State of Illinois

Energy Efficiency

Technical Reference Manual

Draft Date:

Friday, May 11th, 2012

Planned Effective Date:

June 1st, 2012

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TABLE OF CONTENTS

Comment [Jen1]: Reorganized, moved section 3 and 4 to section 1 or 2, and moved section 2.3 to section 3.

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TABLES & FIGURES

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Table 1.1: Revision History

#	Document Title	Date	Reviewer	Status
1	Illinois_Statewide_TRM_HIM_1st_Draft_012712.doc	1/27/12	VEIC	Original Draft
2	Illinois_Statewide_TRM_HIM_1st_Draft_012712_Ameren Navigant.doc	2/10/12	Ryan Del Balso, Navigant/Ameren	Reviewed
3	Illinois_Statewide_TRM_HIM_1st_Draft_012712 – comments NICOR.doc	2/15/12	Andrew Kotila, NICOR	Reviewed
4	Illinois_Statewide_TRM_HIM_1st_Draft_012712 – comments AG_OEI.doc	2/16/12	Phil Mosenthal, OEI/AG	Reviewed
5	Illinois_Statewide_TRM_HIM_1st_Draft_012712 Navigant for ComEd Bus Prescriptive.doc	2/17/12	Kevin Grabner, Navigant/ComEd	Reviewed
6	Illinois_Statewide_TRM_HIM_1st_Draft_012712_CFL Navigant for ComEd.doc	2/17/12	Jeremy Eddy, Navigant/ComEd	Reviewed
7	Illinois_Statewide_TRM_HIM_1st_Draft_012712 ComEd comments.doc	2/20/12	Roger Baker, ComEd	Reviewed
8	NRDC Comments on Draft Illinois TRM 2012-02-20.doc	2/20/12	Chris Neme, NRDC	Reviewed
9	GDS Comments on Draft_012712.doc	2/23/12	Travis Hink, GDS/Ameren	Reviewed
10	Illinois_Statewide_TRM_HIM_1st_Draft_012712 Peoples Northshore comments.doc	2/24/12	George Roemer, Peoples Northshore	Reviewed
11	ELPC Comments on Draft High Impact TRM Illinois comments feb 26.doc	2/26/12	Geoff Crandall, ELPC	Reviewed
12	GDS Comments_Updated on Draft_012712.doc	3/2/12	Travis Hink, GDS/Ameren	Reviewed
13	Illinois_Statewide_TRM_HIM_1st_Draft_012712 KK.doc	3/3/12	K. Kansfield, Ameren	Reviewed
14	Illinois_Statewide_TRM_HIM_1st_Draft_012712_ICC Staff initial comments.doc	3/3/12	J. Hinman, ICC Staff	Reviewed
15	TRM_Draft_012712_KEMA comments_03 01 12.doc	3/4/12	KEMA	Reviewed
16	Addendum 0322 – Residential Gas Boiler and Furnace Measures Integrys comments.doc	4/16/12	Integrys	Reviewed
17	Addendum 0322 – Residential Gas Boiler and Furnace Measures_Navigant 2012 0412.doc	4/12/12	Navigant	Reviewed
18	Addendum 0403 – Commercial Gas Boiler and Furnace Measures Integrys comments.doc	4/16/12	Integrys	Reviewed
19	Addendum 0403 – Commercial Gas Boiler and Furnace Measures-Navigant 2012 0412.doc	4/12/12	Navigant	Reviewed
20	Addendum 0403 – Commercial Gas Boiler and Furnace Measures Nicor comments.doc	4/13/12	Nicor	Reviewed
21	Consolidated Commends from ComEd.doc	4/13/12	KEMA for ComEd	Reviewed
22	Illinois_Statewide_TRM_Comprehensive_Draft_031612 – comments AG_OEI.doc	4/16/12	AG	Reviewed
23	Illinois_Statewide_TRM_Comprehensive_Draft_031612 – Nicor comments.doc	4/13/12	Nicor	Reviewed
24	Illinois_Statewide_TRM_Comprehensive_Draft_031612 Integrys comments.doc	4/16/12	Integrys	Reviewed
25	Illinois_Statewide_TRM_Comprehensive_Draft_031612_BRANDT.doc	4/13/12	ComEd	Reviewed
26	Illinois_Statewide_TRM_Comprehensive_Draft_031612 – comments_Itron Comments for ComEd EMV.doc	4/12/12	ComEd	Reviewed
27	Illinois_Statewide_TRM_Comprehensive_Draft_0	4/11/12	ComEd	Reviewed

Comment [Jen3]: Add an Acknowledgements section for those who participated in the TRM development?

Also add contact info for interested parties that would like to participate in the TRM TAC and the SAG – so they can be added to e-mailing lists. Include SAG website link and ICC website link

#	Document Title	Date	Reviewer	Status
	31612_Jeremy Eddy ComEd WMV.doc			
28	Illinois_Statewide_TRM_Comprehensive_Draft_0 31612_Jeremy.doc	4/11/12	Navigant	Reviewed
29	Illinois_Statewide_TRM_Comprehensive_Draft_0 31612_Navigant_2012_0413.doc	4/14/12	Navigant	Reviewed
30	JE feedback on comment threads in Res HIM Measure Tracking.doc	4/11/12	Navigant	Reviewed
31	Navigant Additional supporting docs for Residential Clothes washers.doc	4/12/12	Navigant	Reviewed
32	Navigant Analysis of ComEd Lighting EFLH from EMV 2012-04-04.doc	4/4/12	ComEd	Reviewed
33	KEMA TRM v2 Review 4/2/12.xls	4/13/12	ComEd	Reviewed
34	Navigant Supporting Calculations for Res Clothers Wathers 04-08-12.xls	4/12/12	Navigant	Reviewed
35	PY2 kWh by Facility TRM Comparison kb.xls	4/13/12	ComEd	Reviewed
36	TRM Application Issue Tracking Ameren ComEd MidAmerican_041212_Mtg.xls	4/12/12	Various	Reviewed

1 Introduction

1.1 Enabling ICC Policy

This Illinois Statewide Technical Reference Manual (TRM) was developed to comply with the Illinois Commerce Commission (ICC or Commission) Final Orders from the electric and gas Utilities'[1] energy efficiency Plan dockets quoted below.

"We further recognize and appreciate that ComEd is developing a TRM. We agree that a TRM can provide substantial benefits to the EEP going forward, and the Commission directs that ComEd will work with other utilities subject to the requirements of Section 8-103 and 8-104 of the PUA[2] and the SAG to develop a statewide TRM in the future. This will allow a consistent format to be developed for a TRM. , We decline to adopt intervenors' proposal granting the SAG oversight of the EM&V process or ordering procedural changes." Docket No. 10-0570, Final Order[3] at 59-60, December 21, 2010.

"Generally, the parties agree that the development of a TRM is appropriate. While some parties believe it is appropriate to develop a statewide TRM, others believe, at a minimum, it is premature to develop a statewide TRM. ELPC witness Crandall, for example, recommends that the SAG should take primary responsibility for developing one statewide TRM… The Commission directs that Ameren will work with other utilities subject to the requirements of Section 8-103 and 8-104 of the PUA and the SAG to develop a statewide TRM… for use in the upcoming energy efficiency three-year plan cycle. This will allow a consistent format to be developed for a TRM. The Commission also accepts Ameren's recommendation that Ameren, as well as ComEd, and the independent evaluators strive to understand differences in evaluation results and to reconcile differences not driven by differences in weather, market and customers." Docket No. 10-0568, Order on Rehearing[4] at 19, May 24, 2011.

"Also consistent with our rulings in other recent dockets, the Commission agrees that the development of a TRM will be valuable. We direct the Utilities to coordinate with other utilities, DCEO and SAG participants to develop a statewide manual." Docket No. 10-0564, Final Order[5] at 76, May 24, 2011.

"The Commission ordered that Ameren and ComEd work together and with other Illinois utilities to develop a statewide TRM in the future. (ICC Docket 10-0568 Final Order at 70; ICC Docket 10-0570 Final Order at 59-60). Consistent with those Orders, the Commission requires Nicor to participate in the statewide TRM development. The Commission also recommends that the newly-created natural gas SAG participate in developing a statewide TRM." Docket No. 10-0562, Final Order[6] at 30, May 24, 2011.

The Illinois Energy Efficiency Stakeholder Advisory Group (SAG) was first defined in the electric utilities' first energy efficiency Plan Orders to include "…, the Utility, DCEO, Staff, the Attorney General, BOMA and CUB and representation from a variety of interests, including residential consumers, business consumers, environmental and energy advocacy organizations, trades and local government… [and] a representative from the ARES

[1] The Illinois Utilities subject to this TRM include: Ameren Illinois Company d/b/a Ameren Illinois (Ameren), Commonwealth Edison Company (ComEd), The Peoples Gas Light and Coke Company and North Shore Gas Company (Integrys), and Northern Illinois Gas Company d/b/a Nicor Gas (Nicor).
[2] The Illinois Public Utilities Act (PUA or Act), 220 ILCS 5/1-101 *et seq.*
[3] http://www.icc.illinois.gov/docket/files.aspx?no=10-0570&docId=159809
[4] http://www.icc.illinois.gov/docket/files.aspx?no=10-0568&docId=167031
[5] http://www.icc.illinois.gov/docket/files.aspx?no=10-0564&docId=167023
[6] http://www.icc.illinois.gov/docket/files.aspx?no=10-0562&docId=167027

Comment [Jen4]: Recommend including in the very front of the TRM and also links and citations to the Commission orders need to be provided.

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(alternative retail electric supplier) community should be included."[7] As directed in the Utilities' efficiency Plan Orders, the SAG had the opportunity to, and also participated in, nearly every aspect of the development of the TRM.

~~1.1~~1.2 Purpose of the TRM

The purpose of this Technical Reference Manual (TRM) is to provide a ~~standardized and~~ transparent basis for calculating ~~and claiming~~ energy (kWh or therms) and capacity (kW) savings implemented through the State of Illinois' energy efficiency programs[8]. To this end, the Vermont Energy Investment Corporation (VEIC) was retained by the Illinois Energy Association (IEA) on behalf of the Department of Commerce and Economic Opportunity (DCEO) and the state's electric and gas ~~Program Administrators~~Utilities[9] to prepare this TRM for statewide use.

This document represents Illinois' first statewide TRM~~,~~. The TRM is a policy document that is filed with the ICC for approval. The TRM ~~and~~ is intended to fulfill a series of objectives, including:

- "Serve as a common reference document for all ~~Program Administrators~~utilities, stakeholders, ~~Program Administrators~~implementers, and the Commission, so as to provide transparency to all parties regarding savings assumptions and calculations and the underlying sources of those assumptions and calculations.
- Support the calculation of the Illinois Total Resource Cost test[10] (TRC), as well as other cost-benefit tests in support of program design, evaluation and regulatory compliance. Actual cost-benefit calculations and the calculation of avoided costs will not be part of this TRM.
- ~~Identify gaps in robust, primary data for Illinois, that can be addressed via evaluation efforts and/or other targeted end-use studies. Recommend a process for periodically updating and maintaining records, and preserve a clear record of what deemed parameters are/were in effect at what times to facilitate evaluation and data accuracy reviews.~~
- ~~Provide standard protocols for determining energy savings for some common custom projects, as appropriate."[11]~~
- ~~"…support coincident peak capacity (for electric) savings estimates and calculations for electric Program Administrators in a manner consistent with the methodologies employed by the Program Administrator's Regional Transmission Organization ("RTO"), as well as those necessary for statewide~~

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[7] Docket No. 07-0540, Final Order at 32-33, February 6, 2008. http://www.icc.illinois.gov/downloads/public/edocket/215193.pdf

[8] Specifically, this TRM has been developed to *help* determine compliance with the energy efficiency requirements of the Illinois Public Utilities Act (220 ILCS 5) (PUA), Sections 8-103 and 8-104 (http://www.ilga.gov/legislation/ilcs/ilcs5.asp?ActID=1277&ChapterID=23)

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[9] ~~In addition to DCEO, the~~The Illinois ~~utilities~~ Utilities subject to this TRM include~~,~~: Ameren Illinois Company d/b/a Ameren Illinois (Ameren), Commonwealth Edison Company (ComEd), The Peoples Gas Light and Coke Company and~~,~~ ~~Peoples~~ North Shore Gas Company (Integrys), and ~~NICOR~~Northern Illinois Gas Company d/b/a Nicor Gas (Nicor).

[10] The Illinois TRC test is defined in 220 ILCS 5/8-104(b) and 20 ILCS 3855/1-10.

[11] Illinois Statewide Technical Reference Manual Request for Proposals, August 22nd, 2011, pages 3-4, http://ilsag.org/yahoo_site_admin/assets/docs/TRM_RFP_Final_part_1.230214520.pdf "TRM_RFP_Final_part_1.230214520.pdf"

~~Illinois tracking of coincident peak capacity impacts."[12]~~

- ~~Provide a standardized, statewide methodology for calculating prescriptive energy and capacity savings, which gives independent evaluators a consistent framework from which to evaluate the savings achieved for the Illinois energy efficiency portfolios.~~

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Comment [Jen5]: Updated to ensure consistent with RFP

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[12] ~~Ibid.~~

~~1.2~~1.3 Development Process

The measure characterizations in this TRM are the result of a quantitative~~rigorous quantitative~~ and qualitative analysis. The ~~e~~
quantitative analysis took the form of a dynamic spreadsheet model of the engineering algorithms for measure level savings. These models were used to perform a sensitivity analysis on all of the algorithms' parameters, and have been reviewed weekly with the Illinois ~~Stakeholder Advisory Group~~ ~~(SAG)~~TRM Technical Advisory Committee (TAC) ~~since~~ during the December 2011 through May 2012 timeframe. VEIC has also presented the TRM at Stakeholder Advisory Group (SAG) meetings. The qualitative analysis includes the results of the quantitative analysis, and the
result is the written measure characterizations in this document which are supported by referencing source documents for each of the parameters within the savings algorithm.

This document is a result of an ongoing ~~SAG~~ review process involving the Illinois Commerce Commission (ICC) ~~and Commission~~ Staff (Staff or ICC Staff), the Utilities, DCEO, the Evaluators, the TRM Technical Advisory Committee (TRM TAC), and the SAG ~~(of which ICC Staff is also considered a member)~~. VEIC met with
the SAG and/or ~~its~~ the TRM TAC weekly beginning in December 2011 through May 2012 to create a high level of transparency and vetting in~~to~~ the
development of this TRM. The purpose of the weekly reviews was to maximize the level of collaboration and visibility into the measure characterization process. Where consensus did not emerge on specific measures or issues, this TRM contains VEIC's recommended approach along with ~~the usual~~ source documentation and rationale.
In keeping with the goal of ~~total~~ transparency, a summary of the comments and their status to-date has been compiled under separate cover~~s~~.

The VEIC analytical team noticed that many of the existing measures in Illinois represent discrete cases within a range of
measure possibilities across Market Sectors, End Uses, Measures & Technologies, Programs and Fuels. This document has consolidated these measures in such a way that discrete measures can be captured within a more generalized format where only individual parameters in the savings algorithm need to be changed to arrive at the savings claim for a discrete case.

Finally, the measure titles used in this TRM may not match exactly the titles that ~~Program Administrator~~the Utilities or DCEO efficiency programs use. An organizational structure, described in the next section, gives details about how measures are grouped, categorized, and described.

1.4 High Impact Measures

The measures that are expected to collectively account for at least 80% of statewide energy savings are considered high impact measures. The following tables list these measures by market sector and show the section in which they may be found in the TRM. Please note that a high impact measure for a specific utility may not necessarily translate into a high impact measure for purposes of the TRM.

Table 1.1: Commercial (Non-Residential) High Impact Measures

Section	End Use	Technology / Measure
5.1.3	Food Service	Commercial Steam Cooker
5.1.8	Food Service	High Efficiency Pre-Rinse Spray Valve
5.2.2	HVAC	Boiler Tune-up

Comment [k6]: Is everything in the TRM vigorous?

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Comment [Jen7]: also add Quality of data sources from 1st TRM draft into this section

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Comment [Jen8]: Please make sure section numbers are accurate

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5.2.3	HVAC	Boiler Lockout/Reset Controls
5.2.9	HVAC	High Efficiency Boilers
5.2.10	HVAC	High Efficiency Furnace
5.2.14	HVAC	Steam Trap Replacement or Repair
5.2.15	HVAC	Variable Speed Drives for HVAC
5.4.1	Lighting	CFL
5.4.2	Lighting	ILED
5.4.3	Lighting	High Performance T8 Fixtures and Lamps
5.4.4	Lighting	T5
5.4.5	Lighting	Lighting Controls
5.5.6	Lighting	Lighting Power Density Reduction
5.4.7	Lighting	LED Traffic and Pedestrian Signals
5.7.6	Hot Water	Tankless Water Heater

Table 1.2: Non-Commercial (Residential) High Impact Measures

Section	End Use	Technology / Measure
6.1.2	Appliances	Clothes Washer
6.1.8	Appliances	Refrigerator & Freezer Recy.
6.3.2	Hot Water	High Efficiency Water Heater
6.3.3	Hot Water	Heat Pump Water Heater
6.3.4	Hot Water	Faucet Aerator
6.3.5	Hot Water	Low Flow Showerhead
6.4.1	HVAC	Air Source Heat Pump
6.4.2	HVAC	Central Air Conditioning
6.4.4	HVAC	Furnace Blower Motor
6.4.5	HVAC	High Efficiency Boiler
6.4.6	HVAC	High Efficiency Furnace
6.4.10	HVAC	Programmable Thermostat
6.5.1	Lighting	Standard CFL
6.5.2	Lighting	Specialty CFL
6.5.5	Lighting	LED
6.6.1	Shell	Air Sealing
6.6.4	Shell	Wall and Ceiling Insulation
6.6.2	Shell	Basement Sidewall Insulation

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Non-Residential lighting measures and LED lighting in particular have been restructured and generalized to incorporate a wide array of potential measures, many of which are not yet available in Illinois.: High Impact Measures

~~Non-Residential lighting measures and LED lighting in particular have been restructured and generalized to incorporate a wide array of potential measures, many of which are not yet available in Illinois.~~

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2 Using the TRM

1.3 Using the TRM

For each measure characterization, this TRM includes engineering algorithm(s) and a value(s) for each parameter in the equations[13]. These parameters have values that fall into one of three categories: a single deemed value, a lookup table of deemed values or an actual value such as the capacity of the equipment. The TRM makes extensive use of lookup tables because they allow for an appropriate level of measure streamlining and customization within the context of an otherwise prescriptive measure.

Accuracy is the overarching principle that governs what value to use for each parameter. When it is explicitly allowed within the text of the measure characterization, the most accurate value is always the actual or on-site value for the individual measure being implemented. The deemed values[14] in the lookup tables are the next most accurate choice, and in the absence of either an actual value or an appropriate value in a lookup table, the single, deemed value should be used. As a result, this single, deemed value can be thought of as a default value for that particular input to the algorithm.

A single deemed savings estimate is produced by any given combination of an algorithm and the allowable input value for each of its parameters. In cases where lookup tables are provided, there is a range of deemed savings estimates that are possible, depending on site-specific factors such as equipment capacity, location and building type.

Algorithms and their parameter values are included for calculating claimed:

Gross annual electric energy savings (kWh)

[13] As noted in the RFP, tThe net-to-gross ratios are provided by the utilities and are listed in the appendicesan appendix to the TRM.

[14] Emphasis has been added to denote the difference between a "deemed value" and a "deemed savings estimate". A deemed value refers to a single input value to an algorithm, while a deemed savings estimate is the result of calculating the end result of all of the values in the savings algorithm.

Comment [Jen12]: How to use, when and who should use, How to update, etc.

Comment [Jen13]: Recommend moving the Custom Measure Expansion Protocol to the front section of the TRM

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Comment [Jen14]: Why aren't the evaluators providing the NTG? Cite/link to specific appendix in final report

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Comment [Jen15]: By whom? Evaluators? Implementers?

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Comment [Jen16]: With respect to TRM-verified energy savings – this encompasses retroactive application - for cases where the utility provides a custom input - those values are subject to retrospective application to ensure the input provided is representative of project. Also in cases where utility chooses the baseline to apply, that is also subject to evaluator verification that the baseline chosen is representative of project.

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Comment [Jen17]: too much detail to be considered Overview - move to evaluator instructions section

Comment [Jen18]: Really do not care for using the term "deemed" as deemed is used in front of certain items in the TRM and not others, causes confusion

Comment [Jen19]: Recommend the EXACT names of items within each measure characterization be used and then describe exactly what is included with each and how it should be used. I pasted some of these later in this section

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- ~~Gross annual fossil fuel energy savings (therms)~~
- ~~Gross electric summer coincident peak demand savings (kW)~~
- ~~To support cost-effectiveness calculations, parameter values are also included for:~~
- ~~Incremental costs ($)~~
- ~~Measure life (years)~~
- ~~Operation and maintenance costs ($)~~
- ~~Water (gal) and other resource savings where appropriate.~~
- ~~To facilitate the use of the TRM as measures are revised, updated, and removed, a unique code is provided for each measure that identifies the measure and the applicable installed program year.~~

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Comment [Jen20]: Support sounds like these values are not necessary to use, is this the case?

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Comment [Jen21]: these are listed as deemed measure costs

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2.1 Organizational Structure

~~1.4~~

The organization of this document follows a three-level format, each level of which is a major heading in the Table of Contents. These levels are designed to define and clarify what the measure is and where it is applied.

