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## MEMORANDUM

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**TO:** STAKEHOLDER ADVISORY GROUP

**FROM:** CHERYL JENKINS, PROJECT MANAGER on Behalf of VEIC TRM Team

**SUBJECT:** PROPOSED EVALUATION PRIORITIES FOR THE TRM

**DATE:** OCTOBER 9, 2019

**Cc:** JENNIFER MORRIS, ICC; CELIA JOHNSON, SAG

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In an effort to increase the accuracy of the IL Statewide TRM, VEIC offers the following list of measures and details of specific parameters for which we believe investment in evaluation may be most beneficial to the accuracy of the TRM saving estimates.

We have also provided a qualitative measure of our sense of priority and an explanation of this assessment, such that those parameters that currently have the least confidence or highest impact rise to the top. This qualitative prioritization is based upon a number of metrics:

- Importance of the measure(s) currently and anticipated importance in the future
- Impact of particular assumption(s) within the measure – i.e., some assumptions within an algorithm can have a significantly greater impact to the final savings value than others
- Source of existing assumption
- Confidence in existing assumption

These priorities reflect VEIC's high-level assessment only. This list is not meant to be exclusive or imply that other evaluation priorities should not be executed based on overall evaluation and program objectives.

Redline edits indicate new recommendations as well as changes from previous recommendations due to subsequent evaluation activities.

### **Provisional Measures**

The following measures were given the new designation of "Provisional Measure" in the v8.0 TRM. As per Section 3.4 of Volume 1, these measures are "generally nascent in Illinois or nationally, for which energy savings have not been validated through robust evaluation, measurement and verification (EM&V) efforts, and/or for which there is substantial uncertainty about their cost-effectiveness, performance, and/or customer acceptance." These measures have been assigned a one-year Review Deadline, meaning that the measure will undergo a review for reasonableness, continued program relevancy, and update of material assumptions during the next TRM update cycle. Expectations are that the Program Administrator will work with evaluators and the TRM Administrator to design and undertake pilot studies, evaluations, or other relevant activities on an appropriate number of installations of the Provisional Measure within that year, with the goal of informing the development of more-robust and Illinois-specific savings assumptions.

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
<a href="#">4.4.45 Adsorbent Air Cleaning – Provisional Measure</a>	<a href="#">Savings verification</a>	<a href="#">Measure requires continued evaluation of savings from pilot program to sure up any deemed assumptions.</a>	<a href="#">High</a>	<a href="#">Provisional Measure currently based on a single project.</a>	<a href="#">2019</a>
<a href="#">4.4.47 Air Deflectors for Unit Ventilators – Provisional Measure</a>	<a href="#">Savings verification</a>	<a href="#">Measure requires continued evaluation of savings from installations to sure up any deemed assumptions.</a>	<a href="#">High</a>	<a href="#">Provisional Measure currently based on a small number of projects.</a>	<a href="#">2019</a>
<a href="#">4.4.48: Small Commercial Thermostats – Provisional Measure</a>	<a href="#">Savings verification</a>	<a href="#">Measures 4.4.18 Small Commercial Programmable Thermostats, 4.4.25 Small Commercial Programmable Thermostats Adjustments and 4.4.42 Advanced Thermostats for Small Commercial were replaced with this new simplified measure, based on Residential %savings. Evaluation to determine expected savings in commercial applications is needed.</a>	<a href="#">High</a>	<a href="#">Provisional measure with potentially high savings and without real application grounding.</a>	<a href="#">2019</a>
<a href="#">4.7.6 Vortex Tube Thermostat – Provisional Measure</a>	<a href="#">Savings verification</a>	<a href="#">Review of savings factor appropriateness with real world applications</a>	<a href="#">High</a>	<a href="#">Provisional measure without real application grounding.</a>	<a href="#">2019</a>
<a href="#">5.3.8 Furnace Filter Alarm – Provisional Measure</a>	<a href="#">Efficiency Improvement % (both electric fan and gas efficiency)</a> <a href="#">Measure life / persistence</a>	<a href="#">Weak basis for electric and gas efficiency improvement.</a> <a href="#">Help answer concerns around actual use of filter alarms (are they reinstalled after filter change) and extent of resulting behavior change compared to population without.</a>	<a href="#">High</a>	<a href="#">Provisional measure requiring better basis for savings and persistence.</a>	<a href="#">2019</a>

### High Priority Recommendations

The following list provides VEIC’s assessment of the other highest priority parameters for evaluation.

