

**MEMORANDUM**

**TO:** IOWA TRM OVERSIGHT COMMITTEE  
**FROM:** CHERYL JENKINS, PROJECT MANAGER and SAM DENT, TECHNICAL LEAD - VEIC  
**SUBJECT:** IOWA TRM VERSION 3.0 – 5<sup>TH</sup> DELIVERABLE – FINAL  
**DATE:** 07/13/2018  
**Cc:** TRACIE GIBLER

VEIC has submitted the Final v.3 of the Iowa TRM with updated and new measures.

Presented below is a summary table documenting all the measures that have had changed in this version, with a brief description of what has changed and whether it is being considered an errata. Note that changes from the 4<sup>th</sup> deliverable are highlighted in red.

Measure # and Name		Errata?	Brief description of what changed	Deliverable
Vol 1	6.4 Electrical Loadshapes	N	Addition of “Non-Residential Lighting - Agricultural Animal Housing and Warehousing”, “Nonresidential Exterior Lighting” and “Nonresidential Ventilation - Agricultural Animal Housing and Warehousing” loadshapes.	2
Multiple	Multiple	N	Many measures had incorrect Loadshape Numbers applied. All have now been fixed. Note some additional loadshape changes are provided in the specific measures below.	3
Multiple	Multiple	N	Spelling of “Multifamily” made consistent across all measures and volumes	3
2.1.1	Clothes Washer	N	Gas loadshape changed from G01 – Flat, to G03 – Dryer	3
2.1.2	Clothes Dryer	N	Gas loadshape changed from G01 – Flat, to G03 – Dryer	3
2.1.5	Refrigerator and Freezer Recycling	N	Added definition of conditioned v unconditioned space.	1
			Performed Reliability Review – no new regression analysis from Illinois, but we understand that one is planned next year, so will consider updating then. Therefore, we have advanced the sunset date one year.  If there is program information on measure costs – we could update that.	1
2.1.6	Room Air Conditioner	N	Removal of Connected Allowance from ENERGY STAR specification ratings. Update to average efficiency levels based on re-analysis of CEC appliance database.	1
2.1.8	ENERGY STAR Air Purifier	N	New measure	2
2.2.2	Tier 2 Advanced Power Strip	N	Updated variable list to make it clear ERP value does not include ISR.	1

Measure # and Name		Errata?	Brief description of what changed	Deliverable
			Performed Reliability Review – no new product manufacturers have submitted data. Additional data on Embertec’s product supports current classification. New study in MA is being performed, and results may indicate changes in next cycle, so we advanced sunset date one year.	1
2.3.1	Gas Water Heater	N	Update to Federal Standard and ENERGY STAR specifications to Uniform Energy Factor and following a Supplemental Notice of Proposed Rulemaking by the DOE. Removal of Tankless units as baseline. As discussed at 3/21 TAC meeting, baseline for all water heater measures is a storage unit except for Early Replacement, which uses the existing type followed by a new baseline unit of the same type. Costs now reflect delta from storage to efficient unit.	1 1 1
2.3.2	Heat Pump Water Heater	N	Update to Federal Standard and ENERGY STAR specifications to Uniform Energy Factor and following a Supplemental Notice of Proposed Rulemaking by the DOE.	1
2.3.4	Low Flow Faucet Aerators	N	Clarification of Gallons per hour recovery of heat pump water heaters.	1
2.3.5	Low Flow Showerheads	N	Clarification of Gallons per hour recovery of heat pump water heaters. Delta temperature rise made consistent across measures.	1 1
Multiple	Multiple	N	Typo in footnotes that heating-based factors are estimated using relative Cooling Degree Days. Corrected to Heating Degree Days.	3
2.4.1	Central Air Source Heat Pump	N	Update to Quality Installation cost assumption.	2
2.4.2	Central Air Conditioner	N	Update to Quality Installation cost assumption.	2
2.4.3	Boiler	N	Fix typo in AFUEexist label. Update EFLH assumptions. Question: Any Iowa data that can inform the AFUEexist assumption?	2 2 2
2.4.4	Furnace	N  N	Update to unit and Quality Installation cost assumptions. <b>Measure costs adjusted.</b> Update EFLH assumptions. Question: Any Iowa data that can inform the AFUEexist assumption? Note added re: reverting to Federal Standard if IA NTG factor applied.	2 5 2 2 3

