
MEMORANDUM

TO: IL TRM TECHNICAL ADVISORY COMMITTEE

FROM: KALEE WHITEHOUSE, PROJECT MANAGER and SAM DENT, TECHNICAL LEAD - VEIC

SUBJECT: IL TRM VERSION 12.0 FINAL - SUMMARY

DATE: 09/22/2023

Cc: CELIA JOHNSON, SAG

VEIC has submitted the fourth and final, full draft of the version 12.0 Illinois TRM to the Technical Advisory Committee and uploaded to SharePoint. This final includes finalized PDF files, and accompanying Word versions that show redline changes made to the TRM during this update cycle. The changes to existing measures and new measures within this version have been discussed and reviewed by the IL TRM Technical Advisory Committee. Changes have been made to all four volumes, and are labeled as:

- IL-TRM_Effective_010124_v12.0_Vol_1_Overview_09222023_DRAFT
- IL-TRM_Effective_010124_v12.0_Vol_2_C_and_I_09222023_DRAFT
- IL-TRM_Effective_010124_v12.0_Vol_3_Res_09222023_DRAFT
- IL-TRM_Effective_010124_v12.0_Vol_4_X-Cutting_Measures_and_Attach_09222023_DRAFT

VEIC has also provided on SharePoint:

- An Excel file titled 'IL Comment Matrix_09222023' containing all comments received from all Deliverables, together with VEIC response and outcome.

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). Highlighted in red are changes made since the second deliverable.

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.

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
Volume 1 – Overview and User Guide				
1.1	Acknowledgements	N	Updates to list of TAC/SAG stakeholders.	N/A
1.3	Enabling ICC Policy	N	Updates to list of TAC stakeholders. All individual companies removed except for Utilities and Issue-specific invited participants.	N/A
1.4	Development Process	N	Addition of ICC Docket Numbers	N/A
2.3	Program Delivery & Baseline Definitions	N	Updates to language on early replacement, specifically specifying that program influence should be captured through the NTG ratio.	N/A
3.3.2	Early Replacement Baseline Assumptions	N	Removal of maximum HVAC efficiency ratings for classification as early replacement – and specifying that decision should be made by the programs.	N/A
3.9	Heating and Cooling Degree-Day Data	Y	Fixing CDD55 values for Zone 2 – Chicago, Zone 4 – Belleville and Zone 5 – Marion, and State Average.	N/A
		N	<p>A further update to the HDD/CDD is actively being developed. In this first draft we have presented values representing updating using the more recent NCDC 15 year climate normals (2006-2020). However the Climate Working Group will continue discussion as to whether we use this data set going forward or an alternative. No other climate adjustments have been made in this draft until that is finalized.</p> <p>Upon discussion in the Climate Working Group it was decided that for all hourly modeling applications, TMYx data (2007-2021) will be used to update the variable assumptions. For more annual assumptions (such as HDD/CDD and EFLH), NCDC Climate Normals will continue to be used. Multiple measures have been updated below accordingly.</p> <p>Note added below HDD/CDD table to document the agreement to use TMYx data for “any peak load calculations,</p>	Review climate data and assumptions

