Illinois Statewide

Technical Reference Manual

for Energy Efficiency

Attachment A

Illinois Statewide

Net-to-Gross

Methodologies

Date

Effective for Evaluation:

June 1st, 2015

Table of Contents

As this is a draft outline, the evaluation team has provided text in blue to indicate the type of information that would be included in the section. Additionally, the appliance recycling programs are drafted here as a way to allow readers a better idea of specifics. The appliance recycling information is draft and most likely will undergo further revision. We expect the outline and information in this document may change slightly as the information herein is used by the evaluation team and SAG members.

I. Illinois Statewide Net-to-Gross Methodologies

A. Policy Context for this Information

The Illinois Evaluation teams (Opinion Dynamics, Cadmus Group, Navigant Consulting, Itron, and ADM Associates) are working with stakeholders to create a document on Illinois Statewide Net-to-Gross (NTG) Methodologies (IL-NTG Methods). This document will be included as part of the Illinois Statewide Technical Reference Manual for Energy Efficiency (IL-TRM). Through five different dockets, the Illinois Commerce Commission (ICC) has directed the evaluation teams to compile and formalize standard methods for use within Illinois.

Order Docket No / Date	Program Administrator	Pages	Link
13-0495 (1/28/14)	Commonwealth Edison Company	129-130	ICC Order Docket No. 13-0495
13-0498 (1/28/14)	Ameren Illinois Company	167, 171	ICC Order Docket No. 13-0498
13-0499 (1/28/14)	Illinois Department of Commerce and Economic Opportunity	20, 23, 49	ICC Order Docket No. 13-0499
13-0549 (5/20/14)	Nicor Gas Company	41-42, 78	ICC Order Docket No. 13-0549
13-0550 (5/20/14)	North Shore Gas Company and The Peoples Gas Light and Coke Company (Integrys)	54-55, 66	ICC Order Docket No. 13-0550

To provide clarity to the direction from the ICC, the relevant section on IL-NTG Methods is shown in its entirety from the Nicor Gas Order (Docket 13-0549). The Nicor Gas Order provides the most detail in terms of this directive in comparison to the language from the other Orders.

> The Commission believes that Staff's recommendations concerning Commission adoption of consistent statewide net-to-gross methodologies ("IL-NTG Methods") for use by the evaluators are reasonable and will aid in future evaluation of the energy efficiency programs. To help ensure the independence of the evaluators, to improve efficiency in the evaluation process, and to ensure programs across the state as delivered by the various program administrators can be meaningfully and consistently evaluated, the Commission hereby adopts Staff's recommendation that consistent IL-NTG Methods be established for use in the evaluations of comparable energy efficiency programs offered by different Illinois program administrators. The Commission notes that Section 8-104(k) of the Act encourages statewide coordination and consistency between the gas and electric energy efficiency programs and Staff's proposal would help ensure consistency in the evaluation of program performance. The Commission notes that this directive is not to create entirely "new" NTG methodologies for every energy efficiency program, but rather to

> assess NTG methodologies and survey instruments that have been used to evaluate energy efficiency programs offered in Illinois, and to compile the most justifiable and well-vetted methodologies (or potentially combine certain components from the existing approaches to better represent the most justifiable and well-vetted method consistent with best practices) in an attachment to the Updated IL-TRM that would get submitted to the Commission for approval. The Commission notes that the IL-NTG Methods will be flexible and adaptable to multiple program designs and budgets and tailored to appropriately assess the specifics of each of the program administrators' energy efficiency programs, consistent with standard NTG methodologies adopted in other states that were filed in this proceeding. The Commission agrees with Staff that in the interest of efficiency, the current program evaluators should take the lead in compiling and formalizing standard methodologies for NTG in Illinois taking into consideration SAG input. Because the existing Plan 1 evaluators are under contract with the Company for the evaluation of the program year three energy efficiency programs, it is appropriate for these existing evaluators to work on and complete the compilation of the IL-NTG Methods over the next year. The Commission recognizes that each year considerable time may be spent vetting NTG methodologies for each program evaluation separately for each utility under the existing evaluation plan review practices; adoption of IL-NTG Methods would save on these limited evaluation resources by having a common reference document for the evaluators to use in estimating net savings for Illinois.
>
> The Commission hereby directs the Company to require its evaluators to collaborate with the other Illinois evaluators and the SAG to use best efforts to reach consensus on the approaches used in assessing NTG in particular markets for both residential and non-residential. (Pages 41-42)

B. Programs Currently Covered in this Document

This document is a work in progress. To facilitate completion of part of the IL-NTG Methods sections prior to the March 1, 2015, the evaluation team will update the document to include methods specific for three programs: 1) Commercial, Industrial, and Commercial Public Sector Standard/Prescriptive and Custom programs, 2) Appliance Recycling program, and 3) Residential Lighting program. Future updates to this document will add all programs. Additionally, by March 2015 the evaluation team plans to include the methods section in Appendix A (a simplified and short description of methods based on other documents) and any relevant references to date in Appendix B.

