

Midwest TRM Inventory

*Statewide Technical Resource Manuals
for Energy Efficiency*

February 2017





Introduction

The Midwest Energy Efficiency Alliance (MEEA) has developed this Midwest TRM Inventory in order to catalog existing Technical Resource Manuals (TRMs) in the Midwest and help our members gain a comprehensive perspective of TRM applications in the region. TRMs, or equivalent tools¹, are technical resources (in the form of a document, searchable database, spreadsheet or website) that offer prescriptive savings equations or deemed savings values that can be used by utilities and implementers running energy efficiency programs to calculate the energy savings associated with the energy efficiency programs.

TRMs are a tool within a broader set of evaluation, measurement and verification (EM&V) resources employed by utilities and states in the Midwest in order to make sure that program administrators can count energy efficiency savings as accurately as possible. TRMs are an important way to ensure consistent program evaluation across utilities and program operators within a state. TRM algorithms and/or deemed values also help program planners more easily design portfolios that balance funding and state goals. In addition to their use in savings estimation and in program evaluation, program administrators and implementers also use these tools for program planning and load forecasting.

This TRM Inventory includes a review of TRM purposes, development, update processes and applications in Midwest states; as well as a measure analysis that may identify opportunities for additional measure offerings in the region. The first section of this report provides an overview of general features of the TRMs in the Midwest. The second section of the report explores the distribution of measure categories in the region with an eye toward identifying opportunities for additional measures that state TRMs could include in future updates. Appendix A contains a detailed, state-specific guide to each TRM and its development and features.

MEEA reviewed existing statewide TRMs within the Midwest, as well as accompanying policy documents, and conducted a series of interviews of TRM administrators and other relevant experts. To help facilitate the Midwest TRM Inventory initiative, MEEA recruited an Advisory Group comprised of stakeholders representing each state in the region with statewide TRM interest. Advisory Group members provided insight into how their TRM or TRM equivalent is developed, updated and applied. The listing of Advisory Group members is in Appendix B.

¹ Various terms are used to describe tools that are functionally equal to a Technical Resource Manual, including, *inter alia*, "Technical Reference Manual", "Deemed Savings Manual" and "Deemed Savings Database." For purposes of clarity and consistency, we use the term Technical Resource Manual or TRM throughout this report.

TRM Overview

TRMs in the Midwest come in many different forms. Below, we provide an overview of: 1) the focus of TRMs in the region, 2) the manner in which TRMs are updated, 3) the process for stakeholder participation in TRM development and maintenance, and 4) the role of non-regulated utilities with respect to TRMs.

TRM Focus

The general reasons for maintaining a statewide TRM are consistent across the Midwest. These include:

- offering greater accountability,
- simplifying implementer and evaluator processes across utility service territories,
- maintaining cost effective updates,
- providing consistency in filings and
- ensuring reliable savings numbers.

Despite this commonality of purpose, each TRM is processed and executed in a somewhat different way. For example, while several Midwest TRMs focus only on annual savings, other TRMs provide algorithms for calculating lifetime savings. Each TRM serves the needs of the stakeholders in that state and the requirements of the state's regulatory process, and the differences in process and execution do not indicate that one TRM is better than another TRM.

In the Midwest, program administrators and evaluators most commonly use the TRM as an evaluation tool. Stakeholders in the states continue to build and enhance their TRMs to provide algorithms and deemed values that are useful for energy efficiency program planning and even capacity planning.

TRMs come in two general formats, either a static report document or a data-driven format such as a spreadsheet or database. Static, report-based TRMs can provide detailed background information on savings equations, reference tables and sources, while dynamic spreadsheets or database tools can also be useful for planners in such scenarios as the testing of different measure savings scenarios. Currently, most of the TRMs in the Midwest are of the former, report-style format, but several states have adopted or are considering the dynamic approach. As state energy efficiency stakeholders create or update their TRMs, the concept of a static reference manual vs. a dynamic format is likely to be a major decision.

TRM Update Timelines

The timeline for updating TRMs varies among the Midwest states. Most TRM updates occur annually, but it is also possible to update TRMs within a program year to adjust values based on completed prior-year program evaluations. Some states do not have an active timeline in place for updating the statewide TRM.

- Illinois, Michigan and Minnesota are examples of states that update their TRMs annually. For states with an annual update schedule, it is normal to have a final draft of the next version of the TRM available well ahead of when the program year starts to allow for program adjustments based on the TRM and to allow program administrators to update electronic tracking and calculation systems. However, this period differs in each state.

- Wisconsin has shifted from a biannual update cycle in the spring and fall to a two-step update process where a deemed savings report is published as a first step, followed by publication of the full TRM including deemed savings changes as well as other updates.
- Several other states, such as Ohio and Indiana, do not have clear update plans due to questions regarding the future of the TRM and available funding.

Having an established update cycle helps to ensure that TRMs can integrate evaluation data regularly into savings calculations and provides an opportunity for new measures to be added to TRMs and obsolete/erroneous measure information removed or corrected. In states where there is no regular update, program administrators are not always able to use outdated TRM-based savings for their program and capacity planning needs. In these cases, program administrators often use the existing TRM to develop individualized TRMs that update measures and values based on their own program experience, thus moving away from the simplicity and consistency of a single statewide tool. Ohio is a good example of this in the Midwest.

Stakeholder Input

Open stakeholder processes for developing and updating TRMs and for energy efficiency planning allow for new ideas to flow into the planning process and for stakeholders to suggest emerging products for consideration to be included in TRMs and future programs. Having an open stakeholder group can also build trust from governing bodies and advocacy organizations that closely review energy efficiency plans. Stakeholder groups can help reduce confusion on the viability and reliability of energy efficiency savings.

- Michigan, Minnesota and Illinois have an open stakeholder process that actively invites outside stakeholders into the process.
- In Wisconsin, the TRM is considered an internal document; there are no active stakeholder groups involved.
- Iowa has just finished their first TRM. The state expects to support an open stakeholder process. Currently, there is an established oversight committee of parties involved in energy efficiency planning to support the launch and future updates, as well as a technical committee to assist this work.

Non-regulated Utility Role in TRMs

The involvement of non-regulated utilities in the process of developing and updating statewide TRMs varies between states. In Illinois, state law does not require cooperative (co-op) and municipal utilities to reach savings goals, and they operate outside of the TRM process. Minnesota co-ops and municipal utilities offer energy efficiency as part of required energy efficiency goals, so they are active in their state's TRM process. While Missouri is in the development stage of their TRM, they hope to include co-ops and municipal utilities (with voluntary energy efficiency programs) into their TRM process so that co-ops can apply the savings equations toward receiving credit under other regulatory regimes.

Midwest TRM Measure Analysis

In addition to the review of Midwest TRMs in the previous section, MEEA also compiled measure information from the Iowa, Illinois, Indiana, Michigan, Minnesota and Wisconsin TRMs. In some cases, a newer version of the TRM has been published since the measure data collection was completed. Where practical, the collected data was updated to incorporate edits and additions to the TRM where it was possible to readily identify these changes. Because TRM updates occur periodically, this analysis should be considered as a “snapshot” of currently available TRMs rather than as an ongoing catalogue of TRM updates. We believe that the most recent version of each TRM is included in this analysis with the exception of the Illinois v6.0 TRM which was published on February 8, 2017 after analysis was already completed. Updated measures from that TRM version will be incorporated into the TRM Measure dataset though those updates are not included in the analysis here.

Measure information and data was extracted electronically from the various TRMs. The original documents came in a variety of formats. Not every data point was available for every measure, nor was it possible to extract all data from the TRMs, especially equations and tables. Omissions and transcription errors are always a possibility with data mining, and while every effort was made to prevent them and to spot check for accuracy, it was impractical and time prohibitive to do any measure-by-measure accuracy check.

We reviewed and classified the measures by sector, end use, category and technology using a taxonomy derived from a schema developed by the Bonneville Power Administration (BPA)² and modified as needed to reflect the measures and technologies found in the TRMs in MEEA's region. The classification taxonomy for the Midwest TRM Inventory Measure Analysis is shown in Table 1. Classifications were matched, where possible, to given measure classifications and additional levels of classification were set based on the judgement of the analyst.

