
MEMORANDUM

TO: IL TRM TECHNICAL ADVISORY COMMITTEE

FROM: CHERYL JENKINS, PROJECT MANAGER and SAM DENT, TECHNICAL LEAD - VEIC

SUBJECT: IL TRM VERSION 9.0 FINAL – SUMMARY OF UPDATES

DATE: 09/25/2020

Cc: CELIA JOHNSON, SAG

VEIC has submitted the Final version 9.0 Illinois TRM to the Technical Advisory Committee and uploaded to SharePoint. This includes both proposed redline changes to existing measures and new measures (also in redline) proposed to be included for the first time in this version. Changes have been made to all four volumes:

- IL-TRM_Effective_010120_v9.0_Vol_1_Overview_09252020_Final
- IL-TRM_Effective_010120_v9.0_Vol_2_C_and_I_09252020_Final
- IL-TRM_Effective_010120_v9.0_Vol_3_Res_09252020_Final
- IL-TRM_Effective_010120_v9.0_Vol_4_X-Cutting_Measures_and_Attach_09252020_Final

VEIC have also provided on SharePoint:

- IL-TRM V9.0 Comparison Exhibit of Non-Consensus Update Issues: Electric Vehicle Measures
- An Excel table with all the comments from TAC members on the workpapers received, VEIC responses to all deliverable comments, and whether the adjustments have been applied
- Final version of the IL TRM Change Summary Memo
- An errata memo documenting those potential changes to Version 8.0, effective 1/1/2020

Presented below are two summary tables. The first provides the measures that have been edited or added, with a brief description of what has changed, whether it is being considered an errata, and a link to the corresponding SharePoint Tracker Item(s). The second table provides a list of those tracker items still pending, with progress made to date and those requests that have not resulted in a change. Final updates made since Deliverable #3 are indicated in red text.

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
Volume 1 – Overview and User Guide				
1.1	Acknowledgments	N	Updates to table of SAG/TAC Stakeholders	N/a
2.2	Components of TRM Measure Characterizations	N	Edits to ‘Deemed Lifetime of Efficient Equipment’ to be consistent with new language in the Glossary.	N/a
3.3.1	LED Lamp and Linear Fixture Baseline Assumptions	N	Updates to text to reflect new approach to LED Lamps.	N/a
3.5	Glossary	N	Addition of Drug Store and Public Sector building definitions. Public Sector now replaced with Emergency Services, definition remains the same. Note this has been updated in all appropriate tables in Volume 2. Addition of Auto Dealership building definitions.	Clarify Drug Store/Pharmacy Classification Add definition of "Public Sector"
		N	Clarification of Technical v Measure Lifetime definitions. Now under umbrella term “Lifetime” with subcategories, so that they remain in alphabetical order. Slight adjustments made to acknowledge HER calculation and clarify technical lifetime.	WAML calculation for lighting for 2020 IL-TRM
3.5	Electrical Loadshapes (kWh)	N	Addition of 6 new agricultural loadshapes.	Create Agricultural Loadshape(s) and Models
		N	Addition of 2 new Voltage Optimization loadshapes.	Voltage Optimization Measure
		N	Addition of new Residential Electric Vehicle Charger loadshape	N/a
3.10	Discount Rates, Inflation Rates and O&M Costs	N	Update to nominal and real discount rates and inflation rate. Table and footnotes updated to make it clear which program years use each rate and the TRM that it is based upon.	Update discount rate in section 3.9, volume 1
Volume 2 – Commercial and Industrial Measures				
4.1.11	Commercial LED Grow Lights	N	Updates to eligibility, efficient and baseline assumptions. Updates to measure life and coincidence factors.	Changes to 4.1.11 Commercial LED Grow Lighting

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			<p>Calculation methods provided for grow space square footage or per fixture. Additional hour assumptions for different crop types. Updates to HVAC interactive effects assumptions. Updates to T5HO baseline watt assumptions to be consistent with T5 measure. Language on Illinois Cannabis legislation moved from efficient definition to baseline.</p>	
4.1.12	Swine Heat Pads	N	<p>New measure Addition of O&M impacts.</p>	New Measure: Swine Heat Pads
4.2.10	Ice Maker	N	<p>Correct typo of federal standard date.</p>	Typo / Quick fixes
4.2.16	Kitchen Demand Ventilation Controls	N	<p>Addition of IECC 2018 code considerations. Update to measure life and cost assumptions. Removal of remaining useful life estimate for retrofit applications, recommendation is to proceed with full measure life.</p>	Reliability review
4.3.1	Storage Water Heater	N	<p>Addition of all draw pattern baseline calculation algorithms plus note that same draw pattern should be used for efficient and baseline units.</p>	Revise DHW efficiency factor to reflect actual savings
4.3.6	Ozone Laundry	N	<p>Update to measure cost assumption.</p>	Recommend a new Measure Cost
4.3.12	Tank Insulation	N	<p>New measure Update to wind speed assumption for outdoor tank insulation from 9.4 mph to 5mph to account for greater shielding. Updated Energy Savings Factor assumptions accordingly.</p>	Tank Insulation
4.4.1	Air Conditioner Tune-up	N	<p>Changed measure cost to be based on actual invoiced cost.</p>	Reliability review
4.4.2	Space Heating Boiler Tune-Up	N	<p>Provided defaults for pre and post efficiency based on Guidehouse evaluation results. Language added allowing in-house staff to perform select tune-up activities.</p>	Provide default values as an option for custom efficiency inputs for Non-Residential process and space heating boiler tune-ups
4.4.3	Process Boiler Tune-Up	N	<p>Provided defaults for pre and post efficiency based on Guidehouse evaluation results.</p>	Provide default values as an option for custom efficiency inputs for Non-Residential process and space heating boiler tune-ups
4.4.4	Boiler Lockout/Reset Controls	N	<p>Update to measure life assumption.</p>	Reliability review