1. **Market Sectors**[15]
   - This level of organization specifies the type of customer the measure applies to, either Commercial and Industrial (C&I) or ~~Non-Commercial~~Residential.
   - Answers the question, "What category best describes the customer?"

2. **End Use Category**
   - This level of organization represents most of the major end use categories for which an efficient alternative exists. The following table lists all of the end use categories in this version of the TRM.
   - Answers the question, "To what end use category does the measure apply?"

Table 2.1: End Use Categories in the TRM[16]

Commercial and Industrial (C&I) Market Sector	Residential Market ~~Sector~~
Agricultural Equipment	Appliances~~Agricultural~~
Food Service Equipment	Consumer Electronics~~Food~~
HVAC	Hot Water~~HVAC~~
Lighting	HVAC~~Lighting~~
Miscellaneous	Lighting~~Miscellaneous~~
Refrigeration	Shell~~Refrigeration~~
Water Heating & Distribution	~~Water Heating & Distribution~~

3. **Measure & Technology**
   - This level of organization represents individual efficient measures such as CFL lighting and LED lighting, both of which are individual technologies within the Lighting end use category.
   - Answers the question, "What technology defines the measure?"

This organizational structure is silent on which fuel the measure is designed to save; electricity or natural gas. By organizing the TRM this way, measures that save energy on both fuels do not need to be repeated. As a result, the TRM will be easier to use and to maintain.

[15] Note that the Public Building and Low Income measures that DCEO administers are not listed as a separate Market Sector. ~~This building type is one of a series of building types that are included in the appropriate measures in the Non-Residential Sector.~~

[16] Please note that this is not an exhaustive list of end uses.

Comment [Jen23]: Can this be moved to later section?

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Comment [Jen24]: mention Low Income are included

Comment [Jen25]: please be consistent. I think Residential versus Commercial and Industrial would be the easiest to understand as this is how the utilities have been classifying sectors in filings with the ICC--- VEIC agreed to this at last meeting 5/9

Comment [Jen26]: customer who will save energy on bill? Consider being more specific to address the low income and public sector and MF master metered vs not. Won't necessarily be those receiving incentives.. Tom mentioned Church example.

Some ideas from Language from other TRMs-
Measure Applicability Based On Sector
Protocols for the residential sector quantify savings for measures typically found in residential areas under residential meters. Likewise, protocols for the C&I sector quantify savings for measures typically found in C&I areas under C&I meters. However, there is some overlap where measure type, usage and the sector do not match.
Protocols in the residential and C&I sections describe measure savings based on the *application* or *usage characteristics* of the measure rather than how the measure is *metered*. For example, if a measure is found in a residential environment but is metered under a commercial meter, the residential sector protocol is used. On the other hand, if a measure is found in a commercial environment but is metered under a residential meter, the commercial sector protocol is used. This is particularly relevant for residential appliances that frequently appear in small commercial spaces (commercial protocol) and residential appliances that are used in residential settings but are under commercial meters (multi-family residences).

Comment [Jen27]: Though it may be correct, deleted for consistency with the surrounding text that does not include dash

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Comment [Jen28]: I do not see measure code for this

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~~1.5~~2.2 Measure Code Specification

In order to uniquely identify each measure in the TRM, abbreviations for the major organizational elements of the TRM have been established. When these abbreviations are combined, a unique, ~~14~~22-character ~~alphanumeric~~ code is formed that ~~can~~ must be used by the Utilities and DCEO in their ~~for~~ tracking systems~~and evaluating savings claims~~.

Code Structure = Market + End Use Category + Measure ~~& Technology +~~ ~~Baseline Category +~~ Version # + Effective Date

Code Structure = @@-@@@-@@@@-V##-YYMMDD

For example, the C ~~commercial~~&I ~~CFL~~ Boiler measure might be coded: "~~COM.LIGHT.STCFL.0001.V.01~~CI-HVC-BLR - V01-120601"

Table 2.2: Measure Code Specification Key

Market (@@)	End Use (@@@)	Measure (@@@@)	Version (V##)	Effective Date
CI (C&I)	APL (Appliances)	T5F	V01	YYMMDD
RS (Residential)	CEL (Consumer Electronics)	T8F	V02	YYMMDD
CU (Custom)	HW (Hot Water)	BLR	V03	YYMMDD
	HVC (HVAC)	…	…	…
	LTG (Lighting)			
	SHL (Shell)			
	AGE (Agricultural Equipment)			
	FSE (Food Service Equipment)			
	MSC (Miscellaneous)			
	RFG (Refrigeration)			

Table 2.3: Measure Codes

~~Market (@@)~~	~~End Use (@@@@@)~~	~~Measure (@@@@@)~~	~~Measure (###)~~	~~Version (V.##)~~
~~COM~~	~~APPLI~~	~~CBOVN~~	~~1 - 999~~	~~1 - 99~~
~~RES~~	~~ELECT~~	~~FZDOR~~	~~1 - 999~~	~~1 - 99~~
	~~HTWTR~~	~~STMCK~~	~~1 - 999~~	~~1 - 99~~
	~~HVAC@~~	~~CVOVN~~	~~1 - 999~~	~~1 - 99~~
	~~LIGHT~~	~~ESOVN~~	~~1 - 999~~	~~1 - 99~~
	~~SHELL~~	~~ESFRY~~	~~1 - 999~~	~~1 - 99~~
	~~AGEQP~~	~~ESICE~~	~~1 - 999~~	~~1 - 99~~
	~~FSEQP~~	~~SPRAY~~	~~1 - 999~~	~~1 - 99~~
	~~MISC@~~	~~CHARB~~	~~1 - 999~~	~~1 - 99~~
	~~REFDG~~	~~IROVN~~	~~1 - 999~~	~~1 - 99~~

Comment [Jen29]: It is Staff's understanding this section has been revised. Please be sure to explain usefulness of measure code structure. May also need to add in that the utilities are responsible for indicating which baseline category was chosen for the TRM, and are responsible for tracking the measure codes

Comment [Jen30]: This is very important… regardless of whether utilities want to try to claim savings greater than TRM, they MUST track this code in their tracking system for all measures that fall under the TRM characterization of the measure--- tracking the measure code for each measure is NOT OPTIONAL as this a key component to aid in evaluator verification process.

Comment [Jen31]: Remove period. This is pasted from document posted on sharepoint site.

Comment [Jen32]: Baseline Category? Utilities and DCEO need to make it clear in their tracking systems which baseline they are trying to claim

		~~IRBLR~~		
		~~IRUBR~~		
		~~VENTC~~		
		~~PCOOK~~		
		~~RKOVN~~		
		~~RECON~~		
		~~ACTUN~~		
		~~BRTUN~~		
		~~BLRCO~~		
		~~CUHTR~~		
		~~ECHIL~~		
		~~ESRAC~~		
		~~GREM@~~		
		~~HPSYS~~		
		~~BOILR~~		
		~~FRNCE~~		
		~~IRHTR~~		

#	Mkt	End Use	Measure Abbrev	Measure Title	Version	Date		Measure Code
1	CI	AGE	WTRH	Water Heater	V01	060112	-	CI-AGE-WTRH-V01-060112
2	CI	AGE	MLUP	Must Look it Up	V01	060112	-	CI-AGE-MLUP-V01-060112
3	CI	FSE	CBOV	Combination Oven	V01	060112	-	CI-FSE-CBOV-V01-060112
4	CI	FSE	FZDO	Commercial Solid and Glass Door Refrigerators & Freezers	V01	060112	-	CI-FSE-FZDO-V01-060112
5	CI	FSE	STMC	Commercial Steam Cooker	V01	060112	-	CI-FSE-STMC-V01-060112
6	CI	FSE	CVOV	Conveyor Oven	V01	060112	-	CI-FSE-CVOV-V01-060112
7	CI	FSE	ESCV	ENERGY STAR Convection Oven	V01	060112	-	CI-FSE-ESCV-V01-060112
8	CI	FSE	ESFR	ENERGY STAR Fryer	V01	060112	-	CI-FSE-ESFR-V01-060112
9	CI	FSE	ESIM	ENERGY STAR Ice Maker	V01	060112	-	CI-FSE-ESIM-V01-060112
10	CI	FSE	SPRY	High Efficiency Pre-Rinse Spray Valve	V01	060112	-	CI-FSE-SPRY-V01-060112
11	CI	FSE	CHAR	Infrared Charbroiler	V01	060112	-	CI-FSE-CHAR-V01-060112
12	CI	FSE	IROV	Infrared Rotisserie Oven	V01	060112	-	CI-FSE-IROV-V01-060112
13	CI	FSE	IRBL	Infrared Salamander Broiler	V01	060112	-	CI-FSE-IRBL-V01-060112
14	CI	FSE	IRUB	Infrared Upright Broiler	V01	060112	-	CI-FSE-IRUB-V01-060112
15	CI	FSE	VENT	Kitchen Demand	V01	060112	-	CI-FSE-VENT-V01-060112

Comment [Jen33]: Does this # have any significance?

Comment [Jen34]: Add headings for each page

				Ventilation Controls				
16	CI	FSE	PCOK	Pasta Cooker	V01	060112	-	CI-FSE-PCOK-V01-060112
17	CI	FSE	RKOV	Rack Oven - Double Oven	V01	060112	-	CI-FSE-RKOV-V01-060112
18	CI	FSE	RFGE	Refrigeration Economizer	V01	060112	-	CI-FSE-RFGE-V01-060112
19	CI	HW	HFBL	Combined High Efficiency Boiler & Water Htg. Unit, 90%AFUE or greater	V01	060112	-	CI-HW -HFBL-V01-060112
20	CI	HW	GSHT	Gas Storage Water Heater	V01	060112	-	CI-HW -GSHT-V01-060112
21	CI	HW	GSH8	Gas Storage Water Heater 88% TE	V01	060112	-	CI-HW -GSH8-V01-060112
22	CI	HW	LFFA	Low Flow Faucet Aerators	V01	060112	-	CI-HW -LFFA-V01-060112
23	CI	HW	LFSH	Low Flow Showerheads	V01	060112	-	CI-HW -LFSH-V01-060112
24	CI	HW	TKWH	Tankless Water Heater	V01	060112	-	CI-HW -TKWH-V01-060112
25	CI	HVC	ACTU	Air Conditioner Tune-up	V01	060112	-	CI-HVC-ACTU-V01-060112
26	CI	HVC	BLRC	Boiler Lockout/Reset Controls	V01	060112	-	CI-HVC-BLRC-V01-060112
27	CI	HVC	BLRT	Boiler Tune-up	V01	060112	-	CI-HVC-BLRT-V01-060112
28	CI	HVC	CUHT	Condensing Unit Heaters	V01	060112	-	CI-HVC-CUHT-V01-060112
29	CI	HVC	CHIL	Electric Chiller	V01	060112	-	CI-HVC-CHIL-V01-060112
30	CI	HVC	ESRA	ENERGY STAR and CEE Tier 1 Room Air Conditioner	V01	060112	-	CI-HVC-ESRA-V01-060112
31	CI	HVC	GREM	Guest Room Energy Management (PTAC & PTHP)	V01	060112	-	CI-HVC-GREM-V01-060112
32	CI	HVC	HPSY	Heat Pump Systems	V01	060112	-	CI-HVC-HPSY-V01-060112
33	CI	HVC	BOIL	High Efficiency Boiler	V01	060112	-	CI-HVC-BOIL-V01-060112
34	CI	HVC	FRNC	High Efficiency Furnace	V01	060112	-	CI-HVC-FRNC-V01-060112
35	CI	HVC	IRHT	Infrared Heaters (all sizes), Low Intensity	V01	060112	-	CI-HVC-IRHT-V01-060112
36	CI	HVC	PTAC	Package Terminal Air Conditioner (PTAC) and Package Terminal Heat Pump (PTHP)	V01	060112	-	CI-HVC-PTAC-V01-060112
37	CI	HVC	SPUA	Single-Package and Split System Unitary Air Conditioners	V01	060112	-	CI-HVC-SPUA-V01-060112
38	CI	HVC	STRE	Steam Trap Replacement or	V01	060112	-	CI-HVC-STRE-V01-060112

Comment [Jen35]: This is inconsistent with the structure listed above YYMMDD.. this is from sharepoint site, please fix one or the other to make consistent

				Repair				
39	CI	HVC	VSDH	Variable Speed Drives for HVAC and Custom Applications	V01	060112	-	CI-HVC-VSDH-V01-060112
40	CI	LTG	CCFL	Commercial Standard CFL	V01	060112	-	CI-LTG-CCFL-V01-060112
41	CI	LTG	T8FX	High Performance T8 Fixtures and Lamps	V01	060112	-	CI-LTG-T8FX-V01-060112
42	CI	LTG	LEDB	LED Bulbs and Fixtures	V01	060112	-	CI-LTG-LEDB-V01-060112
43	CI	LTG	LEDT	LED Traffic and Pedestrian Signals	V01	060112	-	CI-LTG-LEDT-V01-060112
44	CI	LTG	CTRL	Lighting Controls	V01	060112	-	CI-LTG-CTRL-V01-060112
45	CI	LTG	LPDE	Lighting Power Density	V01	060112	-	CI-LTG-LPDE-V01-060112
46	CI	LTG	T5FX	T5 Fixtures and Lamps	V01	060112	-	CI-LTG-T5FX-V01-060112
47	CI	MSC	PCMG	Network PC Mgmt	V01	060112	-	CI-MSC-PCMG-V01-060112
48	CI	MSC	VSDA	VSD Air Compressor	V01	060112	-	CI-MSC-VSDA-V01-060112
49	CI	RFG	ATDC	Automatic Door Closer for Walk-In Coolers	V01	060112	-	CI-RFG-ATDC-V01-060112
50	CI	RFG	BEVM	Beverage and Snack Machine Controls	V01	060112	-	CI-RFG-BEVM-V01-060112
51	CI	RFG	DHCT	Door Heater Controls for Cooler or Freezer	V01	060112	-	CI-RFG-DHCT-V01-060112
52	CI	RFG	ECMF	Electronically Commutated Motors (ECM) for Walk-in and 5.4.4. Reach-in Coolers / Freezers	V01	060112	-	CI-RFG-ECMF-V01-060112
53	CI	RFG	ESVE	ENERGY STAR Refrigerated Beverage Vending Machine	V01	060112	-	CI-RFG-ESVE-V01-060112
54	CI	RFG	EVPF	Evaporator Fan Control	V01	060112	-	CI-RFG-EVPF-V01-060112
55	CI	RFG	CRTN	Strip Curtain for Walk-in Coolers and Freezers	V01	060112	-	CI-RFG-CRTN-V01-060112
56	RS	APL	ESAP	ENERGY STAR Air Purifier/Cleaner	V01	060112	-	RS-APL-ESAP-V01-060112
57	RS	APL	ESRA	ENERGY STAR and CEE Tier 1 Room Air Conditioner	V01	060112	-	RS-APL-ESRA-V01-060112
58	RS	APL	ESCL	ENERGY STAR and CEE Tier 2 and 3 Clothes Washers	V01	060112	-	RS-APL-ESCL-V01-060112
59	RS	APL	ESRE	ENERGY STAR and CEE Tier 2	V01	060112	-	RS-APL-ESRE-V01-060112

				Refrigerator				
60	RS	APL	ESDH	ENERGY STAR Dehumidifier	V01	060112	-	RS-APL-ESDH-V01-060112
61	RS	APL	ESDI	ENERGY STAR Dishwasher	V01	060112	-	RS-APL-ESDI-V01-060112
62	RS	APL	ESFR	ENERGY STAR Freezer	V01	060112	-	RS-APL-ESFR-V01-060112
63	RS	APL	RECY	Refrigerator and Freezer Recycling	V01	060112	-	RS-APL-RECY-V01-060112
64	RS	APL	RACR	Room Air Conditioner Recycling	V01	060112	-	RS-APL-RACR-V01-060112
65	RS	CEL	SSTR	Smart Strip	V01	060112	-	RS-CEL-SSTR-V01-060112
66	RS	HW	PINS	Domestic Hot Water Pipe Insulation	V01	060112	-	RS-HW -PINS-V01-060112
67	RS	HW	GWHT	Gas Water Heater	V01	060112	-	RS-HW -GWHT-V01-060112
68	RS	HW	HPHT	Heat Pump Water Heaters	V01	060112	-	RS-HW -HPHT-V01-060112
69	RS	HW	LFFA	Low Flow Faucet Aerators	V01	060112	-	RS-HW -LFFA-V01-060112
70	RS	HW	LFSH	Low Flow Showerheads	V01	060112	-	RS-HW -LFSH-V01-060112
71	RS	HW	TMPS	Water Heater Temperature Setback	V01	060112	-	RS-HW -TMPS-V01-060112
72	RS	HW	WRAP	Water Heater Wrap	V01	060112	-	RS-HW -WRAP-V01-060112
73	RS	HVC	ASHP	Air Source Heat Pump	V01	060112	-	RS-HVC-ASHP-V01-060112
74	RS	HVC	CAC1	Central Air Conditioning > 14.5 SEER	V01	060112	-	RS-HVC-CAC1-V01-060112
75	RS	HVC	DINS	Duct Insulation and Sealing	V01	060112	-	RS-HVC-DINS-V01-060112
76	RS	HVC	FBMT	Furnace Blower Motor	V01	060112	-	RS-HVC-FBMT-V01-060112
77	RS	HVC	GHEB	Gas High Efficiency Boiler	V01	060112	-	RS-HVC-GHEB-V01-060112
78	RS	HVC	GHEF	Gas High Efficiency Furnace	V01	060112	-	RS-HVC-GHEF-V01-060112
79	RS	HVC	GSHP	Ground Source Heat Pump	V01	060112	-	RS-HVC-GSHP-V01-060112
80	RS	HVC	BAFA	High Efficiency Bathroom Exhaust Fan	V01	060112	-	RS-HVC-BAFA-V01-060112
81	RS	HVC	TUNE	HVAC Tune Up (Central Air Conditioning or Air Source Heat Pump)	V01	060112	-	RS-HVC-TUNE-V01-060112
82	RS	HVC	PSTA	Programmable Thermostats	V01	060112	-	RS-HVC-PSTA-V01-060112

83	RS	LTG	ESCF	ENERGY STAR Compact Fluorescent Lamp (CFL)	V01	060112	-	RS-LTG-ESCF-V01-060112
84	RS	LTG	ESSC	ENERGY STAR Specialty Compact Fluorescent Lamp (CFL)	V01	060112	-	RS-LTG-ESSC-V01-060112
85	RS	LTG	ESTO	ENERGY STAR Torchiere	V01	060112	-	RS-LTG-ESTO-V01-060112
86	RS	LTG	EXTC	Exterior Hardwired Compact Fluorescent Lamp (CFL) Fixture	V01	060112	-	RS-LTG-EXTC-V01-060112
87	RS	LTG	INTC	Interior Hardwired Compact Fluorescent Lamp (CFL) Fixture	V01	060112	-	RS-LTG-INTC-V01-060112
88	RS	LTG	LEDD	LED Downlight	V01	060112	-	RS-LTG-LEDD-V01-060112
89	RS	LTG	LEDE	LED Exit Signs	V01	060112	-	RS-LTG-LEDE-V01-060112
90	RS	SHL	AIRS	Air Sealing	V01	060112	-	RS-SHL-AIRS-V01-060112
91	RS	SHL	BSWI	Basement Sidewall Insulation	V01	060112	-	RS-SHL-BSWI-V01-060112
92	RS	SHL	ICRW	Floor insulation above crawlspace	V01	060112	-	RS-SHL-ICRW-V01-060112
93	RS	SHL	ATIN	Wall and Ceiling/Attic Insulation	V01	060112	-	RS-SHL-ATIN-V01-060112

1.6 Using the TRM to Calculate Savings

The TRM is intended to bring a high level of standardization to the measure savings that each Program Administrator (Program Administrators and DCEO) claim across the state. As long as measure savings are calculated using the algorithms and input values in the TRM, the TRM reduces the risk of program's claimed savings estimates being adjusted during savings verification. For instance, an Program Administrator may accept more risk by not making use of the TRM, but the Program Administrator would bear an increased risk of retrospective changes in the claimed savings estimates during savings verification.

To accomplish the goal of statewide standardization, Program Administrators are strongly encouraged to use the prescriptive savings algorithms and input values that are provided in the TRM, subject to the following three exceptions.

1. The measure savings are being calculated on a custom basis.

An Program Administrator can choose to implement a TRM measure as a custom measure. Just because a measure is in the TRM does not mean that an Program Administrator must calculate savings for that measure prescriptively. The Program Administrator may choose to implement that measure through its own custom program, calculating savings using actual or on-site parameter values, metering or perhaps even developing a non-standard savings algorithm.

2. The measure does not yet exist in the TRM.

In this case, the Program Administrator is free to use algorithms and/or input values that do not yet appear in the TRM. The results will be subject to the usual evaluation and ICC review requirements, and the new measure should be submitted to the TRM Update Procedure during the next update cycle.

3. The Program Administrator decides that it has a strong and documented case for calculating the prescriptive measure savings based on its own prescriptive savings inputs and algorithms.

For example, the Program Administrator may have undertaken a new evaluation study that provides a new parameter value that is better supported or more applicable to the local conditions. In this event, the Program Administrator would report this decision and the results as part of its annual EM&V report and submit the change to the TRM Update Procedure during the next update cycle[17].

1.72.3 Program Delivery & and Baseline Definitions

The measure characterizations in this TRM are not grouped by program delivery type, which is a common approach in other states. As a result, rather the measures characterizations provided include information and assumptions to support savings calculations for the range of program delivery options commonly used for the measure. The organizational significance of this approach is that multiple baseline kWh usages, incremental costs, O&M costs, measure lives, and in-service rates are included in the a single measure characterization(s) for measures that are may be delivered under two or more different program designs. The measure Values input values appropriate to use for each measures implemented under a given program delivery type will beare clearly specified in the algorithms or in the look-up tables within the each measure characterization in the TRM.