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			consideration of climate extremes or where hourly climate variations are modeled".	
3.11	Discount Rates, Inflation Rates, and O&M Costs	N	Addition of language to specify policy on timing of when updates can be made.	N/A
3.12	Interactive Effects	N	Edits to clarify that interactive effects should be handled sequentially in accordance with best practice with respect to building science, with example for Shell and HVAC upgrade calculations provided.	N/A
Volume 2 – Commercial and Industrial Measures				
4.1.1	Engine Block Timer for Agricultural Equipment	N	Reliability Review. Season length assumption will likely be updated based on the new climate data – still to be resolved. UseSeason variable updated utilizing TMYx data. TMYx data used since this relates to low temperature extremes.	N/A
4.1.2	High Volume Low Speed Fans	N	Reliability Review. Update to incremental cost. Measure updated from entirely deemed savings to algorithmic approach with defaults provided. Hours of operation (and therefore default savings) assumption will be developed based on the new climate data – still to be resolved. Hours of operation variable updated utilizing NCEI Hourly Normals 15 yr (2006 - 2020).	N/A
4.1.3	High Speed Fans	N	Reliability Review. Size categories for fan bins and efficient equipment standards updated. Incremental cost and lifetime updates. Typo fix. Measure updated from entirely deemed savings to algorithmic approach with defaults provided. Hours of operation (and therefore default savings) assumption will be developed based on the new climate data – still to be resolved. Hours of operation variable updated utilizing NCEI Hourly Normals 15 yr (2006 - 2020).	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
4.1.4	Livestock Waterer	N	Reliability Review. Added retrofit scenario. Update to measure cost. Measure updated from entirely deemed savings to algorithmic approach with defaults provided. Hours of operation (and therefore default savings) assumption will be developed based on the new climate data – still to be resolved. Run hours of heater variable updated utilizing TMYx data. TMYx data used since this relates to low of note in O&M section to the effect that replacement battery temperature extremes.	N/A
4.1.5	Fan Thermostat Controller	N	Reliability Review. Hours of operation assumption will be developed based on the new climate data – still to be resolved. Hours of operation variable updated utilizing NCEI Hourly Normals 15 yr (2006 - 2020).	N/A
4.1.6	Low Pressure Sprinkler Nozzles	N	Reliability Review. No updates recommended.	N/A
4.1.7	Milk Pre-Cooler	N	Reliability Review. No updates recommended.	N/A
4.1.8	VSD Milk Pump with Plate Cooler Heat Exchanger	N	Reliability Review. No updates recommended.	N/A
4.1.9	Scroll Compressor for Dairy Refrigeration	N	Reliability Review. Update to incremental costs.	N/A
4.1.10	Dairy Refrigeration Heat Recovery	N	Reliability Review. Addition of Fossil Fuel algorithm	N/A
4.1.12	Swine Heat Pads	N	Reliability Review. Update to incremental and O&M costs. Addition of savings from temperature controllers. Updates to default wattage assumptions and associated default savings.	N/A Update Swine Heat Pads - add temp controls
4.1.19	ENERGY STAR Dairy Water Heater	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
4.1.20	Commercial Electric Lawn Mower	N	New measure Note added to O&M section to the effect that replacement battery costs should be incorporated if likely to be required within the 10 year measure life.	Commercial Lawn Equipment - Electric Lawnmower
4.2.1	Combination Oven	Y	Added '* 1000' to ElecIDLE _{SteamEE} algorithm for 3-4 Pan capacity in order to calculate watts rather than kW.	N/A
		N	Addition of actual option for inputs in addition to defaults. Typo fixes. Addition of default costs – for use with midstream scenarios. Replacing ΔkWh in the Summer Coincident Peak Demand Savings section with the calculation of actual kWh impacts (as opposed to the kWh equivalent savings).	4.2.1 Combination Ovens itemized proposed changes Combination Oven Typo Midstream Incremental Cost Clarifications Correct summer peak demand savings for C&I and residential non-space heating fuel switch measures
4.2.2	Commercial Solid and Glass Door Refrigerators & Freezers	N	ENERGY STAR version 5.0 update. Updates to incremental costs. Allowing actual efficiency values.	ENERGY STAR spec update - Commercial Solid and Glass Door Refrigerators and Freezers 4.2.2 Fridge/Freezer
4.2.3	Steam Cooker	N	Addition of actual option for inputs in addition to defaults. Addition of 10-pan units. Altered water consumption input table to account for equipment type – assumptions based on ENERGY STAR QPL Averages. Replacing ΔkWh in the Summer Coincident Peak Demand Savings section with the calculation of actual kWh impacts (as opposed to the kWh equivalent savings). Measure costs updated to provide base and efficient costs for electric and fossil fuel units. Preheat assumptions broken out in to time and energy variables and updated using the latest ENERGY STAR Commercial Foodservice Savings Calculator	4.2.3 Commercial Steam Cooker Correct summer peak demand savings for C&I and residential non-space heating fuel switch measures
4.2.4	Conveyor Oven	N	Reliability Review. Update to measure life and incremental cost. Measure updated from entirely deemed savings to algorithmic approach.	N/A
4.2.5	ENERGY STAR Convection Oven	Y	Added savings associated with pre heat which were inadvertently not included	4.2.5 Energy Star Convection Oven

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			when electric and gas measures were combined.	
		N	Replacing ΔkWh in the Summer Coincident Peak Demand Savings section with the calculation of actual kWh impacts (as opposed to the kWh equivalent savings). Measure costs updated to provide base and efficient costs for electric and fossil fuel units. Clarified that pounds cooked per day variable (LB) should be consistent between baseline and efficient for fuel-switching scenarios.	Correct summer peak demand savings for C&I and residential non-space heating fuel switch measures
4.2.6	ENERGY STAR Dishwasher	N	Addition of fuel switch scenario from ‘High Temp Dishwasher with an Electric Booster Heater and a Gas Building Heater’ to ‘High Temp Heat Recovery Dishwasher with an Electric Booster Heater and no associated Building Heater energy usage’.	N/A
4.2.7	ENERGY STAR Fryer	N	Addition of actual option for inputs in addition to defaults. Example calculation typo fixed. Replacing ΔkWh in the Summer Coincident Peak Demand Savings section with the calculation of actual kWh impacts (as opposed to the kWh equivalent savings).	4.2.7 Energy Star Fryer Correct summer peak demand savings for C&I and residential non-space heating fuel switch measures
4.2.8	ENERGY STAR Griddle	N	Example calculation typo fixed. Replacing ΔkWh in the Summer Coincident Peak Demand Savings section with the calculation of actual kWh impacts (as opposed to the kWh equivalent savings).	4.2.8 Energy Star Griddle Correct summer peak demand savings for C&I and residential non-space heating fuel switch measures
4.2.10	Ice Maker	N	Addition of actual option for inputs in addition to defaults.	4.2.10 Ice Maker
4.2.12	Infrared Charbroiler	N	Upon TAC discussion, the custom entries allow for concern raised in workpaper. No changes to measure.	4.2.12 Infrared Charbroiler
4.2.13	Infrared Rotisserie Oven	N	Split annual hours in to days * hours/day	4.2.13 Rotisserie Oven
4.2.14	Infrared Salamander Broiler	N	Split annual hours in to days * hours/day	4.2.14 Infrared Salamander Broiler

