 **FR Fridge, Non-Retailer: 0.23** **FR Fridge, Weighted Average: 0.47** **FR Freezer, Retailer: 0.70** **FR Freezer, Non-Retailer: 0.58** **FR Freezer, Weighted Average: 0.43** Based upon PY6 Participant and Retailer Surveys. PY6 data sources include telephone surveys with participating customers, telephone surveys with nonparticipating customers, in-depth interviews with participating retailers and telephone surveys with non-participating retailers associated with unit replacements. Information regarding participant spillover was also collected, but ultimately did not support a finding of any spillover.
EPY9	NTG Fridge Overall (including PIR): 0.51 NTG Fridge, Retailer (*excluding Vendors #1&#2)*: 0.22 NTG Fridge, Non-Retailer: 0.62 NTG Fridge, Weighted Average Retailer and Non Retailer: 0.54 NTG Freezer Overall (including PIR): 0.58 NTG Freezer, Retailer (*excluding Vendors #1&#2)*: 0.25 NTG Freezer, Non-Retailer: 0.63 NTG Freezer, Weighted Average Retailer and Non Retailer: 0.60 NTG Room ACs: 0.50 NTG Room AC, Non-Retailer: 0.50 FR Fridge, Retailer: 0.78 FR Fridge, Non-Retailer: 0.38 FR Fridge, Weighted Average: 0.46 FR Freezer, Retailer: 0.75 FR Freezer, Non-Retailer: 0.37 FR Freezer, Weighted Average: 0.40 SO is negligible for this program. **NTG Research Source: PY7 Retailer and participant surveys**
CY2018	NTG Fridge Overall (including PIR): 0.51 NTG Fridge, Retailer (*excluding Vendors #1&#2)*: 0.22 NTG Fridge, Non-Retailer: 0.62 NTG Freezer Overall (including PIR): 0.58 NTG Freezer, Retailer (*excluding Vendors #1&#2)*: 0.25 NTG Freezer, Non-Retailer: 0.63 NTG Room ACs: 0.50 FR Fridge, Retailer: 0.78 FR Fridge, Non-Retailer: 0.38 FR Freezer, Retailer: 0.75 FR Freezer, Non-Retailer: 0.37 SO is negligible for this program. **NTG Research Source: PY7 Retailer and participant surveys**
CY2019	NTG Fridge: 0.50

<table>
<tr><td></td><td>Fridge Freezer Recycling Rewards</td></tr>
<tr><td></td><td>NTG Freezer: 0.48
NTG Room ACs: 0.50
FR Fridge: 0.50
FR Freezer: 0.52
FR Room ACs: 0.50

SO is negligible for this program.
NTG Research Source: PY9 Retailer and participant surveys</td></tr>
<tr><td>CY2020</td><td>Unchanged from CY2019
NTG Fridge: 0.40
NTG Freezer: 0.52
NTG Room ACs: 0.50
FR Fridge: 0.60
FR Freezer: 0.48
FR Room ACs: 0.50

SO is negligible for this program.
CY 2018 NTG Weighted average of Retailer & Non-Retailer participant surveys</td></tr>
<tr><td>CY2021</td><td>NTG Fridge: 0.38
NTG Freezer: 0.41
NTG Room ACs: 0.50

FR Fridge: 0.62
FR Freezer: 0.59
FR Room ACs: 0.50

SO: 0.00.
NTG Research Source: Weighted average of CY2019 Retailer & Non-Retailer participant surveys</td></tr>
</table>

<table>
<tr><td></td><td>Home Energy Assessments (Single Family Retrofit)</td></tr>
<tr><td>EPY1</td><td>NTG 0.80
Free-Ridership 0.20
Spillover NA
Method: ComEd Program Assumption. The EPY1 evaluation did not estimate the net to gross ratio. The value of 80% is drawn from the program plan presented in ComEd’s 2008-2010 Energy Efficiency and Demand Response Plan (November 15, 2007). Page D-2 of the ComEd plan provides a footnote stating the net to gross ratio of 80% is drawn from the California Energy Efficiency Policy Manual, version 2 (2003).</td></tr>
<tr><td>EPY2</td><td>NTG 0.87
Free-Ridership 26%
Spillover 3.5%
Method: Customer self-reports. 130 surveys completed from a population of 760.
<table>
<tr><th>Measure</th><th>NTG Ratio</th><th>FR</th><th>SO</th></tr>
<tr><td>CFL</td><td>0.72</td><td>34%</td><td>6.4%</td></tr>
<tr><td>Kitchen Aerators</td><td>0.97</td><td>3%</td><td>0.0%</td></tr>
<tr><td>Bathroom Aerators</td><td>0.97</td><td>3%</td><td>0.0%</td></tr>
<tr><td>Showerheads</td><td>0.93</td><td>8%</td><td>0.5%</td></tr>
<tr><td>Pipe Insulation</td><td>1.02</td><td>7%</td><td>9.0%</td></tr>
<tr><td>Total Direct Install</td><td>0.87</td><td>26%</td><td>3.5%</td></tr>
</table></td></tr>
<tr><td>EPY3</td><td>NTG 0.74
Free-Ridership 27%
Spillover 4%</td></tr>
</table>

Home Energy Assessments (Single Family Retrofit)

Method: Customer self-reports. 122 full participant (direct install and weatherization measures) and direct install-only participant surveys completed from a population of 413 full participants and 962 direct install-only participants.

Measure	NTG	FR	SO
Compact Fluorescent Bulbs	0.68	34%	3%
Air Sealing	0.99	8%	7%
Attic Insulation	0.98	9%	
Floored Attic Insulation	0.98	9%	
Exterior Wall Insulation	0.96	11%	
Sloped Insulation	0.96	11%	
Knee Wall Insulation	0.96	11%	
Crawl Space Insulation	0.96	11%	
Duct Insulation	0.99	8%	
Rim Joist Insulation	0.96	11%	
Seal and Repair Ducts	0.93	-	
Overall	0.74	27%	4%

EPY4

Retroactive application of NTG* 0.83 (Preliminary)
Overall Free-Ridership* 18% (Preliminary)
Overall Spillover* 1% (Preliminary)
**A final draft of the report has not been submitted yet, thus these values may change.*

Method: Customer self-reports. 54 full-participant (direct Install and weatherization measures) surveys completed from a population of 1,081 audits and 320 full-participants.

	Measure	NTG*	Free Ridership*	Spillover*
Direct- Install Measures	9 Watt CFL	0.79	0.25	0.04
	14 Watt CFL	0.79	0.25	0.04
	19 Watt CFL	0.79	0.25	0.04
	23 Watt CFL	0.79	0.25	0.04
	9 Watt Globe CFL	0.79	0.25	0.04
	Low Flow Shower Head	0.93	0.07	0.00
	Kitchen Aerator	1.00	0.01	0.01
	Bathroom Aerator	1.00	0.01	0.01
	Hot Water Temperature Setback	0.88	0.12	0.00
	Pipe Insulation	0.89	0.18	0.07
	Programmable Thermostat	0.85	-	-
	Programmable Thermostat Education	0.85	-	-
Retrofit Measures	Attic Insulation	0.75	0.27	0.02
	Wall Insulation	0.78	0.22	0.00
	Floor Insulation (Other)	0.76	0.24	0.00
	Duct Insulation & Sealing	0.80	-	-
	Air Sealing	0.84	0.16	0.00
Overall Program		0.83	0.18	0.01

**A final draft of the report has not been submitted yet, thus these values may change.*

EPY5
EPY6

Sag Consensus:

	EPY5	EPY6
Lighting	0.89	0.79
Single Family with Gas _ Showerhead	0.94	0.75
Single Family with Gas_ Kitchen Aerator	0.94	
Single Family with Gas _ Bath Aerator	0.94	
Single Family with Gas _ Water Heater Temp Setback	0.94	

Home Energy Assessments (Single Family Retrofit)

Single Family with Gas _ Pipe Insulation	0.94	
Weatherization Measures	0.80	0.80
Attic Insulation	0.80	
Wall Insulation	0.80	
Floor Insulation (other)	0.80	
Duct Sealing	0.80	
Air Sealing	0.80	

EPY7

Direct Install NTG: 0.80
Weatherization NTG: 1.02
Source: Participant surveys in EPY4 and EPY5, Trade ally surveys in EPY5. For Weatherization free ridership, trade ally value was weighted 75% and participants 25%.