Comment [Jen36]: For consistency with other sections in front matter, remove dash.

Care has been taken to clearly define in the measure's description the types of program delivery that the measure

[17] Note that tracking systems may not be able to track both values within the Program Year.

characterization is designed to support. However, while there are no universally accepted definitions for a particular program type, and the description of the program type(s) may differ by measure, program delivery types can be generally defined according to the following table. These are the definitions used in the measure descriptions, and, when necessary, individual measure descriptions may further refine and clarify these definitions of program delivery type.

Table 2.~~443~~: Program Delivery Types

~~2~~ Progra	Attributes
Time of Sale (TOS)	Definition: A program in which the customer is incented to purchase or install higher efficiency equipment than if the program had not existed. This may include retail rebate (coupon) programs, upstream buydown programs, online store programs, contractor based programs, or CFL giveaways as examples. Baseline = New ~~Equipment~~equipment Efficient Case = New, premium efficiency equipment above federal and state codes and standard industry practice. Example: CFL rebate
New Construction (NC)	Definition: A program that intervenes during building design to support the use of more-efficient equipment and construction practices. Baseline = Building code or federal standards. Efficient Case = The program's level of building specification Example: Building shell and mechanical measures
Retrofit (RF)	Definition: A program that *upgrades* existing equipment before the end of its useful life. Baseline = Existing ~~Equipment~~ equipment or the existing condition of the building or equipment. A single baseline applies over the measure's life. Efficient Case = New, premium efficiency equipment above federal and state codes and standard industry practice. Example: Air sealing~~.~~ And ~~i~~nsulation.
Early Replacement (EREP)	Definition: A program that *replaces* existing equipment before the end of its expected life. Baseline = Dual; it begins as the existing equipment and shifts to new baseline equipment after the expected life of the existing equipment is over. Efficient Case = New, premium efficiency equipment above federal and state codes and standard industry practice. Example: New, replacement appliances
Early Retirement (ERET)	Definition: A program that *retires* duplicative equipment before its expected life is over. Baseline = The existing equipment, which is retired and not replaced. Efficient Case = Zero because the unit is retired. Example: Appliance recycling
Direct Install (DI)	Definition: A program where measures are installed during a site visit. Baseline = Existing ~~Equipment~~equipment Efficient Case = New, premium efficiency equipment above federal and state codes and standard industry practice. Example: Lighting and low-flow hot water measures

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Comment [Jen37]: Please provide an actual example

Comment [Jen38]: Will this be included within appliance recycling measure characterization?

Comment [Jen39]: are these incorporated in the measure code?
--No they are not, do utilities and DCEO need to track this code as well for each measure?

Comment [Jen40]: By program implementer and contractor (which could include trade ally)??? Or just implementer?

The concept and definition of the baseline is a key element of every measure characterization and is directly related to the program delivery type. Without a clear definition of the baseline, the savings algorithms cannot be adequately specified and subsequent evaluation efforts would be hampered. As a result, each measure has a detailed description (and in many cases, specification) of the specific baseline that should be used to calculate savings. Baselines in this TRM fall into one of the following five categories, and are organized within each measure characterization by the program delivery type to which it applies.

1. **Building Code:** As defined by the minimum specifications required under state energy code or applicable federal standards.

2. **Existing Equipment**: As determined by the most representative (or average) example of equipment that is in the existing stock. Existing equipment baselines apply over the equipment's remaining useful life.

3. **New Equipment**: As determined by the equipment that represents standard practice in the current market environment. New equipment baselines apply over the effective useful life of the measure.

4. **Dual Baseline**: A baseline that begins as the ~~Existing~~ existing ~~Equipment~~ equipment and shifts to ~~New~~ new ~~Equipment~~ equipment after the expected life of the existing equipment is over.

5. **Zero Baseline**: A baseline that is applicable to early retirement measures where the existing equipment is no longer in service.

~~2.1~~2.4 Parameter Input Tables

Many of the measures in this TRM require the user to select the appropriate input value from a list of inputs for a given parameter in the savings algorithm. ~~-~~Where the TRM asks the user to select the input, look~~-~~up tables of allowable values are provided. For example, a set of input parameters may depend on building type; while a range of values may be given for each parameter, only one value is appropriate for any specific building type. If no table of alternative inputs is provided for a particular parameter, then the single default ~~deemed~~ value ~~will~~ may be used, unless the entire measure is implemented on a custom basis. In any case, if site-specific information is available, it is permissible to use it in the algorithm subject to the principle of consistency. If site-specific information is not commonly available, then the default ~~deemed (or~~ look~~-~~up~~)~~ value may be ~~is~~ more appropriate.

2.5 Components of TRM Measure Characterizations

OFFICIAL MEASURE CODE

DESCRIPTION

DEFINITION OF EFFICIENT EQUIPMENT

DEFINITION OF BASELINE EQUIPMENT

DEEMED LIFETIME OF EFFICIENT EQUIPMENT

DEEMED MEASURE COST

DEEMED O&M COST ADJUSTMENTS

LOADSHAPE

COINCIDENCE FACTOR

Algorithm

Comment [ms41]: Where there discussions about what standard practice is and how it is determined?

Comment [Jen42]: Typically, the evaluators have made this determination – at least in context of Custom programs – based on research.

Comment [Jen43]: Are these actually used in the measure characterizations?

Comment [Jen44]: Is the custom measure expansion going to be added? will template be required?

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Comment [Jen45]: This can cause confusion, especially since deemed is listed in front of some items in measure characterization and not others.

Comment [ms46]: I suggest a footnote indicating what the group thought this principle of consistency was.

Comment [Jen47]: Recommend a subsection going through each of the headings listed in each measure characterization and explaining what each means and how utilities and DCEO (and perhaps evaluators) should use.. this list here may not be comprehensive

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Comment [Jen48]: These should be distinguished from each other and used consistently throughout the entire document. If inconsistencies are found between description and definition of equipment, which should prevail?

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Comment [Jen49]: I think the use of the term "deemed" in front of some (and not others) of the components of the measure characterization and algorithms is confusing. Would recommend removing

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CALCULATION OF ENERGY SAVINGS

ELECTRIC ENERGY SAVINGS

MID LIFE BASELINE ADJUSTMENT

HEATING PENALTY

SUMMER COINCIDENT PEAK DEMAND SAVINGS

NATURAL GAS SAVINGS

EXAMPLE

WATER IMPACT DESCRIPTIONS AND CALCULATION

DEEMED O&M COST ADJUSTMENT CALCULATION

VERSION DATE & REVISION HISTORY

Draft: Portfolio #
Effective date: Date TRM will become effective
End date: Date TRM will cease to be effective (or TBD)

2.6 TRM Update Process

Because technology is improving and markets are evolving, a TRM should change with them. Otherwise, the TRM will quickly become obsolete and the savings estimates will become less reliable. The need to update the TRM can be driven by a number of events, including but not limited to, the reasons listed below.

- Addition of new measure algorithms perceived to be reliable for TRM inclusion
- Updates to existing TRM measures due to changes in baseline equipment or practices, changes in efficient equipment or practices, changes to assumptions for algorithm parameter values (e.g., due to evaluation studies perceived to be more reliable and representative of Illinois conditions or new market research), and other changes
- Impact of code or legislative changes to specific measures
- Introduction of new technologies
- Discovery of errors in existing TRM measure characterizations
- Changes to industry standard practice
- Updates to the glossary and other front matter included in the TRM
- Updates to net-to-gross (NTG) ratios and other TRM appendices

The following sections outline the annual TRM Update Process, including roles and responsibilities for stakeholders

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Comment [Jen50]: I think the use of the term "deemed" in front of some (and not others) of the components of the measure characterization and algorithms is confusing. Would recommend removing

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Comment [Jen51]: Not sure if necessary, remove or refine language?

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in the TRM Update Process and a timeline for updating the TRM that is in sequence with the regulatory milestones that have already been set for future efficiency Plan filings.

2.6.1 Stakeholder Roles

Formal recommendations for TRM changes should be submitted in a standardized format (Appendix #) (along with all supporting workpapers) to the TRM Technical Advisory Committee (TAC) and TRM Administrator, concurrently. Although any party is free to recommend changes to the TRM, there are a set of stakeholders for which responsibilities can be specified (as shown below), and these responsibilities are officially adopted by the Commission upon approval of this TRM.

1. **Illinois Commerce Commission** (ICC or Commission, Regulator) – The Commission receives the TRM annually, and may at its own discretion, approve, modify, or deny proposed changes to the TRM and its applicability. The official version of the TRM shall be made available on the Commission's website.

2. **ICC Staff** (Commission Staff) – The ICC Staff has primary responsibility to make recommendations to the Commission. ICC Staff shall participate in the TRM Technical Advisory Committee, participate in the development of the annual TRM Update filing, and submit a Staff Report to the Commission annually to initiate the TRM Update proceeding.

3. **TRM Administrator** (Independent Consultant) – The TRM Administrator has primary responsibilities to manage changes to the TRM document, facilitate the TRM Technical Advisory Committee (TAC), coordinate with the SAG, serve as an independent technical resource, and manage a publicly accessible TRM website that contains TRM-related documents such as references, recommendations, responses, and versions of the TRM. The TRM Administrator shall review and respond[18] to all formal TRM recommendations submitted in the standardized format found in Appendix # (by a date specified in advance by the TRM Administrator), when updating the TRM for a specific program year. The TRM Administrator prepares the revised TRM document (redlined) each year for filing with the ICC based on recommended TRM changes vetted through the TRM TAC and the SAG. The TRM Administrator shall make any necessary revisions to the TRM to reflect the Commission Order from the annual TRM Update proceeding.

4. **Evaluators** (Evaluation Teams, Independent Consultants) – The Evaluators have primary responsibility pursuant to 220 ILCS 5/8-103(f)(7) and 220 ILCS 5/8-104(f)(8) to provide independent evaluations of the performance and cost effectiveness of the Utilities' and DCEO's energy efficiency portfolios. The Evaluators shall make recommendations for TRM changes that support this responsibility. The Evaluators shall conduct primary research to improve the reliability and credibility of the TRM values. The Evaluators shall collaborate with the Utilities and DCEO prior to the start of each program year to determine an appropriate balance of data collection that would enable the Utilities and DCEO to implement the TRM through their tracking systems while enabling the Evaluators to present TRM-verified energy savings estimates within the annual evaluation report, for the upcoming program year, while considering the administrative cost and participant burden associated with such data collection.

[18] The TRM Administrator's "response" to a formal recommendation for a TRM change shall explain whether the TRM Administrator has chosen to adopt/reject the formal recommendation (either in its entirety or as modified by the TRM Administrator) and the justification for the TRM Administrator's decision.

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Comment [Jen52]: Add contact information for interested parties to become part of the SAG and TAC.

Comment [Jen53]: TRM Change Recommendation/Request Form should be included somewhere in the TRM - perhaps have a link provided here to a public website (SAG?) to download form – would excel form facilitate a more efficient review process and tracking process over time for recommendations better than PDF format? – discussion around most user/reviewer friendly format should be included - if explanation expands blue area now in pdf – can you still see entire explanation when printing document? Should an excel version be used?
The TRM Change Request form should be vetted/discussed at a TRM meeting within input from VEIC and rest of parties (position of previous form may have changed given findings from comments – and discussion surrounding what should be specified within the form and what must be provided (work papers, directions for submittal) such that all necessary information is being provided to the TRM Administrator at the time of submittal to enable an easy review process. The goal is to ensure sufficient information is provided (to reduce the amount of back and forth between TRM Administrator and person making recommendation) to enable the TRM Administrator to actually respond to recommendation. A couple of potential changes are provided:
-Change Person Reporting to include Name of Person requesting change and their Company, e-mail address, and if they are submitting recommendation on behalf of any utility, then they can provide that as well.
-Currently the TRM Change Request Form only permits proposal of new measures and change to existing measure – would recommend allowing other options such as recommendations for changes to front matter, glossary, etc. .. perhaps indicate that "proposal of new measure" means there is no existing Measure Code upon which the recommendation could apply.
-Include a place for measure code
-Include a place that indicates the applicable T ...

Comment [Jen54]: Staff does not object to including the language suggested by Navigant below.. however, would still prefer to use "TRM-verified energy savings" instead of "verified deemed savings" because "deemed" savings is used in so many different contexts in the TRM that it has lost its original meaning TRM-verified contains more meaning.
Navigant suggests the following edit to the TRM Front Matter to make the evaluator role a bit more clear. This would be inserted into the definition of Evaluator in the TRM after the first sentence of Paragraph 1 of the Evaluator (Independent Consultant) paragraph in the Stakeholder Roles and Responsibilities Section (3.2) of the TRM: ...

5. **Utilities and DCEO** (Entities required by Illinois statute to achieve energy savings targets – 220 ILCS 5/8-103 and 220 ILCS 5/8-104) – The Utilities[19] and DCEO have primary responsibility to cost effectively meet the energy savings targets defined by Illinois statute by implementing energy efficiency programs. The Utilities and DCEO are also responsible for tracking program participation, reporting estimates of energy savings, estimating cost effectiveness, and implementing the TRM through their tracking systems. The Utilities and DCEO shall collaborate with the Evaluators prior to the start of each program year to determine an appropriate balance of data collection necessary to implement the TRM in the upcoming program year while considering the administrative cost and participant burden associated with such data collection. The Utilities and DCEO make recommendations for TRM Updates. The Utilities and DCEO shall present to the SAG, in addition to filing comments with the ICC in the annual TRM Update proceeding, information explaining how the TRM changes impact their energy efficiency portfolios.

6. **TRM Technical Advisory Committee** (TRM TAC) – The TRM Technical Advisory Committee has primary responsibility to provide a forum to allow all interested parties to recommend TRM changes and facilitate consensus for TRM changes among the Evaluators, ICC Staff, Utilities, DCEO, portfolio administrators, program implementers, interested stakeholders (e.g., SAG participants), and the TRM Administrator prior to the annual TRM Update proceeding. All recommendations for TRM changes shall be submitted to the TRM Technical Advisory Committee and TRM Administrator concurrently. For parties interested in participating in the TRM TAC, please contact .

7. **Illinois Energy Efficiency Stakeholder Advisory Group**[20] (SAG) – The Illinois Energy Efficiency Stakeholder Advisory Group reviews the TRM Administrator's recommended TRM Updates prior to the revised (redlined) TRM being filed with the ICC. Where consensus does not emerge in the TRM TAC regarding a particular TRM change, the SAG should provide a forum where experts on all sides of the contested issue should present their expert opinions in an effort to inform parties of the contested issue and to also facilitate consensus. The Commission defined the SAG to include "… the Utility, DCEO, Staff, the Attorney General, BOMA and CUB and representation from a variety of interests, including residential consumers, business consumers, environmental and energy advocacy organizations, trades and local government… [and] a representative from the ARES (alternative retail electric supplier) community should be included."[21] For parties interested in participating in the SAG, please contact the SAG Facilitator at Annette.beitel@futureenergyenterprises.biz.

Comment [Jen55]: Shall be made publicly available

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Comment [Jen56]: Not sure whether this should be someone from VEIC given the potential that TRM Administrator may change over time. Perhaps someone from one of the Utilities or someone expected to be around for a long time? Suggestions welcome.

Contact info should be included in acknowledgement section of TRM (first page) for easy reference

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[19] The Illinois Utilities subject to this TRM include: Ameren Illinois Company d/b/a Ameren Illinois (Ameren), Commonwealth Edison Company (ComEd), The Peoples Gas Light and Coke Company and North Shore Gas Company (Integrys), and Northern Illinois Gas Company d/b/a Nicor Gas (Nicor).

[20] http://www.ilsag.org/home

[21] Docket No. 07-0540, Final Order at 32-33, February 6, 2008. http://www.icc.illinois.gov/downloads/public/edocket/215193.pdf

Table 2.5: Specific Responsibilities of Each Stakeholder in the TRM Update Process

Entity	Responsibilities involved in the TRM Update Process
ICC	• At its discretion, the ICC may approve, modify, or deny requests for changes to the TRM or how it is applied. • An official version of the updated TRM will be available on the Commission's website.
ICC Staff	• Makes recommendations to the Commission to approve, modify, or deny requests for changes the TRM or how it is applied. • Recommends TRM changes to the TRM Technical Advisory Committee and TRM Administrator. • Submits a Staff Report to the Commission annually to initiate the TRM Update proceeding.
TRM Administrator	• Manages the TRM. • Facilitates and reviews recommendations from other parties as part of the TRM Technical Advisory Committee forum. • Acts as an independent technical resource. • Identifies and recommends TRM changes based on ongoing reviews of measures and markets. • Maintains independence from the Utilities and DCEO. • Coordinates with the SAG.
Evaluator	• Provides rigorous reviews of savings algorithms, inputs, and program designs. • Identifies and recommends TRM changes as part of the annual evaluations. • Provides recommendations to the TRM Administrator and TRM TAC regarding adding, changing, and deleting measures in the TRM. • Identifies and recommends changes based on ongoing reviews of measures and markets. • Coordinates with other evaluation teams. • Maintains independence from the Utilities and DCEO. • Offers a professional opinion on other parties' recommendations, when requested.
Utilities and DCEO	• Updates their tracking systems to ensure the necessary data is being collected to implement the TRM. • Provides recommendations to the TRM Administrator and TRM TAC regarding adding, changing, and deleting measures in the TRM. • Documents the recommendations, performs sensitivity analysis, and justification work. • The Utilities and DCEO shall present to the SAG, in addition to filing comments with the ICC in the annual TRM Update proceeding, information explaining how the TRM changes impact their energy efficiency portfolios.
TRM Technical Advisory Committee (TRM TAC)	• Provides a statewide forum where recommended changes to the TRM are processed. • Provides a forum to facilitate consensus for the recommended changes to the TRM. • Anyone may participate in the TRM TAC and recommend changes to the TRM.
Illinois Energy Efficiency Stakeholder Advisory Group (SAG)	• Provides a statewide forum to review the TRM Administrator's recommended changes to the TRM prior to filing the TRM Update with the ICC. • Provides a forum to review the impacts that the TRM Update will have on the Utilities' and DCEO's energy efficiency portfolios. • Where consensus does not emerge in the TRM TAC regarding a particular TRM change, the SAG should provide a forum where experts on all sides of the contested TRM issue should present their expert opinions in an effort to inform parties of the contested issue and to also facilitate consensus.

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Comment [Jen57]: Not sure if this table is really needed?

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2.6.2 TRM Implementation Cycle, Timeline, and Update Process

Changes in technology and markets necessitate a periodic, structured TRM Update Process. The TRM Update Process needs to be aligned with Illinois' existing program planning and implementation cycles. The cycles are summarized in the following two tables.

Table 2.6: Efficiency Plan Filing Periods

Plan	Electric Plan Filing Date	Electric Plan Approval Date	Applicable Electric Program Year (EPY)	Applicable Gas Program Year[22] (GPY)	TRM Application for Plan Filing Purposes
1	Nov-07	Feb-08	PY1 – PY3		
2	Oct-10	Dec-10	PY4 – PY6	PY1 – PY3	
3	Sep-13	Feb-14	PY7 – PY9	PY4 – PY6	Commission-approved TRM as of 6/1/2013

Table 2.7: TRM Implementation Cycle

Plan	EPY	GPY	Effective Start Date	End Date	TRM Application	TRM Tracking System Code
1	1		6/1/2008	5/31/2009	The TRM does not apply to this Plan Period.	
1	2		6/1/2009	5/31/2010		
1	3		6/1/2010	5/31/2011		
2	4	1	6/1/2011	5/31/2012	The TRM does not apply to EPY4/GPY1.	
2	5	2	6/1/2012	5/31/2013	TRM finalized as of 6/1/2012 applies to EPY5/GPY2.	120601
2	6	3	6/1/2013	5/31/2014	TRM finalized as of 3/1/2013 applies to EPY6/GPY3.	130601
3	7	4	6/1/2014	5/31/2015	TRM finalized as of 3/1/2014 applies to EPY7/GPY4.	140601
3	8	5	6/1/2015	5/31/2016	TRM finalized as of 3/1/2015 applies to EPY8/GPY5.	150601
3	9	6	6/1/2016	5/31/2017	TRM finalized as of 3/1/2016 applies to EPY9/GPY6.	160601

The Commission-approved TRM as of June 1st, 2013 shall be used in preparation of the Utilities' and DCEO's energy efficiency Plans filed with the Commission in 2013 (for measures that fall under the TRM measure characterizations). The Utilities and DCEO are permitted to use additional assumptions other than those contained within the TRM in their Plan filings, provided they include a description of why they believe deviation from the TRM is appropriate (e.g., a particular measure may be in the process of getting updated in the TRM at that time); however, they must also show planning estimates from using the TRM assumptions for comparison purposes.

The process of incorporating new and better information into the TRM occurs annually. Prior to the start of the program year for which the Updated TRM will be in effect, the Utilities and DCEO will make portfolio adjustments and tracking system updates based in part on changes reflected in the Updated TRM; thus, efforts will be made to have the Updated TRM approved by the Commission by March 1st of each program year to provide the Utilities and DCEO adequate time for making these pre-program year changes.

[22] Note that there is no statutory deadline for the approval of gas efficiency plans.

Comment [Jen58]: "Cycle" here may be confusing because there are 3 Cycles listed here, yet the TRM will actually be updated multiple times within a cycle.