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
4.4.10	High Efficiency Boiler	N	Update to Federal Standard for <300,000 Btu/hr boilers, impacting measure cost and baseline assumption. TAC decision to delay impact of Federal Standard until 1/1/2022 due to sell through of existing product. Measure reverted to original version with added language of pending Standard. Fixing typo for Steam boiler <200,000Btu/hr baseline.	Residential sized Boiler Federal Standard update (Commercial measure)
4.4.11	High Efficiency Furnace	N	Clarification of Federal Standard. Addition of HOURSyear assumptions for additional building types.	Typo / Quick fixes
4.4.12	Infrared Heaters	N	Modifications to measure to allow savings to be claimed by size. Updates to measure life and cost. Clarification added as to source of Gross Radiant coefficient and default Radiation Sizing Factor provided for when GRC is unknown.	Infrared Heaters
4.4.14	Pipe Insulation	N	Addition of reference to external tool allowing more flexibility and comprehensive analysis of pipe insulation projects. Maintaining default savings for specific measure applications. VEIC have provided directions for accessing the external calculator in a memo stored in the SharePoint reference folder. Clarification that code requirement is appropriate for New Construction and that minimum insulation thicknesses are provided. Removed language indicating that the varying nominal pipe sizes were to be limited to under 4". The intention is that the characterization not restrict the user to certain predetermined parameters when site-specific conditions can be used. Update to wind speed assumption for outdoor pipe insulation from 9.4 mph to 5mph to account for greater shielding. GTI are looking in to adjusting their calculator tool and updating the defaults based on this new assumption. Outdoor defaults updated based on GTI analysis of 108 scenarios resulting in 0.74	Revision to Pipe Insulation Workpaper

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			factor applied to v8 defaults accounting for reduction in wind speed.	
4.4.16	Steam Trap Replacement or Repair	N	Edits proposed by Elevate Energy have been applied together with comments received from Nicor, CLEAResult, Opinion Dynamics and Guidehouse. Working Group set up to discuss next steps. New draft of measure provided in second deliverable based on discussions on 3 working group calls. Final draft of measure provided based on final decisions in 4th working group call.	Steam Trap Replacement or Repair
		N	Addition of lifetime assumptions for Venturi Steam Traps	Venturi Steam Traps
4.4.17	Variable Speed Drives for HVAC Pumps and Cooling Tower Fans	N	Clarification that hours should be provided via Energy Management Software or metered.	Clarification on "actual hours" in VSD measures
		N	Addition of Hours assumptions for additional building types.	Add "Public Sector" building type for VSD Measure
4.4.26	Variable Speed Drives for HVAC Supply and Return Fans	N	Removal of language that implies all other VSD applications should be custom.	Remove "custom analysis" language from 4.4.26
		N	Clarification that hours should be provided via Energy Management Software or metered.	Clarification on "actual hours" in VSD measures
4.4.27	Energy Recovery Ventilator	N	No recommended changes	Reliability review
4.4.28	Stack Economizer for Boilers Serving HVAC Loads	N	Fixed footnote issue. Added custom input for O&M impacts rather than N/A.	Typo / Quick fixes Reliability review
4.4.32	Combined Heat and Power	N	Update to Heat Rate assumption based on eGrid 2018.	N/a
4.4.34	Destratification Fan	N	Recommendation for actual costs if known and other clarifications. Addition of commercial sized HP effective COP estimates.	Reliability review
4.4.38	Covers and Gap Sealers for Room Air Conditioners	Y	Fixing typos in algorithm that would result in incorrect savings.	Correct equations for Covers and Gap Sealers
4.4.44	Commercial Ground Source and Ground Water Source Heat Pump	N	Update to Heat Rate assumption based on eGrid 2018. Updates and clarifications on applicable codes. Addition of (1-ElecHeat) term in fuel switch measure.	N/a Reliability review