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
4.2.15	Infrared Upright Broiler	N	Split annual hours in to days * hours/day	4.2.15 Infrared Upright Broiler
4.2.16	Kitchen Demand Ventilation Controls	N	Updates to kWh per HP, and default HP based on more recent Southern California Edison Workpaper.	4.2.16 Kitchen Demand Ventilation Control
4.2.17	Pasta Cooker	N	Reliability Review. No updates recommended.	N/A
4.2.18	Rack Oven - Double Oven	N	Updates to efficient and baseline criteria. Algorithm adjusted to account for additional inputs.	4.2.18 Rack Oven - Double Oven
4.2.20	Efficient Dipper Wells	N	No changes made to measure.	4.2.20 Efficient Dipper Wells
4.2.23	Electric Deck Oven	N	New measure	Deck Ovens
4.2.24	Gas and Electric Pressure Fryers	N	New measure Addition of fuel switch scenario/ algorithms	Electric and Gas Pressure Fryer
4.2.25	Efficient Cooktop	N	New measure Gas and Induction Cooktop measures now combined, including scenario for fuel switching	Gas Cooktop Commercial Induction Cook Tops
4.2.26	Induction Cooktop	N	New measure	Commercial Induction Cook Tops
4.3.1	Water Heater	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.3.3	Low Flow Faucet Aerators	N	Removal of GPM specs in baseline language.	N/A
4.3.4	Commercial Pool Covers	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.3.7	Multifamily Central Domestic Hot Water Plants	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.3.8	Controls for Central Domestic Hot Water	Y	Between version 10 and 11, assumptions for the reduction in operating hours for normal and low occupancy were incorrectly switched between multi family and dormitories. Language update to reflect IECC 2021 not yet being effective but expected late 2023.	Potential Typo - Rnormal & Rlow
4.3.9	Heat Recovery Grease Trap Filter	Y	Reliability Review. Fixing conversion from BTU to kWh: 0.000293 kWh/BTU not 0.00293 kWh/BTU	N/A
4.3.10	DHW Boiler Tune-up	N	Reliability Review. No updates recommended.	N/A
4.3.11	Tunnel Washers	N	Reliability Review. No updates recommended.	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
4.3.12	Tank Insulation	N	Reliability Review. No updates recommended.	N/A
4.3.13	Tankless Water Heater Array	N	New measure	Tankless Water Heater Array
4.4.4	Boiler Lockout/Reset Controls	N	Reliability Review. No updates recommended.	N/A
4.4.6	Electric Chiller	N	Consolidated measure with '4.4.50 Electric Chillers with Integrated Controls'. Enhanced electric energy savings calculation added to include a comparison of a baseline chiller to a proposed chiller using NPLV efficiency that has been adjusted to actual Illinois conditions, rather than national averages. This is also as an alternate to IPLV, which can still be used with a secondary savings approach where manufacturer specific inputs are unavailable. Added occupancy schedule assumptions for each building type in first table and indicated throughout that Office should be used if building type is unknown. Removed example calculation that was inaccurate.	4.4.6 Electric Chiller
4.4.9	Air and Water Source Heat Pump Systems	N	Update to new ratings throughout. Added single phase specifications and updated effective date of the 3-phase to 1/1/2025. Update to CEE conversion factor for SEER2/EER2/HSPF2. Removal of SEERadj/HSPFadj factor now new ratings are utilized. IEER used (where applicable) for units greater than 65kBtu/hr. Addition of blended baseline HSPF2 value when unknown. Note, additional updates may be added to this measure, once all are resolved in the Residential ASHP measure.	4.4.9 Air and Water Source Heat Pump Systems

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			Language update to reflect IECC 2021 not yet being effective but expected late 2023.	
4.4.10	High Efficiency Boiler	N	Reliability Review. Adoption of new federal standard as baseline. Additional capacity ranges added. Language update to reflect IECC 2021 not yet being effective but expected late 2023. Updated note regarding federal standards, technical amendments, and final ruling for energy conservation standards.	N/A
4.4.11	High Efficiency Furnace	N	Reliability Review. Adoption of new federal standard as baseline. Clarification that incremental costs provided are for residential sized units, and commercial sized units should use actual. Set minimum Early Replacement efficiencies removed to be determined by program. Actual existing efficiency to be used in calculations.	N/A
4.4.15	Single-Package and Split System Unitary Air Conditioners	N	Adoption of new federal standard as baseline. Update to CEE conversion factor for SEER2/EER2/HSPF2. Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.4.16	Steam Trap Replacement or Repair	N	Clarification that actual costs should be used and include survey and installation costs, and that the default costs provided are for trap cost only.	Incremental Cost Clarification for Steam Traps
4.4.17	Variable Speed Drives for HVAC Pumps and Cooling Tower Fans	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.4.19	Demand Controlled Ventilation	N	Reliability review. Update to code minimum OA assumption. Updates to measure costs.	N/A
4.4.23	Shut Off Damper for Space Heating Boilers or Furnaces	N	Reliability Review. No updates recommended.	N/A
4.4.24	Small Pipe Insulation	N	Reliability Review. No updates recommended.	N/A
4.4.26	Variable Speed Drives for HVAC	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
	Supply and Return Fans			
4.4.27	Energy Recovery Ventilator	N	Design Day temperature values updated weather station data and to be consistent with insulation measure. Language update to reflect IECC 2021 not yet being effective but expected late 2023.	C&I Cool Roof
4.4.32	Combined Heat and Power	N	Working Group met and decided to wait until next year for any wholesale changes, following ongoing policy discussions. Guidehouse produced a measure to provide clarification on power exports to the grid and parasitic load calculations. No further changes to the TRM measure this year.	Update/clarification for CHP savings and power exported to grid
4.4.33	Industrial Air Curtain	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.4.34	Destratification Fan	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.4.37	Unitary HVAC Condensing Furnace	N	Reliability Review. Adoption of new federal standard as baseline. Note, HDD assumptions and corresponding savings will be updated once new climate data is determined. Assumptions updated and savings tables updated after modeling with new TMYx data.	N/A
4.4.44	Commercial Ground Source and Ground Water Source Heat Pump	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023. Update to efficiency factors to SEER2/EER2/HSPF2.	N/A
4.4.45	Adsorbent Air Cleaning	N	Reliability Review. No updates recommended.	N/A
4.4.47	Air Deflectors for Unit Ventilators – PROVISIONAL MEASURE	N	Measure removed. Evaluation results were inconclusive and implementation challenges make this not a viable measure at this time.	PROVISIONAL Air Deflector for Unit Ventilator
4.4.48	Small Commercial Thermostats	N	Addition of blended baseline HSPF2 value when unknown. Update to SEER2/EER2/HSPF2	4.4.48 Small Commercial Thermostats
4.4.49	Boiler Chemical Descaling	N	Reliability Review. No updates recommended.	N/A
4.4.50	Electric Chillers with Integrated Controls	N	Measure removed and combined with 4.4.6 Chillers	Air Cooled Oil Free Bearing Chillers