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Comment [Jen59]: We need to indicate which TRM version is required to use in the Plan filing… is it feasible to require the TRM finalized as of 3/1/2013?

Comment [Jen60]: "Cycle" here may be confusing (unless Cycle is changed in table below – I changed it) because there are 3 Cycles listed here, yet the TRM will actually be updated multiple times within a cycle.

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Comment [Jen61]: TRM Effective Date 120601 (within Measure Code)

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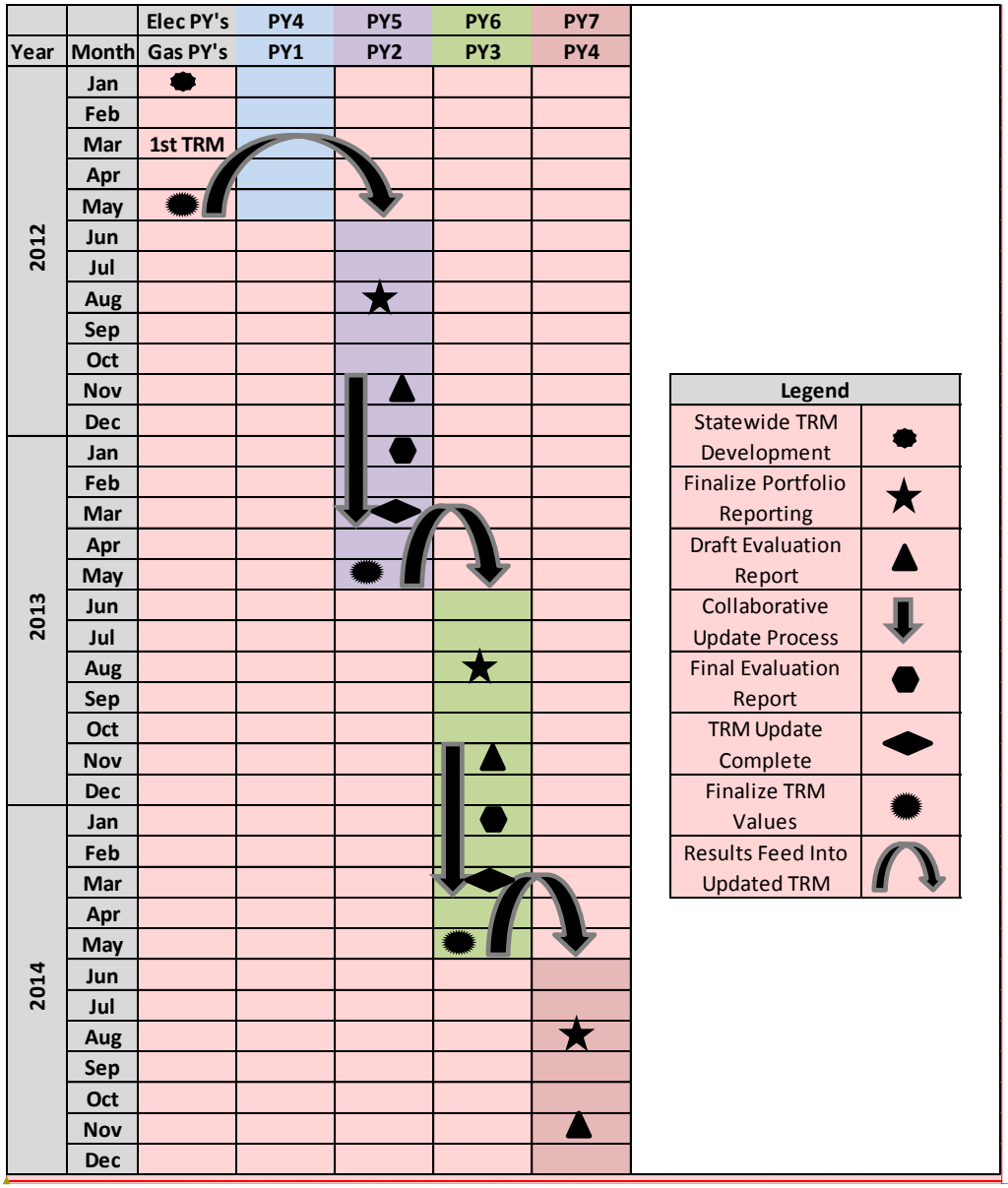
Figure 1: Timeline and Milestones of the TRM Update Process



Comment [Jen62]: Distinguish between evaluation activities, TRM activities, and implementation activities that are relevant to a particular program year but may actually occur during the time period of a different program year. Implementation activities for PY6 should show up in PY6 (or a little after for reporting), the TRM activities for PY6 would show up before the start of PY6 but the TRM would be applicable during PY6, PY6 evaluation activities would show up after PY6.

Revise timeline:
Recommend including VEIC recommended last date for receiving TRM updates from parties to work with a TRM approval by the Commission by March 1st—so an updated TRM would probably need to be ready by the middle of January.

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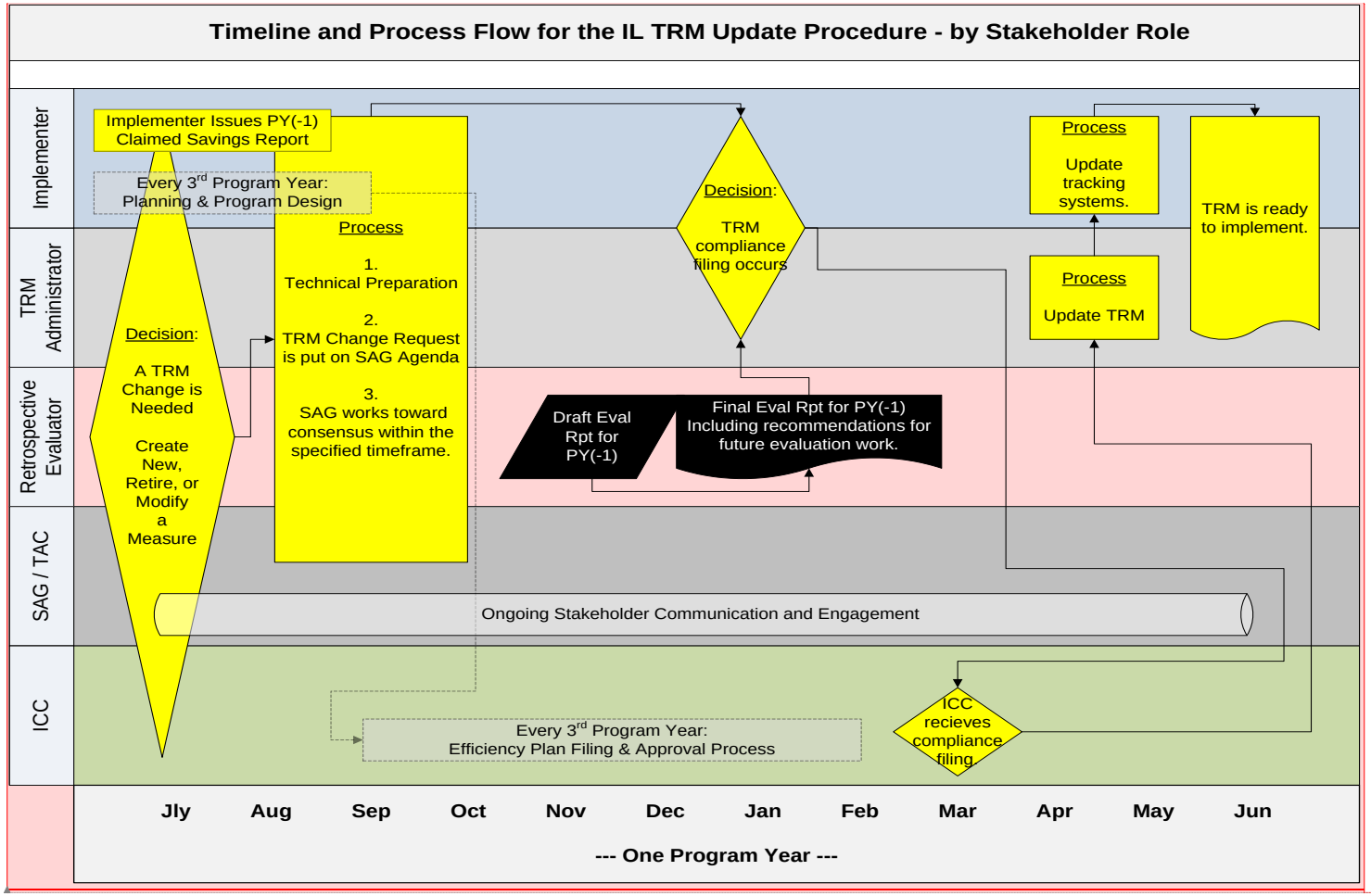
Figure 2: Timeline and Process Flow of the TRM Update Process by Stakeholder



Comment [Jen63]: Please revise figure.
Revise timeline:
Recommend including VEIC recommended last date for receiving TRM updates from parties to work with a TRM approval by the Commission by March 1st—so an updated TRM (vetted already) would probably need to be ready by the middle of January.

The 'TRM change is needed' box (probably should not be classified as "Decision") really spreads across many months – parties should feel free to file TRM change recommendations with TRM TAC and Administrator at any time, however, I think TRM Administrator needs to have a cut off date for the last day upon which the TRM administrator will accept a formal recommendation for inclusion in the following years TRM update… parties can submit recommendations past that date of course, however, there would be no guarantee that the recommendation would be considered for inclusion in the upcoming program year's TRM.

I would envision the "process" working different than envisioned here… there may be many TRM change recommendations (some minor such as errors), the TRM administrator can decide when it should process them all (if cost effective to do so throughout the year then that's fine, or perhaps administrator may wait until November and then process all of the recommendations at once), the TRM Administrator would provide responses to each formal recommendation as identified in the stakeholder roles and responsibilities section. Then TAC meetings are held to discuss issues, then if consensus is not reached the item will be put on SAG agenda and at the SAG meeting it will include presentations from experts describing all sides of the contested issue to aid in achieving consensus. Regardless of whether consensus is reached on all issues at the TAC meetings, the TRM Administrator shall present the proposed changes to the TRM at a SAG meeting prior to filing the updated TRM with the ICC (and with adequate time to incorporate any recommendations that occur at the SAG meeting …

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2.7 Energy Efficiency Plan Filings with the Commission

2.7.1 Plan Filing Assumptions and Program Design

~~2.2 High Impact Measures~~

~~The measures that are expected to collectively account for at least 80% of statewide energy savings are considered high impact measures. The following tables list these measures by market sector and show the section in which they may be found.~~

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Comment [Jen64]: This section seems like it is in the wrong section.

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Table 2.4: Commercial High Impact Measures

3	4	End Use	5	Technology / Measure
6	7	Food	8	Commercial Steam Cooker
9	10	Food	11	High Efficiency Pre-Rinse Spray
12	13	HVAC	14	Boiler Tune-up
15	16	HVAC	17	Boiler Lockout/Reset Controls
18	19	HVAC	20	High Efficiency Boilers
21	22	HVAC	23	High Efficiency Furnace
24	25	HVAC	26	Steam Trap Replacement or
27	28	HVAC	29	Variable Speed Drives for HVAC
30	31	Lighting	32	CFL
33	34	Lighting	35	ILED
36	37	Lighting	38	High Performance T8 Fixtures
39	40	Lighting	41	T5
42	43	Lighting	44	Lighting Controls
45	46	Lighting	47	Lighting Power Density
48	49	Lighting	50	LED Traffic and Pedestrian
51	52	Hot	53	Tankless Water Heater

Table 2.5: Non-Commercial (Residential) High Impact Measures

54	55	End Use	56	Technology / Measure
57	58	Applian	59	Clothes Washer
60	61	Applian	62	Refrigerator & Freezer Recy.
63	64	Hot	65	High Efficiency Water Heater
66	67	Hot	68	Heat Pump Water Heater
69	70	Hot	71	Faucet Aerator
72	73	Hot	74	Low Flow Showerhead
75	76	HVAC	77	Air Source Heat Pump
78	79	HVAC	80	Central Air Conditioning
81	82	HVAC	83	Furnace Blower Motor
84	85	HVAC	86	High Efficiency Boiler
87	88	HVAC	89	High Efficiency Furnace
90	91	HVAC	92	Programmable Thermostat
93	94	Lighting	95	Standard CFL
96	97	Lighting	98	Specialty CFL
99	100	Lighting	101	LED
102	103	Shell	104	Air Sealing
105	106	Shell	107	Wall and Ceiling Insulation
108	109	Shell	110	Basement Sidewall Insulation

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The TRM's Relationship to Existing Processes and Stakeholders

Because this is the first statewide TRM, its relationship to existing processes is not yet clearly defined, nor is the role of each stakeholder in the SAG completely known. This section outlines what processes the TRM impacts and how it is expected to relate to those processes. It also outlines the roles and responsibilities that each stakeholder holds in the context of these interrelated processes.

110.1 Enabling ICC Policy

The Illinois Stakeholder Advisory Group was defined in the Ameren Illinois and ComEd Orders (dockets 07-0539 and 07-0540) as "… representatives from Ameren, DCEO, Staff, the Attorney General, and CUB and representation from a variety of interests including residential consumers, business consumers, environmental and energy advocacy organizations, trades and local government. "

In reference to the SAG and the TRM process, the Ameren Illinois Order (docket 10-0568) states, "With regard to any suggestion that the SAG should have ultimate responsibility for development of the TRM, Ameren and the SAG should work toward the development of the TRM together". The Ameren Illinois Order on Rehearing (docket 10-0568) states, "The Commission directs that Ameren will work with other utilities subject to the requirements of Section 8-103 and 8-104 of the PUA and the SAG to develop a statewide TRM for use in the upcoming energy efficiency three-year plan cycle.

The ComEd Commission Finding states "We agree that a TRM can provide substantial benefits to the EEP going forward, and the Commission directs that ComEd will work with other utilities subject to the requirements of Section 8-103 and 8-104 of the PUA and the SAG to develop a statewide TRM in the 10-0570 60 future."

Finally, the Nicor and Integrys Commission finding states, ""Also consistent with our rulings in other recent dockets, the Commission agrees that the development of a TRM will be valuable. We direct the Utilities to coordinate with other utilities, DCEO and SAG participants to develop a statewide manual."

110.1.1 Filing the TRM with the ICC

None of the Orders state a requirement for the Commission to approve the TRM. As a result, the TRM is expected to be filed with the ICC as a joint, informational filing on the part of the Program Administrators prior to the beginning of each Program Year (PY).

110.1.2 Program Administrator Discretion with respect to the TRM

Consistent with Commission policy, the Program Administrators and DCEO have the flexibility to add, change or retire measures from their programs unilaterally as markets, technology and evaluation results change. This does not mean that a Program Administrator may make unilateral changes to the TRM itself, however. Only the TRM Administrator, working through the SAG, can make a change to the TRM.

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Comment [Jen65]: This needs to move to the very front of the TRM and also links and citations to the Commission orders need to be provided.

Comment [Jen66]: no

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Comment [Jen67]: This statement is of concern. Only the Commission can approve changes to the TRM.

110.1.3 SAG Consensus on TRM Development

Each Utility's Order enables it to implement energy efficiency programs and also provides guidance concerning the TRM. Generally speaking, these Orders describe the TRM's creation and maintenance as being a collaborative process between the Utilities (who in this context are also efficiency Program Administrators[23]) and the SAG.

As a result and as a document that applies statewide, the TRM has been and will continue to be developed through a collaborative consensus using the SAG process[24]. As consensus develops, the TRM Administrator will include the changes in the next version of the TRM[25]. In cases where consensus does not emerge out of the SAG process, the Program Administrators may proceed with their program and measure implementation consistent with section 3.1.2

Stakeholder Roles and Responsibilities

Each stakeholder in the SAG has a role to play in the ongoing TRM development process, and these roles are categorized into six discrete roles and a series of responsibilities that need to be filled to manage changes to the TRM.

1. **Evaluator** (Independent Consultant) – Whose primary responsibility pursuant to 220 ILCS 5/8-103(f)(7) and 220 ILCS 5/8-104(f)(8) is to provide independent evaluations of the performance and cost effectiveness of the Program Administrators' energy efficiency portfolios. The Evaluator may also make recommendations for TRM changes that support this responsibility. The Evaluator conducts primary research to help improve the reliability and credibility of the TRM values and collaborates with the Program Administrator prior to the start of each program year to determine an appropriate balance of data collection in the upcoming program year to support these evaluations while minimizing unnecessary administrative cost and burden.

2. **ICC Staff** – Whose primary responsibility is to make recommendations to the Commission, participate in the development in the annual TRM compliance filing and participate in the SAG's TRM Technical Advisory Committee.

3. **Illinois Commerce Commission** (ICC or Commission or Regulator) – Who receives the TRM annually as a joint informational filing from the Program Administrators, and may at its own discretion, approve, modify, or deny proposed input or algorithmic changes to the TRM. **ICC Staff** – Whose primary responsibility is to make recommendations to the Commission, participate in the development in the annual TRM compliance filing and participate in the SAG's TRM Technical Advisory Committee.

[23] Note that DCEO is also a Program Administrator who was enabled to operate programs by the ICC pursuant to 220 ILCS 5/8-103(c) and 220 ILCS 5/8-104(c).

[24]

25 The TRM Administrator's role has not been firmly established, but has been implied by the ICC staff's comments.

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Comment [Jen68]: no

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4. **TRM Administrator** (Independent Consultant) – Whose primary responsibility is to manage changes to the TRM document, facilitate the TRM Technical Advisory Committee (TAC), and serve as an independent technical resource. The TRM Administrator updates the TRM each year to reflect Commission Orders and SAG input from the TRM Update proceedings.

5.

6. **Program Administrator (Program Administrators and DCEO)** – Whose primary responsibility is to cost effectively meet the energy savings targets set by the Commission by implementing programs, tracking and reporting savings, estimating cost effectiveness and implementing the TRM through its tracking system. The Program Administrators are also key stakeholders in the SAG and TAG processes who also are expected to make recommendations for TRM Updates. As authorized by ICC orders approving Energy Efficiency Plans, the Program Administrators have flexibility to add, change, and retire measures, regardless of whether or not measures are included in the TRM.

7. **TRM Administrator** (Independent Consultant) – Whose primary responsibility is to manage changes to the TRM document, facilitate the TRM Technical Advisory Committee (TAC), and serve as an independent technical resource. The TRM Administrator updates the TRM each year to reflect Commission Orders and SAG input from the TRM Update proceedings.

8. **TRM Technical Advisory Committee** (TAC) – The TAC is a subcommittee of the SAG whose primary responsibility is to provide a forum to facilitate consensus for TRM changes among the Program Administrators, portfolio administrators, program Program Administrators, evaluators, and other stakeholders.

9. **Other Stakeholders** – Who may participate in the SAG or TAC as directed by the Program Administrators.

110.1.4 Stakeholder Roles in the context of Updating the TRM

The TRM will need to be updated to reflect ongoing changes in Illinois' energy efficiency market; specifically, whenever a new measure or technology is being proposed and anytime an existing measure changes or is retired. The need to update a measure within the TRM can be driven by a number of events, including but not limited to:

- Results of program evaluations
- Impact of code or legislative changes to specific measures
- Introduction of new technologies
- Discovery of errors in existing measures

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Comment [Jen69]: pursuant to statute

Comment [Jen70]: this is unnecessary and causes confusion.. it should be obvious that implementing a measure in practice and defining the parameters of the measure for savings are separate functions

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Table 3.6: Specific Responsibilities of Each Stakeholder in the TRM Update Procedure

111 Role	Change Existing Measure (1)[26]
Evaluator (Consultant)	• Provides rigorous reviews of savings algorithms, inputs and program designs. • Offers a professional opinion on other parties' recommendation. • Reviews and suggests changes to the recommendation. • Identifies and recommends changes as part of the annual evaluations. • Provides recommendations to the TRM Technical Advisory Committee and TRM Administrator. • Identifies and recommends changes based on ongoing reviews of measures and markets. • Coordinates with other Program Administrators' evaluation teams.
ICC (Regulator)	• At its discretion, the ICC may approve, modify or deny requests for TRM input and algorithm assumptions or how the TRM is applied.
ICC Staff	• Make recommendations to approve, modify or deny requests for TRM input and algorithm assumptions or how the TRM is applied.

[26] In the event that a measure must be retired, this general category and are not listed separately as a result.

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~~111 Role~~	~~Change Existing Measure (1)~~[26]
~~Program Administrator (Program Administrator)~~	~~• Updates its tracking systems and modifies its measure calculations, and provides measure update recommendations.~~ ~~• Documents the recommendation, performs analysis and justification work.~~ ~~• Provides recommendation in a standardized format agreed to by parties along with supporting workpapers.~~ ~~• Facilitates review process with Evaluator.~~ ~~• Facilitates review process with other Illinois Program Administrators/Program Administrators and their evaluation teams.~~
~~TRM Administrator (Independent Consultant)~~	~~• Manages the TRM.~~ ~~• Facilitates and reviews recommendations from other parties as part of the TRM Technical Advisory Committee forum.~~ ~~• Acts as an independent technical resource to the SAG/TAC.~~
~~TRM Technical Advisory Committee (TAC)~~	~~• Provides a forum to facilitate consensus for the recommended changes.~~

The Commission-approved TRM as of June 1st, 2013 shall be used in preparation of the Utilities' and DCEO's energy efficiency Plans filed with the Commission in 2013 (for measures that fall under the TRM measure characterizations). The Utilities and DCEO are permitted to use additional assumptions other than those contained within the TRM in their Plan filings, provided they include a description of why they believe deviation from the TRM is appropriate (e.g., a particular measure may be in the process of getting updated in the TRM at that time); however, they must also show planning estimates from using the TRM assumptions for comparison purposes.