Table 1: Sector, End Use, Category and Technology classifications used for measure analysis

Sector	End Use	Category	
Agriculture	Agriculture	Behavior/Education	Other
Commercial	Appliances	Computers	Plug Load
Industrial	Compressed Air	Cooking	Process Loads System Improvements
Multifamily	Electronics	Envelope	Pumps/Fans
Public	Food Service Equipment	Heat Recovery	Refrigeration System Improvements
Residential	HVAC	HVAC Controls/Sensors	Refrigerators/Freezers
Upstream	Lighting	HVAC System	Signs/Signals
	Other	HVAC System Improvements	Transformers
	Process Loads	Lamps/Ballasts/Fixtures	Water Heaters
	Refrigeration	Laundry	Water Management

² BPA. 2016. “UES Measures List v4.1” *Energy Efficiency Interim Solution 2.0 Files*. Web. Accessed at <https://www.bpa.gov/EE/Policy/Solutions/Pages/default.aspx>

	Shell	Lighting Controls/Sensors	Water-Using Devices
	Water Heating	Livestock Tanks	Whole Bldg/Meter Level System Improvements
		Motors/Drives	
Technology			
Air Conditioning	Griddles	Nozzle Replacement	
Air Sealing	Heat Pump Water Heaters	Other	
Behavior	Heat Pumps - Air-Source	Oven - Electric	
Case Lighting	Heat Pumps - Ground-source	Oven - Gas	
Clothes Dryers	Heat Pumps - Various	Oven - Other	
Clothes Washers	Heat Recovery - HVAC	Power Strips	
Computer Power Management	Heat Recovery - Stack	Pre Rinse Spray Valves	
Computer Systems	Heat Recovery - Water/Liquid	Pumps	
Controls	Hot Food Holding Cabinets	Refrigerators	
Decommissioning - AC	Ice Makers	Sensors	
Decommissioning - Refrigerator/Freezer	Infrared Heater	Showerhead/Aerators	
Delamping	Insulation - Duct	Split Systems	
Dishwashers	Insulation - Other	Steam Cooker - Electric	
Doors	Insulation - Pipe	Steam Cooker - Gas	
Drives	Insulation - Shell	Strip Curtains	
Duct Sealing	Lamps/Ballasts	Television/Monitor/AV	
Fans	Lamps/Fixtures	Thermostats	
Freeze Resistant Stock Tanks	LED Exit Signs	Training	
Freezers	LED Signs	Tune Up	
Fryers - Electric	LED Traffic Signals	Vending Machines	
Fryers - Gas	Motion Sensors	Water Heaters	
Furnace/Boiler	Motors	Windows	
Gasket Replacement	New Construction		
Grain Dryer	Night Covers		

After classifying state TRM measures, the measure lists were compiled into a single master Excel file, matching comparable data columns between states and maintaining state-specific columns where comparable data was not obtained for other states. The resulting datafile was normalized sufficiently to allow electronic analysis. The file was analyzed using the Tableau Desktop analysis and visualization package.

The distribution of measures at the various categorization levels was analyzed with an eye towards identifying types of measures that may have potential to be expanded to other states in the region. Comparison of underlying input assumptions or levels of energy savings is beyond the scope of this project, though it is possible that some of this analysis could be done using data contained within the TRM Measures datafile.

Midwest TRMs vary in how they treat customer sectors. Some states, such as Iowa and Illinois, have very limited sector categorization – Iowa designates its measures as “residential” or “nonresidential” without further subclassifications, and similarly Illinois classifies measures as “residential” or “commercial and industrial.” Other states have more classifications by sector, such as Wisconsin, where each measure is classified as fitting into six sectors: residential single-family, residential multifamily, commercial, industrial, agriculture and schools & government as well as noting measures that due to program design are upstream of the customer and cannot be clearly assigned to a sector.

In classifying the TRM sectors in the merged measures from the Midwest's statewide TRMs, we used the following sector types:

- a. Residential: measures for residential customers (may include single-family & multifamily customers if that subsector is not separately identified)
- b. Commercial: measures for commercial customers (or commercial & industrial if the industrial sector is not separately identified)
- c. Industrial: measures for industrial customers (not separately identified in some states)
- d. Multifamily: a subset of residential; measures for multifamily residential housing (not separately identified in some states)
- e. Agriculture: measures for agricultural facilities (not separately identified in some states)
- f. Public: measures for schools and governmental facilities (not separately identified in some states)
- g. Upstream: retail markdown measures that cannot be clearly assigned to a sector (not separately identified in some states)

Because some states break out their measures by a wider list of sectors, as much as was possible, we did the same. We feel that separating out the subsectors (multifamily being technically part of residential; industrial, agriculture, and public being part of commercial) helps to call attention to those customer segments that have specific program needs that may be different from the broader sectors to which they belong.

In classifying measures by sector, we used the designations given to them by the individual states as a starting point. In cases where a subsector could be clearly broken out from the broad residential/commercial categories based on the measure details (for example designating measures as ‘commercial’ sector but listing an ‘agriculture’ end-use) we assigned those measures to our more-detailed sector classifications. This was possible only in limited cases where measure descriptions clearly suggested these subclasses.

The lack of a subsector in a state should not be interpreted to mean that the state's utilities do not offer programs for that customer type, but rather that there is not sufficient detail in the TRM for us to identify measures that are specific to that sector. In many cases with the states that have the most detailed sector classifications (Minnesota and Wisconsin) a single measure could

apply to more than one, or even all, of the detailed sector classes. Figure 1 shows the distribution of sectors among the state TRMs.

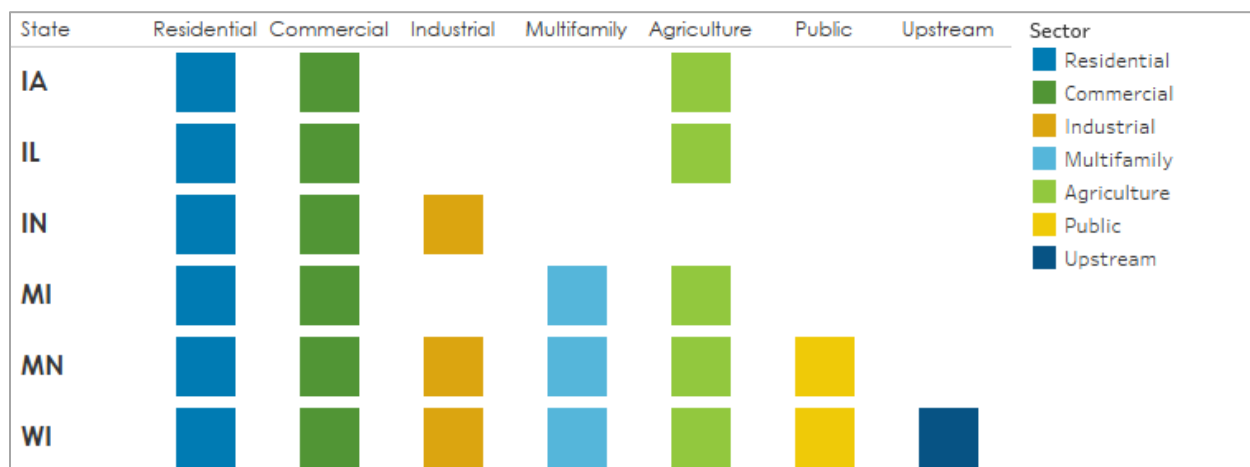


Figure 1: Detailed sector designations for measures in Midwest TRMs. The squares indicate whether or not our merged TRM measures data contains measures classified for that customer sector. The absence of a sector from this listing does not indicate a lack of measures, but rather that it was not possible to segment out those measures from the broader residential/commercial sector. (The exception to that would be Indiana, whose TRM does not include any agriculture-specific measures.)

From the perspective of energy efficiency advocacy, it is useful to have TRMs (and program administrators) break out the detailed subsectors because it helps to increase the understanding of what measures are available for – and ultimately the energy efficiency achievements within – these segments of the customers who have substantially different energy efficiency needs than more “general offer” customers. A deeper look at sector classifications could be an area that TRM administrators and stakeholders could explore as an enhancement to their TRMs and ultimately to the way they break out customers in their program planning and reporting.

End Use

End Use breaks down measures by general functional area, rather than by sector. If *Sector* answers the question “which customers are the measures for?” then the end use would answer the question, “what is the measure for?” Some of the Midwest’s TRMs include classification by end use, while others do not. The end uses that we used to classify measures in our merged TRM measure list are:

- a. *Agriculture*: the measure is related to specialized agricultural equipment or functions
- b. *Appliances*: the measure is related to residential customer in-home appliances
- c. *Compressed Air*: the measure is related to air compression
- d. *Electronics*: the measure is related to computers, audio-visual equipment and other electronic devices
- e. *Food Service Equipment*: the measure is related to commercial food preparation and service
- f. *HVAC*: the measure is related to heating, ventilation and air conditioning functions
- g. *Lighting*: the measure is related to lighting

- h. *Process Loads*: the measure is related to reducing industrial customer process energy use
- i. *Refrigeration*: the measure is related to commercial-scale refrigeration functions (residential refrigerators are included under Appliances)
- j. *Shell*: the measure relates to improving the energy efficiency of the building shell
- k. *Water Heating*: the measure relates to heating water for residential or commercial use
- l. *Other*: the measure has a specialized function that does not fit the above classifications but is not widespread enough to create its own End Use classification

These classifications are somewhat arbitrary, but they are useful for looking at measure types from a broad overview of the functional area in which the measure applies.