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
				4.4.50 Electric Chillers with Integrated Variable Speed Drives Integrated VSD Chiller Efficiency Requirements
4.4.51	Advanced Rooftop Controls	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.4.52	Hydronic Heating Radiator Replacement	N	Reliability Review. No updates recommended.	N/A
4.4.53	HVAC Supply, Return and Exhaust Fans – Fan Energy Index	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.4.54	Process Heating	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023. Removed reference to old federal standards.	N/A
4.4.55	Commercial Gas Heat Pump	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.4.59	Ductless Heat Pump	N	Update to new efficiency ratings and conversions. Set minimum Early Replacement efficiencies removed to be determined by program. Actual existing efficiency to be used in calculations. Deemed Early Replacement rates not limited to downstream programs.	N/A
4.4.60	PROVISIONAL Variable Refrigerant Flow HVAC System	Y	Fix error in HPSiteCoolingImpact algorithm to correctly convert to MMBtu	Correct VRF conversion factor
		N	Update to baseline specifications. Update to incremental costs. Adjustment factors moved from being applied to the efficiency (in the denominator) to being applied to whole savings calculation (in the numerator). Adjustment values are still TBD as Slipstream continue their analysis. Once finalized – hope to remove provisional status. Algorithms updated to separate savings from system switch and from efficiency improvement. Adjustment factors added. Note we have invited Slipstream to present on this paper on the 8/22 TAC call and will	Update to Variable Refrigerant Flow - Provisional Measure

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			discuss the removal of the Provisional status. Provisional status removed.	
4.4.63	Boiler Blowdown Heat Recovery	N	New measure	Boiler Blowdown Heat Recovery
4.4.64	Steam Vent Condensers	N	New measure New variable SF (Savings Factor) added providing the percent of thermal steam energy recovered from vent	Vent Condenser - New Measure
4.5.4	LED Bulbs and Fixtures	Y	Added column to lamp tables to indicate which are impacted by EISA backstop and which aren't. Also clarified that LED Downlight Fixture is also subject to EISA backstop. Added distinction in measure life section for common area lighting in Income Qualified multi family applications to align with the Residential IQ 8 year assumption.	N/A Income Qualified Common Area Lighting Residential applications.
		N	Removed discussion of screw based lamp except for in IQ common areas or direct install. Removed language about future discussions on small/disadvantaged businesses and non-profit entities. Addition of leakage rate for bulbs. TAC to discuss appropriate rate for Ameren. Updated default LED wattages based on updated DLC specifications. Removal of EISA Inc as baseline for AG Fixtures. Update of incremental cost assumptions for LED Exterior and High and Low Bay categories. ComEd leakage rate updated and Ameren rate set to 0%. Addition of Mogul LED lamp assumptions. Updated lifetime assumptions for exterior fixtures.	N/A Leakage Rate for Instant Discount Program Update Commercial LED wattages based on updated DLC specifications Nonresidential LED Cost Update

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
4.5.5	Commercial LED Exit Signs	N	Reliability Review. Minor typo fixes. No further updates recommended.	N/A
4.5.6	LED Traffic and Pedestrian Signals	N	Reliability Review. No updates recommended.	N/A
4.5.7	Lighting Power Density	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.5.8	Miscellaneous Commercial / Industrial Lighting	N	Updated lifetime assumptions for exterior fixtures.	N/A
4.5.10	Lighting Controls	N	Additional language on eligibility requirements when non-DLC listed. Addition of Exterior Networked Lighting Control assumptions. Adjustment to Summer Coincident Peak Demand algorithm to account for measures starting from existing controls. Clarification that exterior lighting controls should assume kW = 0.	Expanding Requirements for NLCs Additional ESF values for exterior lighting controls NLC Coincidence Factor Clarification Error in Lighting Controls kW Calculations
4.5.18	Ultra-Efficient LED Lighting	N	New measure	Ultra-Efficient LED Lighting (C/I) new measure
4.6.8	Refrigeration Economizers	N	Reliability Review. Updated kW assumptions and reference materials.	N/A
4.6.9	Night Covers for Open Refrigerated Display Cases	N	Reliability Review. Updated reference materials. No change to savings.	N/A
4.7.5	Efficient Refrigerated Compressed Air Dryer	N	Reliability Review. Minor typo fixes. No further updates recommended.	N/A
4.7.6	Vortex Tube Thermostat – Provisional	N	Measure removed. No uptake or evaluation. TAC decision to remove.	PROVISIONAL Vortex Tube Thermostat
4.7.7	Efficient Desiccant Compressed Air Dryer	N	Reliability Review. No updates recommended.	N/A
4.7.13	Compressed Air Leak Repair	N	New measure	Compressed Air Leak Repair