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~~111.1 The TRM's Relationship to Program Planning~~

~~Some of the characterizations provided may have impacts on preexisting program designs and planning, most notably when an existing measure has been identified for retirement due to a baseline change. Because the TRM is intended to be a statewide document that is as accurate as possible with respect to the current state of technology, the characterizations presented are not limited to those measures included in existing program designs and planning. Instead, the TRM provides an in-depth characterization of the technologies, without the varied constraints of the existing programs. As a result, Program Administrators can select measures that are applicable to their programs and may not need to include every measure presented in this TRM.~~

~~The TRM will have a role in program planning. For example, the claimed savings that are used in program planning should match the TRM, unless the utility provides a description of why they deviate from the TRM or that particular measure is currently being updated. Furthermore, it is recommended that any new prescriptive measure(s) that is (are) proposed in a program plan be submitted for inclusion in a subsequent version of the TRM. As a result, the relationship between program planning and the TRM is bidirectional; the TRM is both informed by, and informs, program planning.~~

Some of the measure characterizations provided in the TRM may have impacts on pre-existing program designs and planning, most notably when an existing measure's savings has been significantly reduced due to a baseline change. Because the TRM is intended to be a statewide document that is as accurate as possible with respect to the current state of technology, the characterizations presented are not limited to those measures included in Utilities' and DCEO's existing program designs and planning. Instead, the TRM provides an in-depth characterization of the technologies, without the varied constraints of the existing programs. As a result, the Utilities and DCEO likely will not implement every measure presented in this TRM; however, for the measures they do plan to implement that fall under the TRM measure characterizations, the Utilities and DCEO must implement the TRM through their tracking systems, as described further below.

2.8 Utilities and DCEO Tracking Systems

For each energy efficiency measure implemented that falls appropriately within a TRM measure description/characterization, the Utilities and DCEO must implement the TRM measure through their energy efficiency tracking systems by collecting the necessary data[27] and tracking the measure codes applicable to the TRM measures.

If the Utilities or DCEO decide that they have a strong and documented case for calculating the prescriptive measure savings based on their own prescriptive savings inputs and algorithms, then they may report their recommended savings estimates to the ICC, provided they include a description of why they believe deviation from the TRM is appropriate (e.g., the utility may have undertaken a new evaluation study that provides a new parameter value that is better supported or more applicable to the local conditions – in this event, the utility would report this decision and the results and submit the change to the TRM Administrator and TAC as part of the TRM Update Process); however, notwithstanding the aforementioned flexibility, the Utilities and DCEO must also report the prescriptive measure savings estimates using the TRM assumptions for comparison purposes.

2.9 Annual Independent ~~The TRM's Relationship to~~ Evaluations

~~111.2~~2.9.1 TRM-Verified Savings versus Independent Evaluator-Recommended Savings Estimates

[27] The Utilities and DCEO shall collaborate with the Evaluators prior to the start of each program year to determine an appropriate balance of data collection necessary to implement the TRM in the upcoming program year while considering the administrative cost and participant burden associated with such data collection.

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Evaluators shall present TRM-verified savings estimates within the evaluation reports of the Utilities' and DCEO's energy efficiency portfolios. As required by statute, the Evaluators shall also present independent estimates of energy savings achieved in the Utilities' respective service territories. To the extent the TRM-verified estimates differ from the independent Evaluator's recommended savings estimates, both values shall be provided in the annual independent evaluation report required pursuant to 220 ILCS 5/8-103(f)(7) and 220 ILCS 5/8-104(f)(8). ~~Evaluation results are considered the most accurate source of information available in the context of prescriptive savings calculations and are the preferred source of information during the TRM Update Procedure.~~ Evaluation results for each Utility will be applied ~~prospectively,~~ in accordance with the ~~the policies established by the~~ ICC Order from that Utility's respective docketed proceeding regarding 'investigation into compliance with efficiency standard requirement of Section 8-103 (or 8-104) of the Public Utilities Act'[28] [29].

The Evaluators have primary responsibility pursuant to 220 ILCS 5/8-103(f)(7) and 220 ILCS 5/8-104(f)(8) to provide annual independent evaluations of the performance and cost effectiveness of the Utilities' and DCEO's energy efficiency portfolios. The Evaluators shall make recommendations for TRM changes that support this responsibility within the annual evaluation reports and through the TRM TAC process. The Evaluators shall conduct primary research to improve the reliability and credibility of the TRM values. Evaluation results are one source of information that may be used during the TRM Update Process. Evaluation results should be processed through the collaborative TRM Update Process.

The Evaluators shall collaborate with the Utilities and DCEO prior to the start of each program year to determine an appropriate balance of data collection that would enable the Utilities and DCEO to implement the TRM through their tracking systems while enabling the Evaluators to present TRM-verified energy savings estimates within the annual evaluation report, for the upcoming program year. The determination of this data collection will likely inform the evaluation plans for the upcoming program year.

~~When being applied prospectively, evaluation results should be processed through the TRM Update Procedure and the collaborative SAG process. When being applied retrospectively, evaluation results can be incorporated into the TRM during the current Program Year either by consensus or through an ICC Order.~~

~~Because the application and contents of the TRM are the subject of ongoing, annual evaluations, polices and processes must be established to handle the myriad circumstances that will inevitably arise during the course of implementing and evaluating a measure. ICC Orders and/or an Evaluation Plan can provide a framework to handle specific applications of evaluation data such as how and when evaluation results are used to adjust claimed savings reports and/or the TRM itself.~~

~~111.2.1~~2.9.2 ~~Evaluation Reports and~~ Errors in the TRM ~~(Substantial Edit Still Needed)~~

If an error, omission, or assumption which differs significantly from actual program findings is found in the TRM ~~in the middle of a program year~~ that results in an unreasonable savings estimate, the ~~utilities~~Evaluators for the Utilities and DCEO ~~and their evaluation teams~~ should work together to agree upon a solution that will result in a

[28] ~~Note that custom measure savings claims may be adjusted retrospectively. However, the prescriptive measures savings claims resulting from application of this TRM may only be changed prospectively.~~

[29] For example, ICC Docket No. 10-0520 is one such docket and is applicable to ComEd. http://www.icc.illinois.gov/docket/Documents.aspx?no=10-0520 Investigation into compliance with the efficiency standard requirement of Section 8-103 of the Public Utilities Act

Comment [Jen73]: Staff does not object to including the language suggested by Navigant below.. however, we would still prefer to use "TRM-verified energy savings" instead of "verified deemed savings" because "deemed" savings is used in so many different contexts in the TRM that it savings is more intuitive.

Navigant suggests the following edit to the TRM Front Matter to make the evaluator role a bit more clear. This would be inserted into the definition of Evaluator in the TRM after the first sentence of Paragraph 1 of the Evaluator (Independent Consultant) paragraph in the Stakeholder Roles and Responsibilities Section (3.2) of the TRM:

Existing text:
Stakeholder Roles and Responsibilities
...
"Evaluator (Independent Consultant) - Whose primary responsibility pursuant to 220 ILCS 5/8-103(f)(7) and 220 ILCS 5/8-104(f)(8) is to provide independent evaluations of the performance and cost effectiveness of the Program Administrators' energy efficiency portfolios."

Add this text after the previous sentence:
"Pursuant to the independent evaluator responsibilities in Illinois, the evaluator shall continue to conduct ex ante and ex post measurement and verification of public utility energy efficiency programs to properly evaluate the performance and cost effectiveness of energy efficiency programs. Measurement and verification refers to evaluation of a representative sample from a program population for the purposes of calculating ex post gross and net energy and demand savings from that sample and then extrapolating from the sample to calculate program level ex post gross and net energy and demand savings. The evaluator will calculate verified deem ...

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Comment [ms74]: Was there discussion about whether errors in the TRM are applied retrospectively or prospectively?

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Comment [RD75]: Should this be done through SAG?

Comment [KK76]: Seems a bit arduous.

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reasonable savings estimate for presenting in the evaluation reports. The ~~evaluation teams~~Evaluators ~~may~~ shall use this ~~alternative~~ solution ~~to estimate~~ when estimating TRM-verified energy savings during the annual program evaluation, but must also show the Commission-adopted TRM estimates, if feasible. ~~They~~ The Evaluators should provide sufficient justification for using the ~~alternate~~ solution within ~~a memo~~the evaluation report (perhaps as an appendix). The error in the TRM will be officially fixed through the annual TRM Update Process.

In the event that agreement cannot be reached among the ~~parties~~ Evaluators on a single solution, the ~~evaluation teams~~Evaluators will indicate which solution they ultimately recommend for use in the TRM-verified energy savings estimates and will include sufficient justification for the solution ~~through a measure update memo~~within the evaluation report. Within the evaluation report, ~~T~~the ~~evaluation team~~Evaluators should include a discussion of why they believe their recommended solution ~~ultimately recommended~~ provides more reasonable estimates of ~~f~~ energy savings in comparison to the solutions recommended/adopted by the other ~~evaluation teams~~Evaluators (i.e., they should point out the flaws in all of the ~~algorithms~~ solutions ~~proposed~~adopted by Illinois Evaluators) ~~and the TRM~~. To provide transparency and encourage consistent application of the TRM in the presentation of TRM-verified savings estimates within the evaluation reports, it is necessary for the Evaluators to present the TRM-verified energy savings estimates using their recommended solution, the other Illinois Evaluators' recommended/adopted solution(s), and the Commission-adopted TRM estimates (if feasible), within the evaluation report. The error in the TRM will be officially fixed through the annual TRM Update Process.

Errors found in the TRM will be officially corrected through the annual TRM Update Process.

~~TRM Update Process & Timeline~~

~~Because technology is constantly improving, a TRM must be a living document that keeps pace with it. Otherwise, the TRM will quickly become obsolete and the savings estimates will become inaccurate. The following sections propose a procedure and timeline for updating the TRM that is in sequence with the regulatory milestones that have already been set for future efficiency plan filings.~~

~~111.3 The Regulatory Schedule for Energy Efficiency Programs~~

~~Because technology and markets are so dynamic, a structured and ongoing update process for the TRM is necessary. Because the update process needs to be aligned with Illinois' existing program planning and implementation cycles, these cycles are summarized in the following two tables.~~

~~Table 4.1: Efficiency Plan Periods~~

~~112 cycle~~	~~113 Plan Filing Date~~	~~114 Electric Plan~~	~~115 Applicable Electric Program~~	~~116 Applicable Gas Program Years[30]~~
~~117~~	~~118 No~~	~~119 Feb~~	~~120 PY1 – PY3~~	
~~2~~	~~Oct 10~~	~~Dec 10~~	~~PY4 – PY6~~	~~PY1 – PY3~~
~~3~~	~~Sep 13~~	~~Feb 14~~	~~PY7 – PY9~~	~~PY4 – PY6~~

~~[30] Note that there is no statutory deadline for the approval of gas efficiency plans.~~

Comment [Jen77]: should this vary depending on whether this error is found at the time of the evaluation versus in the middle of the program year? Should TRM Administrator be included and TAC process?

Comment [78]: This is generally unreasonable and does not add value to an evaluation report, but does add cost.

Jen: disagree with this comment

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Table 4.2: TRM Implementation Cycle[31]

121 Cycle	122 PY	123 CPY	124 Begins	125 Ends	126 Notes
1	1		6/1/2008	5/31/2009	The TRM does not apply to this cycle.
1	2		6/1/2009	5/31/2010	
1	3		6/1/2010	5/31/2011	
2	4	1	6/1/2011	5/31/2012	The TRM does not
2	5	2	6/1/2012	5/31/2013	TRM finalized as of
2	6	3	6/1/2013	5/31/2014	TRM finalized as of
3	7	4	6/1/2014	5/31/2015	TRM finalized as of
3	8	5	6/1/2015	5/31/2016	TRM finalized as of
3	9	6	6/1/2016	5/31/2017	TRM finalized as of

The TRM update procedure occurs continuously throughout any program year. In recognition of portfolio adjustments that need to be made due to TRM results, TRM results that are finalized as of March 1 of any program year will be in effect for the evaluation and determination of program year savings for the following program year. As part of the SAG and the SAG technical committee, ICC Staff will also have the opportunity to review the TRM prior to it being in effect for the following program year. Whenever there is dissension regarding the TRM, a party can petition the Commission for a ruling or ask that it be addressed in a docketed proceeding.

126.1 Update Timeline and Process

The TRM update procedure occurs over the course of one complete implementation cycle which is three years in duration. Because the evaluation and update cycle cannot begin without one prior year of performance data, these activities take place during the second program year in the implementation cycle. This means that the evaluation results from the first program year will be put into effect for the first time at the beginning of the third planning year. However, it should be noted that it is appropriate and expected that any completed evaluation be

[31] It is assumed the prospective application of the March 1 TRM will occur continuously until policy dictates otherwise. In the spirit of collaboration and support of the TRM process and due to the current 2012 transition process of completing the TRM, there will be an exception to the March 1 dating where TRM results that are finalized as of June 1, 2012 will be in effect for the evaluation of PY5.

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~~considered and/or incorporated into the TRM as they become available.~~

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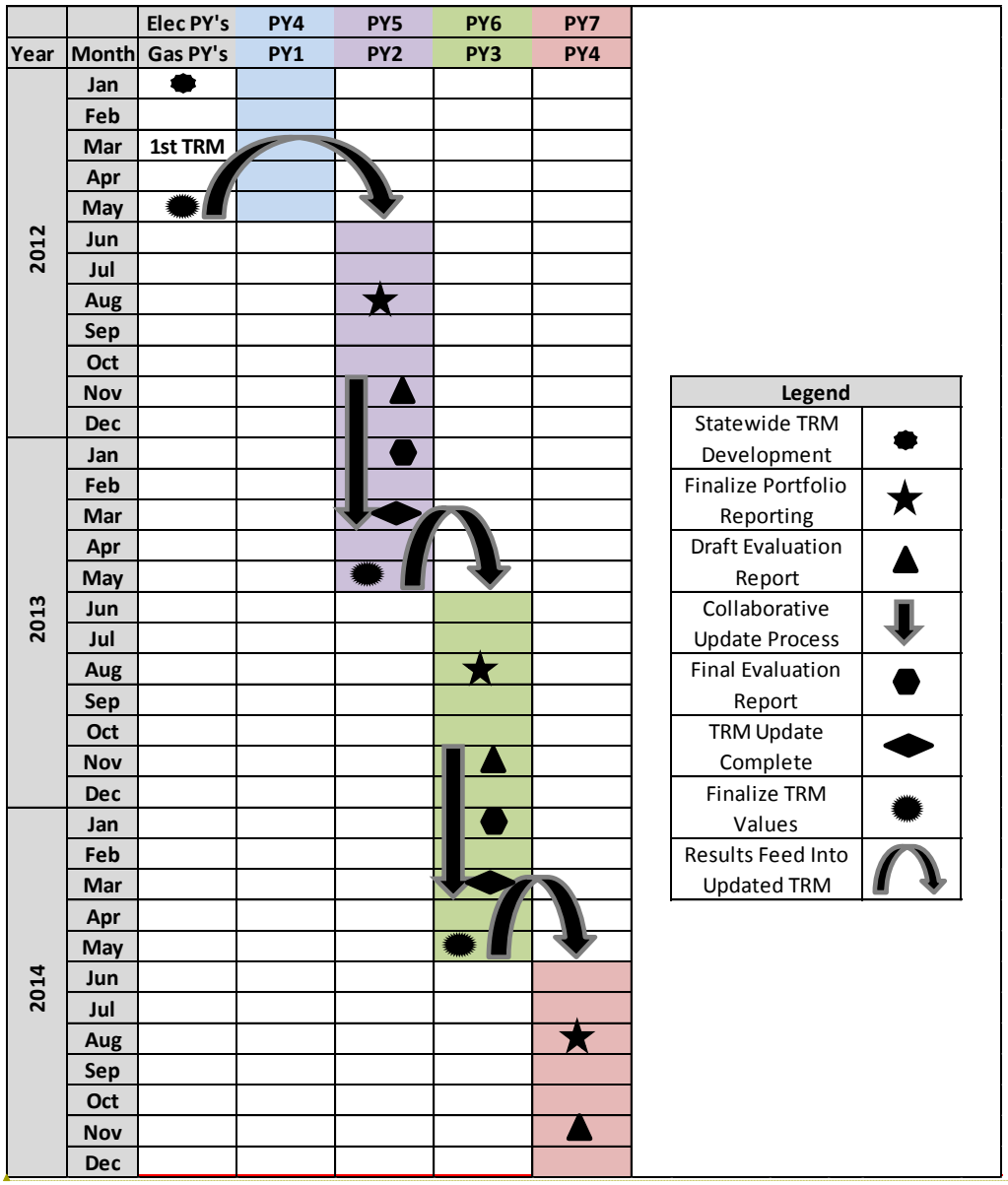
~~Figure 1: Timeline and Milestones of the TRM Update Procedure~~



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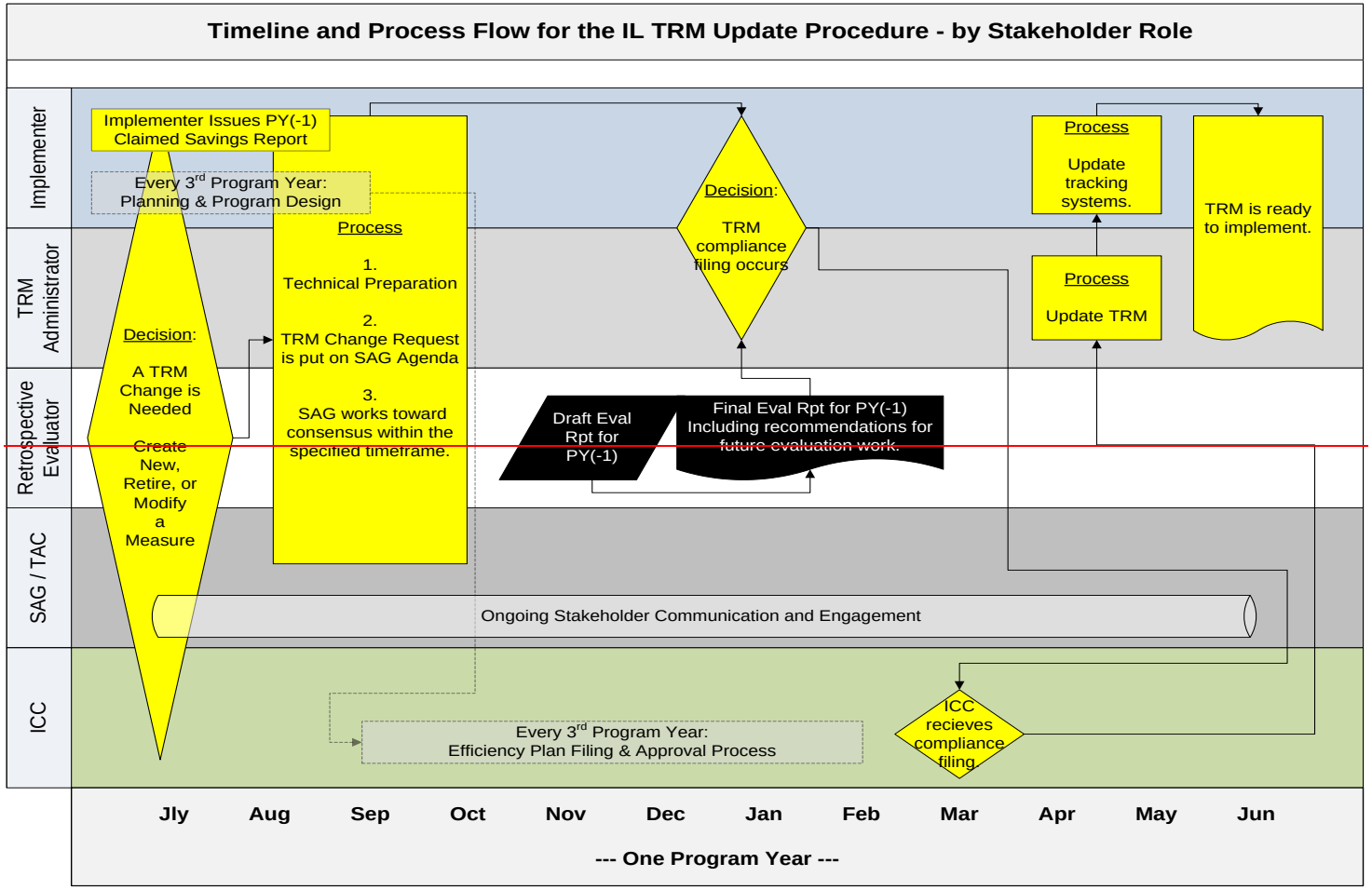
~~Figure 2: Timeline & Process Flow of the TRM Update Procedure by Stakeholder~~



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3 Assumptions

~~126.2~~3.1 Overview

The information contained in this TRM contains VEIC's recommendations for the content of the first edition of the Illinois TRM~~, as well as a process for maintaining and updating it over time~~. Sources that are cited within the TRM have been chosen based on two priorities, geography and age. Whenever possible and appropriate, VEIC has incorporated Illinois-specific information into each measure characterization. The ~~existing Commercia~~Business I TRM documents from Ameren and ComEd were reviewed, as well as program and measure specific data from evaluations, efficiency plans, and working documents. ~~When Illinois specific data has not been available, information from neighboring states, the Midwest region, or states with more mature efficiency programs has been used. Finally, the most current sources have been cited whenever possible.~~

The assumptions for these characterizations rest on our understanding of the information available. In each case, we reviewed the available Illinois and Mid~~-West~~west-specific information, including evaluations and support material provided by the Illinois ~~Program Administrators~~Utilities.