Measure # and Name		Errata?	Brief description of what changed	Deliverable
2.4.5	Furnace Blower Motor	N	Added notification that this measure is effective only until 12/31/2019 due to Federal Standard change, making ECM motors baseline.	2
2.4.6	Ground Source Heat Pump	N	Addition of Early Replacement characterization (from electric heating/cooling only).	2
			Update to Quality Installation cost assumption.	2
2.4.8	Energy Recovery Ventilator	N	Update EFLH assumptions.	2
2.4.10	Whole House Fan	N	Loadshape changed from "RE17 Whole House fan", which does not exist, to "RE11: Single Family Ventilation"	3
2.4.11	Central Air Source Heat Pump Tune-Up	N	New methodology to use outputs from HVAC SAVE to adjust EFLH of post tune-up.	2
2.4.12	Central Air Conditioner Tune-Up	N	New methodology to use outputs from HVAC SAVE to adjust EFLH of post tune-up.	2
2.4.13	Boiler Tune-Up	N	Update EFLH assumptions.	2
2.4.14	Furnace Tune-Up	N	New methodology to use outputs from HVAC SAVE to adjust EFLH of pre tune-up (since new EFLH assumptions correspond to the post HVAC SAVE condition).	2
			Update EFLH assumptions.	2
2.4.16	Duct Sealing	N	Added definition of conditioned vs. unconditioned space.	1
			Typo fix in HeatingSavingsPerUnit variable.	1
			Update EFLH assumptions.	2
		N	Adjusted EFLH to represent 'average home'.	3
2.4.18	Advanced Thermostat	N	Added ENERGY STAR qualification.	2
			Updated Measure Cost.	2
			Added Electric Furnace option.	2
			Cooling % savings factor adjusted	4
2.4.19	Duct Insulation	N	Added definition of conditioned vs. unconditioned space.	1
			Update EFLH assumptions.	2
			Adjusted EFLH to represent 'average home'	3
2.4.20	Advanced Thermostat Optimization Services	N	New Measure	2
			Cooling savings calculation updated based on reduced Advanced Thermostat cooling savings factor	4
2.5.3	LED Lamp – Standard	N	Update ENERGY STAR Spec.	2
			Update Lifetime assumption.	2
			Update In-Service Rate.	2
			Update Hours of Use and corresponding O&M calculations.	2

Measure # and Name		Errata?	Brief description of what changed	Deliverable
			Pushed the EISA midlife adjustment from year 2020 to 2021.	3
			Revised rated life from ENERGY STAR minimum to average rated life from ENERGY STAR QPL.	3
2.5.4	LED Lamp – Specialty	N	Update ENERGY STAR Spec.	2
			Update Lifetime assumption.	2
			Update In-Service Rate.	2
			Update Hours of Use and corresponding O&M calculations	2
			Pushed the EISA midlife adjustment from year 2020 to 2021.	3
			Revised rated life from ENERGY STAR minimum to average rated life from ENERGY STAR QPL.	3
2.5.6	LED Fixtures	N	New Measure	2
			Pushed the EISA midlife adjustment from year 2020 to 2021.	
			Revised the 2020 lumens/watt value to better align with the current ENERGY STAR Luminaires spec.	3
			Added incremental cost assumptions.	
2.6.2	Attic/Ceiling Insulation	N	Addition of text around default assembly R-values and evaluation of existing insulation.	1
		N	Removal of ADJattic from heating algorithms based on TetraTech analysis on meter data.	3
2.6.3	Rim/Band Joist Insulation	N	Added definition of conditioned vs. unconditioned space.	1
			Addition of text around default assembly R-values and evaluation of existing insulation.	1
2.6.6	Floor Insulation Above Uninsulated Crawl Space or Garage	N	Edited name and text to allow measure use for floor insulation above uninsulated garage.	1
			Added definition of conditioned vs. unconditioned space.	1
			Addition of text around default assembly R-values and evaluation of existing insulation.	1
2.6.7	Basement Sidewall Insulation	N	Added definition of conditioned vs. unconditioned space.	1
			Addition of text around default assembly R-values and evaluation of existing insulation.	1
3.1.8	Heat Reclaimer	N	Specific weight of water assumption made consistent with other TRM measures (8.33 lbs/gal).	1
3.1.9	Heat Mat	N	Fix typo in DoubleWattage variable.	1
3.1.14	Dairy Plate Cooler	N	Fix typos in footnotes relating to EER of compressors.	1
3.2.1	Low Flow Faucet Aerators	N	Clarification of Gallons per hour recovery efficiencies.	1
3.2.2	Low Flow Showerheads	N	Clarification of Gallons per hour recovery efficiencies.	1
			Fix error in example calculation.	1