Supporting Information

	Free Ridership	Participant Spillover	NTG
Direct Install	0.23	0.03	0.80
Weatherization	0.10	0.11	1.02
Program Wide	0.20	0.05	0.85

EPY8

Recommendation (based upon PY7 NTG recommended values):
NTG CFL: 0.79 – *(used in PY6 Report based upon PY4 research)*
NTG Hot Water Measures with gas: 0.75 – *(used in PY6 Report based upon PY4 research)*
NTG Direct Install Measures: 0.80 – *(from PY7 Recommendation based upon PY5 research)*
NTG Weatherization Measures: 1.02 – *(from PY7 Recommendation based upon PY5 research)*
NTG Thermostat: 0.90 – *(secondary 2010 MA and VT research)*

FR CFL: NA
FR Hot Water: NA
FR Direct Install: 0.23
FR Weatherization: 0.10
FR Thermostat: NA MA/VT secondary research

SO CFL: na
SO Hot Water: NA
SO Direct Install: 0.03
SO Weatherization: 0.11
SO Thermostat: NA MA/VT secondary research

EPY6 research on thermostat NTG was based on secondary research. There was no EPY6 research for other measures, thus the evaluation team recommends using the EPY7 values – see detail above for EPY7.

EPY9

NTG CFL: 0.80 – *(used in PY6 Report based upon PY4 research)*
NTG Hot Water Measures with gas: 0.80 – *(used in PY6 Report based upon PY4 research)*
NTG Direct Install Measures: 0.80 – *(from PY7 Recommendation based upon PY5 research)*
NTG Weatherization Measures: 1.01 – *(from PY7 Recommendation based upon PY5 research)*
NTG Thermostat: 0.90 – *(secondary 2010 MA and VT research)*

FR CFL: NA
FR Hot Water: NA
FR Direct Install: 0.23
FR Weatherization: 0.10

	Home Energy Assessments (Single Family Retrofit)
	FR Thermostat: NA SO CFL: NA SO Hot Water: NA SO Direct Install: 0.03 SO Weatherization: 0.11 SO Thermostat: NA NTG Source: PY6 SAG consensus value (no new research)
CY2018	NTG Lighting: 0.80 – *(used in PY6 Report based upon PY4 research)* NTG Showerheads: 0.80 – *(used in PY6 Report based upon PY4 research)* NTG Faucet Aerators: 1.03 – (*TRM version 6.0 specifies that the free ridership for faucet aerators be set at zero when estimating gross savings using the TRM specified baseline average water flow rate.)* NTG Other Direct Install Measures: 0.80 – *(from PY7 Recommendation based upon PY5 research)* NTG Programmable Thermostat and Programmable Thermostat Education: 0.90 – *(secondary 2010 MA and VT research)* NTG Advanced Power Strips: 0.95 – *(based on MF Elevate and PY6 Desktop Power Management)* NTG Advanced Thermostat: NA. The savings value in the IL TRM is based on regression analysis on consumption data and thus is a net savings number. FR Lighting: NA FR Showerheads: 0.23 FR Kitchen and Bathroom Faucet Aerator: 0.00 FR Other Direct Install: 0.23 FR Thermostat: 0.23 FR Advanced Power Strips: NA SO Lighting: NA SO Showerheads: 0.03 SO Kitchen and Bathroom Faucet Aerator: 0.03 SO Other Direct Install: 0.03 SO Thermostat: 0.03 SO Advanced Power Strips: NA NTG Source: For faucet aerators: TRM version 6.0 specifies that the free ridership for faucet aerators be set at zero when estimating gross savings using the TRM specified baseline average water flow rate. For other measures: PY6 SAG consensus value (no new research)
CY2019	NTG Pipe Insulation: 0.80 – *(used in PY6 Report based upon PY4 research)* NTG Showerhead and Kitchen and Bathroom Faucet Aerator: 1.04 NTG Other Direct Install Measures: 0.81 – *(from PY7 Recommendation based upon PY5 research)* NTG Programmable Thermostat and Programmable Thermostat Education: 0.90 – *(secondary 2010 MA and VT research)* NTG Advanced Power Strips: 0.85 – *(based on PY9 participant survey for FR and PY8 participant survey for SO)* NTG Advanced Thermostat: NA. The savings value in the IL TRM is based on regression analysis on consumption data and thus is a net savings number. NTG LEDs – Copay: 0.92 NTG LEDs – Free: 0.84

	Home Energy Assessments (Single Family Retrofit)
	FR Showerhead and Kitchen and Bathroom Faucet Aerator: 0.00 FR Other Direct Install: 0.23 FR Thermostat: NA FR Advanced Power Strips: 0.19 FR LEDs – Copay: 0.12 FR LEDs – Free: 0.20 SO Showerhead and Kitchen and Bathroom Faucet Aerator: 0.04 SO Other Direct Install: 0.04 SO Thermostat: NA SO Advanced Power Strips: 0.04 SO LEDs – Copay: 0.04 SO LEDs – Free: 0.04 NTG Source: Showerhead and Kitchen and Bathroom Faucet Aerator FR: TRM version 7.0 specifies that the free ridership for faucet aerators and showerheads be set at zero when estimating gross savings using the TRM specified baseline average water flow rate.LED and APS FR: PY9 participant survey Thermostat: 2010 MA VT Evaluation Research Other Direct Install FR: PY6 SAG consensus value (no new research) SO: PY8 participant survey
CY2020	NTG Pipe Insulation: 0.80 – *(used in PY6 Report based upon PY4 research)* NTG Showerhead and Kitchen and Bathroom Faucet Aerator: 1.04 NTG Other Direct Install Measures: 0.81 – *(from PY7 Recommendation based upon PY5 research)* NTG Programmable Thermostat and Programmable Thermostat Education: 0.90 – *(secondary 2010 MA and VT research)* NTG Advanced Power Strips: 0.85 – *(based on PY9 participant survey for FR and PY8 participant survey for SO)* NTG Advanced Thermostat: NA. The savings value in the IL TRM is based on regression analysis on consumption data and thus is a net savings number. NTG LEDs – Copay: 0.92 NTG LEDs – Free: 0.84 FR Showerhead and Kitchen and Bathroom Faucet Aerator: 0.00 FR Other Direct Install: 0.23 FR Thermostat: NA FR Advanced Power Strips: 0.19 FR LEDs – Copay: 0.12 FR LEDs – Free: 0.20 SO Showerhead and Kitchen and Bathroom Faucet Aerator: 0.04 SO Other Direct Install: 0.04 SO Thermostat: NA SO Advanced Power Strips: 0.04 SO LEDs – Copay: 0.04 SO LEDs – Free: 0.04 NTG Source: Showerhead and Kitchen and Bathroom Faucet Aerator FR: TRM version 7.0 specifies that the free ridership for faucet aerators and showerheads be set at zero when estimating gross

	Home Energy Assessments (Single Family Retrofit)
	savings using the TRM specified baseline average water flow rate.LED and APS FR: PY9 participant survey Thermostat: 2010 MA VT Evaluation Research Other Direct Install FR: PY6 SAG consensus value (no new research) SO: PY8 participant survey
CY2021	**All but advanced Thermostat Unchanged from CY2020** NTG Pipe Insulation: 0.80 – *(used in PY6 Report based upon PY4 research)* NTG Showerhead and Kitchen and Bathroom Faucet Aerator: 1.04 NTG Other Direct Install Measures: 0.81 – *(from PY7 Recommendation based upon PY5 research)* NTG Programmable Thermostat and Programmable Thermostat Education: 0.90 – *(secondary 2010 MA and VT research)* NTG Advanced Power Strips: 0.85 – *(based on PY9 participant survey for FR and PY8 participant survey for SO)* NTG Advanced Thermostat - cooling: 0.80 NTG Advanced Thermostat - heating: 0.90 *)* NTG LEDs – Copay: 0.92 NTG LEDs – Free: 0.84 FR Showerhead and Kitchen and Bathroom Faucet Aerator: 0.00 FR Other Direct Install: 0.23 NTG Thermostat - Cooling: Policy Manual default NTG Thermostat – Heating: SAG decision. TRM savings are between net and gross therefore NTG should be between the default value (0.8) and 1.0. FR Advanced Power Strips: 0.19 FR LEDs – Copay: 0.12 FR LEDs – Free: 0.20 SO Showerhead and Kitchen and Bathroom Faucet Aerator: 0.04 SO Other Direct Install: 0.04 SO Thermostat: See FR. SO Advanced Power Strips: 0.04 SO LEDs – Copay: 0.04 SO LEDs – Free: 0.04 NTG Source: Showerhead and Kitchen and Bathroom Faucet Aerator FR: TRM version 7.0 specifies that the free ridership for faucet aerators and showerheads be set at zero when estimating gross savings using the TRM specified baseline average water flow rate. LED and APS FR: PY9 participant survey Other Direct Install FR: PY6 SAG consensus value (no new research) SO: PY8 participant survey

	Multifamily Market Rate
EPY1	**NTG** 0.80 **Free-Ridership** n/a **Spillover** n/a **Method**: ComEd planning documents. (No EMV NTG analysis).
EPY2	**Program NTG 0.88** **Measure Specific:**