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			Measure life updated to range of 1-5 years and language consistent with Volume 4, Attachment B.	
4.8.2	Roof Insulation for C&I Facilities	N	Update from average delta T to full load delta T to be consistent with use of EFLH. Language update to reflect IECC 2021 not yet being effective but expected late 2023.	C&I Cool Roof
4.8.5	High Speed Clothes Washer	N	Reliability Review. Update to incremental costs.	N/A
4.8.7	Advanced Power Strip – Tier 1 Commercial	N	Reliability Review. Providing base and efficient cost for use in midstream programs	N/A Midstream Incremental Cost Clarifications
4.8.13	Variable Speed Drives for Process Fans	N	Language update to reflect IECC 2021 not yet being effective but expected late 2023.	N/A
4.8.23	Lithium Ion Forklift Batteries	Y	Added clarity on fuel switch opportunity. Fix to the efficiency terms in the algorithm to reflect that battery capacity values represent output capacities. Updates to default savings. Savings values were inadvertently switched between diesel and propane – corrected in this draft.	Revise Forklift Fuel Switch Savings Algorithm
4.8.27	C&I Air Sealing	Y	CDD55 assumptions for Chicago, Belleville and Marion were switched.	N/A
		N	Values updated based on NCEI Annual Normals 15 yr (2006 - 2020).	N/A
4.8.30	Commercial Wall Insulation	Y	CDD55 assumptions for Chicago, Belleville and Marion were switched.	N/A
		N	Values updated based on NCEI Annual Normals 15 yr (2006 - 2020).	N/A
Volume 3 – Residential Measures				
5.1.1	ENERGY STAR Air Purifier/Cleaner	N	Reliability Review. No updates recommended. DOE finalizing new federal standard for Air Purifiers so review deadline set for next year. Measure cost for IQ participants added. IQ Adjustments added for IQ populations to reflect that portion of market will utilize secondary market. IQAdj added to algorithm and IQ deemed savings assumptions added to tables.	N/A
5.1.2	ENERGY STAR Clothes Washer	N	Measure cost for IQ participants added. Adjustments added for IQ populations to reflect that portion of market will utilize	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			secondary market. IQAdj added to algorithm and IQ deemed savings assumptions added to tables.	
5.1.3	ENERGY STAR Dehumidifier	N	Measure cost for IQ participants added. Adjustments added for IQ populations to reflect that portion of market will utilize secondary market. IQAdj added to algorithm and IQ deemed savings assumptions added to tables.	N/A
5.1.4	ENERGY STAR Dishwasher	N	Reliability Review. New ENERGY STAR standard. Deemed savings updated. Measure cost for IQ participants added. Adjustments added for IQ populations to reflect that portion of market will utilize secondary market. IQAdj added to algorithm and IQ deemed savings assumptions added to tables.	N/A
5.1.5	ENERGY STAR Freezer	N	Reliability Review. No updates recommended. Measure cost for IQ participants added. Adjustments added for IQ populations to reflect that portion of market will utilize secondary market. IQAdj added to algorithm and IQ deemed savings assumptions added to tables.	N/A
5.1.6	ENERGY STAR and CEE Tier 2 Refrigerator	N	Reliability Review. No updates recommended. Measure cost for IQ participants added. Adjustments added for IQ populations to reflect that portion of market will utilize secondary market. IQAdj added to algorithm and IQ deemed savings assumptions added to tables.	N/A
5.1.7	ENERGY STAR and CEE Tier 2 Room Air Conditioner	N	Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).	N/A
5.1.8	Refrigerator and Freezer Recycling	N	Reliability Review. No updates recommended. No active programs utilizing measure. HDD and CDD update using NCEI Annual Normals 15 yr (2006 - 2020).	N/A
5.1.9	Room Air Conditioner Recycling	N	Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
5.1.10	ENERGY STAR Clothes Dryer	N	<p>Replacing ΔkWh in the Summer Coincident Peak Demand Savings section with the calculation of actual kWh impacts (as opposed to the kWh equivalent savings). Added clarity in baseline section and CEFbase to indicate why Federal Standard values (that are rated using the D1 test) are not used, but instead ESTAR developed baseline values are (which estimate the equivalent D2 test result which is how ESTAR units are rated).</p> <p>Measure cost for IQ participants added. Adjustments added for IQ populations to reflect that portion of market will utilize secondary market. IQAdj added to algorithm and IQ deemed savings assumptions added to tables.</p>	Correct summer peak demand savings for C&I and residential non-space heating fuel switch measures
5.1.11	ENERGY STAR Water Coolers	N	<p>Reliability Review.</p> <p>New ENERGY STAR standard v3.0. Update to incremental cost. Update to baseline and efficient consumption and resultant energy savings.</p> <p>Fix to calculated values for Hot and Cold Water – On Demand.</p>	N/A
5.1.13	Income Qualified: ENERGY STAR Room Air Conditioner	N	<p>Reliability Review.</p> <p>Clarification of baseline unit remaining life. Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).</p>	N/A Clarify Room AC Measure Life
5.1.14	Residential Induction Cooktop	N	<p>Measure name updated to ‘Residential Induction Cooking Appliances’ and measure now incorporates range upgrades.</p> <p>Addition of heating penalty and cooking savings due to reduced waste heat.</p> <p>HVACImpact calculations brought in to top level algorithm.</p> <p>%Electric / %Fuel heating and %Cool variables added to HVACImpact algorithms to allow unknown scenarios.</p> <p>WHFHeat changed to HCFHeat.</p> <p>DeltaTherms changes to FuelHeatImpact.</p> <p>Example calculation updated.</p> <p>Algorithms delineated in to fuel switch and non-fuel switch savings. Clarification added that HVACImpacts should be counted as non-fuel switch savings.</p>	Residential Induction Cooktops Add cooling savings and heating penalty to 5.1.14 Residential Induction Cooktop and update summer coincidence peak demand from fuel switch scenario.

