ComEd Programs NTG Approach for EPY10

Final – March 1, 2017

Updated with Faucet Aerator Correction--March 20, 2019

Table of Contents

Business Programs

Legacy Programs

	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

	Business Standard Incentive
	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). **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**

	Business Standard Incentive
	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
EPY10	**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

	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)

	Business Custom Incentive
	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.
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
EPY10	**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:**

	Business Custom Incentive
	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.

	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
EPY10	**Data Center NTG kWh and kW: 0.68** **Data Center Free Ridership kWh and kW: 0.32** **Data Center 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)
EPY1	Program did not exist
EPY2	Program did not exist
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
EPY10	**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**

	Industrial Systems Optimization (Compressed Air in EPY4)
	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.

	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)

	Retro-Commissioning
	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)** 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
EPY10	**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.

	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**

	Business New Construction Service
	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. 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

	Business New Construction Service
	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.
EPY10	**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.

	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:

	BILD and MidStream Incentives
	• 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 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.

	BILD and MidStream Incentives
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).
EPY10	**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).

	Small Business Energy Savings
EPY1	No Program
EPY2	No Program
EPY3	No Program
EPY4	**Retroactive application of NTG** of 0.95

	Small Business Energy Savings
	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) **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**
EPY10	**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

	Small Business Energy Savings
	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**

	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.
EPY10	**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.

	Agentis Behavioral Program (Business Energy Analyzer)
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.
EPY10	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.

	CHP
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.
EPY10	Program not active in PY10.

New Program Pilots

The rationale for the NTG value is given for all programs in the spreadsheet.

	AirCare Plus (>100kW)
EPY10	NTG: 0.90 PY7 Secondary Research

	Operational Savings
EPY10	NTG: 0.91 Similar to RCx.

	Advanced Power Strips for Commercial
EPY10	NTG: 0.90 Secondary research, assuming DI.

	PlotWatt Quick Serve Restaurant Optimization
EPY10	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-Sync Motor Pilot
EPY10	NTG: 0.89 Similar to SBES, high-end delivery system.

	Alltemp Advanced Refrigerant Pilot
EPY10	NTG: 0.89 Similar to SBES, high-end delivery system.

	Q-Coefficient Thermal Mass Energy Efficiency Pilot
EPY10	NTG: 0.91 Similar to RCx.

	Multi-family Common Area
EPY10	NTG: 0.95 PY7 SAG Consensus Value.

Residential Programs

Legacy Programs

	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**

Residential Lighting – Smart Lighting Discounts

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.

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

	Residential Lighting – Smart Lighting Discounts
	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 PY6 NTG LED Fixtures: 0.73 FR LED Fixtures: 0.44 SO LED Fixtures: 0.17

	Residential Lighting – Smart Lighting Discounts
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
EPY10	**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.

<table>
<tr><td></td><td>Fridge Freezer Recycling Rewards</td></tr>
<tr><td>EPY1</td><td>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
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.</td></tr>
</table>

	Fridge Freezer Recycling Rewards
	Note: ODC-Ameren accepted the ComEd values.
EPY8	**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** **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

	Fridge Freezer Recycling Rewards
	SO is negligible for this program. **NTG Research Source: PY7 Retailer and participant surveys**
EPY10	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**

	Multi-Family Comprehensive
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:** **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).
EPY3	**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%**

<table>
<tr><td></td><td>Multi-Family Comprehensive</td></tr>
<tr><td></td><td>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)

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</td></tr>
</table>

	Multi-Family Comprehensive
	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)
EPY10	NTG Direct Install CFLs: 0.98 NTG Hot Water Measures (showerhead, bath aerators, kitchen aerator): 0.92, 1.00 and 1.00 respectively 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, 0.0 & 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:

	Multi-Family Comprehensive
	PY7 SAG consensus values (no new research) 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.

	Home Energy Assessments (Single Family Retrofit)
EPY1	**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).
EPY2	**NTG** 0.87 **Free-Ridership** 26% **Spillover** 3.5% **Method**: Customer self-reports. 130 surveys completed from a population of 760.

Measure	NTG Ratio	FR	SO
CFL	0.72	34%	6.4%
Kitchen Aerators	0.97	3%	0.0%
Bathroom Aerators	0.97	3%	0.0%
Showerheads	0.93	8%	0.5%
Pipe Insulation	1.02	7%	9.0%
Total Direct Install	0.87	26%	3.5%

EPY3

NTG 0.74
Free-Ridership 27%
Spillover 4%
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%	

Home Energy Assessments (Single Family Retrofit)

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	

Home Energy Assessments (Single Family Retrofit)

Single Family with Gas _ Water Heater Temp Setback	0.94	
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)*