<table>
<tr><td></td><td>Multifamily Market Rate</td></tr>
<tr><td></td><td>CFLs NTG 0.81
CFLs Free Ridership 27%
CFLs Spillover 18%
Water Efficient Showerheads NTG 0.93
Water Efficient Showerheads Free Ridership 9%
Water Efficient Showerheads Spillover 2%
Water Efficient Aerators NTG 0.94
Water Efficient Aerators Free Ridership 6%
Water Efficient Aerators Spillover 0%
Method: Participant Self-Report. CATI telephone survey with 75 participating tenants (90/9).</td></tr>
<tr><td>EPY3</td><td>Program NTG 0.90
Measure Specific:
CFLs NTG 0.81
CFLs Free Ridership 20%
CFLs Spillover 1%
Water Efficient Showerheads NTG 0.93
Water Efficient Showerheads Free Ridership 7%
Water Efficient Showerheads Spillover 0%
Water Efficient Aerators NTG 0.94
Water Efficient Aerators Free Ridership 6%
Water Efficient Aerators Spillover 0%
Method: Participant self-report. CATI telephone survey with 140 participating tenants (90/10).</td></tr>
<tr><td>EPY4</td><td>Deemed using EPY2 values:
Program NTG 0.83
Measure Specific:
CFLs NTG 0.81
Water Efficiency Measures (Aerators + Showerheads) NTG 0.93
Verification Method: Applied EPY2 evaluation findings according to NTG Framework.
EPY4 Research Findings:
Program NTG 0.97
CFLs NTG 0.98
Water Efficiency Measures (Aerators + Showerheads) NTG 0.92
Water Efficient Showerheads NTG 0.91
Water Efficient Aerators NTG 0.93
Research Method: Participant self-report. CATI telephone survey with participating decision-makers (37 property managers)</td></tr>
<tr><td>EPY5</td><td>SAG Consensus:<table><tr><td>Multi-Family – Lighting</td><td>0.81</td></tr><tr><td>Multi-Family – Water Measures</td><td>0.93</td></tr></table></td></tr>
<tr><td>EPY6</td><td>SAG Consensus:<table><tr><td>Multi-Family – CFLs</td><td>0.98</td></tr><tr><td>Multi-Family – Showerhead</td><td>0.92</td></tr><tr><td>Multi-Family – Common Areas</td><td>0.80</td></tr></table></td></tr>
<tr><td>EPY7</td><td>Evaluation used EPY4 research findings:
Program NTG 0.98
CFLs NTG 0.98
Water Efficient – Showerheads NTG 0.92
Water Efficient – Bath Aerators NTG 0.94
Water Efficient – Kitchen Aerators NTG 1.00
Other measures: 0.95 (programmable thermostats and water temperature turndown)</td></tr>
</table>

	Multifamily Market Rate
	Participant spillover: Comprehensive spillover is in the estimated NTG. Other measures: No participant spillover is likely for any measures given the program approach and program theory. **Nonparticipant spillover:** No nonparticipant spillover is likely for any measures given the program approach and program theory. **Research Method**: Participant self-report. CATI telephone survey with participating decision-makers (37 property managers). For EPY7 comprehensive projects, Navigant recommends a NTGR of 0.95. These are new measures, and Navigant's research indicates that the target market for this program is unlikely to install these measures without the existence of the program, similar to PY4 ComEd Small Business Energy Savings program evaluation research findings. For EPY7 CFL direct install Free-Ridership, Navigant recommends the PY4 evaluation research finding NTGR of 0.98, based on survey self-report data from participating property managers. Navigant recommends the PY4 values for each of the water efficient measures (showerheads, bath aerators and kitchen aerators).
EPY8	**Recommendation (based upon PY7 NTG recommended values):** **NTG Direct Install CFLs and LED Lighting: 0.98** **NTG Hot Water Measures (showerhead, bath aerators, kitchen aerator): 0.92, 0.94 and 1.00** **NTG Unit Measures: 0.95** **NTG Common Areas Measures: 0.95** **NTG Thermostat: 0.90** EPY6 research on thermostat NTG was based on secondary research. There was no EPY6 research for other measures, thus the evaluation team recommends using the EPY7 values – see detail above for EPY7.
EPY9	NTG Direct Install CFLs: 0.98 NTG Hot Water Measures (showerhead, bath aerators, kitchen aerator): 0.92, 0.94 and 1.00 NTG Unit Measures: 0.95 NTG Common Areas Measures: 0.95 NTG Thermostat: 0.90 FR DI CFL: 0.02 FR Hot Water Measures: 0.08, 0.06 & 0.0, showerhead, bath & kitchen aerators, respectively FR Unit: 0.05 FR Common Areas: 0.05 FR Thermostats (based upon evaluation secondary research) SO Was not found in this program. NTG Source: PY7 SAG consensus values (no new research)
CY2018	NTG Direct Install CFLs: 0.98 NTG Hot Water Measures (showerhead, bath aerators, kitchen aerator): 0.92, 1.00 and 1.00 NTG Unit Measures: 0.95 NTG Common Areas Measures: 0.95 NTG Thermostat: 0.90 FR DI CFL: 0.02 FR Hot Water Measures: 0.08, 0.00 & 0.0, showerhead, bath & kitchen aerators, respectively FR Unit: 0.05 FR Common Areas: 0.05 FR Thermostats (based upon evaluation secondary research)

	Multifamily Market Rate
	SO Was not found in this program. NTG Source: For faucet aerators: TRM version 6.0 specifies that the free ridership for faucet aerators be set at zero when estimating gross savings using the TRM specified baseline average water flow rate. For all other measures: PY7 SAG consensus values (no new research)
CY2019	NTG Direct Install CFLs: Not active CY2019 NTG Direct Install LED: 0.84 NTG Hot Water Measures (showerhead, bath aerators, kitchen aerator): 1.00 NTG Programmable and Reprogram Thermostat: 0.90 NTG Other Unit Measures: 0.95 NTG Common Areas: 0.95 FR Hot Water Measures: 0.0 FR Unit: 0.05 FR Common Areas: 0.05 FR Thermostats (based upon evaluation secondary research) SO was not found in this program. NTG Source: For DI LED: HEA PY9 participating customer survey For faucet aerators and showerheads: TRM version 7.0 specifies that the free ridership for faucet aerators and showerheads be set at zero when estimating gross savings using the TRM specified baseline average water flow rate. For all other: PY7 SAG consensus values (no new research)
CY2020	NTG Direct Install CFLs: Not active CY2019 NTG LED Linear (Common Area): 0.96 NTG LED Omnidirectional: 0.67 NTG LED Specialty: 0.82 NTG Controls (In Unit): 0.83 NTG Fluorescent Delamping (Common Area):0.83 NTG Hot Water Measures (showerhead, bath aerators, kitchen aerator): 1.03 NTG Programmable Thermostat (Direct Install): 0.86 NTG Programmable Thermostat (Comprehensive): 0.85 NTG Reprogram Thermostat: 0.86 NTG Advanced Power Strip (Tier 1): 0.94 NTG Advanced Power Strip (Tier 2): 0.83 NTG DWH Pipe Insulation: 0.83 NTG Other Measures, Direct Installed in Units: 0.83 NTG Common Areas: 0.83 FR LED Linear (Common Area): 0.07 FR LED Omnidirectional: 0.36 FR LED Specialty: 0.21 FR Controls (In Unit): 0.20 FR Fluorescent Delamping (Common Area):0.20 FR Hot Water Measures (showerhead, bath aerators, kitchen aerator): 0 FR Programmable Thermostat (Direct Install): 0.17 FR Programmable Thermostat (Comprehensive): 0.18 FR Reprogram Thermostat: 0.17 FR Advanced Power Strip (Tier 1): 0.09 FR Advanced Power Strip (Tier 2): 0.20 FR DWH Pipe Insulation: 0.20

	Multifamily Market Rate
	FR Other Measures, Direct Installed in Units: 0.20 FR Common Areas: 0.20 SO All Measures: 0.03 NTG Source: For LED FR: PY9 and CY2018 participating customer surveys For faucet aerators and showerheads FR: TRM version 7.0 specifies that the free ridership for faucet aerators and showerheads be set at zero when estimating gross savings using the TRM specified baseline average water flow rate. For Programmable Thermostat FR: PY9 and CY2018 participating customer surveys For all other: Savings weighted average of measures studied in PY9 and CY2018 participating customer surveys For All Measures SO: PY9 and CY2018 participating customer surveys
CY2021	**Unchanged from CY2020** NTG Direct Install CFLs: Not active CY2019 NTG LED Linear (Common Area): 0.96 NTG LED Omnidirectional: 0.67 NTG LED Specialty: 0.82 NTG Controls (In Unit): 0.83 NTG Fluorescent Delamping (Common Area):0.83 NTG Hot Water Measures (showerhead, bath aerators, kitchen aerator): 1.03 NTG Programmable Thermostat (Direct Install): 0.86 NTG Programmable Thermostat (Comprehensive): 0.85 NTG Reprogram Thermostat: 0.86 NTG Advanced Power Strip (Tier 1): 0.94 NTG Advanced Power Strip (Tier 2): 0.83 NTG DWH Pipe Insulation: 0.83 NTG Other Measures, Direct Installed in Units: 0.83 NTG Common Areas: 0.83 FR LED Linear (Common Area): 0.07 FR LED Omnidirectional: 0.36 FR LED Specialty: 0.21 FR Controls (In Unit): 0.20 FR Fluorescent Delamping (Common Area):0.20 FR Hot Water Measures (showerhead, bath aerators, kitchen aerator): 0 FR Programmable Thermostat (Direct Install): 0.17 FR Programmable Thermostat (Comprehensive): 0.18 FR Reprogram Thermostat: 0.17 FR Advanced Power Strip (Tier 1): 0.09 FR Advanced Power Strip (Tier 2): 0.20 FR DWH Pipe Insulation: 0.20 FR Other Measures, Direct Installed in Units: 0.20 FR Common Areas: 0.20 SO All Measures: 0.03 NTG Source: For LED FR: PY9 and CY2018 participating customer surveys