C. Updating the IL-NTG Methods

This attachment will be included in the IL-TRM and therefore follow the timeline for updating of the IL-TRM as specified in the IL-TRM Policy Document.[1] In general, the updates will:

- Occur annually
- Be discussed within the SAG and updated by March 1st

[1] Policy Document for the Illinois Statewide Technical Reference Manual for Energy Efficiency. October 25, 2012. http://www.icc.illinois.gov/downloads/public/IL%20TRM%20Policy%20Document.pdf

- The ICC Staff will then submit a Staff Report (with the consensus Updated TRM attached) to the Commission with a request for expedited review and approval.

II. Attribution in Energy Efficiency Programs in General

Discuss the task of evaluators in figuring out attribution for a program and the purpose of this document. (1/2 page type of discussion)

Provide relevant definitions such as:

a. *Net-to-Gross Ratio*
b. *Freeridership*
c. *Participant Inside and Outside Spillover*
d. *Nonparticipant Spillover*
e. *Market Effects*

III. Attribution within the Commercial, Industrial, and Public Sectors

Brief introduction to the contents of this section and overview of the various C&I and Commercial Public Sector programs offered in Illinois.

The first version of the NTG TRM attachment will include discussion of freeridership assessment methodologies for Standard/Prescriptive and Custom programs.

Table 1: Overview of Commercial, Industrial, and Commercial Public Sector Programs Offered in Illinois (EPY8)

Unofficial Program Name in PY8	Ameren	ComEd	DCEO	Integrys	Nicor
Standard/Prescriptive	X	X	X	X	X
Custom	X	X	X	X	X
Upstream Commercial Lighting		X			
Small Business	X	X			
Retro-commissioning	X	X			
Data Centers		X			
New Construction		X			X
etc.					

Note that this table is not complete nor are the X's necessarily correct. It is an example only.

The following sections will discuss the different types of C&I programs offered in Illinois. Each section will have a similar structure to that outlined for Standard/Prescriptive programs.

A. Standard/Prescriptive Programs

This section will contain a list of each non-residential Standard/Prescriptive program offered in Illinois that has an "X" in Table 1 and whether or not they are subject to the consistent methods outlined in this section. In the case of partial or total inapplicability of the methods, the section will present information regarding how and why that is so. If the program is not applicable for this specific set of NTG methods, it will be included by itself in a separate section for completeness.

Table 2: Standard/Prescriptive Commercial, Industrial, and Commercial Public Sector Programs Offered in Illinois (EPY8)

Program Identifier	Official Program Name for PY8	Program Administrator	Framework Applicability

Program Identifier	Official Program Name for PY8	Program Administrator	Framework Applicability
		Ameren	
		ComEd	
		DCEO	
		Integrys	
		Nicor	

Note that this table is not complete. It is an example only.

1. Freeridership

a) Concepts and Data Sources

- *Includes discussion of concepts that underpin the selected core methodology ("core methodology," here defined as the method outlined within the TRM attachment, exclusive of any enhanced rigor methods not specifically outlined in the attachment).*
- *May include a brief literature review or meta-analysis of approaches.*
- *Includes discussion of data sources, including participant self-reporting and additional data that may be algorithmically incorporated into the FR score (e.g., Trade Ally input).*
- *Does not include required sample sizes*
- *Where applicable, may include discussion regarding when and how evaluators may adjust freeridership estimated per the core methodology under an enhanced rigor approach that incorporates data from additional sources, and which may involve administration of survey or interview questions not reflected in the core methodology.*

b) Components within each Concept

- *Will briefly describe the concepts and components within each concept as well as the purpose of each of the analytical components or scores that are averaged or otherwise algorithmically combined to estimate freeridership.*
- *Specifically outlines how the numeric value of each component is determined relative to responses to specified questions. For example, the section will state if survey question will use numeric or verbal scales and if verbal scales are used, the numeric values associated with each response.*
- *Will not include specific question batteries, but will include examples of survey questions for collecting self-report data for use in calculating the component/score value (questions may contain fields allowing for customization to account for variation between program administrators, etc.).*
- *Discusses any modifications or exceptions to these methods under an enhanced rigor approach, and how these must be documented.*

c) Algorithm

- *Presents example(s) of how to numerically calculate freeridership with the method using concepts and/or components but not specific questions (similar to gross savings estimation examples in the TRM).*
- *Discusses what may need to be weighted when calculating a freeridership for the program / end use / measure and why*