	Home Energy Assessments (Single Family Retrofit)
	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 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)
EPY10	NTG Lighting: 0.80 – *(used in PY6 Report based upon PY4 research)* NTG Hot Water Measures (excluding faucet aerators): 0.80 – *(used in PY6 Report based upon PY4 research)* NTG Faucet Aerators: 1.0 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 Smart Power Strips: 0.95 – *(based on MF Elevate and PY6 Desktop Power Management)* NTG Smart 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 Hot Water (excluding faucet aerators): NA FR Faucet Aerators: 0.00 – (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.) FR Other Direct Install: 0.23 FR Thermostat: 0.23 FR Smart Power Strips: NA SO Lighting: NA SO Hot Water Measures (including faucet aerators): NA SO Other Direct Install: 0.03 SO Thermostat: 0.03 SO Smart Power Strips: NA NTG Source: PY6 SAG consensus value (no new research)

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

	Sales Weighted Free-Ridership	Sales Weighted Spillover	N
Highest Volume Trade Allies	0.21	0.12	13
Medium Volume Trade Allies	0.34	0.10	18
Lowest Volume Trade Allies	0.35	0.20	18

<table>
<tr><td></td><td>

Complete System Replacement (HEER)

<table>
<tr><td>All Participating Trade Allies</td><td>0.25</td><td>0.12</td><td>49</td></tr>
</table>

Source: Evaluation Team analysis.

Non-Participant Trade Ally Spillover

Non-Part TA SO Savings (kWh)	Program Savings	Non-Part TA SO Rate
598,288	3,011,855	0.20

</td></tr>
<tr><td>EPY8</td><td>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.</td></tr>
<tr><td>EPY9</td><td>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)</td></tr>
<tr><td>EPY10</td><td>Program replaced in PY7 with Heating, Cooling, and Weatherization Rebates</td></tr>
</table>

<table>
<tr><td></td><td>

Heating, Cooling and Weatherization Rebates

</td></tr>
<tr><td>EPY 10</td><td>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</td></tr>
</table>

	Heating, Cooling and Weatherization Rebates
	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 Smart 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** **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.

	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

	Residential New Construction
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
EPY10	NTG: 0.65 Free-Ridership 0.39 Participant Spillover: 0.04 PY7 NTG Research Source: Research of participants, builders and raters

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.

	Elementary Energy Education
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 CFL FR: 0.51 Showerheads FR: 0.29 Aerators FR: 0.20 CFL SO: 0.18 Showerheads SO: 0.11 Aerators SO: 0.12
EPY10	**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:**

	Elementary Energy Education
	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.
EPY10	**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

	Energy Star Rebate (Appliances)
	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.

	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.
EPY10	Program not active in PY10.

New Program Pilots

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 for the following programs:

- Bidgley
- Connected Savings Wi-Fi Thermostat Optimization (Weatherbug)

IPA and Third-Party Programs

Legacy Programs

Regression Based EM&V Analysis

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 for the following programs:

- Home Energy Report (IPA PY9, EEPS PY10)
- CUB Energy Saver (third party)
- Great Energy Stewards (third party)
- Monitoring-based Commissioning (PowerTakeoff)

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 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
NTC Middle School Take Home Kits – CFL	0.83	Based upon EEE
NTC Middle School Take Home Kits – Showerheads	1.05	Based upon EEE
NTC Middle School Take Home Kits – Aerators	1.04	Based upon EEE
NTC Middle School Take Home Kits – Power Strips	0.95	
NTC Middle School Take Home Kits – Hot Water Temp Gauge	0.93	
NTC Middle School Take Home Kits – Flow Rate Test Bags	0.93	
Sodexo DCV	0.87	National Grid, RI Tech. Resource Manual 2014, p. B-7
Weidt Group New Construction	0.77	Based upon Business New Construction
Small Commercial HVAC Tune-Up	0.90	Evaluation research using secondary sources
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

IPA Program:	PY8 NTG	Reasoning
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
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
Weidt Group New Construction	0.77	Based upon PY7 Res NC research
Small Commercial HVAC Tune-Up	0.90	Based on Multi-Family research
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
NTC Middle School Take Home Kits – CFL	1.00	SAG consensus based upon EEE
NTC Middle School Take Home Kits – Showerheads	1.00	SAG consensus based upon EEE
NTC Middle School Take Home Kits – Aerators	1.00	SAG consensus based upon EEE
NTC Middle School Take Home Kits – Power Strips	1.00	SAG consensus based upon EEE
NTC Middle School Kits – Hot Water Temp Gauge Cards	1.00	SAG consensus based upon EEE
NTC Middle School Kits – Flow Rate Test Bags	1.00	SAG consensus based upon EEE
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

IPA Program:	PY9 NTG	Reasoning
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
Smart Meter Connected Devices	TBD	
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
Monitoring Based Commissioning (PowerTakeoff)	NA	Based upon ComEd program detail outlining behavioral program and assumes impact analysis is based on regression analysis.
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
Root 3	0.95	Similar to RCs, based upon RCx for PY9

New Programs

Third Party Programs for PY10

The rationale for the NTG values for all programs is in the spreadsheet.