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			<p>Additional edits proposed:</p> <ul style="list-style-type: none"> • Clarification added that fuel switch measures must produce positive total annual source fuel savings (i.e., reduction in source Btus) in order to qualify. • The gas heat consumption is now calculated consistently using 'FLH * Capacity' as opposed to using default assumptions. • Electric and Gas saving algorithms are now presented together, making it easier to review the fuel switch scenarios. • The fuel switching components are separated out and a new table provided which indicates how the calculation should be performed dependent on which utilities are promoting the measure. • The electric only scenario for fuel switches now appropriately incorporates the fuel switch part of the scenario, and not just the efficiency improvement. • Instead of different algorithms for TOS v Early Replacement (with baseline being the only variance), a single set of algorithms is provided with the appropriate baseline specified in the variable list. <p>Assumptions for the remaining useful life of different types of existing equipment provided.</p> <p>Additional calculations provided to determine the total source energy savings to determine eligibility, and provided in example calculations.</p>	
4.4.45	Adsorbent Air Cleaning	N	<p>Removal of Provisional Measure status.</p> <p>Addition of NC and DI program types.</p> <p>Updates to measure cost.</p> <p>Edit to electric savings based on updated pilot study results and including energy penalty of AAC modules.</p> <p>Addition of natural gas savings</p>	Update measure results based on cooling data collected during 2019
4.4.48	Small Commercial Thermostats – Provisional Measure	N	<p>Update to cooling assumption from 8% to 17.7% based on Guidehouse evaluation.</p>	Update SCPT Cooling Savings Factor

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			Propose remain Provisional Measure as additional evaluation on heating savings and on Advanced Thermostats would benefit this characterization. Heating %Savings updated to 8.8% to reflect the manual only baseline from the residential measure. Footnotes relating to appropriate NTG application added.	
4.4.49	Boiler Chemical Descaling	N	New measure	Commercial Boiler Descaling
4.4.50	Electric Chillers with Integrated Variable Speed Drives	N	New measure	Electric chillers with integrated variable speed drives
4.4.51	Advanced Rooftop Controls with High Rotor Pole Switch Reluctance Motors	N	New measure	Switch reluctance motors
4.4.52	Hydronic Heating Radiator Replacement	N	New measure Inclusion of testing requirements of outdoor air temperatures at 20F and below.	Hydronic Heating Radiator Replacements
4.5	Lighting End Use Factors	N	Addition of hours and waste heat factors for 8 agriculture operations	New Measure: Dairy Farm Long Daylight New Measure: Poultry Farm LED Lighting Create Agricultural Loadshape(s) and Models
		N	Update to fixture annual operating hours for Grocery. Correction of IF waste heat factors for Grocery.	Update to Grocery Lighting HOU
		N	Addition of accounting for lighting controls in lighting hours assumptions. Update to lighting control ESF table. Clarified language around assumption if presence of existing controls is unknown.	Account for Sensors in HOU in Lighting Algorithm
4.5.2	Fluorescent Delamping	N	Updates to T12:T8 weighting based on latest ComEd Baseline Study.	Reliability review
4.5.3	High Performance and Reduced Wattage T8 Fixtures and Lamps	N	TAC ascertained that the linear fluorescent measures are only being offered in a select few programs- having been largely replaced with Linear LED Fixtures. It is anticipated these measures will soon be retired. Reliability review therefore proposed unnecessary.	Reliability review
4.5.4	LED Bulbs and Fixtures	Y	Lamp measures updated to reflect Lighting Working Group developed forecasts of natural LED growth. Impacts measure lifetime, mid-life baseline adjustment and	Review proposed 2020 lighting standards

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			O&M impacts. Note values are different for the v8 errata and v9. Errata factors were incorrect in first draft – timing and factors updated in 2 nd draft. Example calculation provided to ensure appropriate application of mid-life adjustment. Clarification on lifetime assumption that actual rated life of lamps can be used to determine measure life up to cap of 10 years.	
		N	Update to T12 early replacement midlife adjustment based on 2019 ComEd baseline survey results.	Review Linear Fixture assumptions
		N	Fixing typo in baseline table.	Update the LED Baseline Descriptions in 4.5.4
		N	Update to LED Display Case Watts assumptions.	Update the LED Case Lighting Wattages
		N	Additional high lumen fixture assumptions added.	Updated Baseline Wattage Table
4.5.8	Miscellaneous Commercial/ Industrial Lighting	N	Update to measure life assumption and ISR to make consistent with other measures.	Reliability review
4.5.9	Multi-Level Lighting Switch	N	Update to measure life assumption	Reliability review
4.5.10	Lighting Controls	N	Addition of new set of assumptions for Luminaire Level Lighting Controls (LLCs) with high end trim and networking capabilities. Edits to efficient and baseline conditions. Addition of $(ESF_{EE} - ESF_{Base})$ term in algorithm to allow comparison of any existing condition. Updates to ESF table to allow custom trending for networked controls and an adder for High End Trim. Addition of prior assumptions for “Vacancy Sensors”	Luminaire Level Lighting Controls
		N	Addition of refrigerated case occupancy sensor assumptions.	Lighting Controls
		N	Update to measure lifetime New lifetime specific to NLC/LLCs, tied to fixture lifetime of 15 years added.	Update EUL: LED Streetlighting and Lighting Controls
		N	Clarification that daylighting sensors are not appropriate for use as exterior photocells by addition of “Interior” term to each control type.	Clarify the intended application of daylight sensors