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
5.1.16	Electric Lawn and Garden Equipment	N	New measure	Residential Lawn Equipment - Electric Lawnmower
5.2.1	Advanced Power Strip – Tier 1	N	Providing base and efficient cost for use in midstream programs.	Midstream Incremental Cost Clarifications
5.2.2	Tier 2 Advanced Power Strips (APS) – Residential Audio Visual	N	Reliability Review. Added baseline equipment cost for use where unknown.	N/A Midstream Incremental Cost Clarifications
5.2.4	Smart Sockets	N	New measure	Residential Smart Socket
5.3.1	Centrally Ducted Air Source Heat Pump	Y	Addition of baselines for ‘space constrained’ units as per the Federal Standard.	N/A
		N	<p>Combined with 5.3.12 Ductless Heat Pumps.</p> <p>Removal of efficient measure criteria. Efficient criteria to be determined by the program, however ENERGY STAR specifications maintained for reference.</p> <p>Removal of minimum efficiencies for early replacement.</p> <p>Updates to deemed early replacement rates (discussions ongoing).</p> <p>Removal of restriction of deemed early replacement rates to downstream programs only. Data is being reviewed to determine if the deemed early replacement rates should be provided by existing unit type.</p> <p>Update to new ratings throughout.</p> <p>Update to CEE conversion factor for SEER2/EER2/HSPF2.</p> <p>Removal of SEERadj/HSPFadj factor now new ratings are utilized.</p> <p>Addition of ability to analyze partial displacement scenarios – addition of HeatLoadFactor and PD_Adj (discussions ongoing).</p> <p>Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).</p> <p>HeatLoadFactor and PD_Adj values updated after recalculation using TMYx data.</p> <p>Example calculations updated.</p> <p>Deemed early replacement rates added.</p> <p>Deemed ratio of 50:50 Partial:Full</p>	<p>N/A</p> <p>Mobile Home Central AC Minimum Requirements</p> <p>Update default Early Retirement % for non-downstream ASHP</p> <p>Update TRM algorithms to use SEER2, EER2, and HSPF2</p> <p>Update ER Baseline SEER & AFUE Definitions</p> <p>5.3.1 Air Source Heat Pump - Partial Displacement</p> <p>Hybrid Ducted ASHP w/ Non-Electric Backup</p>

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			displacement for ductless heat pumps and 100% full displacement for ducted added. Measure costs updated to reflect new Federal Standard and rating system.	
5.3.2	Boiler Pipe Insulation	N	Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).	N/A
5.3.3	Central Air Conditioning	Y	Addition of baselines for 'space constrained' units as per the Federal Standard.	N/A
		N	Reliability Review. Update to new ratings throughout. Removal of SEERadj/HSPFadj factor now new ratings are utilized. Efficient criteria to be determined by the program, however ENERGY STAR specifications maintained for reference. Removal of restriction of deemed early replacement rates to downstream programs only. Incremental cost update. Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).	N/A
5.3.4	Duct Insulation and Sealing	N	Updates to accommodate advanced sealing applications and materials. Addition of Pressurized Duct Test as evaluation option. Unknown HP efficiency assumption added. SEER/EER/HSPF ratings adjusted to SEER2/EER2/HSPF2. Table formatting fix. HVAC efficiency ratings updated to new metric. Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).	Duct Insulation and Sealing COP value for heat pumps with unknown age not provided in TRM tables Update FLHcool table alignment for Duct Sealing
5.3.5	Furnace Blower Motor	N	Reliability Review. No updates recommended. Note added to clarify that motor savings should not be claimed when new HVAC (furnace or CAC) is installed. Language edited and additional clarification provided for early replacement scenarios.	N/A
5.3.6	Gas High Efficiency Boiler	N	Efficient criteria to be determined by the program, however ENERGY STAR specifications maintained for reference. Removal of minimum efficiencies for early replacement.	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			Removal of restriction of deemed early replacement rates to downstream programs only.	
5.3.7	Gas High Efficiency Furnace	N	Efficient criteria to be determined by the program, however ENERGY STAR specifications maintained for reference. Removal of minimum efficiencies for early replacement. Removal of restriction of deemed early replacement rates to downstream programs only. Typo fixed.	N/A
5.3.8	Ground Source Heat Pump	N	Reliability Review. Update to new ratings throughout. Efficient criteria to be determined by the program, however ENERGY STAR specifications maintained for reference. DGX systems now separate category. Removal of minimum efficiencies for early replacement. Removal of restriction of deemed early replacement rates to downstream programs only.	N/A
5.3.9	High Efficiency Bathroom Exhaust Fan	N	Reliability Review. Update to incremental cost. Updated savings based on review of available product.	N/A
5.3.10	HVAC Tune Up (Central Air Conditioning or Air Source Heat Pump)	N	SEER/EER/HSPF ratings adjusted to SEER2/EER2/HSPF2. Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).	N/A
5.3.12	Ductless Heat Pumps	Y	Addition of baselines for 'space constrained' units as per the Federal Standard.	N/A
		N	Measure combined with 5.3.1 Air Source Heat Pump. This measure is intended to be removed once issues are resolved in the combined measure. Measure removed.	N/A
5.3.14	Boiler Reset Controls	N	Reliability Review. AFUE default provided	N/A
5.3.16	Advanced Thermostats	N	SEER/EER/HSPF ratings adjusted to SEER2/EER2/HSPF2. Full Load Hours updated based on NCEI Annual Normals 15 yr (2006 - 2020).	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
5.3.20	Residential Energy Recovery Ventilator (ERV)	N	SEER/EER/HSPF ratings adjusted to SEER2/EER2/HSPF2. Unknown HP efficiency assumption added.	N/A COP value for heat pumps with unknown age not provided in TRM tables
5.3.22	High Efficiency Kitchen Exhaust Fans	N	New measure	Kitchen Exhaust Fan
5.4.1	Domestic Hot Water Pipe Insulation	N	Clarification added in footnote to ISR sources. Language updated describing the calculation method for determining unknown savings factors.	N/A
5.4.2	Gas Water Heater	N	Updates to ENERGY STAR specification v5.0 and associated savings estimates. Updates to measure life. Updates to measure cost. Federal Standard is under development so review deadline set to next year.	Residential Water heater ENERGY STAR v5 update
5.4.3	Heat Pump Water Heaters	N	Defining ΔkWh in the Summer Coincident Peak Demand Savings section to be from electric savings when non-fuel switch, or from Cost Effectiveness section (showing actual kWh increase) for fuel switch scenarios. Federal Standard is under development so review deadline set to next year. Removal of language in measure life section relating to the need to include a mid life adjustment. Clarification added that HVACImpacts should be counted as non-fuel switch savings.	Correct summer peak demand savings for C&I and residential non-space heating fuel switch measures N/A
5.4.4	Low Flow Faucet Aerators	N	Update to Distributed School Efficiency Kit ISR, incorporating 'future install' survey participants. Footnote fixed.	Energy Savings Kit ISR (ESK ISR Follow-up Survey) Correct Typo in Footnote 740
5.4.5	Low Flow Showerheads	N	Update to Distributed School Efficiency Kit ISR, incorporating 'future install' survey participants.	Energy Savings Kit ISR (ESK ISR Follow-up Survey)
5.4.6	Water Heater Temperature Setback	N	Updates to pre and post temperatures for distributed efficiency kits Minor edits made.	5.4.6 Water Heater Temperature Reset (Water Heater Temperature Setback Setpoint and ISR Updates)
5.4.10	Pool Covers	N	Reliability Review. Update to incremental cost. New cost assumptions provided.	N/A