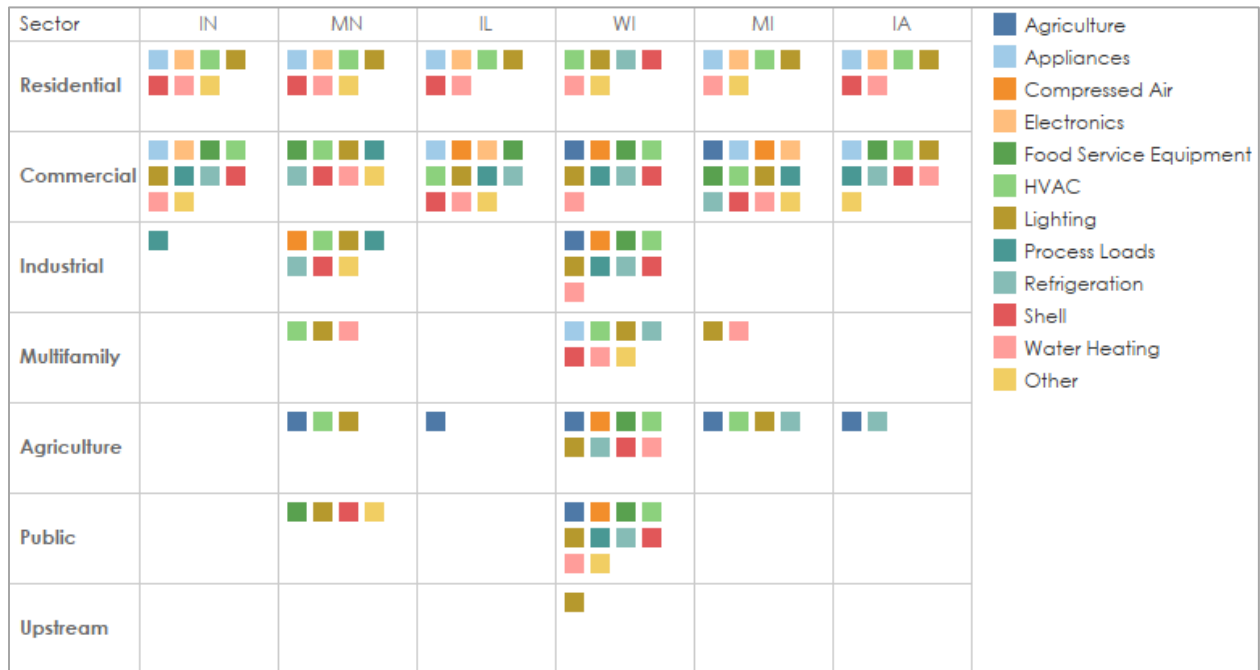


Figure 2: End use classifications contained within each state TRM, by customer sector.

As Figure 2 shows, the end uses are broadly distributed among states and sectors within the states. The major sectors – residential and commercial – have the most distinct end uses, while the smaller sectors are much more specialized. Wisconsin has the broadest distribution of end uses among its sectors, followed by Minnesota.

Figure 3 shows that lighting and HVAC end uses are the most common measure types seen in all of the TRMs, though the proportion varies by state. Water heating and food service equipment are the next largest end use categories. The large variability in the number of measure records for each state is due to the granularity of the TRM measure list. For some TRMs, such as Michigan and Wisconsin, individual records are itemized by many separate measure codes, whereas in others like Illinois a single measure code may apply to a variety of variations on the measure as specified in lookup tables within the measure listing but without assigning each variation a separate measure name/measure code.

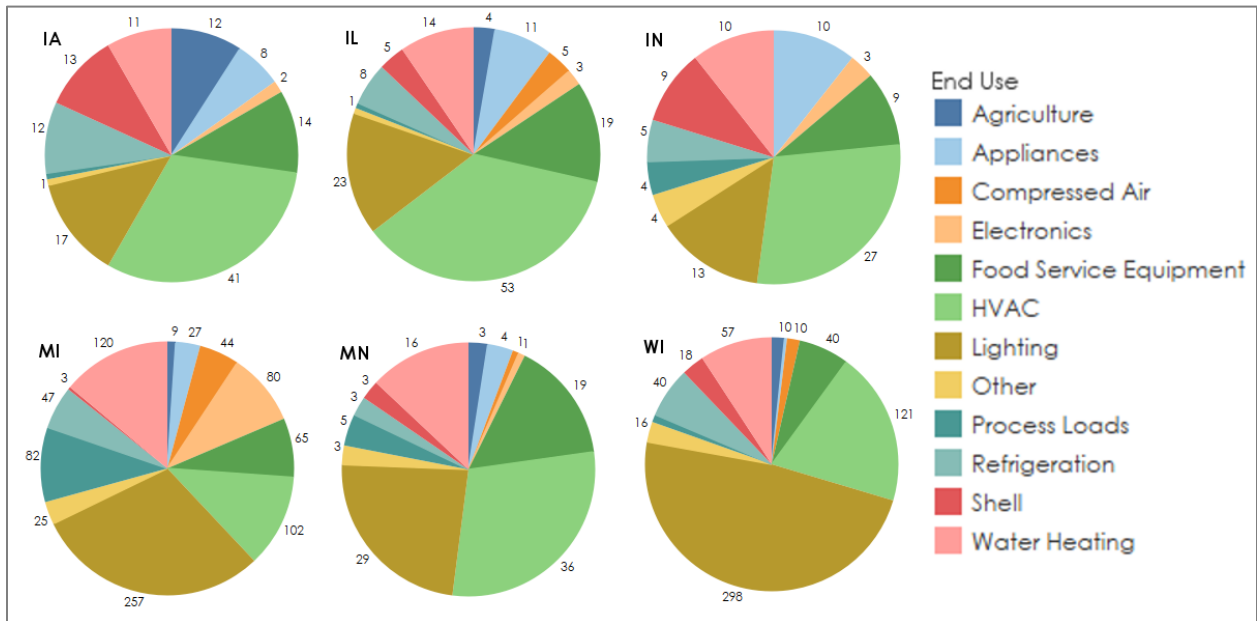


Figure 3: Measure end use by state and the count of distinct measure names within each state (note: distinct count of measure name was used rather than count of distinct measure codes because the Minnesota TRM does not use measure codes)

In Figure 4, measure end uses are color coded by the energy savings type to which they apply. Measures can provide electricity savings, natural gas savings, or they can be what we have termed “dual” measures in the figure – either they provide both electric and natural gas savings or they could provide either depending on the finer details of the measure and installation. For example a low-flow showerhead’s savings would depend on whether water heating was by electricity or natural gas, or an improved HVAC fan could save electricity used to run the fan itself as well as natural gas from the gas-fired furnace. Classifying measures by electric, gas or dual was based on the designation given in the individual TRM, except in Iowa where measures were not coded as such and were therefore categorized based on whether kWh or therm savings, or both, were listed for the measure.