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
		N	<p>Addition of language that where possible installation should be verified where savings beyond occupancy sensing are claimed.</p> <p>Clarification that DLC is not a requirement, but that programs should consider eligibility requirements to ensure quality product is installed.</p> <p>Additional language to clarify that where an existing inefficient fixture is replaced with an efficient fixture with control, use fixture measure fixture measure to calculate savings from the wattage reduction first, then assume the efficient fixture without control as the baseline for the control measure.</p>	N/a
4.5.12	T5 Fixtures and Lamps	N	TAC ascertained that the linear fluorescent measures are only being offered in a select few programs- having been largely replaced with Linear LED Fixtures. It is anticipated these measures will soon be retired. Reliability review therefore proposed unnecessary.	Reliability review
4.5.13	Occupancy Controlled Bi-Level Lighting Fixtures	N	Update to measure life assumption	Reliability review
4.5.16	LED Streetlighting	N	Update to measure lifetime. Addition of TOS considerations with note that it is recommended to consider likely high freeridership for this measure as TOS. Update to early replacement remaining useful life.	Update EUL: LED Streetlighting and Lighting Controls
4.5.17	Exterior Photocell Repair	N	New measure	Add new measure to repair a broken photocell
4.6.4	Error! No text of specified style in document.	N	Addition of default motor size for when it is unknown.	Add Default Motor Size to 4.6.4 (EC Evap Fans)
4.6.5	ENERGY STAR Refrigerated Beverage Vending Machine	N	Update to ENERGY STAR specification v4.0, effective April 2020.	Update ENERGY STAR Refrigerated Beverage Vending Machine
4.6.13	Add Doors to Open Refrigerated Display Cases	N	New measure Removed references and allocations of horizontal display cases. Measure now	Add measure for installing new or retrofitting existing coolers/freezers with doors

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			characterized for vertical display cases only. Included adder for energy and demand savings for retrofitted doors containing lights.	
4.7.7	Efficient Desiccant Compressed Air Dryer	N	Addition of Purge Reduction Factor.	Add Dew Point Demand Control Measure
4.7.8	Desiccant Dryer Dew Point Demand Controls	N	New measure	Add Dew Point Demand Control Measure
4.7.9	Compressed Air Heat Recovery	N	New measure	Add Compressed Air Heat Recovery Measure
4.7.10	Compressed Air Storage Receiver Tank	N	New measure Update to example calculation. Removed language that specified efficient equipment criteria relating to the storage ratio of the installed equipment. The efficient equipment definition now states that the efficient condition has an improved storage capacity and ratio compared to the baseline system. Updated the default baseline compressor factor to load/no load compressors. For reference, this update impacted the electric energy savings algorithm.	Add measure for Compressed Air Storage Receiver Tank
4.7.11	Reduce Compressed Air Setpoint	N	New measure Clarified that the energy savings assumptions are based on compressors operating at 100 psi. Update to market share % assumptions.	Add new measure for reducing compressed air setpoint
4.8.1	Pump Optimization	N	Added loadshapes	N/a
4.8.2	Roof Insulation for C&I Facilities	N	Reworded to use actual inputs if available for costs and existing conditions.	Reliability review
4.8.3	Computer Power Management Software	N	Addition of assumptions for adjusting power settings on individual units. Saves the same, difference in cost and lifetime.	Computer Power Management Features
4.8.5	High Speed Clothes Washer	N	Clarification that this measure applies to facilities with gas dryers only. Update to Retained Moisture Content assumption.	Reliability review
4.8.6	ENERGY STAR Computers	N	Update to ENERGY STAR v8, effective October 15 th , 2020. Inclusion of short idle mode assumptions in the calculation of demand savings.	Federal Standard update for ENERGY STAR computers

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4.8.8	High Efficiency Transformer	N	Updated loadshape to new Ameren and ComEd utility system loads rather than Flat. Review deadline set to 1/1/2022 as there is a potential update to the Federal Standard.	Reliability review
4.8.9	High Frequency Battery Chargers	N	No changes recommended	Reliability review
4.8.14	Low Flow Toilets and Urinals	N	Updated number of flushes per day assumptions based on more appropriate reference. Clarified that actual gallons per flush can be used if known.	N/a
4.8.17	Switch Peripheral Equipment Consolidation	N	New measure Include COP description for the values in the ASHRAE 90.1 2016: Table 6.8.1-11 table. Additional references to assumptions provided.	New Measure: Switch Peripheral Equipment Consolidation
4.8.18	ENERGY STAR Uninterruptible Power Supply	N	New measure UPS and Rectifier separated in to two measures to allow UPS ENERGY STAR specifications to be applied.	New Measure: Energy Efficient UPS or Rectifier
4.8.19	Energy Efficient Rectifier	N	New measure Actual measure cost used with default if unknown. Removed some typo references to UPS.	New Measure: Energy Efficient UPS or Rectifier
4.8.20	Energy Efficient Hydraulic Oils - Provisional Measure	N	New measure	Energy efficient hydraulic oils
4.8.21	Energy Efficient Gear Lubricants - Provisional Measure	N	New measure	Energy Efficient Gear Oils
4.8.22	Smart Sockets	N	New measure Updates to table providing standby assumptions for devices and clarifying language on source of savings.	Smart Sockets
Volume 3 – Residential Measures				
5.1.1	ENERGY STAR Air Purifier	N	Update due to ENERGY STAR Version 2.0, effective October 17, 2020.	Update ENERGY STAR Air Cleaner Measure
5.1.3	ENERGY STAR Dehumidifier	N	Update to ENERGY STAR Most Efficient specification	ESTAR Most Efficient Dehumidifier criteria update
5.1.4	ENERGY STAR Dishwasher	N	Fixing typo of ENERGY STAR version number	Typo / Quick fixes
5.1.5	ENERGY STAR Freezer	N	No changes recommended	Reliability review