	Multifamily Market Rate
	For faucet aerators and showerheads FR: TRM version 7.0 specifies that the free ridership for faucet aerators and showerheads be set at zero when estimating gross savings using the TRM specified baseline average water flow rate. For Programmable Thermostat FR: PY9 and CY2018 participating customer surveys For all other: Savings weighted average of measures studied in PY9 and CY2018 participating customer surveys For All Measures SO: PY9 and CY2018 participating customer surveys

	NTC Middle School Take Home Kits
PY8	CFL NTG: 0.83 Based upon EEE Showerheads: 1.05 Aerators: 1.04 Power Strips: 0.95 Hot Water Temp Gauge: 0.93 Flow Rate Test Bags: 0.93 Based upon EEE
PY9	NTG = 1.0 for all measures CFL Showerheads Aerators Power Strips Hot Water Temp Gauge Cards Flow Rate Test Bags Based on SAG consensus for EEE
CY2019	LEDs NTG = 0.84 For all other measures, NTG = 1.0: Showerheads Aerators Power Strips Flow Rate Test Bags For LEDs, NTG based on HEA PY9 participating customer surveys For all other measures, NTG based on SAG consensus for EEE
CY2020	LEDs NTG = 0.84 For all other measures, NTG = 1.0: Showerheads Aerators Power Strips Flow Rate Test Bags For LEDs, NTG based on HEA PY9 participating customer surveys For all other measures, NTG based on SAG consensus for EEE
CY2021	**Unchanged from CY2020** LEDs NTG = 0.84 For all other measures, NTG = 1.0: Showerheads Aerators Power Strips Flow Rate Test Bags For LEDs, NTG based on HEA PY9 participating customer surveys For all other measures, NTG based on SAG consensus for EEE

	Residential HVAC **Formerly known as** **Heating, Cooling and Weatherization Rebates** **and Heating and Cooling Rebates**
CY2018	**Heating and Cooling** NTG Central AC: 0.69 Free-Ridership Central AC: 0.43 TA Spillover (Participant) Central AC: 0.12 NTG Source for Central AC: Free-Ridership: PY8 participant self-report survey TA Spillover (Participant): PY7 SAG consensus value for CSR PY7 SAG consensus value for non-participant spillover for CSR is not applicable here because those savings are likely now captured by the new stand-alone CAC program. Navigant interviewed participating trade allies as part of the CSR evaluation and found the non-participant spillover was from ComEd customers who needed and got a new high efficiency CAC but did not need or get a new furnace, thus they did not do a “complete system replacement” and were not eligible for the incentive. The trade allies reported a substantial share of sales in high efficiency CAC that did not get an incentive because the customer did not do a CSR. We counted that as spillover. Now, however, with the Heating, Cooling, and Weatherization Program, ComEd customers can get an incentive when they replace just the CAC, and thus the NPSO we found for the old CSR program is probably being captured by the new program. NTG Advanced Thermostat: NA The savings value in the IL TRM is based on regression analysis on consumption data and thus is a net savings number. NTG Air Source Heat Pump: 0.57, based upon 2013 Navigant research for Duke. NTG Ductless Mini-Split: 0.68, based upon average for 5 utilities cited in 2016 study for Wisconsin Focus on Energy. NTG ECM Furnace Motor – with Furnace Upgrade: 0.68, based upon GPY5 Navigant research for Nicor Gas NTG ECM Furnace Motor – without Furnace Upgrade: 0.80, default value NTG Geothermal Heat Pump: 0.59, based upon 2013 Ameren IL Study, Res Home Rebate Program NTG Heat Pump Water Heater: 0.76, based upon 2013 Navigant research for Duke **"2013 EM&V Report for the Home Energy Improvement Program" Duke Energy, July 2015. http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=b94770a2-2d4a-427d-9c50-b09fd11096ed** **"Ductless Mini-Split Heat Pump Market Assessment and Savings Review Report" for Wisconsin Focus on Energy, December 30, 2016. https://focusonenergy.com/sites/default/files/research/Focus%20EERD%20DMSHP%20Final%20Report_30Dec2016.pdf**

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	Weatherization NTG: 1.01 Free-Ridership: 0.10 Participant Spillover: 0.11 NTG Source: Free-Ridership: PY7 SAG consensus value for the Home Energy Assessments program, which was based on participant surveys in EPY4 and EPY5 and trade ally surveys in EPY5.
CY2019	**Heating and Cooling** NTG Central AC: 0.65 Free-Ridership Central AC: 0.43 Participant Spillover Central AC: 0.08 NTG Source for Central AC: Free-Ridership: PY8 participant self-report survey Spillover: PY8 participant self-report survey NTG Advanced Thermostat: NA The savings value in the IL TRM is based on regression analysis on consumption data and thus is a net savings number. NTG Air Source Heat Pump: 0.57, based upon SAG consensus value. NTG Ductless Mini-Split: 0.68, based upon SAG consensus value. NTG ECM Furnace Motor – with Furnace Upgrade: 0.68, based upon SAG consensus value. NTG ECM Furnace Motor – without Furnace Upgrade: 0.80, based upon SAG consensus value. NTG Geothermal Heat Pump: 0.59, based upon SAG consensus value. NTG Heat Pump Water Heater: 0.76, based upon SAG consensus value. **"2013 EM&V Report for the Home Energy Improvement Program" for Duke Energy, July 2015. http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=b94770a2-2d4a-427d-9c50-b09fd11096ed** **"Ductless Mini-Split Heat Pump Market Assessment and Savings Review Report" for Wisconsin Focus on Energy, December 30, 2016. https://focusonenergy.com/sites/default/files/research/Focus%20EERD%20DMSHP%20Final%20Report_30Dec2016.pdf** **Weatherization** NTG: 1.01 Free-Ridership: 0.10 Participant Spillover: 0.11 Attic insulation and Air Sealing Only NTG: N/A NTG Source: Free-Ridership: PY7 SAG consensus value for the Home Energy Assessments program, which was based on participant surveys in EPY4 and EPY5 and trade ally surveys in EPY5. Spillover: SAG consensus value
CY2020	**Heating and Cooling** NTG Central AC: 0.83 NTG Ductless Mini-Split: 0.63 NTG ECM Furnace Motor: 0.78

	Residential HVAC **Formerly known as** **Heating, Cooling and Weatherization Rebates** **and Heating and Cooling Rebates**
	FR Central AC: 0.25 FR Ductless Mini-Split: 0.45 FR ECM Furnace Motor: 0.30 SO Participant Central AC: 0.08 SO Ductless Mini-Split: 0.08 SO ECM Furnace Motor: 0.08 NTG Source for Central AC, Ductless Mini Split, and Furnace Motor Free-Ridership: CY2018 participating customers survey Spillover: CY2018 participating customers survey NTG Advanced Thermostat: NA The savings value in the IL TRM is based on regression analysis on consumption data and thus is a net savings number. NTG Air Source Heat Pump: 0.57, based upon SAG consensus value. NTG Geothermal Heat Pump: 0.59, based upon SAG consensus value. **Weatherization** NTG Attic Insulation + Air Sealing Only: NA NTG Air Sealing (without Attic Insulation): 0.78 NTG Duct Sealing: 0.88 FR Attic Insulation + Air Sealing Only: NA FR Air Sealing (without Attic Insulation): 0.24 FR Duct Sealing: 0.14 SO Attic Insulation + Air Sealing Only: NA SO Air Sealing (without Attic Insulation): 0.02 SO Duct Sealing: 0.02 NTG Source for Attic Insulation and Duct Sealing: PY9 and CY2018 participating customer surveys NTG Wall Insulation: 0.80 FR Wall Insulation: 0.22 SO Wall Insulation: 0.02 NTG Source for Wall Insulation: Savings-weighted average of PY9 and CY2018 participating customer survey
CY2021	**NTG Midstream HVAC: 0.80** **NTG CAC Tune-Up: 0.80** **NTG ASHP Tune-Up: 0.80** NTG Source: IL TRM v8.0; Guidehouse secondary research which concluded that the TRM default was appropriate. NTG Advanced Thermostat - cooling: 0.80 NTG Advanced Thermostat - heating: 0.90 NTG Air Sealing (with attic insulation): 0.88 NTG Attic Insulation (with air sealing): 0.89