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
5.4.11	Drainwater Heat Recovery	N	Npersons term replaced with Household to be consistent with other measures. Household size table updated to allow custom entry where known.	N/A
5.5.6	LED Specialty Lamps	Y	EISA exempt bulb types (<310 and >3300 lumens) removed from measure.	N/A
		N	Updates to reflect now only applicable for IQ programs or direct install. Removal of new construction assumptions. Unknown HP efficiency assumption added. HVAC efficiency ratings updated to new metric.	N/A COP value for heat pumps with unknown age not provided in TRM tables
5.5.7	LED Exit Signs	N	Reliability Review. No updates recommended. Unknown HP efficiency assumption added. HVAC efficiency ratings updated to new metric.	N/A COP value for heat pumps with unknown age not provided in TRM tables
5.5.8	LED Screw Based Omnidirectional Bulbs	Y	EISA exempt bulb types (<310 and >3300 lumens) removed from measure.	N/A
		N	Updates to reflect now only applicable for IQ programs or direct install. Removal of new construction assumptions. Unknown HP efficiency assumption added. HVAC efficiency ratings updated to new metric.	N/A COP value for heat pumps with unknown age not provided in TRM tables
5.5.9	LED Fixtures	N	Clarification of treatment of desk lamps. Updates to reflect now only applicable for IQ programs or direct install. Removal of new construction assumptions. Unknown HP efficiency assumption added. HVAC efficiency ratings updated to new metric.	Additional Clarification of Treatment for LED Desk Lamps N/A COP value for heat pumps with unknown age not provided in TRM tables
5.5.10	Holiday String Lighting	N	Unknown HP efficiency assumption added. HVAC efficiency ratings updated to new metric.	COP value for heat pumps with unknown age not provided in TRM tables
5.5.11	LED Nightlights	N	Unknown HP efficiency assumption added. HVAC efficiency ratings updated to new metric.	COP value for heat pumps with unknown age not provided in TRM tables
5.5.12	Connected LED Lamps	N	Addition of heating penalty sections – to be consistent with other lighting measures HVAC efficiency ratings updated to new metric.	N/A
5.5.13	EISA Exempt LED Lighting	Y	EISA exempt decorative and directional bulb types added to measure.	N/A
		N	Unknown HP efficiency assumption added.	COP value for heat pumps with unknown age not provided in TRM tables

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			HVAC efficiency ratings updated to new metric.	
5.5.14	Ultra-Efficient LED Lighting	N	New measure HVAC efficiency ratings updated to new metric. Leakage rate and waste heat factor unknown values updated to be straight average of omnidirectional and specialty values.	Ultra-Efficient LED Lighting (res) new measure
5.6.1	Air Sealing	N	Addition of multifamily and PJM heat pump coincidence factors. Note added that where new HVAC installed at same time as shell measures, the old HVAC unit efficiency should be used (pending further guidance from SAG and discussion) Unknown HP efficiency assumption added. ISR for Opt-In Weatherization Kits updated to reflect “future install” participants. SEER/EER/HSPF ratings adjusted to SEER2/EER2/HSPF2. ISR value and footnote updates. Prescriptive cooling assumptions updated using methodology matching the Rx heating. Example calculation added. ISR term made specific to the measure and not one value for the whole algorithm. Full Load Hours and CDD/HDD assumptions updated based on NCEI Annual Normals 15 yr (2006 - 2020). Shell Adjustment Factors updated to bring new climate data derived estimates back to evaluation determined best estimate.	Coincidence factor for Heat Pumps - PJM nHeat/nCool Derating Confusion COP value for heat pumps with unknown age not provided in TRM tables Energy Savings Kit ISR (ESK ISR Follow-up Survey)
5.6.2	Basement Sidewall Insulation		Update to measure life to 30 years.	N/A
5.6.3	Floor Insulation Above Crawlspace		Addition of multifamily and PJM heat pump coincidence factors.	Coincidence factor for Heat Pumps - PJM
5.6.4	Wall Insulation	N	Note added that where new HVAC installed at same time as shell measures, the old HVAC unit efficiency should be used (pending further guidance from SAG and discussion)	nHeat/nCool Derating Confusion
5.6.5	Ceiling/Attic Insulation			
5.6.6	Rim/Band Joist Insulation			