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
5.1.6	ENERGY STAR and CEE Tier 2 Refrigerator	Y	Fixing error in CEE Tier 2 specification which was assuming 25% better than Federal Standard rather than 15%	N/a
5.1.10	ENERGY STAR Clothes Dryer	N	Addition of Most Efficient criteria and assumptions.	Reliability review
5.1.12	Ozone Laundry	N	Fixing typo of CEE tier used in calculation.	Typo / Quick fixes
5.1.13	Income Qualified: ENERGY STAR Room AC	N	New measure	N/a
5.2.1	Advanced Power Strip – Tier 1	N	Updates to ISR assumptions based on Guidehouse evaluation. Note some results are still being analyzed and are presented as TBD. Second draft of Guidehouse evaluation memo provided values for Time of sale ISR assumption and removed Income Qualified EE Kit as separate program type. Additional value for TOS kW savings provided.	Update APS In-Service Rate
5.2.2	Tier 2 Advanced Power Strip – Residential Audio Visual	N	Removal of requirement for independent field testing. Replacement of manufacture specific performance bands with assumptions related to IR-only v IR-OS product types.	For v9 - review requirement for field testing for APS
5.3.1	Air Source Heat Pump	N	Addition of assumptions relating to fuel switch scenarios. Additional edits proposed: <ul style="list-style-type: none"> • Clarification added that fuel switch measures must produce positive total annual source fuel savings (i.e., reduction in source Btus) in order to qualify. • The gas heat consumption is now calculated consistently using 'FLH * Capacity' as opposed to using default assumptions. • Electric and Gas saving algorithms are now presented together, making it easier to review the fuel switch scenarios. • The fuel switching components are separated out and a new table provided which indicates how the calculation should be performed dependent on which utilities are promoting the measure. 	Baseline efficiency for fuel conversion

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			<ul style="list-style-type: none"> The electric only scenario for fuel switches now appropriately incorporates the fuel switch part of the scenario, and not just the efficiency improvement. Instead of different algorithms for TOS v Early Replacement (with baseline being the only variance), a single set of algorithms is provided with the appropriate baseline specified in the variable list. <p>Assumptions for the remaining useful life of different types of existing equipment provided.</p> <p>Clarification that install costs should include any necessary electrical and distribution costs, and that defaults should not be used for fuel switch scenarios.</p> <p>Additional calculations provided to determine the total source energy savings to determine eligibility, and provided in example calculations.</p>	
		N	Added defaults for HSPFadj assumption. Updated default based on ComEd data. Update to Heat Rate assumption based on eGrid 2018.	Add default value or guidance for HSPF adjustment
5.3.2	Boiler Pipe Insulation	N	Addition of language that if existing equipment efficiency is greater than new baseline efficiency, mid-life adjustment should not be applied.	Midlife Adjustment for Heating/Cooling Systems
5.3.3	Central Air Conditioning	N	Added requested clarification on measure eligibility that while ENERGY STAR SEER is a requirement, the EER is not an absolute requirement.	N/a
5.3.4	Duct Insulation and Sealing	N	Energy Conservatory Blower Door method document and BPI Distribution Efficiency table saved to SharePoint and weblink removed from document.	Modified Blower Door Subtraction reference link
		N	Mid-life adjustment calculation fixed for gas fueled systems to appropriate incorporate the change in equipment efficiency.	Midlife Adjustment for Duct Sealing
		N	Addition of language that if existing equipment efficiency is greater than new baseline efficiency, mid-life adjustment should not be applied.	Midlife Adjustment for Heating/Cooling Systems

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5.3.5	Furnace Blower Motor	N	Removal of language relating to new high efficiency equipment, since this is now a retrofit only measure. Removal of TOS assumptions from savings tables.	Peak Savings from Furnace Blower Motors
5.3.6	Gas High Efficiency Boiler	N	Update to Federal Standard, impacting cost and baseline assumptions. TAC decision to delay impact of Federal Standard until 1/1/2022 due to sell through of existing product. Measure reverted to original version with added language of pending Standard.	Upcoming federal standard change for residential boilers
5.3.7	Gas High Efficiency Furnace	N	Addition to cost assumption for 97% AFUE unit. Addition of Input Capacity and AFUE(eff) default assumptions.	Update the "if unknown" assumptions for furnaces using Illinois program data
5.3.8	Ground Source Heat Pump	N	Update to boiler Federal Standard efficiency and cost assumptions. Fixing ElecHeat term in fuel switch scenario. This term allows for a mix baseline to be applied to New Construction or Time of Sale applications. Reversal of update to boiler Federal Standard as TOS baseline. Remains higher 84% for Early Replacement new baseline. Update to Heat Rate assumption based on eGrid 2018. Updated assumption for existing efficiency of GSHP being early replaced to 14SEER and 12 EER. Additional adjustments recommended – see ASHP measure above. Assumptions for the remaining useful life of different types of existing equipment provided. Clarification that install costs should include any necessary electrical and distribution costs, and that defaults should not be used for fuel switch scenarios. Additional calculations provided to determine the total source energy savings to determine eligibility, and provided in example calculations.	Upcoming federal standard change for residential boilers
5.3.10	HVAC Tune Up (Central Air	N	Updated cost assumption	Reliability review