	Residential HVAC **Formerly known as** **Heating, Cooling and Weatherization Rebates** **and Heating and Cooling Rebates**
	Unchanged from CY2020 **Heating and Cooling** NTG Central AC: 0.83 NTG Ductless Mini-Split: 0.63 NTG ECM Furnace Motor: 0.78 FR Central AC: 0.25 FR Ductless Mini-Split: 0.45 FR ECM Furnace Motor: 0.30 SO Participant Central AC: 0.08 SO Ductless Mini-Split: 0.08 SO ECM Furnace Motor: 0.08 NTG Source for Central AC, Ductless Mini Split, and Furnace Motor Free-Ridership: CY2018 participating customers survey Spillover: CY2018 participating customers survey NTG Thermostat - Cooling: Policy Manual default NTG Thermostat – Heating: SAG decision. TRM savings are between net and gross therefore NTG should be between the default value (0.8) and 1.0. NTG Air Source Heat Pump: 0.57, based upon SAG consensus value. NTG Geothermal Heat Pump: 0.59, based upon SAG consensus value. **Weatherization** NTG Air Sealing (without Attic Insulation): 0.78 NTG Duct Sealing: 0.88 FR Air Sealing (without Attic Insulation): 0.24 FR Duct Sealing: 0.14 SO Air Sealing (without Attic Insulation): 0.02 SO Duct Sealing: 0.02 NTG Source for Attic Insulation and Duct Sealing: PY9 and CY2018 participating customer surveys NTG Source for Air Sealing and Attic Insulation: PY2018 participating customer surveys NTG Wall Insulation: 0.80 FR Wall Insulation: 0.22 SO Wall Insulation: 0.02 NTG Source for Wall Insulation: Savings-weighted average of PY9 and CY2018 participating customer survey

	Residential Lighting – Smart Lighting Discounts
EPY1	**NTG** 0.69 **Free-Ridership** 38% **Spillover** 7% **Method**: Customer self-report. Based on phone surveys with 100 coupon participants and 56 identified participants identified in a general population survey.
EPY2	**NTG** 0.58 **Free-Ridership** 48% **Spillover** 6% **Method**: Average of two customer self-report methods (based on general population survey [201 completes] and in-store intercept surveys [381 completes]). A supplier self-report method (22 surveys) and a revealed preference demand model method were also employed and resulted in lower NTGR estimates but were believed to be less accurate methods.
EPY3	**NTG** 0.71 **Free-Ridership** 31% **Spillover** 2% **Method**: A customer self-report method based on in-store intercept surveys [496 completes]. A supplier self-report method (13 surveys) and a multi-state regression model was also employed and resulted in lower NTGR estimates but were believed to be less accurate methods.
EPY4	**Deemed using PY2 values** **EPY4 Research NTG** 0.54 Total, 0.55 Standard, 0.44 Specialty, 0.54 Other – Fixture/LEDs **Free-Ridership** 47% Standard, 58% Specialty, 48% Other – Fixture/LEDs **Spillover** 2% **Method**: Customer self-report method based on in-store intercept surveys (719 intercept surveys).
PY5	SAG Consensus: • Standard CFL: 0.72 • Specialty CFL: 0.80 • CFL Fixtures: 0.79
EPY6	SAG Consensus: • Standard CFL: 0.54 • Specialty CFL: 0.80 • CFL Fixtures: 0.54
EPY7	**NTG (*based upon 3 year weighted average*):** **Standard CFL: 0.60** **Specialty CFL: 0.55** **CFL Fixtures: 0.75** **LED Bulbs: 0.48** **LED Fixtures: 0.54** **Coupon: 0.55** **Source:** EPY5 in-store intercept surveys. 3 year average NTG for Standard and Specialty CFLs. EM&V estimate for CFL Fixtures, LED Bulbs, and LED Fixtures. Rationale: They are higher priced and less common products so the barrier to adoption is higher, meaning the incentive has relatively more impact on the purchase decision than for the more common standard and specialty CFLs. **Participant Spillover:** 0.01 all bulb types. Source: EPY5 in-store intercept surveys. **Nonparticipant Spillover:** 0.003 all bulb types. Source: EPY5 in-store intercept surveys. 477 nonparticipants interviewed.

Residential Lighting – Smart Lighting Discounts

Table E-1. 3-Year Average Standard and Specialty NTGR for ComEd

Program Year	Standard CFLs		Specialty CFLs	
	Bulbs	NTGR	Bulbs	NTGR
EPY3	9,893,196	71%	1,217,723	71%
EPY4	11,419,752	55%	1,097,670	44%
EPY5	9,633,227	55%	1,197,896	48%
3-year Weighted Average for EPY7	-	60%	-	55%

Source: Navigant team analysis.

Table 11 – PY5 FR, Spillover and NTGR Estimates Compared to Prior Program Years (From NTG Memo)

Net Impact Parameters	Population	PY5	PY4	PY3	PY2
Free-Ridership	Standard CFLs	0.47	0.47	--	--
	Specialty CFLs	0.53	0.58	--	--
	All Program Bulbs	0.48	0.48	0.31	0.46
Spillover	Standard CFLs	0.02	0.02		
	Specialty CFLs	0.02	0.02		
	All Program Bulbs	0.02	0.02	0.02	0.05
NTGR	Standard CFLs	0.54	0.55		
	Specialty CFLs	0.48	0.44		
	All Program Bulbs	0.54	0.54	0.71	0.60

EPY8

Recommendation (based upon PY6 research):
NTG Standard CFL: 0.59
NTG Specialty CFL: 0.54
NTG CFL Fixtures: 0.56
NTG LED Bulbs: 0.73
NTG LED Fixtures: 0.73
NTG Coupon: As above

PY6 NTG Research:
NTG Standard CFL: 0.59
Free Ridership Standard CFL: 0.41
Spillover Standard CFL: 0.01

PY6 NTG Specialty CFL: 0.54
Free Ridership Specialty CFL: 0.47
Spillover Specialty CFL: 0.01

PY6 NTG CFL Fixtures: 0.54 (no research in PY6
CFL Fixtures FR: none
CFL Fixtures SO: none

PY6 NTG LED Bulbs: 0.73
FR LED Bulbs: 0.44
SO LED Bulbs: 0.17

	Residential Lighting – Smart Lighting Discounts
	PY6 NTG LED Fixtures: 0.73 FR LED Fixtures: 0.44 SO LED Fixtures: 0.17
EPY9	**NTG Standard CFL: 0.57** **NTG Specialty CFL: 0.43 (from previous research)** **NTG CFL Fixtures: 0.56 (from previous research)** **NTG LED Bulbs – Omnidirectional: 0.58** **NTG LED Bulbs – Directional: 0.60** **NTG LED Fixtures: 0.73 (from previous research)** **NTG Coupon: As above (from previous research)** **PY8 NTG Research:** NTG Standard CFL: 0.57 Free Ridership Standard CFL: 0.45 Participant Spillover Standard CFL: 0.005 Nonparticipant Spillover Standard CFL: 0.008 PY6 NTG Specialty CFL: 0.43 Free Ridership Specialty CFL: 0.59 Spillover Specialty CFL: 0.02 PY6 NTG CFL Fixtures: 0.56* (no research in PY7, PY8 SAG Consensus Value) CFL Fixtures FR: none CFL Fixtures SO: none PY8 NTG LED Bulbs – Omni-Directional: 0.58 FR LED Bulbs – Omni-Directional: 0.49 Participant spillover LED Bulbs – Omni-Directional: 0.009 Nonparticipant spillover LED Bulbs – Omni-Directional: 0.065 PY8 NTG LED Bulbs – Directional: 0.60 FR LED Bulbs – Directional: 0.42 Participant spillover LED Bulbs – Directional: 0.009 Nonparticipant spillover LED Bulbs – Directional: 0.014 PY6 NTG LED Fixtures: 0.73 FR LED Fixtures: 0.44 SO LED Fixtures: 0.17 **NTG Research Source:** PY8 In-store intercept survey, results weighted on projected sales. *Note: The CFL fixtures NTG ratio is from the PY8 SAG consensus value and is consistent with Standard & Specialty CFLs, "fixtures" is discontinued in PY7