When Illinois or region-specific evaluations or data were not available, we turned to best practice research and data from other jurisdictions, often from west and east-coast states that have ~~long-standing efficiency programs. These programs have~~ allocated large amounts of funding to evaluation work and to refining their measure characterization parameters. As a result, much of the most-defensible information originates from these regions. In every case, ~~we~~ VEIC used the most ~~-~~recent, well-designed, and best ~~-~~supported studies and only if it was appropriate to generalize their conclusions to the Illinois ~~Program Administrators~~Utilities' and DCEO's programs.

The TRM is intended to be a living document. There will be measures that are not characterized here; new measures will be added to programs and new program designs will be implemented; new information will be gathered through evaluations or other market research; and savings for current measures will change as the activity of the programs changes their markets. For instance, savings for CFLs will decrease over time as successful programs result in lamps being installed mostly in lower-use locations. As assumptions and reference material changes, the TRM ~~update~~ Update ~~and timeline p~~Process described in the previous section allows for frequent review and an annual update ~~of~~ to the TRM~~ as needs demand~~. Data from reliable impact evaluations would be necessary to support savings claims until the measure has been incorporated into the TRM~~ or updated~~.

~~126.3~~3.2 Footnotes ~~&~~ and Documentation of Sources

Each measure characterization uses footnotes to document the references that have been used to characterize the technology. The reference documents are too numerous to include in an ~~Appendix~~ appendix and have instead been posted in *.zip files on the TRM Project's Sharepoint website. These zip files can be found in the 'Sources and Reference Documents' folder in the main directory, and will also be posted to the SAG's public web-site as well.

~~126.4~~3.3 General Savings Assumptions

~~These~~ The TRM savings estimates are expected to serve as average, representative~~, recommended~~ values~~,~~ or ways to calculate savings based on program-specific information. All information is presented on a per-measure basis. In using the measure-specific information in the TRM, it is helpful to keep the following notes in mind.

- All estimates of energy (kWh) and peak (kW) savings are for first-year savings, not lifetime savings.

Comment [Jen79]: This sounds like it would be part of the TRM Development process section

Comment [Jen80]: Appropriate section?

Comment [Jen81]: Please include a full list of reference documents (similar to Massachusetts TRM)

Comment [Jen82]: Need link to specific area these will be posted. The PY3 evaluations have not been posted to the evaluation area of the SAG website.

Comment [Jen83]: "Recommended values" sounds like implementing the TRM is "optional" – recommend removing "recommended" language

- Unless otherwise noted, measure life is defined to be the life of an energy consuming measure, including its equipment life and measure persistence.

- Where ~~deemed~~ values for energy savings are provided, they are intended to represent the average annual energy (kWh or therms) savings or peak ~~(kW)~~ demand (kW) savings that could be expected from the average of all measures that might be installed in the state in ~~2012~~a year.

- In general, the baselines included in the TRM are intended to represent average conditions in Illinois. Some are based on data from the state, such as household consumption characteristics provided by the Energy Information Administration. Some are extrapolated from other areas, when Illinois data are not available. For program years in which characteristics of actual program participants differ from the average, actual energy savings is expected to differ from that presented in the TRM. The program's "realized" energy savings will be presented in the annual evaluation reports.

~~126.5~~3.4 Shifting Baseline Assumptions

The TRM anticipates the effects of changes in efficiency codes and standards on affected measures. When these changes take effect, a shift in the baseline is usually called for. This complicates the measure savings estimation somewhat, and ~~will be~~is handled in ~~future versions of~~ the TRM by describing the choice of and reasoning behind a shifting baseline assumption. In this version of the TRM, this applies to CFLs and ~~T12~~ T5/T8 Linear Fluorescents.

~~126.5.1~~3.4.1 CFL and ~~T12~~ T5/T8 Linear ~~Florescents~~Fluorescents

Specific reductions in savings have been incorporated for CFL measures that relate to the shift in appropriate baseline due to changes in Federal Standards for lighting products. Federal legislation (stemming from the Energy Independence and Security Act of 2007) mandates a phase-in process beginning in 2012 for all general-purpose light bulbs between 40 and 100W to be approximately 30% more energy efficient than current incandescent bulbs, in essence beginning the phase-out of the current style, or "standard", incandescent bulbs. In 2012, standard 100W incandescent bulbs will no longer be manufactured, followed by restrictions on standard 75W bulbs in 2013 and 60W and 40W bulbs in 2014. The baseline for the CFL measure in the corresponding program years starting June 1 each year will therefore become bulbs (improved~~,~~ or "efficient"~~,~~ incandescent, or halogen) that meet the new standard and have the same lumen equivalency. Those products can take several different forms we can envision now and perhaps others we do not yet know about~~;~~. ~~h~~Halogens are one of those possibilities and have been chosen to represent a baseline at that time. To account for this shifting baseline, annual savings are reduced within the lifetime of the measure.

Other lighting measures will also have baseline shifts (for example screw based LED and CFL fixtures) that will result in significant impacts to annual estimated savings in later years. Finally, as of July 14, 2012, Federal ~~standards~~ Standards will require that practically all linear fluorescents meet strict performance requirements essentially requiring all T12 users, when they need to purchase new bulbs, to upgrade to high performance T8 lamps and ballasts[32]. We have assumed that this standard will become fully effective in 2016. To account for this, we have included a methodology to address the shifting baseline in the high performance T8 measure and T5 measure which is defined specifically in each measure characterization.

[32] At the time of this draft, we understand that some standard T8 lamps may meet the federal standard, and in that event, some T12 retrofits may end up being completed with standard T8s instead of high performance T8s.

Comment [Jen84]: Not sure this is appropriate location for this

Comment [Jen85]: This is not the baseline

Comment [Jen86]: This is the baseline

Comment [Jen87]: Not sure why this footnote is here?

Comment [Jen88]: Since devoting an entire subsection to shifting baseline assumptions, please provide justification for this date within this section

~~126.6~~3.5 Glossary

Baseline Efficiency: The assumed standard efficiency of equipment, absent an efficiency program.

Building Types[33]**:**

Building Type	Definition
College/University	Applies to facility space used for higher education. Relevant buildings include administrative headquarters, residence halls, athletic and recreation facilities, laboratories, etc. The total gross floor area should include all supporting functions such as kitchens used by staff, lobbies, atria, conference rooms and auditoria, fitness areas for staff, storage areas, stairways, elevator shafts, etc.
Exterior	Applies to unconditioned spaces that are outside of the building envelope.
Garage	Applies to unconditioned spaces either attached or detached from the primary building envelope that are not used for living space.
Grocery	Applies to facility space used for the retail sale of food and beverage products. It should not be used by restaurants, which are not eligible for a rating at this time. The total gross floor area should include all supporting functions such as kitchens and break rooms used by staff, storage areas (refrigerated and non-refrigerated), administrative areas, stairwells, atria, lobbies, etc.
Heavy Industry	Undefined.
Hotel/Motel	Applies to buildings that rent overnight accommodations on a room/suite basis, typically including a bath/shower and other facilities in guest rooms. The total gross floor area should include all interior space, including guestrooms, halls, lobbies, atria, food preparation and restaurant space, conference and banquet space, health clubs/spas, indoor pool areas, and laundry facilities, as well as all space used for supporting functions such as elevator shafts, stairways, mechanical rooms, storage areas, employee break rooms, back-of-house offices, etc. Hotel does not apply to fractional ownership properties such as condominiums or vacation timeshares. Hotel properties should be owned by a single entity and have rooms available on a nightly basis.
K-12 School	Applies to facility space used as a school building for Kindergarten through 12th grade students. This does not include college or university classroom facilities and laboratories, vocational, technical, or trade schools. The total gross floor area should include all supporting functions such as administrative space, conference rooms, kitchens used by staff, lobbies, cafeterias, gymnasiums, auditoria, laboratory classrooms, portable classrooms, greenhouses, stairways, atria, elevator shafts, small landscaping sheds, storage areas, etc. The K-12 school model does not apply to preschool or day care buildings; in order to classify as K-12 school, more than 75% of the students must be in kindergarten or older.
Light Industry	Undefined.
Medical	Applies to a general medical and surgical hospital (including critical access hospitals and children's hospitals) that is either a stand-alone building or a campus of buildings. The definition of Hospital accounts for all space types that are located within the Hospital building/campus, such as medical offices, administrative offices, and skilled nursing. The total floor area should include the aggregate floor area of all buildings on the campus as well as all supporting functions such as: stairways, connecting corridors between buildings, medical offices, exam rooms, laboratories, lobbies, atria, cafeterias, storage areas, elevator shafts, and any space affiliated with emergency medical care, or diagnostic care.
Miscellaneous	Applies to spaces that do not fit clearly within any available categories should be designated as "miscellaneous".
Multifamily	Applies to residential buildings of three of more units, including all public and multiuse

[33] Source: US EPA, www.energystar.gov, Space Type Definitions

Comment [Jen89]: move to end?

Comment [Jen90]: Glossary may need a little more vetting – topic for discussion at future TRM meeting

Comment [Jen91]: Add list of acronyms

Comment [Jen92]: add list of references

Comment [Jen93]: please define

Comment [Jen94]: please define

Comment [Jen95]: If using as single word here, please use consistently throughout, I've seen it also listed as Multi-family and Multi Family

Building Type	Definition
	spaces within the building envelope.
Office	Applies to facility spaces used for general office, professional, and administrative purposes. The total gross floor area should include all supporting functions such as kitchens used by staff, lobbies, atria, conference rooms and auditoria, fitness areas for staff, storage areas, stairways, elevator shafts, etc.
Restaurant	Applies to a subcategory of Retail/Service space that is used to provide commercial food services to individual customers, and includes kitchen, dining, and common areas.
Retail/Service	Applies to facility space used to conduct the retail sale of consumer product goods. Stores must be at least 5,000 square feet and have an exterior entrance to the public. The total gross floor area should include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, etc. Retail segments typically included under this definition are: Department Stores, Discount Stores, Supercenters, Warehouse Clubs, Drug Stores, Dollar Stores, Home Center/Hardware Stores, and Apparel/Hard Line Specialty Stores (e.g. books, clothing, office products, toys, home goods, electronics). Retail segments excluded under this definition are: Supermarkets (eligible to be benchmarked as Supermarket space), Convenience Stores, Automobile Dealerships, and Restaurants.
Warehouse	Applies to unrefrigerated or refrigerated buildings that are used to store goods, manufactured products, merchandise or raw materials. The total gross floor area of Refrigerated Warehouses should include all temperature controlled area designed to store perishable goods or merchandise under refrigeration at temperatures below 50 degrees Fahrenheit. The total gross floor area of Unrefrigerated Warehouses should include space designed to store non-perishable goods and merchandise. Unrefrigerated warehouses also include distribution centers. The total gross floor area of refrigerated and unrefrigerated warehouses should include all supporting functions such as offices, lobbies, stairways, rest rooms, equipment storage areas, elevator shafts, etc. Existing atriums or areas with high ceilings should only include the base floor area that they occupy. The total gross floor area of refrigerated or unrefrigerated warehouse should not include outside loading bays or docks. Self-storage facilities, or facilities that rent individual storage units, are not eligible for a rating using the warehouse model.

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Coincidence Factor (CF): Coincidence factors represent the fraction of connected load expected to be coincident with a particular system peak period, on a diversified basis. Coincidence factors are provided for summer peak periods.

Commercial: The market sector that includes measures that apply to any of the building types defined in this TRM, which includes multifamily common areas and public housing[34].

Comment [Jen96]: and industrial?

Comment [Jen97]: Does this mean that low income residential program savings should be based on the C&I measure savings?

Connected Load: The maximum wattage of the equipment, under normal operating conditions.

Deemed Value: A value that has been assumed to be representative of the average condition of an input parameter. This term may also refer to the calculated result of a prescriptive savings algorithm.

Default Value: When a measure indicates that an input to a prescriptive saving algorithm may take on a range of values, an average value is also provided in many cases. This value is considered the default input to the algorithm, and should be used only when the other alternatives listed in the measure are not applicable.

[34] Measures that apply to the multifamily and public housing building types describe how to handle tenant versus master metered buildings.

End Use Category: A general term used to describe the categories of equipment that provide a service to an individual or building. See Table 2.1 for a list of the end use categories that are incorporated in this TRM.

EM&V – Evaluation, Measurement and Verification. An ongoing annual process that ~~Program Administrators~~Utilities must complete for the ICC.

Evaluation: Evaluation is an applied inquiry process for collecting and synthesizing evidence that culminates in conclusions about the state of affairs, value, merit, worth, significance, or quality of a program, product, person, policy, proposal, or plan. Evaluation within the context of this TRM is a~~A~~ backward looking process of determining the appropriate process, algorithm and/or input value for any given measure or measure component. Evaluation results may be applied prospectively or retrospectively in accordance with ~~the approved plans~~ICC Orders of each utility.

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Full Load Hours (FLH): The equivalent hours that equipment would need to operate at its peak capacity in order to consume its estimated annual kWh consumption (annual kWh/connected kW).

High Efficiency: General term for technologies and processes that require less energy, water, or other inputs to operate.

Lifetime: The number of years (or hours) that the new high efficiency equipment is expected to function. These are generally based on engineering lives, but sometimes adjusted based on expectations about frequency of removal, remodeling or demolition. Two important distinctions fall under this definition; Effective Useful Life (EUL) and Remaining Useful Life (RUL).

EUL – EUL is based on the manufacturers rating of the effective useful life; how long the equipment will last. For example, a CFL that operates x hours per year will typically have an EUL of y. A house boiler may have a lifetime of 20 years but the EUL is only 15 years since after that time it may be operating at a non-efficient point. As estimate of the median number of years that the measures installed under a program are still in place and operable.

Comment [98]:

RUL – Applies to retrofit or replacement measures. For example, if an existing working refrigerator is replaced with a high efficiency unit, the RUL is an assumption of how many more years the existing unit would have lasted. As a general rule the RUL is usually assumed to be 1/3 of the EUL.

Load Factor (LF): The fraction of full load (wattage) for which the equipment is typically run.

Measure Cost: The incremental (for time of sale measures) or full cost (both capital and labor for retrofit measures) of implementing the High Efficiency equipment.

Comment [Jen99]: Ensure consistent with earlier definition in front matter or delete earlier one

Measure Description: A detailed description of the technology, the criteria it must meet to be eligible for an incentive and the program(s) that delivers it.

Comment [Jen100]: inaccurate

Measure Type: Measures are categorized into two subcategories; prescriptive and custom.

Custom: Measures whose ~~use~~ claimed savings algorithm and/or inputs, or metering results ~~that~~ apply only to the individual customer who is implementing them.

Prescriptive: Measures whose claimed savings algorithm and inputs are ~~fixed~~ provided within the TRM ~~and may not be changed by the Program Administrator~~. ~~Prescriptive measures make up most of the measure in the Residential market sector.~~ Two subcategories of prescriptive measures include:

Fully Deemed: A measure whose inputs are completely specified ~~and are not subject to change~~

~~or choice on the part of the Program Administrator.~~.

Partially Deemed: A measure ~~whose~~ with customized input parameters~~ may be selected to some degree by the Program Administrator.~~.

Measure: An efficient technology or procedure that results in energy savings as compared to the baseline efficiency.

~~**Non-Commercial**~~**Residential:** The market sector that includes measures that apply only to detached, residential buildings or duplexes.

Operation and Maintenance (O&M) Cost Adjustments: The dollar impact resulting from differences between baseline and efficient case ~~Operation and Maintenance~~O&M costs.

Operating Hours (HOURS): The annual hours that equipment is expected to operate.

Program: The mode of delivering a particular measure or set of measures to customers. See Table 2.2 for a list of program descriptions that are presently operating in Illinois.

Program Year: A program year runs from the June monthly billing period through the May monthly billing period.

Rating Period Factor (RPF): Percentages for defined times of the year that describe when energy savings will be realized for a specific measure.

Savings Verification: The annual process that verifies that the TRM has been applied correctly and consistently during the previous program year and that measures are in place and operating. This process results in a realization rate, which may adjust the ~~claimed~~ TRM savings of an entire program retroactively. Savings verification often results in recommendations for further evaluation and/or field (metering) studies to increase the accuracy of the ~~claimed~~ TRM savings estimate going forward.

Stakeholder Advisory Group (SAG): The Illinois Energy Efficiency Stakeholder Advisory Group (SAG) was first defined in the electric utilities' first energy efficiency Plan Orders to include "… the Utility, DCEO, Staff, the Attorney General, BOMA and CUB and representation from a variety of interests, including residential consumers, business consumers, environmental and energy advocacy organizations, trades and local government… [and] a representative from the ARES (alternative retail electric supplier) community should be included."[35] ~~A~~ A group of stakeholders who have an interest in Illinois' energy efficiency programs and who meet regularly to share information and work toward consensus on various energy efficiency issues. The ~~Program Administrators~~Utilities in Illinois have been directed by the Illinois Commerce Commission (ICC) to work with the SAG on the development of a statewide TRM. A list of current SAG ~~members~~ participants appears in the following table.

Table 3.1: SAG Stakeholder List

SAG Stakeholder
Ameren Illinois Company (Ameren)
Center for Neighborhood Technology (CNT)

[35] Docket No. 07-0540, Final Order at 32-33, February 6, 2008. http://www.icc.illinois.gov/downloads/public/edocket/215193.pdf

Comment [Jen101]: ? I think more detailed program descriptions are supposed to be provided in the NTG appendix

Comment [Jen102]: Perhaps expand?

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Comment [Jen103]: Verify before final – send to SAG and request parties to respond to correct list

Comment [Jen104]: Not alphabetized correctly

Citizen's ~~Program Administrator~~Utility Board (CUB)
City of Chicago
Commonwealth Edison Company (ComEd)
Environment IL
Environmental Law and Policy Center (ELPC)
Future Energy Enterprises LLC
Illinois Commerce Commission Staff (ICC Staff)
Illinois Department of Commerce and Economic Opportunity (DCEO)
Illinois Attorney General's Office (AG)
Integrys (Peoples Gas and North Shore Gas)
Metropolitan Mayor's Caucus (MMC)
Midwest Energy Efficiency Association (MEEA)
National Resources Defense Council (NRDC)
Nicor Gas
Shaw Environmental
University of Illinois, Chicago

Comment [Jen105]: Try to minimize tables crossing multiple pages, to the extent feasible, in the final document

~~126.7~~3.6 Electrical Loadshapes (kWh)

Loadshapes are an integral part of the measure characterization and are used to divide energy savings in~~-~~to appropriate periods using Rating Period Factors (RPFs) such that each have variable avoided cost values allocated to them for the purpose of estimating cost effectiveness.

For the purposes of assigning energy savings (kWh) periods, the ~~Technical Subcommittee~~TRM TAC has agreed to use the industry standards for wholesale power market transactions as shown in the following table.

Table 3.2~~2.4~~: On and Off Peak Energy Definitions

Comment [Jen106]: Table number should update automatically

Period Category	Period Definition (Central Prevailing Time)
Winter On-Peak Energy	~~8AM~~ 8AM – ~~11PM~~11PM, weekday, Oct ~~–~~ – Apr, No NERC
Winter Off-Peak Energy	All other hours
Summer On-Peak Energy	8AM – 11PM~~8AM – 11PM~~, weekdays, May – Sept, No NERC
Summer Off-Peak	All other hours

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Loadshapes have been developed for each end use by assigning ~~Rating Period Factor~~RPF percentages to each of the four periods above. Two methodologies were used:

1. Itron eShapes[36] data for Missouri, reconciled to Illinois loads and provided by Ameren, were used to calculate the percentage of load in~~-~~to the four categories above.

[36] All loadshape information has been posted to the project's Sharepoint site, and may be provided public~~al~~ly through the Stakeholder Advisory Group's web~~-~~site at their discretion. http://www.ilsag.org/

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2. Where the Itron eShapes data did not provide a particular end use or specific measure load profile, loadshapes that have been developed over many years by Efficiency Vermont and that have been reviewed by the Vermont Department of Public Service, were adjusted to match Illinois period definitions. Note – no weather sensitive loadshapes were based on this method. Any of these load profiles that relate to High Impact Measures should be an area of future evaluation.

The following pages provide the loadshape values for all measures provided in the T~~echnical Reference Manual~~RM. To distinguish the source of the loadshape, they are color coded. Rows that are shaded in green are Efficiency Vermont loadshapes adjusted for Illinois periods. Rows that are unshaded and are left in white are Itron eShapes data provided by Ameren.

~~A number of~~ The Illinois electric ~~Program Administrators~~utilities use the ~~DSMore~~ DSMore™ (Integral Analytics DSMore™ Demand Side Management Option/Risk Evaluator) software ~~tool~~ to screen the efficiency measures for cost effectiveness. ~~and s~~Since this tool requires a loadshape value for weekdays and weekends in each month (i.e., 24 inputs), the percentages for the four period categories above were calculated by weighting the proportion of weekdays/weekends in each month to the total within each period. The results of these calculations are also provided below.