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	Conditioning or Air Source Heat Pump)			
5.3.11	Programmable Thermostats	N	Update to measure life to make consistent with Weighted Average Measure Life definitions. Addition of mid-life adjustment to discount future savings resulting in lifetime savings consistent with applying 50% persistence adjustment to measure life.	Reliability review
5.3.12	Ductless Heat Pump	N	Update to Heat Rate assumption based on eGrid 2018. Update to EER assumptions to make consistent with Opinion Dynamics source. Review deadline set to 1/1/2022 as there is a potential update to the Federal Standard. Reversal of update to boiler Federal Standard as TOS baseline. Remains higher 84% for Early Replacement new baseline. Additional adjustments recommended – see ASHP measure above. Assumptions for the remaining useful life of different types of existing equipment provided. Clarification that install costs should include any necessary electrical and distribution costs, and that defaults should not be used for fuel switch scenarios. Additional calculations provided to determine the total source energy savings to determine eligibility, and provided in example calculations.	Reliability review
5.3.13	Residential Furnace Tune-Up	N	Removal of HVAC SAVE methodology and assumptions.	Reliability review
5.3.14	Boiler Reset Controls	N	Updated measure life. Removal of mid-life adjustment for this measure, assuming that the BRC will last the remaining useful life of the existing boiler.	Review lifetime and mid-life assumptions for Boiler Reset Controls
5.3.15	ENERGY STAR Ceiling Fan	N	Fix reference to LED Fixture measure for lighting considerations. No further changes recommended.	Reliability review
5.3.16	Advanced Thermostats	N	Update to Cooling_Reduction, Cooling_DemandReduction value for non-Ameren programs, to incorporate Guidehouse evaluation results and	Update RES Advanced Tstat Cooling Savings Factor

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			<p>accounting for growth in Thermostat Optimization savings.</p> <p>Update to Heating_Reduction to include accounting for Thermostat Optimization savings.</p> <p>Updates to Eff_ISR, Cooling_Reduction and Cooling_DemandReduction, unknown SEER and EER variables.</p> <p>Final Cooling_Reduction decision to use 90/10 weighting of econometric and ENERGY STAR result giving 8.4%.</p> <p>Footnotes relating to appropriate NTG application added.</p>	
5.3.17	Gas High Efficiency Combination Boiler	N	Added reference to Federal Standard applying from 1/1/2022 due to sell through of existing product.	N/A
5.3.18	Furnace Filter Alarm – Provisional Measure	N	Measure removed due to evaluation showing ineffectual results and safety concerns over reliance on measure that may not work.	NEW Residential Measure - Dirty Furnace Filter Whistle
5.3.19	Thermostatic Radiator Valves – Provisional Measure	N	New measure	Thermostatic Radiator Valves
5.4.1	Domestic Hot Water Pipe Insulation	N	Addition of KITS and corresponding ISR assumption.	Add an In-Service Rate for self install through kit distribution
5.4.2	Gas Water Heater	N	Addition of additional draw pattern Federal Standard algorithms, with default provided for <55 gallons (Medium draw) and >55 gallons (High draw). Efficient equipment rating at different draw patterns added. Direction on appropriate use of draw patterns added.	Revise DHW efficiency factor to reflect actual savings
		N	Removal of adjustment for tankless water heaters since UEF better reflect typical draw over 24 hour period.	Residential Tankless Water Heater De-Rating
5.4.3	Heat Pump Water Heaters	N	Addition of additional draw pattern Federal Standard algorithms, with default provided for <55 gallons (Medium draw) and >55 gallons (High draw).	Revise DHW efficiency factor to reflect actual savings
		N	Addition of language that if existing equipment efficiency is greater than new baseline efficiency, mid-life adjustment should not be applied.	Midlife Adjustment for Heating/Cooling Systems