	Residential Lighting – Smart Lighting Discounts
CY2018	**NTG Standard CFL: 0.54** **NTG Specialty CFL: 0.43** **NTG CFL Fixtures: 0.56** **NTG LED Bulbs – Omnidirectional: 0.58** **NTG LED Bulbs – Directional: 0.58** **NTG LED Fixtures: 0.73** **NTG Coupon: As above** **PY8 NTG Research:** NTG Standard CFL: 0.54 Free Ridership Standard CFL: 0.47 Participant Spillover Standard CFL: 0.004 Nonparticipant Spillover Standard CFL: 0.010 PY6 NTG Specialty CFL: 0.43 Free Ridership Specialty CFL: 0.59 Spillover Specialty CFL: 0.02 PY6 NTG CFL Fixtures: 0.56* (no research in PY7, PY8 SAG Consensus Value) CFL Fixtures FR: none CFL Fixtures SO: none PY8 NTG LED Bulbs – Omni-Directional: 0.58 FR LED Bulbs – Omni-Directional: 0.49 Participant spillover LED Bulbs – Omni-Directional: 0.009 Nonparticipant spillover LED Bulbs – Omni-Directional: 0.058 PY8 NTG LED Bulbs – Directional: 0.58 FR LED Bulbs – Directional: 0.45 Participant spillover LED Bulbs – Directional: 0.009 Nonparticipant spillover LED Bulbs – Directional: 0.026 PY6 NTG LED Fixtures: 0.73 FR LED Fixtures: 0.44 SO LED Fixtures: 0.17 **NTG Research Source:** PY8 In-store intercept survey, results weighted on verified savings.
CY2019	**NTG Standard CFL: Not active CY2019** **NTG Specialty CFL: Not active CY2019** **NTG CFL Fixtures: Not active CY2019** **NTG LED Fixtures: Not active CY2019** **NTG Coupon: Not active CY2019** **NTG LED Bulbs – Omnidirectional: 0.67** **NTG LED Bulbs – Directional: 0.61** **NTG LED Bulbs – Specialty: 0.53*** **PY9 NTG Research:** PY9 NTG LED Bulbs – Omni-Directional: 0.67 FR LED Bulbs – Omni-Directional: 0.41 Participant spillover LED Bulbs – Omni-Directional: 0.02 Nonparticipant spillover LED Bulbs – Omni-Directional: 0.06 PY9 NTG LED Bulbs – Directional: 0.61

	Residential Lighting – Smart Lighting Discounts
	FR LED Bulbs – Directional: 0.47 Participant spillover LED Bulbs – Directional: 0.02 Nonparticipant spillover LED Bulbs – Directional: 0.06 PY9 NTG LED Bulbs – Specialty: 0.53 FR LED Bulbs – Specialty: 0.55 Participant spillover LED Bulbs – Specialty: 0.02 Nonparticipant spillover LED Bulbs – Specialty: 0.06 **NTG Research Source:** PY9 In-store intercept survey, results weighted on verified savings. * = subject to revision as per TRM v7 and EISA.
CY2020	**NTG Standard CFL: Not active CY2019** **NTG Specialty CFL: Not active CY2019** **NTG CFL Fixtures: Not active CY2019** **NTG LED Fixtures: Not active CY2019** **NTG Coupon: Not active CY2019** **NTG LED Bulbs – Omnidirectional: 0.52** **NTG LED Bulbs – Directional: 0.52** **NTG LED Bulbs – Specialty: 0.59** **CY2018 Research:** CY2018 NTG LED Bulbs – Omni-Directional: 0.52 FR LED Bulbs – Omni-Directional: 0.55 Participant spillover LED Bulbs – Omni-Directional: 0.02 Nonparticipant spillover LED Bulbs – Omni-Directional: 0.05 CY2018 NTG LED Bulbs – Directional: 0.52 FR LED Bulbs – Directional: 0.55 Participant spillover LED Bulbs – Directional: 0.02 Nonparticipant spillover LED Bulbs – Directional: 0.05 CY2018 NTG LED Bulbs – Specialty: 0.59 FR LED Bulbs – Specialty: 0.48 Participant spillover LED Bulbs – Specialty: 0.02 Nonparticipant spillover LED Bulbs – Specialty: 0.05 **NTG Research Source:** CY2018 in-store intercepts. Note that the evaluation team developed a single estimate for participant spillover and a single estimate for non-participant spillover across all LED types.
CY2021	**Unchanged from CY2020** **NTG LED Bulbs – Omnidirectional: 0.52** **NTG LED Bulbs – Directional: 0.52** **NTG LED Bulbs – Specialty: 0.59** **CY2018 Research:** CY2018 NTG LED Bulbs – Omni-Directional: 0.52 FR LED Bulbs – Omni-Directional: 0.55 Participant spillover LED Bulbs – Omni-Directional: 0.02 Nonparticipant spillover LED Bulbs – Omni-Directional: 0.05

	Residential Lighting – Smart Lighting Discounts
	CY2018 NTG LED Bulbs – Directional: 0.52 FR LED Bulbs – Directional: 0.55 Participant spillover LED Bulbs – Directional: 0.02 Nonparticipant spillover LED Bulbs – Directional: 0.05 CY2018 NTG LED Bulbs – Specialty: 0.59 FR LED Bulbs – Specialty: 0.48 Participant spillover LED Bulbs – Specialty: 0.02 Nonparticipant spillover LED Bulbs – Specialty: 0.05 **NTG Research Source:** CY2018 in-store intercepts. Note that the evaluation team developed a single estimate for participant spillover and a single estimate for non-participant spillover across all LED types

	Residential New Construction
EPY1	No Program
EPY2	No Program
EPY3	No Program
EPY4	NTG not evaluated. Program just launched. No impact evaluation. No kWh savings
EPY5	SAG Consensus: Retrospective evaluation
EPY6	SAG Consensus • 0.80
EPY7	**NTG: 0.80** **Free-Ridership 0.20** **Participants Spillover: negligible** **Nonparticipants Spillover: negligible** Source: Planning value used in each prior year. There are no evaluation NTG has been conducted yet. The program is so young it is unlikely to be creating meaningful spillover.
EPY8	**Recommendation (Secondary research: National Grid, CPS Energy, CPUC and Market Effects):** **NTG: 1.0** Based upon secondary research including MA Res NC (NTG=1.18), National Grid RI (NTG=1.0), CPS Energy Savers (NTG=1.0), CPUC (NTG=-0.80) and market effects IEPEC paper.
EPY9	NTG: 0.65 Free-Ridership 0.39 Participant Spillover: 0.04 PY7 NTG Research Source: Research of participants, builders and raters
CY2018	NTG: 0.65 Free-Ridership 0.39 Participant Spillover: 0.04 PY7 NTG Research Source: Research of participants, builders and raters
CY2019	NTG: 0.65 Free-Ridership 0.39 Participant Spillover: 0.04

	Residential New Construction
	PY7 NTG Research Source: Research of participants, builders and raters
CY2020	**Unchanged from CY2019** NTG: 0.65 Free-Ridership 0.39 Participant Spillover: 0.04 PY7 NTG Research Source: Research of participants, builders and raters
CY2021	**Unchanged from CY2020** NTG: 0.65 Free-Ridership 0.39 Participant Spillover: 0.04 PY7 NTG Research Source: Research of participants, builders and raters

	School Kits, Elementary Education
CY2020	NTG LED Bulb: 0.84, based upon Residential Lighting HEA PY9 participating customer surveys NTG, All Other Measures: 1.00 based upon ComEd EEE CY2019
CY2021	**Unchanged from CY2020** NTG LED Bulb: 0.84, based upon Residential Lighting HEA PY9 participating customer surveys NTG, All Other Measures: 1.00 based upon ComEd EEE CY2019

Income Eligible Programs

	Products Discount
CY2020	LED Bulb, LED Bulb- Directional, LED Fixture: Big Box, DIY, and Warehouse stores: NTG= 0.62 FR= 0.45 Participant SO=0.02 Nonparticipant SO=0.05 All other stores: NTG = 1.0 Source Big Box, DIY, and Warehouse stores: CY2018 in-store intercept program at participating retailers with sufficient daily sales volume (DIY and Bix Box stores). Source all other stores: Draft Illinois Policy Manual statement on Income Eligible programs NTG=1.0 for: Advanced Power Strips Air Purifiers Room Air Conditioners Source: Draft Illinois Policy Manual statement on Income Eligible programs
CY2021	**Unchanged from CY2020** LED Bulb, LED Bulb- Directional, LED Fixture: Big Box, DIY, and Warehouse stores: NTG= 0.62 FR= 0.45 Participant SO=0.02 Nonparticipant SO=0.05 All other stores: NTG = 1.0 Source Big Box, DIY, and Warehouse stores: CY2018 in-store intercept program at participating retailers with sufficient daily sales volume (DIY and Bix Box stores). Source all other stores: Draft Illinois Policy Manual statement on Income Eligible programs NTG=1.0 for: Advanced Power Strips Air Purifiers Room Air Conditioners Source: Draft Illinois Policy Manual statement on Income Eligible programs

Regression Based EM&V Analysis

EM&V impact analysis (regression) will estimate net savings, not adjusted gross therefore EM&V does not calculate a NTG ratio that could be applied prospectively for the following programs:

- Home Energy Report (RCT regression evaluation)
- Seasonal Savings (RED regression evaluation)
- Connected Savings Wi-Fi Thermostat Optimization (Weatherbug)
- Smart Meter Connected Devices

Pilots

At the time of this writing, ComEd has several pilots in differing stages of development that may having savings in CY2021. When the evaluation team has sufficient detail on a pilot's design and implementation, the team will recommend a NTG value. The team will determine a pilot's NTG value either by conducting secondary research to produce a proxy NTG value from similar pilots or programs or by assign the default 0.8 NTG value. We will document this research and our recommendations in a memo and distribute it to ComEd and SAG for consideration.