Table 3.~~33~~32: Loadshapes by Season

		Winter Peak	Winter Off-peak	Summer Peak	Summer Off-peak
	Loadshape Reference Number	Oct-Apr, M-F, non-holiday, ~~8AM~~ 8AM-~~ 11PM~~11PM	Oct-Apr, All other time	May-~~-~~Sept, M-F, non-holiday, 8AM-11PM~~8AM - 11PM~~	May-~~--~~Sept, All other time
Residential Clothes Washer	R01	47.0%	11.1%	34.0%	8.0%
Residential Dish Washer	R02	49.3%	8.7%	35.7%	6.3%
Residential Electric DHW	R03	43.2%	20.6%	24.5%	11.7%
Residential Freezer	R04	38.9%	16.4%	31.5%	13.2%
Residential Refrigerator	R05	37.0%	18.1%	30.1%	14.7%
Residential Indoor Lighting	R06	48.1%	15.5%	26.0%	10.5%
Residential Outdoor Lighting	R07	18.0%	44.1%	9.4%	28.4%
Residential Cooling	R08	4.1%	0.7%	71.3%	23.9%
Residential Electric Space Heat	R09	57.8%	38.8%	1.7%	1.7%
Residential Electric Heating and Cooling	R10	35.2%	22.8%	31.0%	11.0%
Residential Ventilation	R11	25.8%	32.3%	18.9%	23.0%
Residential - Dehumidifier	R12	12.9%	16.2%	31.7%	39.2%
Residential Standby Losses - Entertainment Center	R13	26.0%	32.5%	18.9%	22.6%
Residential Standby Losses - Home Office	R14	23.9%	34.6%	17.0%	24.5%
Commercial Electric Cooking	C01	40.6%	18.2%	28.7%	12.6%
Commercial Electric DHW	C02	40.5%	18.2%	28.5%	12.8%
Commercial Cooling	C03	4.9%	0.8%	66.4%	27.9%
Commercial Electric Heating	C04	53.5%	43.2%	1.9%	1.4%
Commercial Electric Heating and Cooling	C05	19.4%	13.5%	47.1%	19.9%
Commercial Indoor Lighting	C06	40.1%	18.6%	28.4%	12.9%
Grocery/Conv. Store Indoor Lighting	C07	31.4%	26.4%	22.8%	19.3%
Hospital Indoor Lighting	C08	29.1%	29.0%	21.0%	20.9%
Office Indoor Lighting	C09	42.1%	16.0%	30.4%	11.5%

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	Loadshape Reference Number	Winter Peak Oct-Apr, M-F, non-holiday, ~~8AM~~ 8AM- ~~11PM~~11PM	Winter Off-peak Oct-Apr, All other time	Summer Peak May-~~-~~Sept, M-F, non-holiday, 8AM-11PM~~8AM – 11PM~~	Summer Off-peak May-~~--~~Sept, All other time
Restaurant Indoor Lighting	C10	32.1%	25.7%	23.4%	18.8%
Retail Indoor Lighting	C11	35.5%	22.3%	25.8%	16.3%
Warehouse Indoor Lighting	C12	39.4%	18.5%	28.6%	13.5%
K-12 School Indoor Lighting	C13	45.8%	22.6%	20.2%	11.4%
Indust. 1-shift (8/5) (e.g., comp. air, lights)	C14	50.5%	7.2%	37.0%	5.3%
Indust. 2-shift (16/5) (e.g., comp. air, lights)	C15	47.5%	10.2%	34.8%	7.4%
Indust. 3-shift (24/5) (e.g., comp. air, lights)	C16	34.8%	23.2%	25.5%	16.6%
Indust. 4-shift (24/7) (e.g., comp. air, lights)	C17	25.8%	32.3%	18.9%	23.0%
Industrial Indoor Lighting	C18	44.3%	13.6%	32.4%	9.8%
Industrial Outdoor Lighting	C19	18.0%	44.1%	9.4%	28.4%
Commercial Outdoor Lighting	C20	23.4%	35.3%	13.0%	28.3%
Commercial Office Equipment	C21	37.7%	20.9%	26.7%	14.7%
Commercial Refrigeration	C22	38.5%	20.6%	26.7%	14.2%
Commercial Ventilation	C23	38.1%	20.6%	29.7%	11.6%
Traffic Signal - Red Balls, always changing or flashing	C24	25.8%	32.3%	18.9%	23.0%
Traffic Signal - Red Balls, changing day, off night	C25	37.0%	20.9%	27.1%	14.9%
Traffic Signal - Green Balls, always changing	C26	25.8%	32.3%	18.9%	23.0%
Traffic Signal - Green Balls, changing day, off night	C27	37.0%	20.9%	27.1%	14.9%
Traffic Signal - Red Arrows	C28	25.8%	32.3%	18.9%	23.0%
Traffic Signal - Green Arrows	C29	25.8%	32.3%	18.9%	23.0%
Traffic Signal - Flashing Yellows	C30	25.8%	32.3%	18.9%	23.0%
Traffic Signal - “Hand” Don’t Walk Signal	C31	25.8%	32.3%	18.9%	23.0%
Traffic Signal - “Man” Walk Signal	C32	25.8%	32.3%	18.9%	23.0%
Traffic Signal - Bi-Modal Walk/Don’t Walk	C33	25.8%	32.3%	18.9%	23.0%
Industrial Motor	C34	47.5%	10.2%	34.8%	7.4%
Industrial Process	C35	47.5%	10.2%	34.8%	7.4%

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	Loadshape Reference Number	Winter Peak Oct-Apr, M-F, non-holiday, ~~8AM~~ 8AM-~~11PM~~11PM	Winter Off-peak Oct-Apr, All other time	Summer Peak May-~~-~~Sept, M-F, non-holiday, 8AM-11PM~~8AM – 11PM~~	Summer Off-peak May-~~--~~Sept, All other time
HVAC Pump Motor (heating)	C36	38.7%	48.6%	5.9%	6.8%
HVAC Pump Motor (cooling)	C37	7.8%	9.8%	36.8%	45.6%
HVAC Pump Motor (unknown use)	C38	23.2%	29.2%	21.4%	26.2%
VFD - Supply fans <10 HP	C39	38.8%	16.1%	28.4%	16.7%
VFD - Return fans <10 HP	C40	38.8%	16.1%	28.4%	16.7%
VFD - Exhaust fans <10 HP	C41	34.8%	23.2%	20.3%	21.7%
VFD - Boiler feedwater pumps <10 HP	C42	42.9%	44.2%	6.6%	6.3%
VFD - Chilled water pumps <10 HP	C43	11.2%	5.5%	40.7%	42.6%
VFD Boiler circulation pumps <10 HP	C44	42.9%	44.2%	6.6%	6.3%
Refrigeration Economizer	C45	36.3%	50.8%	5.6%	7.3%
Evaporator Fan Control	C46	24.0%	35.9%	16.7%	23.4%
Standby Losses - Commercial Office	C47	8.2%	50.5%	5.6%	35.7%
VFD Boiler draft fans <10 HP	C48	37.3%	48.9%	6.4%	7.3%
VFD Cooling Tower Fans <10 HP	C49	7.9%	5.2%	54.0%	32.9%
Engine Block Heater Timer	C50	26.5%	61.0%	4.1%	8.5%
Door Heater Control	C51	30.4%	69.6%	0.0%	0.0%
Beverage and Snack Machine Controls	C52	10.0%	48.3%	7.4%	34.3%
Flat	C53	36.3%	21.8%	26.2%	15.7%

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Table 3.~~44~~3: Loadshapes by Month and Day of Week

		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S
Residential Clothes Washer	R01	6.8%	1.7%	6.5%	1.5%	6.8%	1.5%	6.5%	1.7%	7.2%	1.5%	6.5%	1.5%	6.9%	1.7%	7.2%	1.5%	6.2%	1.9%	7.1%	1.5%	6.8%	1.5%	6.5%	1.8%
Residential Dish Washer	R02	7.1%	1.3%	6.8%	1.2%	7.1%	1.2%	6.8%	1.3%	7.5%	1.2%	6.9%	1.2%	7.2%	1.3%	7.5%	1.2%	6.5%	1.5%	7.5%	1.2%	7.1%	1.2%	6.8%	1.5%
Residential Electric DHW	R03	6.2%	3.1%	6.0%	2.8%	6.2%	2.8%	6.0%	3.1%	5.2%	2.2%	4.7%	2.2%	5.0%	2.4%	5.2%	2.2%	4.5%	2.7%	6.5%	2.8%	6.2%	2.8%	6.0%	3.4%
Residential Freezer	R04	5.6%	2.5%	5.4%	2.2%	5.6%	2.2%	5.4%	2.5%	6.6%	2.5%	6.1%	2.5%	6.4%	2.8%	6.6%	2.5%	5.8%	3.1%	5.9%	2.2%	5.6%	2.2%	5.4%	2.7%
Residential Refrigerator	R05	5.4%	2.7%	5.1%	2.4%	5.4%	2.4%	5.1%	2.7%	6.4%	2.7%	5.8%	2.7%	6.1%	3.1%	6.4%	2.7%	5.5%	3.4%	5.6%	2.4%	5.4%	2.4%	5.1%	3.0%
Residential Indoor Lighting	R06	7.0%	2.3%	6.6%	2.1%	7.0%	2.1%	6.6%	2.3%	5.5%	2.0%	5.0%	2.0%	5.2%	2.2%	5.5%	2.0%	4.8%	2.4%	7.3%	2.1%	7.0%	2.1%	6.6%	2.6%
Residential Outdoor Lighting	R07	2.6%	6.6%	2.5%	5.9%	2.6%	5.9%	2.5%	6.6%	2.0%	5.3%	1.8%	5.3%	1.9%	6.0%	2.0%	5.3%	1.7%	6.6%	2.7%	5.9%	2.6%	5.9%	2.5%	7.4%
Residential Cooling	R08	0.6%	0.1%	0.6%	0.1%	0.6%	0.1%	0.6%	0.1%	15.1%	4.4%	13.7%	4.4%	14.4%	5.0%	15.1%	4.4%	13.1%	5.6%	0.6%	0.1%	0.6%	0.1%	0.6%	0.1%
Residential Electric Space Heat	R09	8.4%	5.8%	8.0%	5.2%	8.4%	5.2%	8.0%	5.8%	0.4%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.3%	0.3%	0.4%	8.8%	5.2%	8.4%	5.2%	8.0%	6.5%
Residential Electric Heating and Cooling	R10	5.1%	3.4%	4.9%	3.0%	5.1%	3.0%	4.9%	3.4%	6.5%	2.0%	6.0%	2.0%	6.3%	2.3%	6.5%	2.0%	5.7%	2.6%	5.3%	3.0%	5.1%	3.0%	4.9%	3.8%
Residential Ventilation	R11	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Residential - Dehumidifier	R12	1.9%	2.4%	1.8%	2.2%	1.9%	2.2%	1.8%	2.4%	6.7%	7.3%	6.1%	7.3%	6.4%	8.2%	6.7%	7.3%	5.8%	9.1%	2.0%	2.2%	1.9%	2.2%	1.8%	2.7%
Residential Standby Losses - Entertainment Center	R13	3.8%	4.9%	3.6%	4.3%	3.8%	4.3%	3.6%	4.9%	4.0%	4.2%	3.7%	4.2%	3.8%	4.7%	4.0%	4.2%	3.5%	5.3%	3.9%	4.3%	3.8%	4.3%	3.6%	5.4%

		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S
Residential Standby Losses - Home Office	R14	3.5%	5.2%	3.3%	4.6%	3.5%	4.6%	3.3%	5.2%	3.6%	4.6%	3.3%	4.6%	3.4%	5.1%	3.6%	4.6%	3.1%	5.7%	3.6%	4.6%	3.5%	4.6%	3.3%	5.8%
Commercial Electric Cooking	C01	5.9%	2.7%	5.6%	2.4%	5.9%	2.4%	5.6%	2.7%	6.0%	2.3%	5.5%	2.3%	5.8%	2.6%	6.0%	2.3%	5.3%	2.9%	6.1%	2.4%	5.9%	2.4%	5.6%	3.0%
Commercial Electric DHW	C02	5.9%	2.7%	5.6%	2.4%	5.9%	2.4%	5.6%	2.7%	6.0%	2.4%	5.5%	2.4%	5.8%	2.7%	6.0%	2.4%	5.2%	3.0%	6.1%	2.4%	5.9%	2.4%	5.6%	3.0%
Commercial Cooling	C03	0.7%	0.1%	0.7%	0.1%	0.7%	0.1%	0.7%	0.1%	14.0%	5.2%	12.8%	5.2%	13.4%	5.8%	14.0%	5.2%	12.2%	6.5%	0.7%	0.1%	0.7%	0.1%	0.7%	0.1%
Commercial Electric Heating	C04	7.7%	6.5%	7.4%	5.8%	7.7%	5.8%	7.4%	6.5%	0.4%	0.3%	0.4%	0.3%	0.4%	0.3%	0.4%	0.3%	0.3%	0.3%	8.1%	5.8%	7.7%	5.8%	7.4%	7.2%
Commercial Electric Heating and Cooling	C05	2.8%	2.0%	2.7%	1.8%	2.8%	1.8%	2.7%	2.0%	9.9%	3.7%	9.1%	3.7%	9.5%	4.2%	9.9%	3.7%	8.6%	4.6%	2.9%	1.8%	2.8%	1.8%	2.7%	2.3%
Commercial Indoor Lighting	C06	5.8%	2.8%	5.5%	2.5%	5.8%	2.5%	5.5%	2.8%	6.0%	2.4%	5.5%	2.4%	5.7%	2.7%	6.0%	2.4%	5.2%	3.0%	6.1%	2.5%	5.8%	2.5%	5.5%	3.1%
Grocery/Conv. Store Indoor Lighting	C07	4.5%	4.0%	4.3%	3.5%	4.5%	3.5%	4.3%	4.0%	4.8%	3.6%	4.4%	3.6%	4.6%	4.0%	4.8%	3.6%	4.2%	4.5%	4.8%	3.5%	4.5%	3.5%	4.3%	4.4%
Hospital Indoor Lighting	C08	4.2%	4.3%	4.0%	3.9%	4.2%	3.9%	4.0%	4.3%	4.4%	3.9%	4.0%	3.9%	4.2%	4.4%	4.4%	3.9%	3.9%	4.9%	4.4%	3.9%	4.2%	3.9%	4.0%	4.8%
Office Indoor Lighting	C09	6.1%	2.4%	5.8%	2.1%	6.1%	2.1%	5.8%	2.4%	6.4%	2.1%	5.9%	2.1%	6.1%	2.4%	6.4%	2.1%	5.6%	2.7%	6.4%	2.1%	6.1%	2.1%	5.8%	2.7%
Restaurant Indoor Lighting	C10	4.7%	3.9%	4.4%	3.4%	4.7%	3.4%	4.4%	3.9%	4.9%	3.5%	4.5%	3.5%	4.7%	3.9%	4.9%	3.5%	4.3%	4.4%	4.9%	3.4%	4.7%	3.4%	4.4%	4.3%
Retail Indoor Lighting	C11	5.1%	3.3%	4.9%	3.0%	5.1%	3.0%	4.9%	3.3%	5.5%	3.0%	5.0%	3.0%	5.2%	3.4%	5.5%	3.0%	4.7%	3.8%	5.4%	3.0%	5.1%	3.0%	4.9%	3.7%
Warehouse Indoor Lighting	C12	5.7%	2.8%	5.4%	2.5%	5.7%	2.5%	5.4%	2.8%	6.0%	2.5%	5.5%	2.5%	5.8%	2.8%	6.0%	2.5%	5.3%	3.1%	6.0%	2.5%	5.7%	2.5%	5.4%	3.1%

		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S
K-12 School Indoor Lighting	C13	6.6%	3.4%	6.3%	3.0%	6.6%	3.0%	6.3%	3.4%	4.3%	2.1%	3.9%	2.1%	4.1%	2.4%	4.3%	2.1%	3.7%	2.6%	6.9%	3.0%	6.6%	3.0%	6.3%	3.8%
Indust. 1-shift (8/5) (e.g., comp. air, lights)	C14	7.3%	1.1%	7.0%	1.0%	7.3%	1.0%	7.0%	1.1%	7.8%	1.0%	7.1%	1.0%	7.5%	1.1%	7.8%	1.0%	6.8%	1.2%	7.6%	1.0%	7.3%	1.0%	7.0%	1.2%
Indust. 2-shift (16/5) (e.g., comp. air, lights)	C15	6.9%	1.5%	6.6%	1.4%	6.9%	1.4%	6.6%	1.5%	7.3%	1.4%	6.7%	1.4%	7.0%	1.6%	7.3%	1.4%	6.4%	1.7%	7.2%	1.4%	6.9%	1.4%	6.6%	1.7%
Indust. 3-shift (24/5) (e.g., comp. air, lights)	C16	5.0%	3.5%	4.8%	3.1%	5.0%	3.1%	4.8%	3.5%	5.4%	3.1%	4.9%	3.1%	5.1%	3.5%	5.4%	3.1%	4.7%	3.8%	5.3%	3.1%	5.0%	3.1%	4.8%	3.9%
Indust. 4-shift (24/7) (e.g., comp. air, lights)	C17	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Industrial Indoor Lighting	C18	6.4%	2.0%	6.1%	1.8%	6.4%	1.8%	6.1%	2.0%	6.8%	1.8%	6.2%	1.8%	6.5%	2.0%	6.8%	1.8%	5.9%	2.3%	6.7%	1.8%	6.4%	1.8%	6.1%	2.3%
Industrial Outdoor Lighting	C19	2.6%	6.6%	2.5%	5.9%	2.6%	5.9%	2.5%	6.6%	2.0%	5.3%	1.8%	5.3%	1.9%	6.0%	2.0%	5.3%	1.7%	6.6%	2.7%	5.9%	2.6%	5.9%	2.5%	7.4%
Commercial Outdoor Lighting	C20	3.4%	5.3%	3.2%	4.7%	3.4%	4.7%	3.2%	5.3%	2.7%	5.3%	2.5%	5.3%	2.6%	5.9%	2.7%	5.3%	2.4%	6.6%	3.5%	4.7%	3.4%	4.7%	3.2%	5.9%
Commercial Office Equipment	C21	5.5%	3.1%	5.2%	2.8%	5.5%	2.8%	5.2%	3.1%	5.6%	2.7%	5.1%	2.7%	5.4%	3.1%	5.6%	2.7%	4.9%	3.4%	5.7%	2.8%	5.5%	2.8%	5.2%	3.5%
Commercial Refrigeration	C22	5.6%	3.1%	5.3%	2.7%	5.6%	2.7%	5.3%	3.1%	5.6%	2.6%	5.1%	2.6%	5.4%	3.0%	5.6%	2.6%	4.9%	3.3%	5.8%	2.7%	5.6%	2.7%	5.3%	3.4%
Commercial Ventilation	C23	5.5%	3.1%	5.3%	2.7%	5.5%	2.7%	5.3%	3.1%	6.3%	2.2%	5.7%	2.2%	6.0%	2.4%	6.3%	2.2%	5.5%	2.7%	5.8%	2.7%	5.5%	2.7%	5.3%	3.4%
Traffic Signal - Red Balls, always	C24	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%

		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S
changing or flashing																									
Traffic Signal - Red Balls, changing day, off night	C25	5.4%	3.1%	5.1%	2.8%	5.4%	2.8%	5.1%	3.1%	5.7%	2.8%	5.2%	2.8%	5.5%	3.1%	5.7%	2.8%	5.0%	3.5%	5.6%	2.8%	5.4%	2.8%	5.1%	3.5%
Traffic Signal - Green Balls, always changing	C26	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Traffic Signal - Green Balls, changing day, off night	C27	5.4%	3.1%	5.1%	2.8%	5.4%	2.8%	5.1%	3.1%	5.7%	2.8%	5.2%	2.8%	5.5%	3.1%	5.7%	2.8%	5.0%	3.5%	5.6%	2.8%	5.4%	2.8%	5.1%	3.5%
Traffic Signal - Red Arrows	C28	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Traffic Signal - Green Arrows	C29	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Traffic Signal - Flashing Yellows	C30	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Traffic Signal - “Hand” Don’t Walk Signal	C31	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Traffic Signal - “Man” Walk Signal	C32	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Traffic Signal - Bi-Modal Walk/Don’t Walk	C33	3.7%	4.9%	3.6%	4.3%	3.7%	4.3%	3.6%	4.9%	4.0%	4.3%	3.6%	4.3%	3.8%	4.8%	4.0%	4.3%	3.5%	5.4%	3.9%	4.3%	3.7%	4.3%	3.6%	5.4%
Industrial Motor	C34	6.9%	1.5%	6.6%	1.4%	6.9%	1.4%	6.6%	1.5%	7.3%	1.4%	6.7%	1.4%	7.0%	1.6%	7.3%	1.4%	6.4%	1.7%	7.2%	1.4%	6.9%	1.4%	6.6%	1.7%
Industrial Process	C35	6.9%	1.5%	6.6%	1.4%	6.9%	1.4%	6.6%	1.5%	7.3%	1.4%	6.7%	1.4%	7.0%	1.6%	7.3%	1.4%	6.4%	1.7%	7.2%	1.4%	6.9%	1.4%	6.6%	1.7%
HVAC Pump Motor (heating)	C36	5.6%	7.3%	5.3%	6.5%	5.6%	6.5%	5.3%	7.3%	1.3%	1.3%	1.1%	1.3%	1.2%	1.4%	1.3%	1.3%	1.1%	1.6%	5.9%	6.5%	5.6%	6.5%	5.3%	8.1%