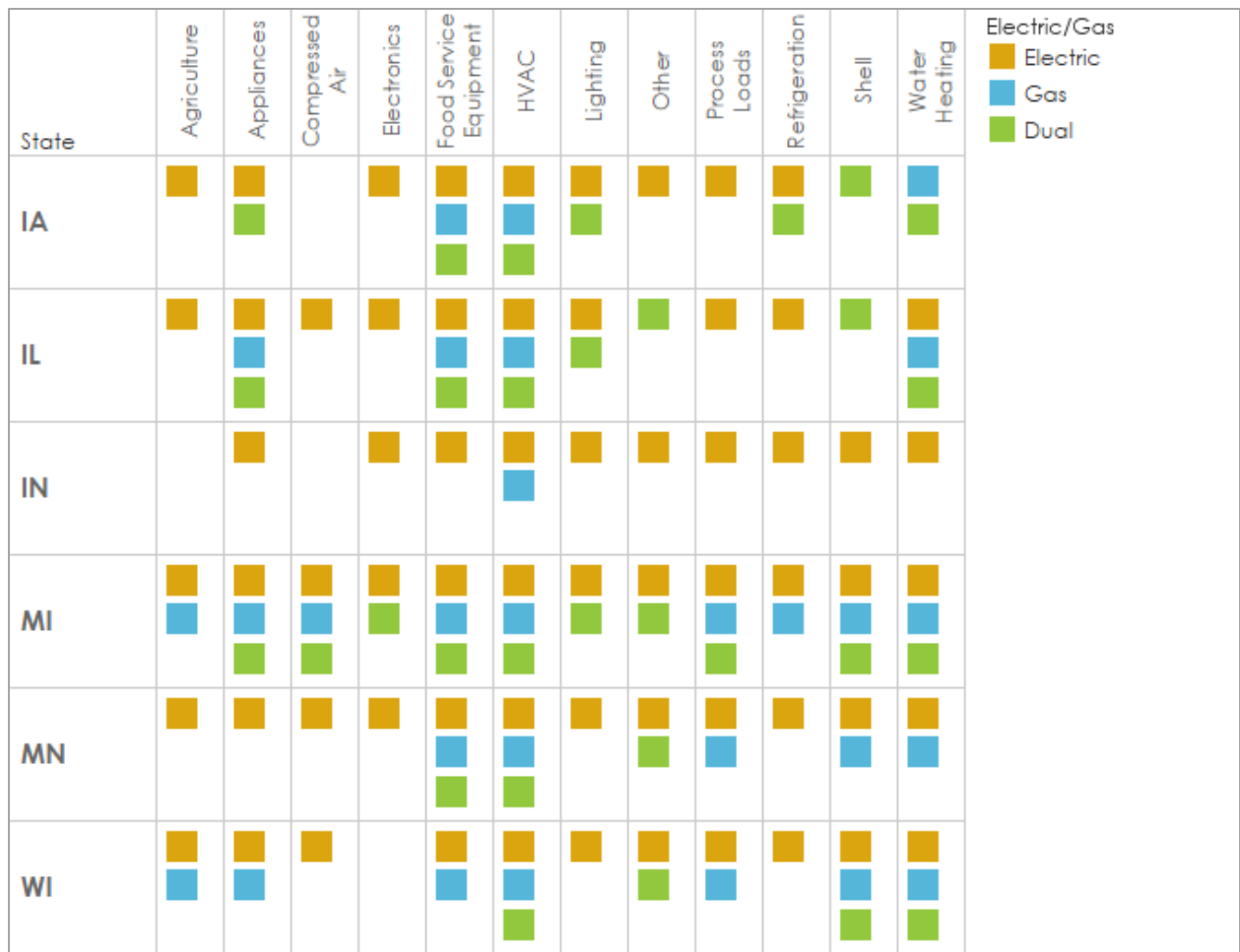


Figure 4: End uses by state, color coded by primary energy savings type. Electric: measure is classified as an electric savings measure; Gas: measure is classified as a natural gas savings measure; Dual: measure can provide savings of electricity or natural gas, or both, depending on details of measure & installation.

Category

Category is used to break up end uses further. A lighting end use may have measures that are, for example, lamp replacement, fixture replacement, ballast replacement, traffic signals, or control and sensor upgrades. Water heating end use might indicate measures that replace a water heater with a more efficient model, or measures that save the amount of water being used. Category gives us a way to look at broader groups of measure types seen within each end use.

Figure 5 shows a graphical representation of how many measures – this time by count of distinct measure name, rather than number of records as in the earlier figure – are found in each TRM, with color coding representing the end uses and boxes within each end use representing how the end uses break down into individual categories.

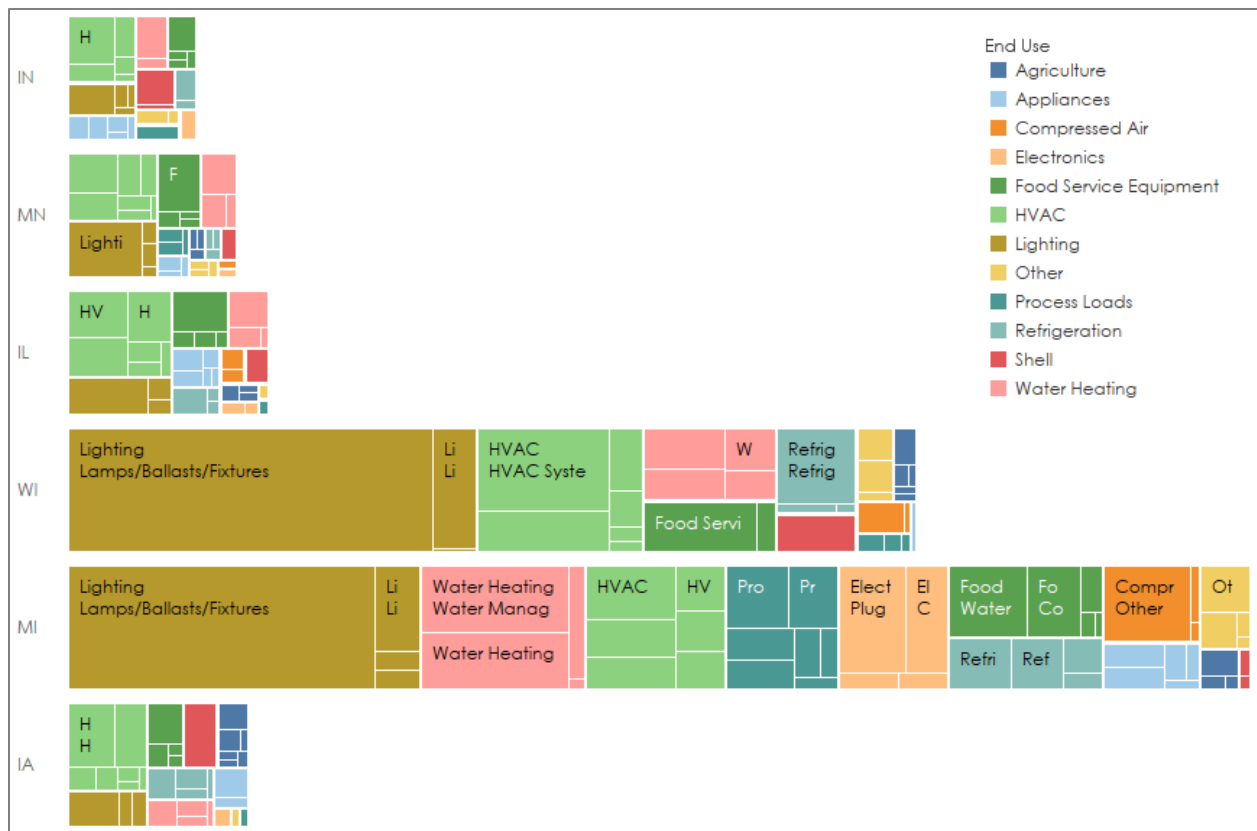


Figure 5: Count of measures in each state TRM, categorized by end use (color) and category (boxes). Measure count is by distinct measure name rather than measure codes because the Minnesota does not include measure codes.

The category assigned to each measure was based upon the categories used in the original BPA measure classification tables, modified to fit logical groupings of measures within the Midwest TRMs. Each end use has a number of different categories. For example, the HVAC end use includes the categories: *Heat Recovery, HVAC Controls/Sensors, HVAC System, HVAC System Improvements, Motors/Drives, Pumps/Fans* and *Other*. (Note: *HVAC System* would include whole replacement systems such as a furnace, boiler or central AC unit, whereas *HVAC System Improvement* would signify measures such as duct sealing, pipe insulation or system tune-ups.) Figure 6 through Figure 16 show how many measures, again by count of distinct measure name, of each category exist within the end uses for each state TRM.

	Agriculture						
	HVAC Controls..	Irrigation	Livestock Tanks	Motors/ Drives	Other	Plug Load	Pumps/ Fans
MN			● 1			● 1	● 1
IL			● 1			● 1	● 2
WI		● 1	● 2	● 5	● 1		● 1
MI			● 2	● 6	● 1		
IA	● 1	● 1	● 1	● 1	● 5		● 3

Figure 6: Count of measures in each category within the *Agriculture* end use, by state.

	Appliances					
	HVAC System	Laundry	Other	Plug Load	Refrigerat ors/ Fre..	Water- Using D..
IN	● 3	● 2		● 1	● 3	● 1
MN		● 1			● 2	● 1
IL	● 1	● 4		● 2	● 3	● 1
WI		● 2				
MI		● 8	● 5	● 3	● 9	● 2
IA		● 2			● 6	

Figure 7: Count of measures in each category within the *Appliances* end use, by state.