	Building Operator Certification
CY2020	NTG: 0.8 Based Upon TRM Default
CY2021	NTG: 0.8 Based Upon TRM Default

Programs No Longer Active

BUSINESS

	Adsorbent Air Cleaner
CY2020	NTG: 1.0 Based upon innovation equipment available only via ComEd Pilot

	Advanced Power Strips for Commercial
CY2018	NTG: 0.90 Secondary research, assuming DI.

	AirCare Plus (>100kW)
CY2018	NTG: 0.90 PY7 Secondary Research
CY2019	NTG: 0.90 PY7 Secondary Research
CY2020	**Unchanged from CY2019** NTG: 0.90 PY7 Secondary Research

	Alltemp Advanced Refrigerant Pilot
CY2018	NTG: 0.89 Similar to SBES, high-end delivery system.

	Business Energy Analyzer (Agentis Behavioral Program)
EPY8	NTG: NA EM&V impact analysis (regression) will create net savings, not adjusted gross therefore EM&V does not calculate a NTG ratio that could be applied prospectively.
EPY9	NTG: NA EM&V impact analysis (regression) will create net savings, not adjusted gross therefore EM&V does not calculate a NTG ratio that could be applied prospectively.
CY2018	NTG: NA EM&V impact analysis (regression) will create net savings, not adjusted gross therefore EM&V does not calculate a NTG ratio that could be applied prospectively.
CY2019	**NTG: 0.94** **Free Ridership: 0.06** **Spillover: 0.00** **NTG Source:** Free-Ridership and Spillover: RCx PY9 Research The program is similar to RCx and the impact analysis will NOT produce net savings.
CY2020	**Unchanged from CY2019** **NTG: 0.94** **Free Ridership: 0.06** **Spillover: 0.00** **NTG Source:** Free-Ridership and Spillover: RCx PY9 Research

	Business Energy Analyzer (Agentis Behavioral Program)
	The program is similar to RCx and the impact analysis will NOT produce net savings.

	CHP
	Now part of Custom
EPY8	NTG: 0.68 Based upon PY6 Custom Program
EPY9	NTG: Project-specific NTG values to be determined by evaluation early in each project. If that is not possible, the default of 0.8 NTG will be used. Background: 0.8 is the rounded average of PY7 Custom research NTG and NYSERDA's 0.9 NTG.
CY2018	Program not active in PY10.
CY2019	Recommending the use of an ex-post value.
CY2020	Recommending the use of an ex-post value.

	Commercial Geothermal Advancement (CSA)
CY2020	NTG: 0.80 Based upon CY2020 Evaluation Plan

	Data Centers
EPY7	**Data Centers NTG: 0.48** **Free-Ridership 0.52** **Participants Spillover: Negligible** **Nonparticipants Spillover: Negligible** **See EPY7 Custom Program**
EPY8	**Recommendation (based upon PY6 research):** **Data Center NTG kWh: 0.60** **Data Center NTG kW: 0.57** **Data Center Free Ridership kWh: 0.40** **Data Center Free Ridership kW:0.43** **Data Center Spillover: Negligible** NTGR results were based on self-reported data from surveys of a census of PY6 projects. For PY6, the net program impacts were quantified solely on the estimated level of Free-Ridership. Information regarding participant spillover was also collected, but ultimately did not support a finding of any spillover – spillover was very small.
EPY9	**Data Center NTG: 0.68** **Data Center Free Ridership: 0.36** **Data Center Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY7 Participant and vendor self-report data Spillover: PY7 Participant and vendor self-report data
CY2018	**Data Center NTG kWh and kW: 0.68** **Data Center Free Ridership kWh and kW: 0.32** **Data Center Spillover: Negligible**

	Data Centers
	NTG Research Source: Free-Ridership: PY7 Participant and vendor self-report data Spillover: PY7 Participant and vendor self-report data The evaluation team performed telephone surveys in PY8, but the analysis will be performed and combined with PY9 findings.
CY2019	**Data Center Co-Locations: New Construction NTG kWh and kW: 0.20** **Data Center Co-Locations: New Construction Free Ridership kWh and kW: 0.80** **Data Center Co-Locations Spillover: Negligible** **Data Center Co-Locations: Retrofit NTG kWh and kW: 0.72** **Data Center Co-Locations: Retrofit Free Ridership kWh and kW: 0.28** **Data Center Co-Locations Spillover: Negligible** **Data Center Non-Co-Locations NTG kWh and kW: 0.71** **Data Center Non-Co-Locations Free Ridership kWh and kW: 0.29** **Data Center Non-Co-Locations Spillover: Negligible** **NTG Research Source:** Free-Ridership: PY8 and PY9 Participating customer surveys Spillover: PY8 and PY9 Participating customer surveys The evaluation team performed telephone surveys in PY8, but deferred analysis until PY9. The recommended values are based on the combined PY8/9 results.
CY2020	**Data Center Co-Locations, New Construction NTG kWh: 0.44** **Data Center Co-Locations, New Construction NTG kW: 0.34** **Data Center Co-Locations, New Construction Free Ridership kWh: 0.56** **Data Center Co-Locations, New Construction Free Ridership kW: 0.66** **Data Center Co-Locations Spillover: Negligible** **Data Center Co-Locations, Retrofit NTG kWh: 0.78** **Data Center Co-Locations, Retrofit NTG kW: 0.82** **Data Center Co-Locations, Retrofit Free Ridership kWh: 0.22** **Data Center Co-Locations, Retrofit Free Ridership kw: 0.18** **Data Center Co-Locations Spillover: Negligible** **Data Center Non-Co-Locations NTG kWh and kW: 0.67** **Data Center Non-Co-Locations Free Ridership kWh and kW: 0.33** **Data Center Non-Co-Locations Spillover: Negligible** **NTG Research Source:** Free-Ridership: CY2018 participating customers survey Spillover: CY2018 participating customers survey
CY2021	[program moved into Custom program]

	PlotWatt Quick Serve Restaurant Optimization
CY2018	NTG: NA EM&V impact analysis (regression) will create net savings, not adjusted gross therefore EM&V does not calculate a NTG ratio that could be applied prospectively.

	Q-Coefficient Thermal Mass Energy Efficiency Pilot
CY2018	NTG: 0.91 Similar to RCx.

	Q-Sync Motor Pilot
CY2018	NTG: 0.89 Similar to SBES, high-end delivery system.
CY2019	**NTG: 0.92** **Free-Ridership: 0.10** **Spillover: 0.02** **Non-Participant Spillover: 0.00** **Source Free-Ridership and Spillover:** SBES, high-end delivery system
CY2020	No longer active

	Schnucks VFD
CY2020	NTG: 0.70 No longer active

	Small Business Energy Efficiency Kits Legacy Program
CY2018	NTG: 0.90 NTG Source: Similar to Ameren SB (0.89), rounded up
CY2019	NTG: 0.89 NTG Source: Ameren SB
CY2020	**Unchanged from CY2019** NTG: 0.89 NTG Source: Ameren SB

	Smart Building Operations Pilot
CY2020	No longer active

	Small Commercial HVAC Tune-Up (AirCare Plus <=100kW)
EPY8	NTG: 0.90 Based on Multi-Family research. Research was 0.92; conservatively recommended 0.90
EPY9	NTG: 0.90 PY8 SAG Consensus
CY2018	NTG: 0.90 PY8 SAG Consensus
CY2019	NTG: 0.90 PY8 SAG Consensus
CY2020	**Unchanged from CY2019** NTG: 0.90 PY8 SAG Consensus

	Weidt Group New Construction (Third Party)
CY2018	NTG: 0.77 Based upon New Construction.
CY2019	NTG: 0.68 Based upon Non-Residential New Construction
CY2020	No longer active

RESIDENTIAL

<table>
<tr><th></th><th>Complete System Replacement (HEER)</th></tr>
<tr><td>EPY1</td><td>CSR program not offered in EPY1</td></tr>
<tr><td>EPY2</td><td>CSR program not offered in EPY1</td></tr>
<tr><td>EPY3</td><td>CSR program not offered in EPY1</td></tr>
<tr><td>EPY4</td><td>Retroactive application of NTG of 59%
Free-Ridership: 41%
Spillover: 0%
Method: Customer self-report.</td></tr>
<tr><td>EPY5</td><td>SAG consensus: Retrospective evaluation</td></tr>
<tr><td>EPY6</td><td>SAG consensus:
0.59</td></tr>
<tr><td>EPY7</td><td>NTG: 0.99

Free Ridership: Participant 0.41; Trade ally 0.25; Average = 0.33
(EPY4 participant survey and EPY5 participating trade ally surveys)
Participant Spillover: 0.12 from participating trade ally survey
Nonparticipant Spillover: 0.20 from nonparticipant trade ally survey.