Measure # and Name		Errata?	Brief description of what changed	Deliverable
3.2.3	Gas Water Heater	N	Removed "Hot" from title.	1
			Added an algorithm to show that total therms is the unit + standby loss calculations.	1
			Fixed example calculations to show standby loss should be included.	1
			Brought forward sunset date to 2020 since it looks like a new Federal Standard may be due to be effective in 2021.	1
3.2.6	Drainwater Heat Recovery	N	Made symbol for Practical effectiveness of drain water heat recovery consistent across Electric and Gas algorithm.	1
3.3.2	Furnace	N	Update lifetime assumption.	2
			Update measure costs.	2
			Measure costs adjusted.	5
3.3.4	Heat Pump Systems	N	Update of Federal Standard.	2
			Recommendation to make change effective 1/1/2019	2
3.3.6	Single-Package and Split System Unitary Air Conditioners	N	Update of Federal Standard.	2
			Recommendation to make change effective 1/1/2019	2
3.3.9	Package Terminal Air Conditioned (PTAC) and Heat Pump (PTHP)	N	Update of Federal Standard.	2
			Recommendation to make change effective 1/1/2019	2
3.3.11	Furnace Tune-Up	N	Definitions of variables added.	2
3.3.14	VFDs for HVAC Supply and Return Fans	N	Added %FF and PLR factors for <30% bins to make the default values compute correctly.	1
3.3.15	Duct Insulation	N	Fix typo in cost section – costs provided are for R-3, not R-30.	1
3.3.20	Room Air Conditioner	N	Removal of Connected Allowance from ENERGY STAR specification ratings. Update to average efficiency levels based on re-analysis of CEC appliance database.	1
3.3.22	Steam Trap Replacement or Repair	N	New Measure	4
3.4	Lighting Table	N	Addition of 'Agricultural Animal Housing and Warehousing' and 'Exterior Lighting' assumptions	2
3.4.3	LED Lamp – Standard	N	Update ENERGY STAR Spec.	2
			Update Lifetime assumption.	2
			Update In-Service Rate.	2
			Update Hours of Use and corresponding O&M calculations.	2
			Pushed the EISA midlife adjustment from year 2020 to 2021.	3
Revised rated life from ENERGY STAR minimum to average rated life from ENERGY STAR QPL.				
3.4.4	LED Lamp – Specialty	N	Update ENERGY STAR Spec.	2