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
			<p>Unknown HP efficiency assumption added.</p> <p>SEER/EER/HSPF ratings adjusted to SEER2/EER2/HSPF2.</p> <p>Full Load Hours and CDD/HDD assumptions updated based on NCEI Annual Normals 15 yr (2006 - 2020).</p> <p>Shell Adjustment Factors updated to bring new climate data derived estimates back to evaluation determined best estimate.</p>	COP value for heat pumps with unknown age not provided in TRM tables
5.6.7	Low-E Storm Windows	N	<p>Addition of multifamily and PJM heat pump coincidence factors.</p> <p>Full Load Hours assumptions updated based on NCEI Annual Normals 15 yr (2006 - 2020).</p>	Coincidence factor for Heat Pumps - PJM
5.6.8	High Performance Windows	N	<p>Measure name changed from 'Triple Pane and Thin Triple Windows' to 'High Performance Windows'.</p> <p>Language updated to be less specific about window type/configuration.</p> <p>Update to specifications to align with ENERGY STAR v7.0 and associated update of savings.</p> <p>Updates to measure cost.</p> <p>Addition of multifamily and PJM heat pump coincidence factors.</p> <p>Full Load Hours assumptions updated based on NCEI Annual Normals 15 yr (2006 - 2020).</p> <p>Modeling outputs updated to use TMYx climate data.</p> <p>kWhCooling only values provided for Time of Sale, Early Replacement values still TBD.</p> <p>Early replacement savings factors added.</p> <p>New baseline for single pane window added.</p> <p>Minor typo in therm savings table fixed.</p>	<p>Update Thin Triple Window Measure 5.6.8</p> <p>Coincidence factor for Heat Pumps - PJM</p>
5.6.9	Insulated Cellular Shades	N	<p>Addition of multifamily and PJM heat pump coincidence factors.</p> <p>SEER/EER/HSPF ratings adjusted to SEER2/EER2/HSPF2.</p> <p>Full Load Hours assumptions updated based on NCEI Annual Normals 15 yr (2006 - 2020).</p>	Coincidence factor for Heat Pumps - PJM

Measure # and Name		Errata?	Brief description of what changed	Tracker Item(s)
5.6.11	Insulated Concrete Forms	N	New measure HVAC efficiency tables made consistent with other shell measures. Full Load Hours and CDD/HDD assumptions updated based on NCEI Annual Normals 15 yr (2006 - 2020). Typo fixed. Shell Adjustment Factors updated to bring new climate data derived estimates back to evaluation determined best estimate.	Insulated Concrete Form
5.7.5	Tree Planting	N	Adjustment of maximum distance trees must be planted from buildings to 30 feet. SEER/EER/HSPF ratings adjusted to SEER2/EER2/HSPF2. Full Load Hours and CDD/HDD assumptions updated based on NCEI Annual Normals 15 yr (2006 - 2020).	Request to review shade tree distance from buildings in light of challenges to implementation
Volume 4 – Cross-Cutting Measures and Attachments				
Attachment A	Illinois Statewide Net-to-Gross Methodologies	N	Updates as provided by NTG committee. See Volume 1 Section 1.2, Table 1.4 for a summary.	N/A
Attachment B	Effective Useful Life for Custom Measure Guidelines	N	Addition of lifetime assumption for energy savings measures completed by users of the Business Energy Analyzer tool.	Business Energy Analyzer Measure Life Increase
Attachment C	Framework for Counting Market Transformation Savings in Illinois	N	Updates as provided by Market Transformation committee.	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
Residential Lawn Equipment - Electric Chainsaw	Items were all included in the Residential Lawn Equipment – Electric Lawnmower workpaper.
Residential Lawn Equipment - Electric Trimmer	
Residential Lawn Equipment - Electric Leafblower	
Update peak demand savings from space heating fuel switch measures	After discussion, determined not an issue.
Income Eligible Data Review	After review and discussion with TAC, determined that the data does not support a change to the HVAC assumptions at this time.
Heat Pump Water Heater Baseline UEF	After discussion, determined this is not an error. No change to measure.
IQ Systematic Review	Ongoing effort in the IQ Working Group to perform a systematic review of all assumptions within the TRM with a view to potential future

Tracker Items:	Comments
	updates for IQ customers. In v12, appliance baselines for IQ participants and single pane window assumptions were added.
Q-Sync Motors	This measure is already characterized in the Refrigeration section and can be used for applications in Commercial Kitchens.
Residential Heat Pumps	Item combined with other tracker items.
Commercial Heat Pumps	Item combined with other tracker items.
IQ Behavior program - Enhanced Energy Education	No further input provided at this time.
Electric Pasta Cookers	Items not being pursued as per requestor. May be reviewed again in v13.
Heat Pump Water Heater Incremental Cost Information	
LED Grow Light update	
Default Value for RNew	
NEW Measure: Range Oven	
Clarify Parameters for Connected LEDs	
ENERGY STAR Doors	
High Lumen Screw Based Garage Lights	
NEW Measure: Induction Soup Well	
Fireplace measure	
Hot Food Holding Bins	
Electric Rotisseries	
Adding Doors to Cooler and Freezer Cases	
Injection Molding Machines	
Air Side Economizer	
Photocells	
Time Clocks for Lighting	
5.7.4 Heat Pump Pool Heater Update	
Update electric heat pump setback savings assumption	
Commercial Air Curtain	
PROVISIONAL On Demand Package Sealer	No significant uptake of measure or evaluation effort. No updates at this time.
PROVISIONAL Energy efficient hydraulic oils	Ameren had an unsuccessful pilot and ComEd's emerging tech group continue to review. No updates at this time.
PROVISIONAL Energy Efficient Gear Oils	