Ameren HVAC. Very similar values for spillover. (0.1 and 0.22). Free-Ridership varies from 44% to 69%.

The overall program NTG was calculated by averaging the EPY4 participant and the EPY5 trade ally Free-Ridership rates, and then adding the EPY4 participant spillover, and EPY5 participating trade ally and non-participating trade ally spillover, as follows:

$$NTG_{Program} = 1 - \frac{(FR_{Part.} + FR_{TA})}{2} + SO_{Part.} + SO_{Part.TA} + SO_{Non-Part.TA}$$

Where NTGProgram = Program NTG
FRPart. = Participant Free-Ridership
FR_{TA} = Trade Ally Free-Ridership
$SO_{Part.}$ = Participant Spillover
SO_{PartTA} = Participating TA Spillover
$SO_{Non\text{-}PartTA}$ = Non-Participating TA Spillover

Finding: The NTG rate found in this evaluation is 99% combining participant free ridership (0.41), trade ally free ridership (0.25), and spillover (0.12 participating trade ally and 0.20 nonparticipating trade ally).

Participating Trade Ally Free Ridership and Spillover
<table><tr><th></th><th>Sales Weighted Free-Ridership</th><th>Sales Weighted Spillover</th><th>N</th></tr><tr><td>Highest Volume Trade Allies</td><td>0.21</td><td>0.12</td><td>13</td></tr><tr><td>Medium Volume Trade Allies</td><td>0.34</td><td>0.10</td><td>18</td></tr><tr><td>Lowest Volume Trade Allies</td><td>0.35</td><td>0.20</td><td>18</td></tr><tr><td>All Participating Trade Allies</td><td>0.25</td><td>0.12</td><td>49</td></tr></table>Source: Evaluation Team analysis.</td></tr>
</table>

	Complete System Replacement (HEER)
	Non-Participant Trade Ally Spillover Non-Part TA SO Savings (kWh): 598,288 Program Savings: 3,011,855 Non-Part TA SO Rate: 0.20
EPY8	Recommendation (based upon PY7 NTG recommended values): NTG: 0.99 Free Ridership with Gas Participant: 0.41 Free Ridership with Gas TA: 0.25 TA Spillover (Participant): 0.12 TA Spillover (Non-Participant): 0.20 There was no additional NTG research conducted for EPY6. The recommended value is the same as the PY7 recommendation.
EPY9	NTG: 0.99 Free-Ridership with Gas Participant: 0.41 Free-Ridership with Gas TA: 0.25 TA Spillover (Participant): 0.12 TA Spillover (Non-Participant): 0.20 NTG Source: PY7 SAG consensus value (no new research)
CY2018	Program replaced in PY7 with Heating, Cooling, and Weatherization Rebates

	Direct to Consumer Kits
EPY8	NTG = 0.94 based upon Ameren MO, Home Energy Kits (May 2014)
EPY9	NTG = 0.94 NTG Source: Based upon EPY8 Recommendations due to no new research in PY7.
CY2018	Program not active in PY10.

	Holiday Light Exchange
CY2020	NTG: 0.8 Based Upon TRM Default

	HVAC SAVE
CY2020	NTG: 0.8 Based Upon TRM Default

PY6 Third-Party Programs

The calculated NTG values from PY6 and evaluator recommendations are as follows:

- Willdan Sustainable Schools (ended in PY6): 0.95, FR: 0.05
- RLD C&I Thermostats (ended in PY6): 1.0
- RSG Computer (ended in PY6): 0.95, FR: 0.05
- One Change (ended in PY6): 0.60, FR: 0

IPA PROGRAMS

IPA Programs for PY8

IPA Program:	PY8 NTG	Reasoning
Home Energy Reports	NA	Regression-based impact
Small Business Energy Savings	0.95	Based upon past research on this program
Great Energy Stewards	NA	Regression-based impact
Small Comm. HVAC Tune-Up	0.90	Secondary research by Navigant last year
CUB Energy Saver	NA	Regression-based impact
Elevate All-Electric Heat Multifamily	See Below	See values below
CLEAResult Schools DI	0.95	Based upon Willdan
Matrix Demand-Based Fan Control	0.89	Ameren recommendation based upon Ameren SBDI evaluation, covers wide range of building types.
LED Street Lighting	1.00	Participants have no ability to implement without ComEd's assistance
Matrix K through 12 Private Schools	0.95	Based upon Willdan
Sodexo DCV	0.87	National Grid, RI Tech. Resource Manual 2014, p. B-7
Multi-Family Elevate DI CFL Common Areas	0.95	Evaluation research using secondary sources
Multi-Family Elevate CFL Non-Common Areas	0.98	Evaluation research using secondary sources
Multi-Family Elevate CFL Public Event	0.62	Evaluation research using secondary sources
Multi-Family Elevate Power Strip DI	0.95	Evaluation research using secondary sources
Multi-Family Elevate Programmable Thermostat	0.95	Evaluation research using secondary sources
Multi-Family Elevate Power Strip Public Event	0.86	Evaluation research using secondary sources
Multi-Family Elevate Water Measures	0.93	Evaluation research using secondary sources
Multi-Family Elev. Wall Mounted Occupancy Sensor	0.95	Evaluation research using secondary sources
Multi-Family Elevate T12	0.95	Evaluation research using secondary sources
Multi-Family Elevate Insulation	0.95	Evaluation research using secondary sources
Multi-Family Elevate Comprehensive Non-CFL	0.95	Evaluation research using secondary sources

IPA Programs for PY9

IPA Program:	PY9 NTG	Reasoning
CLEAResult Schools DI	0.95	Based upon Willdan Sustainable Schools PY6

IPA Program:	PY9 NTG	Reasoning
LED Street Lighting	1.00	Evaluation
Matrix Demand-Based Fan Control	0.89	Ameren SBDI research
Matrix K through 12 Private Schools DI	0.95	based upon Willdan Sustainable Schools PY6
Sodexo DCV – Demand Control Ventilation	0.87	National Grid – RI Tech Resource Manual 2014, page B-7
Pulse Energy <100 kW	1.00	
Root 3	0.95	Based upon PY6 RCx
Home Energy Reports	NA	Regression analysis so NTG=NA
CUB Energy Saver	NA	Regression analysis so NTG=NA
Great Energy Stewards	NA	Regression analysis so NTG=NA
Multi-Family Elevate DI CFL Common Areas	0.95	Based on Multi-Family research
Multi-Family Elevate CFL Public Event	0.62	Based on Multi-Family research
Multi-Family Elevate CFL Non-Common Areas	0.98	Based on Multi-Family research
Multi-Family Elevate Power Strip DI	0.95	Based on Multi-Family research
Multi-Family Elevate Power Strip Public Event	0.86	Based on Multi-Family research
Multi-Family Elevate Programmable Thermostat	0.95	Based on Multi-Family research
Multi-Family Elevate Water Measures	0.93	Based on Multi-Family research
Multi-Family Elevate Wall Mounted Occupancy Sensor	0.95	Based on Multi-Family research
Multi-Family Elevate T12	0.95	Based on Multi-Family research
Multi-Family Elevate Insulation	0.95	Based on Multi-Family research
Multi-Family Elevate Comprehensive Non-CFL	0.95	Based on Multi-Family research
Bidgely	NA	Regression-based impact
Meter Genius	NA	Regression-based impact
Luminaire Level Lighting Control	0.90	Similar to SBES and this is a high-end delivery system
Community Based CFL Distribution	1.0	Low Income delivery, similar to low income kits
Assisted & Sr. Living	0.95	Similar to ComEd MF Comprehensive
Rural Small Biz EE Kits	0.90	Similar to Ameren SB (0.89), rounded up
Agricultural EE Lighting	0.90	Similar to Ameren SB (0.89), rounded up
Agricultural EE Non-Lighting	0.90	Similar to Ameren SB (0.89), rounded up
Lit Signage	0.90	Similar to Ameren SB (0.89), rounded up
Efficient Products (STEP)	0.96	Expansion of DCEO program with 0.96 NTG
SEDEC – Enhanced Building Optimization	0.95	Based upon ComEd RCx PY7 NTG Research
Low-Income Kits	1.0	Low income delivery, similar to low income kits
Low-Income MF	1.0	Low income delivery, similar to low income kits

IPA Program:	PY9 NTG	Reasoning
Root 3	0.95	Similar to RCs, based upon RCx for PY9