Measure # and Name		Errata?	Brief description of what changed	Deliverable
			Update Lifetime assumption.	2
			Update In-Service Rate.	2
			Update Hours of Use and corresponding O&M calculations.	2
			Pushed the EISA midlife adjustment from year 2020 to 2021.	3
			Revised rated life from ENERGY STAR minimum to average rated life from ENERGY STAR QPL.	
3.4.5	LED Fixtures	N	Updated cost assumptions to match updated Efficiency Vermont TRM.	1
3.4.9	Commercial LED Exist Sign	N	Reliability Review performed.	2
			Removal of incandescent as baseline option.	2
3.4.10	LED Street Lighting	N	Performed Reliability Review – no major changes.	1
3.4.11	LED Traffic and Pedestrian Signals	N	Performed Reliability Review – no major changes.	1
3.5.2	Clothes Washer	N	Update to Federal Standard.	2
			Update to Measure cost.	2
			Update to capacity and product driven assumptions.	2
3.6.1	Dishwasher	N	Updated delta water temperature and water heater efficiency assumptions to be consistent with other measures.	1
			Updated default savings values based on new assumption.	1
3.6.2	Commercial Solid and Glass Door Refrigerators & Freezers	Y	Update to Federal Standard (03/2017) and ENERGY STAR (01/2017) specifications.	1
			Update to incremental cost assumptions.	1
			Suggest making this an errata for PY 2018, as product would have sold in 2017.	1
3.6.3	Pre-Rinse Spray Valve	N	Updated delta water temperature and water heater efficiency assumptions to be consistent with other measures.	1
3.6.8	Conveyor Oven	N	Removed reference to ESTAR, as not ENERGY STAR product	1
3.6.10	Commercial Steam Cooker	N	Updated incremental cost to match updated ENERGY STAR Calculator.	1
			Fixed parentheses issue.	1
3.6.11	Fryer	N	Updated ENERGY STAR spec. Suggest not making errata, as limited change and minimal volume.	1
			Update to incremental cost.	1
3.7	Shell Intro Section	N	Introduction to the new use of Load Hours in Shell measures replacing the EFLH.	2
3.7.1	Infiltration Control	N	Update to using Load Hours.	2

Measure # and Name		Errata?	Brief description of what changed	Deliverable
3.7.2	Foundation Wall Insulation	N	Addition of text around default assembly R-values and evaluation of existing insulation.	1
		N	Update to using Load Hours.	2
3.7.3	Roof Insulation	N	Addition of text around default assembly R-values and evaluation of existing insulation.	1
		N	Update to using Load Hours.	2
3.7.4	Wall Insulation	N	Addition of text around default assembly R-values and evaluation of existing insulation.	1
		N	Update to using Load Hours.	2
3.7.5	Efficient Windows	N	Update to using Load Hours.	2
3.7.6	Insulated Doors	N	Update to using Load Hours.	2
3.8.1	LED Refrigerator Case Light Occupancy Sensor	N	Updated kW Controlled to reflect falling LED wattage. Simplified methodology.	1 1
3.8.3	Efficiency Motors for Walk-in and Display Case Coolers / Freezers	N	Added distinction between Output Wattage of reach-in vs. walk-in coolers/freezers.	1
			Provided new table of default savings values.	1
			Fixed error in example calculation.	1
3.8.5	Refrigerated Beverage Vending Machine	N	Performed a reliability review. Updated cost assumption and added CF footnote. Note: Federal Standard is changing effective 1/1/2019. This brings baseline very close to the current ENERGY STAR level. We anticipate an ENERGY STAR specification change in line with this update will be forthcoming so propose leaving measure as is for 2019 and updating for 2020 when this specification is known. Sunset Date altered to 1/1/2020.	2 2
3.8.7	Scroll Refrigeration Compressor	N	Performed a reliability review and found no reason to update. Sunset date changed to 1/1/2023.	2
3.8.8	Strip Curtain for Walk-In Coolers and Freezers	N	Fix error in example calculation.	1
3.8.9	Ice Maker	N	Update to ESTAR and Federal Standard specifications.	1
			Update to incremental cost based on latest ESTAR calculator.	1
			Although the spec changes is 1/2018 – we suggest making change effective 1/2019 due to selling of remaining product and low volume measure.	1
3.8.10	Efficient Motor Controls for Walk-in and Display Case Coolers/Freezer	N	New measure	2