	Compressed Air		
	Heat Recovery	Motors/ Drives	Other
MN			● 1
IL		● 2	● 3
WI	● 1		● 9
MI	● 1	● 3	● 40

Figure 8: Count of measures in each category within the *Compressed Air* end use, by state.

	Electronics			
	Computers	Heat Recovery	HVAC System	Plug Load
IN				● 3
MN				● 1
IL	● 1			● 2
MI	● 27	● 6	● 5	● 42
IA				● 2

Figure 9: Count of measures in each category within the *Electronics* end use, by state.

	Food Service Equipment						
	Cooking	Other	Plug Load	Refrigerators/ Freezers	Water Management	Water-Using Devices	
IN	● 6		● 1		● 1	● 1	
MN	● 15		● 1		● 2	● 1	
IL	● 14		● 2		● 1	● 2	
WI	● 6						● 34
MI	● 23	● 6	● 2		● 1		● 33
IA	● 9		● 1	● 1			● 3

Figure 10: Count of measures in each category within the *Food Service Equipment* end use, by state.

	HVAC									
	HVAC				HVAC System			Other	Pumps/ Fans	
	Heat Recovery	Controls/ Sens..	HVAC System	Improvements	Motors/ Drives					
IN	● 1	● 5	● 14	● 5	● 2					
MN	● 3	● 6	● 12	● 9	● 2	● 1	● 4			
IL	● 3	● 13	● 17	● 14	● 4		● 2			
WI	● 2	● 12	● 32	● 65	● 3		● 7			
MI	● 12	● 20	● 11	● 29	● 17		● 13			
IA	● 1	● 4	● 12	● 18	● 3	● 2	● 1			

Figure 11: Count of measures in each category within the *HVAC* end use, by state.

	Lighting							
	Lamps/ Ballasts/ Fixtur..	Lighting Controls/ Sens..	Other	Signs/ Signals				
IN	• 9	• 1	• 1	• 2				
MN	• 25	• 2	• 1	• 2				
IL	• 18	• 2		• 3				
WI	● 266	• 31		• 1				
MI	● 224	• 23	• 5	• 5				
IA	• 11	• 3		• 3				

Figure 12: Count of measures in each category within the *Lighting* end use, by state.

	Other						
	Behavior/ Education	Motors/ Drives	Other	Pumps/ Fans	Water Management	Whole Building	
IN				● 3		• 1	
MN	• 1		• 1	• 1			
IL			• 1				
WI	● 14		• 2				
MI	● 14	• 1	● 8		• 2		
IA		• 1					

Figure 13: Count of measures in each category within the *Other* end use, by state.

	Process Loads						
	Heat Recovery	Motors/ Drives	Other	Process Loads System Improv..	Pumps/ Fans	Transformers	Water Heaters
IN				● 4			
MN		● 2	● 2				
IL					● 1		
WI		● 2	● 3	● 1			
MI	● 3	● 23	● 18	● 13	● 8	● 12	● 5
IA		● 1					

Figure 14: Count of measures in each category within the *Process Loads* end use, by state.

	Refrigeration						
	Heat Recovery	Motors/ Drives	Pumps/ Fans	Refrigeration Controls/Sens..	Refrigeration System Improv..	Refrigerators/ Freezers	
IN					● 4	● 1	
MN			● 1		● 1	● 1	
IL	● 1				● 6	● 1	
WI		● 1			● 3	● 36	
MI	● 4	● 8			● 19	● 16	
IA		● 1		● 2	● 5	● 4	

Figure 15: Count of measures in each category within the *Refrigeration* end use, by state.









	Shell	
	Envelope	Whole Building
IN	 8	 1
MN	 3	
IL	 5	
WI	 18	
MI	 2	 1
IA	 13	

Figure 16: Count of measures in each category within the *Shell* end use, by state.

Without going into a detailed discussion of each end use and category combination, it is clear from the above figures that some categories within each end use are more prevalent among the state TRMs, and some categories are not included in the end uses for some of the state TRMs at all. This provides evidence that there are significant opportunities remaining for the introduction of new and expanded measures to all of the TRMs if they meet the needs of the state's energy efficiency stakeholders.

Technology

The *Technology* classifications are the most granular classification in the Midwest TRM Measures data file. A subset of each *Category*, the technologies indicate most specifically what types of measures are in each TRM. Technologies tell us whether a measure that is from the *Food Service Equipment* end use and the *Cooking* category is an oven, a fryer or a steam cooker. Individual technologies may be very clearly part of a single “tree” such as the previous example, or a technology could be part of numerous different classifications – for example the technology classification *Drives* (which would include both variable frequency and variable speed drives) could be applicable to a wide spectrum of end uses including *Agriculture*, *Compressed Air*, *HVAC* and *Process Loads*.

In Figure 17 through Figure 20, we present a breakdown of how category/technology pairings apply to the assorted end uses within the state TRMs.

Category	Technology	End Use
Behavior/ Education	Behavior	MI WI
	Training	MI MN
Computers	Computer Power Management	IL MI
	Computer Systems	MI
	Fans	MI
Cooking	Fryers	IA IL IN MI MN
	Griddles	IA IL IN MI MN
	Hot Food Holding Cabinets	IL IN MI MN
	Other	IA IL MI
	Ovens	IA IL IN MI MN WI
	Steam Cookers	IA IL IN MI MN
Envelope	Air Sealing	IA IL IN MI MN WI
	Doors	IA MI MN
	Duct Sealing	IN
	Insulation - Shell	IA IL IN WI
	Other	IN
	Windows	IA IN
Heat Recovery	Heat Recovery - HVAC	MI WI MI IA IL IN MI MN WI IL
	Heat Recovery - Stack	IL MN MI
	Heat Recovery - Water/Liquid	MI MI IA IL MN
	Tune-Up	WI
HVAC Controls/ Sensors	Controls	IA IA IL IN MI MN WI
	Motion Sensors	MI
	Thermostats	IA IL IN MI MN WI
HVAC System	Air Conditioning	IN MI IA IL IN MI MN WI
	Decommissioning - AC	IL IN IA MI
	Furnace/Boiler	IA IL IN MI MN WI
	Heat Pump - Ground-source	IA
	Heat Pumps - Air-source	IA IL IN MN WI
	Heat Pumps - Ductless	IA
	Heat Pumps - Ground-source	IA IL IN MN WI
	Heat Pumps - Various	IA IL IN MN
	Infrared Heater	IL IN MN
	Other	IL MN
	Split System	IA
	Split Systems	MN WI

- End Use
- Agriculture
 - Appliances
 - Compressed Air
 - Electronics
 - Food Service Equipment
 - HVAC
 - Other
 - Process Loads
 - Refrigeration
 - Shell
 - Water Heating

Figure 17: End use classifications by state, for measures in category and technology groupings in Midwest TRMs. (Part 1)

Category	Technology	End Use
HVAC System Improvements	Air Sealing	MN WI
	Controls	IL WI
	Duct Sealing	IA
	Furnace/Boiler	MN
	Insulation - Duct	IA IL MI
	Insulation - Pipe	IA IL MI WI
	Other	IA IN MI MN
	Strip Curtains	IL MI
	Tune-Up	IA IL IN MI MN WI
Irrigation	Drives	WI
	Other	IA
Lamps/Ballasts/Fixtures	Case Lighting	IN MN WI
	Delamping	IL IN MI WI
	Lamps/Ballasts	MI
	Lamps/Fixtures	IA IL IN MI MN WI
	Other	IL
Laundry	Clothes Dryers	IA IL MI
	Clothes Washers	IA IL IN MI MN WI
Lighting Controls/Sensors	Controls	IA IL IN MI MN WI
	Sensors	IA IL MI MN WI
Livestock Tanks	Freeze Resistant Stock Tanks	IA IL MI MN WI
Motors/Drives	Drives	IA MI WI IL MI IA IL IN MI MN WI MI IA MI MN WI
	Motors	IA IL IN MI MN IA MN IA MI WI
	Other	IL MI
Other	Controls	IA
	Grain Dryer	IA MI WI
	Insulation - Pipe	IA WI
	Nozzle Replacement	IL MI WI
	Other	IA MI IL MI WI MI IA MN IN MI MN IL MI MN WI MI MN WI MI
	Tune-Up	MI MN WI
Plug Load	Motion Sensors	IN
	Other	IL MN IL IN MI
	Power Strips	IA IL IN MI MN
	Television/Monitor/AV	MI
	Vending Machines	IA IL IN MI MN

Figure 18: End use classifications by state, for measures in category and technology groupings in Midwest TRMs. (Part 2)