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
5.4.4	Low Flow Faucet Aerators	N	Clarification added that secondary kWh savings from water supply/treatment should not be included in peak kW savings calculation.	Add Clarification to kW Calculation for Water-Saving Measures with Secondary kWh Impacts
5.4.6	Water Heater Temperature Setback	N	Added language to include costs of information insert for when part of a kit program.	Update IC for water temp setback
		N	Added ISR for instructions provided in kit.	Discuss Possibility of Deeming ISR for Water Heater Temperature Setbacks in Kits
5.4.9	Shower Timer	N	No recommended changes	Reliability review
5.4.11	Drain Water Heat Recovery	N	New measure	Drain Water Heat Recovery
5.5.6	LED Specialty Lamps	Y	Lamp measures updated to reflect Lighting Working Group developed forecasts of natural LED growth. Impacts measure lifetime, mid-life baseline adjustment and O&M impacts. Note values are different for the v8 errata and v9. Example calculation provided to ensure appropriate application of mid-life adjustment.	Review proposed 2020 lighting standards
		Y	Additional forecasts developed and utilized for Income Eligible populations.	EISA Extension for Income Eligible Income Eligible Program Baseline Adjustments
		Y	Accounting for IECC 2015 in New Construction baseline. Baseline assumptions and incremental costs provided for NC program. Addition of IECC 2018 baseline.	Remove NC program type from 5.5.8-9
5.5.8	LED Screw Based Omnidirectional Bulbs	Y	Lamp measures updated to reflect Lighting Working Group developed forecasts of natural LED growth. Impacts measure lifetime, mid-life baseline adjustment and O&M impacts. Note values are different for the v8 errata and v9. Example calculation provided to ensure appropriate application of mid-life adjustment. Correction of appropriate mid-life adjustment in example calculation.	Review proposed 2020 lighting standards
		Y	Additional forecasts developed and utilized for Income Eligible populations.	EISA Extension for Income Eligible Income Eligible Program Baseline Adjustments
		Y	Accounting for IECC 2015 in New Construction baseline. Baseline	Remove NC program type from 5.5.8-9

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			assumptions and incremental costs provided for NC program. Addition of IECC 2018 baseline.	
5.5.9	LED Fixtures	Y	Lamp measures updated to reflect Lighting Working Group developed forecasts of natural LED growth. Impacts measure lifetime, mid-life baseline adjustment and O&M impacts. Note values are different for the v8 errata and v9. Example calculation provided to ensure appropriate application of mid-life adjustment.	Review proposed 2020 lighting standards
		Y	Additional forecasts developed and utilized for Income Eligible populations.	EISA Extension for Income Eligible Income Eligible Program Baseline Adjustments
		Y	Accounting for IECC 2015 in New Construction baseline. Baseline assumptions and incremental costs provided for NC program. Addition of IECC 2018 baseline.	Remove NC program type from 5.5.8-9
5.5.12	Connected LED Lamps	N	No recommended changes. VEIC are not aware of any additional evaluation on this emerging technology.	Reliability review
5.6.1	Airsealing	N	Addition of language that if existing equipment efficiency is greater than new baseline efficiency, mid-life adjustment should not be applied. Footnotes relating to appropriate NTG application added.	Midlife Adjustment for Heating/Cooling Systems
5.6.2	Basement Sidewall Insulation	N	Extra parenthesis in algorithm	Inconsistency in Basement Sidewall Insulation
		N	Addition of language that if existing equipment efficiency is greater than new baseline efficiency, mid-life adjustment should not be applied.	Midlife Adjustment for Heating/Cooling Systems
5.6.3	Floor Insulation Above Crawlspace	N	Addition of language that if existing equipment efficiency is greater than new baseline efficiency, mid-life adjustment should not be applied.	Midlife Adjustment for Heating/Cooling Systems
5.6.4	Wall Insulation	N	Addition of language that if existing equipment efficiency is greater than new baseline efficiency, mid-life adjustment should not be applied.	Midlife Adjustment for Heating/Cooling Systems
5.6.5	Ceiling/Attic Insulation	N	Addition of language that if existing equipment efficiency is greater than new	Midlife Adjustment for Heating/Cooling Systems

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			baseline efficiency, mid-life adjustment should not be applied.	
5.6.6	Rim/Band Joist Insulation	N	Addition of language that if existing equipment efficiency is greater than new baseline efficiency, mid-life adjustment should not be applied.	Midlife Adjustment for Heating/Cooling Systems
5.6.7	Low-E Storm Window	N	New measure	Low-E Interior Storm Windows
5.7.1	High Efficiency Pool Pumps	N	The reliability review deadline changed to 1/1/2022 as new Federal Standards go into effect July 2021. Addition of language specifying the Federal Standards impact on the baseline won't be adopted by the characterization until January 1, 2022.	Reliability review
5.7.3	Level 2 Electric Vehicle Charger	N	New measure Addition of loadshape. Update to measure incremental cost.	N/a
Volume 4 – Cross-Cutting Measures and Attachments				
6.1.1	Adjustments to Behavior Savings to Account for Persistence	N	Updated guidance for application for the 2022-2025 cycle. Additional adjustment to update of length of savings persistence for both electric and gas savings. Update to decay rate for both electric and gas savings. Clarification of language related to length of persistence and measure life. Added flexibility for measure life for non-RES HERs type programs to be > 1 yr with defensible evaluation results. Added flexible language to provide opportunity to make the case for persistent savings from customer move-outs with defensible evaluation results. Clarification edits.	HER Persistence Factor Updates
6.2.1	Voltage Optimization	N	New measure Measure number updated. Review Deadline updated to 1/1/2023 with additional language relating to what that date represents. Removal of language about revisiting in v13.	Voltage Optimization Measure
Attachment A	Illinois Statewide Net-to-Gross Methodologies	N	Final consensus document from the NTG Methodologies SAG subcommittee	N/a

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
Attachment B	Effective Useful Life for Custom Measure Guidelines	N	Update to custom lighting control measure life	N/a
Attachment C	Framework for Counting Market Transformation Savings in Illinois	N	Final consensus document from the Market Transformation SAG subcommittee	N/a

The following table provides a list of those tracker items still pending with progress made to date and those requests that have not resulted in a change.