2. Spillover

a) Concept and Data Sources

- *Includes discussion of concepts that underpin spillover*
- *May include a brief literature review and presentation of values from other jurisdictions.*
- *Includes discussion of data sources and additional data that may be included to obtain a spillover estimate of savings.*
- *Does not include required sample sizes*
- *For participant self-reporting, will include examples of the types of questions that could be used to determine if spillover should be included or not for a participant*
- *Describes in general the basis for spillover estimates (i.e., deemed engineering value, detailed information gathered from respondent used in engineering estimate, etc.)*

b) Algorithm

- *Presents example(s) of how to numerically calculate spillover for a program level value with the available data (similar to gross savings estimation examples in the TRM).*

IV. Attribution within the Residential and Low Income Sectors

Brief introduction to the contents of this section and overview of the various residential and low income programs offered in Illinois.

Table 3: Overview of Residential and Low Income Programs Offered in Illinois (EPY8)

Unofficial Program Name for PY8	Ameren	ComEd	DCEO	Integrys	Nicor
Appliance Recycling	X	X	-	-	-
Low Income	X		X	X	X
etc.					

Note that this table is not complete nor are the X's necessarily correct. It is an example only.

In order to facilitate understanding of what would be included within the outline, the evaluation team has put together what we expect would be included in the residential appliance recycling program.

A. Appliance Recycling Programs

Ameren and ComEd appliance recycling programs are implemented comparably and so the evaluation team uses a consistent NTG method.

1. Freeridership

a) Concepts and Data Sources

Freeridership definition: Freeridership is estimated from determining how the recycled appliance would have been disposed of had the program not occurred (five possible scenarios).

1. The recycled unit would have been kept and used by the household.
2. The recycled unit would have been kept, but not used (i.e., would have been stored and unplugged indefinitely).
3. The recycled unit would have been discarded by a method that transfers it to another customer for continued use.
4. The recycled unit would have been discarded by a method leading to its destruction.

5. The recycled unit would have been removed by the retailer that they bought the new unit from.

Only scenarios 2 and 4 constitute freeridership. Scenario 5 constitutes the category that is assigned the retailer's net-to-gross ratio.

Approach: Participant Survey with adjustments for secondary market effects and induced replacement, with enhanced approach to test for survey response bias.

- Basic: Participant Survey – determine the likely fate of recycled appliance absent the program
- Basic: assume age criteria as a proxy for whether unit is destroyed or resold
- Enhanced: Retailer survey – determine quantity and/or proportion returned to a retailer that would be deconstructed or recycled by the retailer. Determine retailer's criteria for reselling used units vs. deconstructing them, based on unit age and condition.
- Enhanced: (Optional) Market research study – determine size of secondary appliance market and whether the removal of participating units from the market cause an otherwise would-be receiver to purchase an alternative used or new unit.
- Basic: Induced replacement – determine proportion who were motivated by the recycling program/incentive to purchase a new refrigerator
- Enhanced – (Optional) Nonparticipant survey to find out how nonparticipants acquire and dispose of used units; if big enough sample, weight these into the results; otherwise provide validation.

b) Components within each Concept

1) Participant Survey – Determine which of the following options the participant would have chosen absent the program:
   a. Kept and continued to operate the refrigerator.
   b. Kept the refrigerator but stored it unplugged indefinitely.
   c. Sold the refrigerator to a private party (either an acquaintance or through a posted advertisement).
   d. Sold or gave the refrigerator to a used-appliance dealer.
   e. Gave the refrigerator to a private party, such as a friend or neighbor.
   f. Gave the refrigerator to a charity organization, such as Goodwill Industries or a church.
   g. Had the refrigerator removed by the dealer from whom the new or replacement refrigerator was obtained.
   h. Hauled the refrigerator to a landfill or recycling center.
   i. Hired someone else to haul the refrigerator away for junking, dumping, or recycling

   Questions should include follow up questions to validate the viability of initial response

2) Retailer or market actor survey or appliance age assumption (for responses d or g) –
   - Basic: If participant response is d or g, and age, conditions, features [meets certain criteria], assume it would be recycled by that entity and is therefore a freerider.
   - Enhanced: Interview representatives from new appliance dealers and used appliance dealers— both local chains and big-box retailers— to determine (1) their disposal methods for used appliances in areas without appliance recycling programs; and (2) the viability and percentage of recycled units [and condition/age/features needed to

be recycled] being resold on the used market had they not been deconstructed through the program. Assign freeridership to d or g participants meeting these conditions.