Category	Technology	End Use
Process Loads System Improvements	Drives	WI
	Insulation - Duct	IN MI
	Insulation - Other	IN MI
	Nozzle Replacement	IN
	Other	IN
Pumps/ Fans	Fans	IA IL WI IA IL MI MN WI MN
	Pumps	MN MN IN MN IL MI MI WI
Refrigeration Controls/Sensors	Controls	IA
	Sensors	IA
Refrigeration System Improvements	Controls	IL IN MI MN WI
	Doors	IL IN MI
	Drives	MI
	Gasket Replacement	IN MI
	Motors	IL
	Night Covers	IA IL
	Other	IA MI
	Refrigerators	IA MI
	Strip Curtains	IA IL IN MI WI
	Tune-Up	MI
Refrigerators/ Freezers	Decommissioning - Refrigerator/Freezer	IA IL IN MI MN IA WI
	Freezers	IA IL MI MI WI
	Refrigerators	IA IL IN MI MN IA IL IN MI MN WI
Signs/ Signals	LED Exit Signs	IA IL IN MI MN WI
	LED Signs	MI
	LED Traffic Signals	IA IL IN MI MN
Transformers	Other	MI
Water Heaters	Controls	IL MN
	Heat Pump Water Heaters	IA IN MN
	Insulation - Other	IA IN MN
	Insulation - Pipe	IL IN MI MN WI
	Other	MI MI WI
	Tune-Up	IA MI
	Water Heaters	MI IA IL IN MI MN WI

Figure 19: End use classifications by state, for measures in category and technology groupings in Midwest TRMs. (Part 3)

Category	Technology	End Use
Water Management	Night Covers	IA IL MI
	Nozzle Replacement	MI
	Other	MN
	Pre Rinse Spray Valves	IL IN MI MN
	Showerhead/Aerators	IA IL IN MI MN WI
Water-Using Devices	Dishwashers	IL IN MI MN IA IL MI MN WI
	Ice Makers	IA IL IN MI WI
	Other	MI
	Pre Rinse Spray Valves	IA
Whole Building	New Construction	IN MI
	Other	IN

Figure 20: End use classifications by state, for measures in category and technology groupings in Midwest TRMs. (Part 4)

Conclusion

There are many ways to parse the TRM Measures data using the measure classifications. We have only included a few of them in this report, and static figures can only present some of the views of the data that we found interesting. We think that the data we have presented here makes the case that there are ample opportunities around the Midwest for expanding the depth and breadth of state TRMs to better target specific customer segments, to expand the lists of available measures and to introduce energy saving technologies that have not previously been used in some states.

MEEA Members who are interested in obtaining the TRM Measures datafile for use with their own analytical tools should email their request to:

Will Baker, Director of Programs, wbaker@mwalliance.org

The Midwest TRM Measures datafile is not available to non-members at this time.

Appendix A: Midwestern State-wide TRM Guide

Illinois

TRM name	Illinois Technical Reference Manual
Current version	v5
URL	http://www.ilsag.info/technical-reference-manual.html
Applicable resources	Electric, Gas, Water
Status	In use
Applies to	Investor-Owned Utilities (IOU)
TRM Administrator	VEIC
Last update effective	Submitted: February, 2016. Approved May, 2016. Effective: June 1, 2016
Next update effective	February 2017
Update cycle	Annual (Deadline for existing measure work papers, Aug 1; for new measure work papers, Oct 1) TRM v6 update schedule: http://www.ilsag.info/il_trm_version_6.html
Stakeholders	Illinois Commerce Commission staff (ICC); Illinois Energy Efficiency Stakeholder Advisory Group (SAG); Illinois Department of Commerce and Economic Opportunity; utilities; evaluators (Itron, Navigant, Opinion Dynamics, ADM Associates, The Cadmus Group, Michael's Engineering, etc.); state advocacy groups; implementation companies

Illinois' statewide TRM was established in 2012, and is actively used by the state and the investor-owned utilities (IOUs) subject to the state's Energy Efficiency Resource Standard (EERS). The Illinois Stakeholder Advisory Group (IL SAG) is an open group that participates in program planning, quarterly energy efficiency program status updates, TRM updates, policy issues and related tasks. A public SAG website is regularly updated with meeting presentations, minutes and agendas as well as TRM, program evaluation and program planning process timelines. The annual Illinois TRM update process is facilitated by a TRM Administrator.

While the TRM document is publically available to all, the primary purpose is to serve IOUs; other utilities in Illinois are not required to achieve demonstrated savings goals by the ICC. The TRM is used both as an evaluation document and as a program design tool for the investor-owned utilities. There is an emphasis on annual savings, though the document also includes lifetime savings information. Due to its nature as a static document, organizations typically maintain their own proprietary savings calculator tools. There is interest in creating a more dynamic, interactive version of the TRM.

IN current practice, IL SAG begins updating the TRM each fall in order to have a new version approved and ready for the new program year that begins the following summer. Each year savings algorithms are modified based on stakeholder and utility input, utility program evaluations and TRM Administrator (VEIC) input. The priority list of measures is established by July 1, as directed by the ICC.

The TRM update process and schedule will undergo some modification as energy legislation passed in late 2016 (SB2814) will shift utility energy efficiency programs onto a calendar-year cycle starting January 1, 2018. IL SAG is currently discussing how the legislative changes will affect the update and approval cycles.

While anyone can join SAG and suggest inclusion of new measures in the TRM, the TRM Technical Advisory Committee (TAC) provides direction to which measures will receive priority to be updated in the year or added to the TRM; this prioritization process is supported by SAG. Often the measure proposer is asked to provide an accompanying work paper to aid measure prioritization. Existing product savings calculation updates are generally proposed by evaluators or program implementers based on pilots, further research or annual evaluations. Within in their EE budgets, Illinois statutes allow each EEPS administrator 3% of the portfolio budget to be used for program evaluation tasks. This 3% funding does not include funding updates to the TRM.

TRM name	Indiana Technical Resource Manual
Current version	v1 (v2.2 published)
URL	TRM v1 https://iurc.portal.in.gov/_entity/sharepointdocumentlocation/3e84b42b-8d84-e611-810e-1458d04f0178/bb9c6bba-fd52-45ad-8e64-a444aef13c39?file=dmccall_1_17_201310-58-26am[1].pdf (Official filing, Jan. 17, 2013 in Cause 42693 S1) TRM v2.2 https://iurc.portal.in.gov/_entity/sharepointdocumentlocation/fa57b522-8184-e611-8124-1458d04ea8b8/bb9c6bba-fd52-45ad-8e64-a444aef13c39?file=jenniferwashburn_43827--cac%20exhibit%201--final--1-13-16_1_13_201611-51-54pm.pdf (Exhibit NM-21 in CAC testimony, 1/13/2016 in Cause 43827-DSM 5)
Applicable resources	Electric, Gas
Status	In limited use
Applies to	Investor-Owned Utilities
TRM Administrator	TecMarket Works/Cadmus, Demand Side Management Coordination Committee (DSMCC)
Last update effective	TRM v1 published 2013. TRM v2.2 published 2016; introduced into evidence in several IURC dockets by EE advocates but no mandatory adoption.
Next update effective	N/A
Update cycle	No active update cycle
Stakeholders	Indiana Utility Regulatory Commission (IURC); Demand Side Management Coordination Committee (DSMCC) (v1 TRM); Investor-Owned Utilities, Industrial Users Group, Office of Utility Consumer Council, Citizens Action Coalition

The Indiana TRM was developed for the now-disbanded Indiana Demand-Side Management Coordination Committee (DSMCC) and filed with the Indiana Utility Regulatory Commission (IURC) in 2013. The TRM was based on the Draft Ohio TRM and adjusted with Indiana-specific information where available. The Indiana TRM, offered in a report-based format, is used for evaluation and planning purposes. The included savings algorithms offer both prescriptive values and deemed calculations that require program-specific data. They also include a step-down adjustment for early replacement of some products. The TRM focuses on annual savings, but also includes lifetime savings information. The TRM is in use by some utilities, which typically use a mix of the TRM, other out-of-state TRM sources and additional surveys/evaluation data to evaluate their programs.

Initially, annual committee-based updates to the TRM, driven by impact evaluations and research, were planned; however, the regular update schedule is on hold for the indefinite future. Before its dissolution, the DSMCC completed one TRM update, Indiana TRM v2.2. TRM v2.2 includes measure updates based on the first three years (2010-2012) of statewide evaluation results. TRM v2.2 has been submitted as an exhibit in testimony in a number of DSM cases before the commission³ though whether it will be adopted in whole or in part by utilities for future DSM cases is unclear. It is also unclear whether there will be any updates to the statewide TRM going forward.