		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S
HVAC Pump Motor (cooling)	C37	1.1%	1.5%	1.1%	1.3%	1.1%	1.3%	1.1%	1.5%	7.8%	8.5%	7.1%	8.5%	7.4%	9.5%	7.8%	8.5%	6.8%	10.6%	1.2%	1.3%	1.1%	1.3%	1.1%	1.6%
HVAC Pump Motor (unknown use)	C38	3.4%	4.4%	3.2%	3.9%	3.4%	3.9%	3.2%	4.4%	4.5%	4.9%	4.1%	4.9%	4.3%	5.5%	4.5%	4.9%	3.9%	6.1%	3.5%	3.9%	3.4%	3.9%	3.2%	4.9%
VFD - Supply fans <10 HP	C39	5.6%	2.4%	5.4%	2.1%	5.6%	2.1%	5.4%	2.4%	6.0%	3.1%	5.5%	3.1%	5.7%	3.5%	6.0%	3.1%	5.2%	3.9%	5.9%	2.1%	5.6%	2.1%	5.4%	2.7%
VFD - Return fans <10 HP	C40	5.6%	2.4%	5.4%	2.1%	5.6%	2.1%	5.4%	2.4%	6.0%	3.1%	5.5%	3.1%	5.7%	3.5%	6.0%	3.1%	5.2%	3.9%	5.9%	2.1%	5.6%	2.1%	5.4%	2.7%
VFD - Exhaust fans <10 HP	C41	5.0%	3.5%	4.8%	3.1%	5.0%	3.1%	4.8%	3.5%	4.3%	4.0%	3.9%	4.0%	4.1%	4.5%	4.3%	4.0%	3.7%	5.0%	5.3%	3.1%	5.0%	3.1%	4.8%	3.9%
VFD - Boiler feedwater pumps <10 HP	C42	6.2%	6.6%	5.9%	5.9%	6.2%	5.9%	5.9%	6.6%	1.4%	1.2%	1.3%	1.2%	1.3%	1.3%	1.4%	1.2%	1.2%	1.5%	6.5%	5.9%	6.2%	5.9%	5.9%	7.4%
VFD - Chilled water pumps <10 HP	C43	1.6%	0.8%	1.6%	0.7%	1.6%	0.7%	1.6%	0.8%	8.6%	7.9%	7.8%	7.9%	8.2%	8.9%	8.6%	7.9%	7.5%	9.9%	1.7%	0.7%	1.6%	0.7%	1.6%	0.9%
VFD Boiler circulation pumps <10 HP	C44	6.2%	6.6%	5.9%	5.9%	6.2%	5.9%	5.9%	6.6%	1.4%	1.2%	1.3%	1.2%	1.3%	1.3%	1.4%	1.2%	1.2%	1.5%	6.5%	5.9%	6.2%	5.9%	5.9%	7.4%
Refrigeration Economizer	C45	5.3%	7.6%	5.0%	6.8%	5.3%	6.8%	5.0%	7.6%	1.2%	1.4%	1.1%	1.4%	1.1%	1.5%	1.2%	1.4%	1.0%	1.7%	5.5%	6.8%	5.3%	6.8%	5.0%	8.5%
Evaporator Fan Control	C46	3.5%	5.4%	3.3%	4.8%	3.5%	4.8%	3.3%	5.4%	3.5%	4.4%	3.2%	4.4%	3.4%	4.9%	3.5%	4.4%	3.1%	5.5%	3.6%	4.8%	3.5%	4.8%	3.3%	6.0%
Standby Losses - Commercial Office	C47	1.2%	7.6%	1.1%	6.7%	1.2%	6.7%	1.1%	7.6%	1.2%	6.6%	1.1%	6.6%	1.1%	7.5%	1.2%	6.6%	1.0%	8.3%	1.2%	6.7%	1.2%	6.7%	1.1%	8.4%
VFD Boiler draft fans <10 HP	C48	5.4%	7.3%	5.2%	6.5%	5.4%	6.5%	5.2%	7.3%	1.3%	1.4%	1.2%	1.4%	1.3%	1.5%	1.3%	1.4%	1.2%	1.7%	5.7%	6.5%	5.4%	6.5%	5.2%	8.2%
VFD Cooling Tower Fans <10 HP	C49	1.1%	0.8%	1.1%	0.7%	1.1%	0.7%	1.1%	0.8%	11.4%	6.1%	10.4%	6.1%	10.9%	6.9%	11.4%	6.1%	9.9%	7.6%	1.2%	0.7%	1.1%	0.7%	1.1%	0.9%

		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S	M-F	S-S
Engine Block Heater Timer	C50	3.8%	9.1%	3.7%	8.1%	3.8%	8.1%	3.7%	9.1%	0.9%	1.6%	0.8%	1.6%	0.8%	1.8%	0.9%	1.6%	0.7%	2.0%	4.0%	8.1%	3.8%	8.1%	3.7%	10.2 %
Door Heater Control	C51	4.4%	10.4%	4.2%	9.3%	4.4%	9.3%	4.2%	10.4 %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.6%	9.3%	4.4%	9.3%	4.2%	11.6 %
Beverage and Snack Machine Controls	C52	1.4%	7.2%	1.4%	6.4%	1.4%	6.4%	1.4%	7.2%	1.6%	6.4%	1.4%	6.4%	1.5%	7.2%	1.6%	6.4%	1.4%	8.0%	1.5%	6.4%	1.4%	6.4%	1.4%	8.1%
Flat	C53	5.3%	3.3%	5.0%	2.9%	5.3%	2.9%	5.0%	3.3%	5.5%	2.9%	5.0%	2.9%	5.3%	3.3%	5.5%	2.9%	4.8%	3.7%	5.5%	2.9%	5.3%	2.9%	5.0%	3.6%

~~6.8~~3.7 Summer Peak Period Definition (kW)

To estimate the impact that an efficiency measure has on a ~~Program Administrator~~utility's system peak, the peak itself needs to be defined. Illinois spans two different electrical control areas, the Pennsylvania – Jersey – Maryland (PJM) and the Midwest Independent System Operators (MISO). As a result, there is some disparity in the peak definition across the state. However, only PJM has a forward capacity market where an efficiency program can potentially participate. Because ComEd is part of the PJM control area, their definition of summer peak is being applied statewide in this TRM.

~~Being a~~Because Illinois is a summer peaking state, only the summer peak period is defined for the purpose of this TRM. The coincident summer peak period is defined as 1:00-5:00 ~~P.M.~~PM Central Prevailing Time on non-holiday weekdays, June through August.

Summer peak coincidence factors can be found within each measure characterization. The source is provided and is based upon evaluation results, analysis of load shape data (e.g., the Itron eShapes data provided by Ameren), or through a calculation using stated assumptions.

For measures that are not weather-sensitive, the summer peak coincidence factor is estimated whenever possible as the average of savings within the peak period defined above. For weather sensitive measures such as cooling, the summer peak coincidence factor is provided in two different ways. The first method is to estimate demand savings during the ~~Program Administrator~~utility's peak hour (as provided by Ameren). This is likely to be the most indicative of actual peak benefits. The second way represents the average savings over the defined summer peak period, consistent with the non-weather sensitive end uses, and is presented so that savings can be bid into PJM's Forward Capacity Market.

~~6.9~~3.8 Heating and Cooling Degree-Day Data

Many measures are weather sensitive. ~~-~~Because there is a range of climactic conditions across the ~~State~~state, ~~we~~ VEIC engaged the ~~Technical Subcommittee~~Utilities to provide their preferences for what airports and cities are the best proxies for the weather in their service territories. The result of this engagement is in ~~the following~~ the table below. All of the data represents 30-year normals[37] from the National Climactic Data Center (NCDC). Note that the base temperature for the calculation of heating degree-days in this document does not follow the historical 65F degree base temperature convention. Instead ~~we~~ VEIC used several different temperatures in this TRM to more accurately reflect the outdoor temperature when a heating or cooling system turns on.

Residential heating is based on 60F, in accordance with regression analysis of heating fuel use and weather by state by the Pacific Northwest National Laboratory~~.~~[38]. Residential cooling is based on 65F in agreement with a field study in Wisconsin~~.~~[39]. These are lower than typical thermostat set points because internal gains such as appliances, lighting, and people provide some heating. In ~~Non-Residential and industrial~~C&I settings, internal gains are often much higher; the base temperatures for both heating and cooling is 55F[40]. Custom degree-days with

[37] 30-year normals have been used instead of Typical Meteorological Year (TMY) data due to the fact that few of the measures in the TRM are significantly affected by solar insolation, which is one of the primary benefits of using the TMY approach.

[38] Belzer and Cort, Pacific Northwest National Laboratory in "Statistical Analysis of Historical State-Level Residential Energy Consumption Trends," 2004.

[39] Energy Center of Wisconsin, May 2008 metering study; "Central Air Conditioning in Wisconsin, A Compilation of Recent Field Research", p. 32 (amended in 2010).

[40] This value is based upon experience, and it is preferable to use building-specific base temperatures when

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building specific base temperatures are recommended for large C&I projects.

Comment [Jen108]: Not defined

Table 3.554: Degree-Day Zones and Values by Market Sector

	Residential		C&I		
Zone	HDD	CDD	HDD	CDD	Weather Station / City
1	5,352	820	4,272	2,173	Rockford AP / Rockford
2	5,113	842	4,029	3,357	Chicago O'Hare AP / Chicago
3	4,379	1,108	3,406	2,666	Springfield #2 / Springfield
4	3,378	1,570	2,515	3,090	Belleville SIU RSCH / Belleville
5	3,438	1,370	2,546	2,182	Carbondale Southern IL AP / Marion
Average	4,860	947	3,812	3,051	Weighted by occupied housing units
Base Temp	60F	65F	55F	55F	30 year climate normals, 1981-2010

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This table assigns each of the proxy cities to one of five climate zones. The following graphics from the Illinois State Water Survey show isobars (lines of equal degree-days) and we have color-coded the counties in each of these graphics using those isobars as a dividing line. Using this approach, the state divides into five cooling degree-day zones and five heating degree-day zones. Note that although the heating and cooling degree-day maps are similar, they are not the same, and the result is that there are a total of 10 climate zones in the ~~S~~state. The counties are listed in the tables following the figures for ease of reference.

available.

Figure 3: Cooling Degree-Day Zones by County

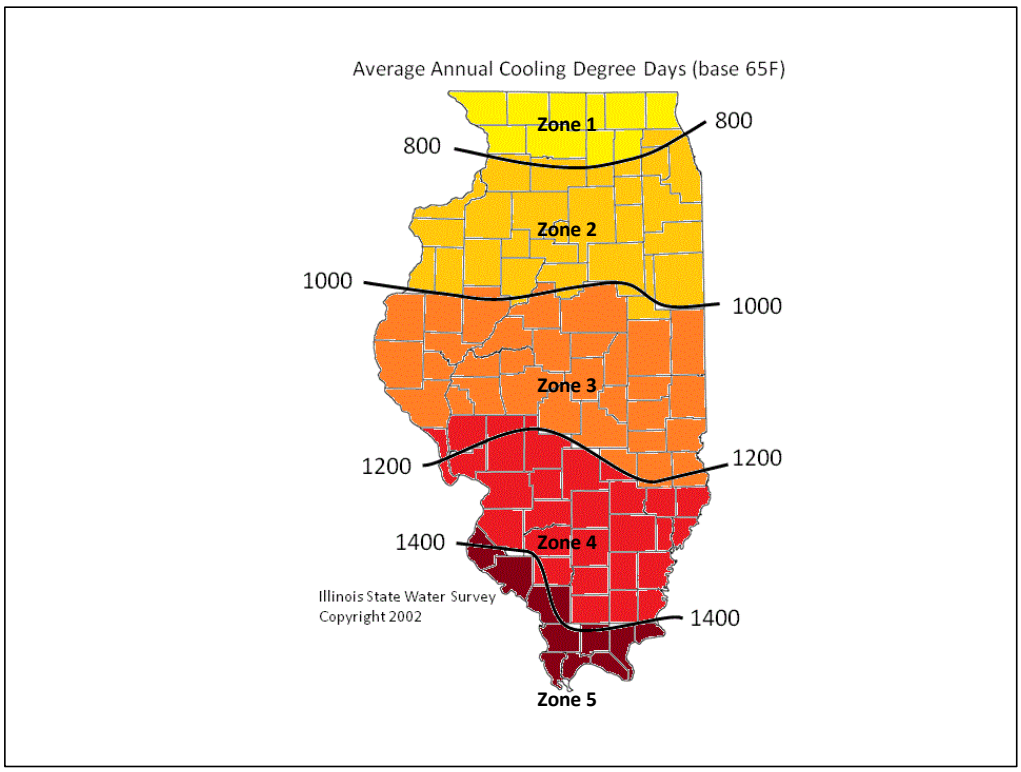

Figure 4: Heating Degree-Day Zones by County

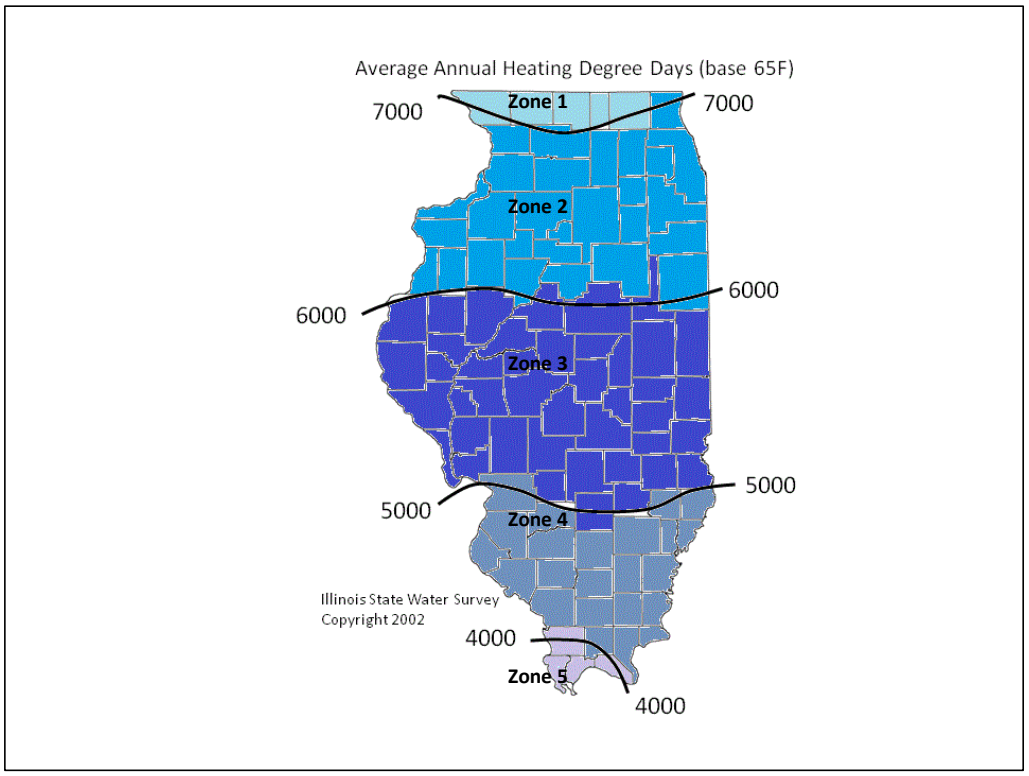

Table 3.~~6~~65: Heating Degree-Day Zones by County

Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Boone County	Carroll County	Adams County	Clinton County	Alexander County
Jo Daviess County	Bureau County	Bond County	Edwards County	Massac County
Stephenson County	Cook County	Brown County	Franklin County	Pulaski County
Winnebago County	DeKalb County	Calhoun County	Gallatin County	Union County
	DuPage County	Cass County	Hamilton County	
	Grundy County	Champaign County	Hardin County	
	Henderson County	Christian County	Jackson County	
	Henry County	Clark County	Jefferson County	
	Iroquois County	Clay County	Johnson County	
	Kane County	Coles County	Lawrence County	
	Kankakee County	Crawford County	Madison County	
	Kendall County	Cumberland County	Marion County	
	Knox County	De Witt County	Monroe County	
	Lake County	Douglas County	Perry County	
	LaSalle County	Edgar County	Pope County	
	Lee County	Effingham County	Randolph County	
	Livingston County	Fayette County	Richland County	
	Marshall County	Ford County	Saline County	
	McHenry County	Fulton County	St. Clair County	
	Mercer County	Greene County	Wabash County	
	Ogle County	Hancock County	Washington County	
	Peoria County	Jasper County	Wayne County	
	Putnam County	Jersey County	White County	
	Rock Island County	Logan County	Williamson County	
	Stark County	Macon County		
	Warren County	Macoupin County		
	Whiteside County	Mason County		
	Will County	McDonough County		
	Woodford County	McLean County		
		Menard County		
		Montgomery County		
		Morgan County		
		Moultrie County		
		Piatt County		
		Pike County		
		Sangamon County		
		Schuyler County		
		Scott County		
		Shelby County		
		Tazewell County		
		Vermilion County		

Table 3.7~~76~~: Cooling Degree-day Zones by County

Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Boone County	Bureau County	Adams County	Bond County	Alexander County
Carroll County	Cook County	Brown County	Clay County	Hardin County
DeKalb County	DuPage County	Calhoun County	Clinton County	Johnson County
Jo Daviess County	Grundy County	Cass County	Edwards County	Massac County
Kane County	Henderson County	Champaign County	Fayette County	Pope County
Lake County	Henry County	Christian County	Franklin County	Pulaski County
McHenry County	Iroquois County	Clark County	Gallatin County	Randolph County
Ogle County	Kankakee County	Coles County	Hamilton County	Union County
Stephenson County	Kendall County	Crawford County	Jackson County	
Winnebago County	Knox County	Cumberland County	Jefferson County	
	LaSalle County	De Witt County	Jersey County	
	Lee County	Douglas County	Lawrence County	
	Livingston County	Edgar County	Macoupin County	
	Marshall County	Effingham County	Madison County	
	Mercer County	Ford County	Marion County	
	Peoria County	Fulton County	Monroe County	
	Putnam County	Greene County	Montgomery County	
	Rock Island County	Hancock County	Perry County	
	Stark County	Jasper County	Richland County	
	Warren County	Logan County	Saline County	
	Whiteside County	Macon County	St. Clair County	
	Will County	Mason County	Wabash County	
	Woodford County	McDonough County	Washington County	
		McLean County	Wayne County	
		Menard County	White County	
		Morgan County	Williamson County	
		Moultrie County		
		Piatt County		
		Pike County		
		Sangamon County		
		Schuyler County		
		Scott County		
		Shelby County		
		Tazewell County		
		Vermilion County		

~~126.10~~3.9 O&M Costs and the Weighted Average Cost of Capital (WACC)

Some measures specify an operations and maintenance (O&M) parameter that describes the incremental O&M cost savings that can be expected over ~~its~~ the measure's lifetime. ~~For~~ When estimating the cost effectiveness of these measures, it is necessary to calculate the net present value (NPV) of O&M costs over the life of the measure, which requires an appropriate discount rate. The utility's weighted average cost of capital (WACC) is the most commonly used discount rate that is used in this context.

Each ~~Program Administrator~~utility has a unique WACC that will vary over time. As a result, the TRM does not specify the NPV of the O&M costs. Instead, the necessary information required to calculate the NPV is included. ~~For instance,~~An example is provided below to demonstrate how to calculate the NPV of O&M costs.

EXAMPLE

Baseline Case: O&M costs equal $150 every two years.

Efficient Case: O&M costs equal $50 every five years.

~~Baseline Case: O&M costs equal $150 every two years.~~

~~Efficient Case: O&M costs equal $50 every five years.~~

Given this information, the incremental O&M costs can be determined by discounting the cash flows in the Baseline Case and the Efficient Case separately using the applicable WACC. Then the NPV of the incremental O&M costs is calculated by subtracting one NPV from the other. This value is then used in ~~the~~ each ~~Program Administrator~~utility's cost-effectiveness screening process.

Those measures that include baseline shifts that result in multiple component costs and lifetimes cannot be calculated by this standard method. In only these cases, the O&M costs are presented both as Annual Levelized equivalent cost (i.e., the annual payment that results in an equivalent NPV to the actual stream of O&M costs) and as NPVs using a ~~Statewide~~ statewide average real discount rate of 5.23%.

~~126.11~~3.10 Interactive Effects

The TRM presents engineering equations for most measures. This approach is desirable because it conveys information clearly and transparently, and is widely accepted in the industry. Unlike simulation model results, engineering equations also provide flexibility and the opportunity for users to substitute local, specific information for ~~deemed~~ specific input values. Furthermore, the parameters can be updated ad hoc as better information becomes available.

One limitation is that some interactive effects between measures are not automatically captured. Because we cannot know what measures will be implemented at the same time with the same customer, we cannot always capture the interactions between multiple measures within individual measure characterizations. However, interactive effects with different end uses are included in individual measure characterizations whenever possible.[41] For instance, waste heat factors are included in the lighting characterizations to capture the interaction

[41] For more information, please refer to the ~~'~~document, "Dealing with ~~i~~Interactive Effects During Measure Characterization" Memo to the Stakeholder Advisory Group dated 12/9/11.

Comment [Jen111]: What should DCEO do?

Comment [Jen112]: Please present the NPV formula and actually calculate the result perhaps using the statewide average real discount rate presented below of 5.23%

Comment [Jen113]: DCEO?

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between more-efficient lighting measures and the amount of heating and/or cooling that is subsequently needed in the building.

By contrast, no effort is made to account for interactive effects between an efficient air conditioning measure and an efficient lighting measure, because it is impossible to know the specifics of the other measure in advance of its installation. For custom measures and projects where a bundle of measures is being implemented at the same time, these kinds of interactive effects ~~can~~ should be estimated~~.~~ , ~~and the custom protocols include a procedure to estimate~~

Comment [Jen116]: I don't think the custom protocols for this are included in the TRM