- Secondary market effects (for response c, d, e, f, or g) – since participant unit is unavailable, what percentage of these a) purchase a different unit or not take the unit and then further, if purchasing another unit, would it be used or new
  - Basic: Assume 50% would purchase new unit and 50% would be used
  - Enhanced: Utility-specific market research information regarding the change in the total number of refrigerators (overall and used appliances specifically) that were active before and after program implementation.
- Induced Replacement: Measured through Participant Survey
  - Would you have purchased your replacement refrigerator if the recycling program/incentive had not been offered?
  - Include follow-up questions to verify validity of the answer
- Enhanced: Nonparticipant Survey
  - Similar questions to participant survey – on how did you dispose of unit
  - Used as a cross check to validate realism of critical participant survey responses used in NTGR calculation.
  - Or, if a large enough sample, NTGR is weighted average of participant and nonparticipant – weighted by inverse of variance of participant and nonparticipant freeridership ratios.

c) Algorithm

$$FR = (free\ ridership\ and\ secondary\ market\ impacts\ \% - induced\ replacement\%)$$

2. Spillover

Unlike many programs, recycling programs face reduced opportunities for spillover because of the lack of general energy education or the likelihood of having further units they recycle on their own is small. This program could directly impact a decision to replace a refrigerator or freezer with ENERGY STAR rather than standard efficiency.

V. Appendix A: Overview of NTG Methods

This section is limited in nature and not a re-write of methods. It will include a listing of attribution methods as well as a brief description of the method and references for interested parties to use if desired. We expect that this section will be relatively short and consist of the methods shown below in A through H. If there are other methods that the TAC or SAG feel should be described here, please let the evaluation teams know.

A. Randomized control trials (RCT) and quasi-experimental designs

RCT - Control vs. treatment groups

QED – non-random assignment to groups – comparison group approach, e.g. pre/post, participants vs. nonparticipants

References

- Mohr 1995
- Shadish, Cook, Campbell 2002
- SEE Action 2012(a)

B. Survey-based approaches

1. Self Report Approach

a) Participating Customer surveys

b) Market Actor surveys

2. Econometric/Revealed Preference Approach

C. Common practice baseline approaches

Industry Standard Practice used as baseline – yields Net savings estimate

Generally applied in replace-on-burnout situations, as dual baseline. Post RUL baseline based on ISP.

D. Market analyses

Analyses based on postulated changes in program logic such as

- Changes in units manufactured
- Changes in market actor behavior – promotion, stocking
- Changes in sales – unit volumes sold
- Captures full effect FR + P/NP SO
- Changes in prices - reductions

E. Structured expert judgment approaches

Example is a Delphi Panel

F. Deemed or stipulated NTG ratios

G. Program Theory Design

Discuss how explicating the theory of a program and then researching the links can show attribution

H. Case Studies Design

Discuss how multiple case studies can show attribution – each case study may use an approach already shown above

VI. Appendix B – References

This shows the beginning of possible references that will be included in this section. We plan to use the author-date system and provide references within Appendix A as shown above. If the document is available on the internet, we will include a hyperlink.

Mohr, Lawrence B. 1995. *Impact Analysis for Program Evaluation, Second Edition*. Thousand Oaks: SAGE Publications.

Shadish, William R., Cook, Thomas D., and Campbell, Donald T. 2002. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Boston: Houghton Mifflin Company.

SEE Action. 2012(a). *Evaluation, Measurement, and Verification (EM&V) of Residential Behavior-Based Energy Efficiency Programs: Issues and Recommendations.* https://www4.eere.energy.gov/seeaction/publications?topic=4

SEE Action. 2012(b). *Energy Efficiency Program Impact Evaluation Guide.* Evaluation, Measurement, and Verification Working Group. https://www4.eere.energy.gov/seeaction/publication/energy-efficiency-program-impact-evaluation-guide