Tracker Items:	Comments
Pending/ In Progress Updates	
Electric Vehicles	<p>Two new measures relating to Electric Vehicles proposed by Ameren to be included in the v9.0 TRM have been edited based on technical comments from VEIC and ICC-Staff. Reference files have been provided in the deliverable folder. There remains an open question on the appropriate use of Heat Rate or other terms to appropriately capture the energy use of the internal combustion engine vehicle.</p> <p>Stakeholders have already identified differences in the interpretation of statute that would determine the eligibility of these measures for inclusion in the IL TRM, and as such, it is expected that this will result in a formal non-consensus issue. VEIC have prepared a draft non-consensus memo and comparison exhibit to document the issue and the positions that have been provided.</p> <p>Updates to measure cost and addition of loadshape. Calculation now uses HeatRate consistent with other fuel conversion measures in TRM. Calculation of deemed savings removed since now dependent on HeatRate value.</p>
Items not proceeding at this time	
Standardize EUL language	<p>Request to standardize language around EUL or effective life. VEIC will review and make appropriate edits for the next deliverable time permitting.</p> <p>This will be put on hold for v10 update.</p>
Question Regarding ECMS	<p>SharePoint Discussion Thread posted to respond to this question. In short, yes the values provided in the kWh section include both heating and cooling impacts.</p>
Update the gas heating savings factor for small commercial standard programmable thermostats	<p>Findings from evaluation are not expected until Q3 of 2020, so this item will be put on hold for v10 review.</p>

Possible Errata: EFLH for MF High Rise - Common Area	VEIC reviewed model for EFLH of high rise MF common areas and can confirm that the published numbers are correct. The sub space-type Common addresses the reality that different system schedule and setpoints typically vary between residential units and common corridors, stairwells, and lounges. We expect to see HVAC equipment run hours to differ from setpoint adjustments alone, combine with the interior nature of these spaces reflects the low EFLH. VEIC provided this response to Guidehouse.
Agricultural measure minor errors	Upon review, these edits were fixed late in the v8 cycle.
A new measure: Air Deflector for Unit Ventilator	Measure to remain as Provisional. The winter of 2019/2020 did not provide appropriate conditions for evaluation but plans remain for 2020/2021.
Refine the guidance for Pipe Insulation Thermal Regain Factors	SharePoint Discussion Thread posted to respond to this question. The request was for more guidance on developing custom TRFs. There is already a document ('Thermal Regain Factor_4-30-14.docx' on how to determine custom TRFs. This file is referenced as a source in the TRM and is stored on SharePoint.
Vortex Tube Thermostat	This measure was added in v8 and assigned as a Provisional measure. As discussed on 5/18 TAC there are currently no plans from any utility to offer this measure. There has therefore been no evaluation and the measure should remain "Provisional" until pilot programs are developed, and data collected to improve the measure.
Update the gas heating savings factor for small commercial standard programmable thermostats	Findings from evaluation are not expected until Q3 of 2020, so this item will be put on hold for v10 review.
Possible Errata: ENERGY STAR Clothes Washers	SharePoint Discussion Thread posted to respond to this question. The issue is not an error, but a rounding issue where the intermediary assumptions in the TRM are rounded, however the final value is calculated in a spreadsheet.
For v9 - adding PJM Winter Peak	VEIC held discussions with ComEd and Guidehouse on this issue. Conclusion that there is no need or benefit from adding the PJM Winter Peak coincidence factors in to the TRM at this time.
Add "Public Sector" building type for Advanced Rooftop Controls (ARC)	VEIC reviewed this request with the original developer of the measure (CLEAResult). It was determined that the time/budget required to add this building type could not be justified. As with all commercial building type assumptions, user should use the model of best fit – likely to be "Low Rise Office" for "Public Sector" buildings as this was the starting point for the Public Sector model.
Correct error in hot water per load in 5.1.12 Ozone Laundry (residential)	VEIC have reviewed this request. We looked back at the reference document that was provided as a basis for the measure (Residential Ozone Laundry Summary Calcs_2019.xlsx provided on the SharePoint) and this mix of hot v cold water was based on the average of twelve installations. We feel this is a reasonable basis, but happy to discuss in a future TAC call if necessary.
Add other heating systems to the heating penalty	Proposal to add electric heating penalty for ECM waste heat was determined to not be appropriate as the values in the "kWhSavingsPerTon" table already account for the reduced

	waste heat impact in the ASHP column. The workpaper author (Guidehouse) was informed and is in agreement.
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