³ e.g. Testimony and Exhibits of the Citizens Action Coalition, Exhibit NM-21, filed 1/13/2016 in Cause 43827-DSM 5

TRM name	Iowa Technical Reference Manual
Current version	v1
URL	Filed for approval in IUB dockets EEP-2012-0001, EEP 2012-0002, EEP-2013-0001
Applicable resources	Electric, Gas
Status	In use
Applies to	Investor-owned utilities, optional for consumer-owned utilities
TRM Administrator	VEIC
Last update effective	Release 9/30/2016; Approval: TBD; Effective 1/1/2017
Next update effective	January 1, 2017
Update cycle	Annual
Stakeholders	Iowa Utilities Board (IUB), Black Hills Energy, Interstate Power and Light Company, MidAmerican Energy Company, Environmental Law and Policy Center (ELPC), Iowa Environmental Council, Office of Consumer Advocate (OCA)

Iowa's statewide TRM was filed in utility energy efficiency planning dockets on September 30, 2016. The TRM is subject to approval by the Iowa Utilities Board. Previously, each utility based claimed savings on utility-specific savings tables approved through their individual energy efficiency plan filings. The Iowa TRM includes both a static report-based report and a dynamic measure spreadsheet. The new statewide TRM will be used for planning and evaluations and will be used as a resource for the 2019-2023 planning period. Prior to 2019, the TRM will be phased in, with utilities able to elect to incorporate TRM measures in their operating plans for 2017 and 2018, subject to stakeholder feedback and commission approval.

Most measures in the TRM are based on provided engineering calculations, although deemed values are provided for select measures. The TRM algorithms are derived from VEIC's previous research and background with preference given to state-specific/relevant data. The TRM will be updated annually based on ongoing program evaluations.

The stakeholder process is generally open and will help in guiding the TRM in the future. There is an oversight committee composed of energy efficiency plan parties and a technical advisory committee to help assist the committee. The IUB makes final determinations for all TRM issues.

TRM name	N/A (TRM in consideration for development)
Current version	N/A
URL	N/A
Applicable resources	Electric, Gas
Status	Exploratory
Applies to	Regulated utilities
TRM Administrator	N/A
Last update effective	N/A
Next update effective	N/A
Update cycle	N/A
Stakeholders (involved in MEEA-facilitated stakeholder process under DOE SEP grant)	Department for Energy Development and Independence (DEDI), Kentucky Public Service Commission (PSC), Kentucky Attorney General's Office, PSC-regulated utilities, MEEA, and representatives from Kentucky-based environmental advocates, manufacturers, housing organizations, local government, universities, and energy service companies.

In 2015-2016, MEEA and the Kentucky Department for Energy Development and Independence (DEDI) facilitated a stakeholder process in Kentucky to determine the feasibility of a statewide TRM. This stakeholder process was carried out under a U.S. DOE SEP grant. Through this process, MEEA, DEDI and Kentucky stakeholders developed a TRM Roadmap for Kentucky, which guides the development, use and maintenance of a TRM in Kentucky should the state decide to proceed with TRM development in the future. If developed, the TRM would likely be used as a non-mandatory reference resource by the Public Service Commission and regulated utilities.

Some utilities active in Kentucky already choose to use utility-specific TRMs that have been developed for use in their service territory. This includes TVA, which has a TRM (v5) that covers their 7-state footprint. TVA's programs are offered to all members, who then choose whether to offer the energy efficiency service. They begin with a test pilot before committing to full program roll outs. Each local power company currently administers at least one of the local programs, and as party of their turnkey solution, TVA helps them track participation and expected savings. If a Kentucky statewide TRM is ultimately developed, utilities such as TVA would likely review the TRM but would also continue to use their unique TRMs.

TRM name	Michigan Energy Measures Database (MEMD)
Current version	2017
URL	http://www.michigan.gov/mpsc/0,4639,7-159-52495_55129---,00.html
Applicable resources	Electric, Gas
Status	In use
Applies to	All utilities
TRM Administrator	Michigan Collaborative/Morgan Marketing Partners
Last update effective	September 30, 2016
Next update effective	September 30, 2017
Update cycle	Annual (April 1 deadline for submitting new measures for consideration, May 1 deadline for submitting work papers and re-applications of existing measures for new uses, June 1 deadline for pilot based data) Update process flowchart: http://www.dleg.state.mi.us/mpsc/electric/workgroups/memd_update_process_w_flowchart_2013_1_22.pdf
Stakeholders	Michigan Public Service Commission (MPSC), program planners, regulatory reviews and planners, utility and regulatory forecasters, and consultants supporting utility and regulatory research and evaluation efforts

The Michigan MEMD is a spreadsheet-based tool designed to quickly and easily provide utilities with recommended standard inputs for their initial energy savings calculations and as they develop their Energy Optimization Plans. All utilities participating in efficiency programs are required to use the deemed savings numbers provided by the TRM, with a mix of custom measures. The MEMD table format offers easy integration with database data, allowing utilities to explore various MEMD outputs during portfolio planning exercises and Integrated Resource Planning work. The TRM is also used for cost-benefit analysis, goal attainment determination and to analyze program design. There is no manual-based format available.

There is a large stakeholder group, the Michigan Public Service Commission (MPSC)-sponsored Energy Optimization (EO) Collaborative, which invites a variety of interest groups to join monthly meetings focused around planning and updating existing products. Concurrently, a technical subcommittee of the EO Collaborative focuses on adding new measures annually. The update process is based on measure-specific whitepapers. Whitepapers can be submitted by outside parties, although the majority are submitted by utilities and their energy efficiency implementation teams. Smaller utilities can submit measures for the MEMD, but—due to funding appropriation and size—the main inputs come from DTE Energy and Consumers Energy. Though

not strictly required to, evaluation contractors review the work papers to provide feedback to the planning group.

The administrator develops a new TRM annually by September for use in the new program year. Each utility is responsible for its own evaluation, and they provide periodic reports, and a number of presentations are shared to the broader stakeholder group depending on what topics the collaborative is most interested in. However, independent third party evaluations are required, and the TRM is updated annually to capture new evaluation data, further research or baseline shifts. The result is the steady calibration of the TRM to reflect more Michigan-specific data. The two main IOUs, Consumers Energy and DTE Energy, have helped to fund studies on higher-risk, high-volume measures in order to calibrate the TRM. In recent years, the TRM has added several new behavioral measures which require rigorous evaluation to document their initial savings and ongoing research to ensure the ongoing accuracy of those savings values over time.

TRM name	State of Minnesota Technical Reference Manual for Energy Conservation Improvement Programs
Current version	V1.3
URL	http://mn.gov/commerce/industries/energy/utilities/cip/technical-reference-manual/
Applicable resources	Electric, Gas
Status	In use
Applies to	All utilities
TRM Administrator	Department of Commerce
Last update effective	January 1, 2016
Next update effective	January 1, 2017 (v2)
Update cycle	Annual
Stakeholders	MN Department of Commerce, Division of Energy Resources (MN DOC), TRM Advisory Committee, utilities

Minnesota uses a savings manual (TRM) both to document standard methodologies and savings calculation inputs, and to provide written documentation for the Minnesota Department of Commerce, Division of Energy Resources (DER) TRM Smart Measure Library savings calculations stored on ESP®. ESP is a computer-based smart measure library that allows utilities to track real-time savings calculations. While ESP is a valuable tool, not all utilities have adopted it, and some rely on the TRM to build savings calculations on their own energy platforms. A next goal for the MN TRM/ESP is enhancing the ability for utilities to provide input via an Excel spreadsheet that auto feeds into ESP and generates savings estimates based on ESP's background. While deemed savings are not provided, the provided calculations can be used to create deemed savings tables if required. The TRM calculations are intended to be used as a guide for CIP administrators with pre-approved calculation methods, but utilities are free to propose justified variations to the methodology to better reflect program designs or incorporate enhanced data. Utilities can also provide additional products not included in the TRM without pre-approval.

Minnesota offers an open stakeholder process. The stakeholder list is regularly updated based on interest and actual participation. Stakeholders meet quarterly as a mix of utilities representing IOUs and smaller co-op and municipal utilities. To supplement the wider stakeholder process, a team of technical advisors helps guide research and development of the TRM. In addition to these technical advisors, Fresh Energy acts as the advocacy group. At most meetings, discussions focus around a single topic, highlighting new measures for possible inclusion in the TRM and reviewing existing measure calculations. These minor updates rotate throughout the year. A more comprehensive update is completed every three years as part of the tri-annual plans. Franklin Energy helps to maintain the TRM update cycle and manages updates to the codes portion of the TRM.

New products are added to the TRM based on interest from implementers and the applied research and development program managed by the state. They also compare utilities' custom projects to determine whether frequently-used measures may merit a deemed calculation.

The TRM is primarily designed as an evaluation tool, but is used for program portfolio planning as well. TRM updates are completed a year in advance of adoption; this ensures users can utilize the revised TRM for planning purposes up to 6 months prior to the June filing deadline. The main updates are completed every three years for IOUs' tri-annual planning process, although minor updates are provided each year. On minor years, the focus is on co-op and muni-requested measures, as both rely on the TRM and ESP system, which allows them to achieve better savings with the resources available to them. While the TRM equations are considered part of the evaluation process, independent evaluations are carried out on all programs which may result in diversions from the planned savings based on the TRM, especially for large projects which go through an individual EM&V process.

Minnesota IOUs are currently adding several electric utility infrastructure measures including voltage reduction (i.e., high efficiency transformers to reduce line losses), which is allowed in Minnesota policy. This update, due in 2018, will differ from the typical demand side approach, and will coincide with policy work around voltage reduction measures.

TRM name	Missouri Technical Reference Manual
Current version	v1
URL	https://energy.mo.gov/energy/about/trm
Applicable resources	Electric, Gas, Water
Status	Under development
Applies to	Regulated utilities
Administrator	VEIC
Last update effective	N/A
Next update effective	Spring 2017
Update cycle	TBD
Stakeholders	Missouri Department of Economic Development - Division of Energy; Missouri Department of Natural Resources, Missouri Office of Public Counsel, Missouri Public Service Commission, Ameren Missouri, Empire District Electric, Kansas City Power and Light, Laclede Gas Company, Missouri American Water Company, Summit Natural Gas, Missouri Public Utility Alliance, Missouri Energy Initiative, Natural Resources Defense Council, Renew Missouri, Sierra Club

Missouri is working with 14

stakeholders to develop its first statewide TRM, on schedule for completion in 2017. The stakeholders are actively engaged at two levels. An Oversight Committee ensures the project is on target and addresses policy issues including how updates will be administered and funded in the future. The Technical Advisory Committee is focused on actual development of the technical document. The project is being facilitated by Vermont Energy Investment Corporation (VEIC), thanks to a grant from the U.S. Department of Energy.

While Missouri does not have a mandatory energy efficiency standard, the Missouri Division of Energy intends for the TRM to be submitted and approved by the Missouri Public Service Commission so that it may be used as a filing reference by Missouri IOUs. The Division of Energy also intends for the TRM to be useful for non-regulated utilities in the state.

The Missouri TRM grant project will extend its focus to a secondary goal of leveraging EM&V 2.0, integrating big data in order to generate more accurate and timely savings calculations. The hope is that this new framework will then inform future program incentive decisions.

TRM name	Draft 2010 Ohio Technical Reference Manual
Current version	Draft
URL	http://docplayer.net/15339585-State-of-ohio-energy-efficiency-technical-reference-manual.html (non-official source) http://dis.puc.state.oh.us/DocumentRecord.aspx?DocID=be39455f-350c-43a3-8d46-971563809a01 (official source)
Applicable resources	Electric, Gas
Status	Draft
Applies to	Use not required, some utilities use the Draft TRM as a reference
TRM Administrator	VEIC
Last update effective	Draft: August 1, 2010
Next update effective	N/A
Update cycle	N/A
Stakeholders	Public Utilities Commission of Ohio (PUCO), utilities

Energy efficiency policy in Ohio has been in flux for several years, as a 2014 law put a 'freeze' on the 2008 energy efficiency standard. Recently, Governor Kasich vetoed a bill that would have extended the freeze and further rolled back energy efficiency. Electric utilities continued to offer energy efficiency programs and have filed plans for the next 3-year program cycle. Gas utilities can offer efficiency programs on a voluntary basis with limited oversight by the commission. In Ohio, energy efficiency programming and evaluation is carried out by utilities with PUCO oversight.

As the region's first TRM, the draft Ohio TRM has been used for a model for other state TRMs including Indiana. The draft TRM (developed by VEIC with input from the investor-owned utilities) includes equations for high-frequency measures and could be used by utilities to create deemed savings for their programs. It was filed with the commission in August 2010 and has not had additional development. In a July 31, 2013 order, PUCO approved the draft TRM as a guideline for the utilities⁴. As ordered by PUCO, this document can act as a "safe harbor" with prescriptive measures from the TRM given a presumption of reasonableness in energy efficiency plan proceedings. Utilities can submit their own measures for approval as part of their efficiency plans, but the burden of proving energy savings falls on the filing utility.

In Ohio, evaluations are administered by both the utilities and PUCO. Currently, evaluations inform energy efficiency programming in the state, outside of the TRM structure. There is no statewide stakeholder group for energy efficiency work, instead utilities run their own stakeholder groups dependent on their programs and needs. These can include implementers, customers

⁴ Order of 7/31/2016 in Docket 09-0512-GE-UNC

and relevant community, businesses and government representatives. Ohio utilities report gross energy savings; they do not have a requirement for measuring free-ridership or spillover effects.

TRM name	2017 Wisconsin Focus on Energy TRM
Current version	2017
URL	https://focusonenergy.com/about/evaluation-reports
Applicable resources	Electric, Gas
Status	In use
Applies to	Focus on Energy
TRM Administrator	Cadmus
Last update effective	Published: November 1, 2016; Effective: Jan 1 2017
Next update effective	January 1, 2018
Update cycle	Annual
Stakeholders	Third-party program administrator (CB&I) and program implementers responsible for portfolio programs, Public Service Commission of Wisconsin (PSC)

Focus on Energy is the statewide energy efficiency program for Wisconsin, and the contractors involved in administering and evaluating the program develop and manage the TRM. The state TRM is a report-based format. Savings equations are provided for each measure. While both commercial and some residential measures are included in the TRM, the number of residential and commercial measures are currently being expanded to serve as a more comprehensive resource. The TRM focuses on products with deemed savings, but also allows for a broadly defined number of custom measures. Program implementers are responsible for writing work papers to create new measures. Those work papers are reviewed by the program administrator and evaluator and approved by PSC. Upon approval the work papers are incorporated into the TRM. The same development/approval process can be used to update existing TRM entries (new data to update savings, modified measure definitions, etc.). All work papers whether new or revisions, take effect immediately upon approval, even if this is in advance of the next TRM update where they are formally published. Wisconsin maintains a priority list for high-impact measures and accompanying work papers to add. The TRM is mainly used as an evaluation tool, but the goal is to continue making it more comprehensive in order to use for portfolio planning in the future.

Energy efficiency programs propose new products for inclusion in the TRM, so typically implementers initiate updates, with Cadmus and CB&I helping to develop and verify savings. Ultimately, the PSC has final oversight over the TRM. Utilities are not involved in the day-to-day operations of Focus on Energy, since they contract with third parties for administration and evaluation.

The TRM is administered by Cadmus, the organization that acts as the Focus on Energy evaluator. The TRM does not have an outside stakeholder group. There is a TRM management committee that allows CB&I, evaluator and implementer staff to meet with PSC on quarterly

basis to outline work papers and communicate around policies. A deemed savings report is released each June with summarized evaluation findings to inform future TRM updates.

Appendix B: Advisory Review Group

MEEA recruited an Advisory Review Group to gather input from MEEA members and other important TRM stakeholders. The voluntary participation of these professionals brought us deeper insight into the TRM development process and practices within their states and to they provided early review our state write-ups for accuracy and completeness.

<i>Advisory Review Group</i>		
IA	Iowa Office of Consumer Advocate	<i>Jennifer Easler</i>
IL	Future Energy Enterprises	<i>Celia Johnson</i>
IN	Citizens Action Coalition	<i>Jennifer Washburn</i>
IN	Indianapolis Power & Light	<i>Zac Elliot</i>
KY	TVA	<i>James Linder</i>
MI	Consumers Energy	<i>Joe Forcillo</i>
MI	Morgan Marketing Partners	<i>Rick Morgan</i>
MI	Michigan Public Service Commission	<i>Dave Walker</i>
MN	Franklin Energy Group	<i>Joe Plummer</i>
MN	Minnesota Dept. of Commerce	<i>Mark Garofano</i>
MO	Missouri Dept. of Commerce	<i>Brenda Wilbers, Jane Epperson, Barb Meisenheimer, Kristy Manning, Candice Hubbard</i>
WI	CB&I representing Focus on Energy	<i>Levi Kingery</i>
WI	Wisconsin PSC	<i>Joe Fontaine</i>