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
<a href="#">Lighting Forecast Subcommittee</a>	<a href="#">To review available data and market forecast projections to estimate future baseline trends and appropriate</a>	<a href="#">TAC decision for v8 update included assumption that after EISA backstop, CFLs will not be available and LED savings go to zero.</a> <a href="#">In addition, the deferred baseline for linear lamps being</a>	<a href="#">High</a>	<a href="#">High saving measures and significant impact on lifetime savings.</a>	<a href="#">2019</a>

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
	<u>mid-life adjustments.</u>	<u>early replaced after the assumed remaining life of the existing lamp is assumed to be Standard T8s. These assumptions should be reviewed and ensured to be consistent with credible forecasts of future market trends.</u>			
<u>Income Eligible Lighting Subcommittee</u>	<u>To review available data and market forecast projections to estimate future baseline trends and appropriate mid-life adjustments specific to this population.</u>  <u>Determine if Income Eligible sales in DIY, Warehouse and Big Box retail stores should apply same assumptions as other IE serving retail types.</u>	<u>Exceptions for Income Eligible populations were added late in the process for v8. These assumptions should be reviewed and discussed to ensure they are appropriate.</u>	<u>High</u>	<u>High saving measure</u>	<u>2019</u>
<u>4.5.3: High Performance and Reduced Wattage T8 Fixtures</u>	<u>Baseline</u>	<u>Measure assumes T12 is still a valid baseline for retrofit. A baseline study for Illinois would provide greater clarity on this issue.</u>	<u>High</u>	<u>This assumption has been deferred a number of years and the legislation is now many years old.</u>	<u>2015</u>
<u>4.4.1: Air Conditioner Tune-up</u>	<u>Deemed-savings percentages</u>	<u>Deemed-assumptions were added for v6, when testing in and out is not performed. To provide greater confidence in deemed approach — an IE based study would be beneficial.</u>	<u>High</u>	<u>Likely high volume measure and key input to deemed savings assumption.</u>	<u>2017</u>
<u>4.4.16: Steam Trap Replacement or Repair</u>	<u>Savings verification</u>  <u>Potential for useful heat regain, condensate return and other</u>	<u>High volume/savings measure based on algorithm. Would be good to compare the resulting savings with metered <u>or billing</u> – based savings.</u>	<u>High</u>	<u>Potentially high savings measure without real application grounding.</u>	<u>2016</u>

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
	<a href="#">interactive impacts.</a>	<a href="#">VEIC understand that Kristofer Kisynski of Elevate Energy will be providing a white paper on this measure for v9.</a>			
<a href="#">4.4.17: Variable Speed Drives for HVAC Pumps and Cooling Tower Fans</a>	Measure cost	Assumption is from 2008	High	<a href="#">Likely high volume measure and low confidence in assumption. If actual costs are always/mostly used then less of a priority.</a>	2017
<a href="#">4.4.19: Demand Controlled Ventilation</a>	Savings Factors	<a href="#">Measure is based on savings factors derived from modeling. Would be good to compare the resulting savings with metered savings.</a>	High	<a href="#">Potentially high savings measure without real application grounding.</a>	2017
<a href="#">4.4.18: Small Commercial Programmable Thermostat</a>	Savings verification	<a href="#">Measure is based on complex regression equation. Would be good to compare the resulting savings with metered savings.</a>	High	<a href="#">Potentially high savings measure without real application grounding.</a>	2014
<a href="#">4.5.4 LED Bulbs and Fixtures</a>	Incremental costs	Rapidly changing market and costs are multiple years old now	High	High savings measure and key assumption for cost effectiveness	2017
<a href="#">4.8.12 Spring-Loaded Garage Door Hinge</a>	<a href="#">Savings Verification</a>	<a href="#">A limited number of pilot projects currently form the basis of the savings. Lack of third party verification to validate deemed savings.</a>	High	<a href="#">Potentially high savings measure without real application grounding.</a>	2019
<a href="#">4.8.16 Commercial Weather Stripping</a>	<a href="#">Rx savings per weatherstrip</a>	<a href="#">Currently based upon lab testing. After discussions in TAG assumptions were made more conservative and in line with residential assumptions, but any real world application and evaluation studies would benefit the measure's robustness.</a>	High	<a href="#">New very low cost measure that could easily become high volume measure.</a>	2019
<a href="#">NOT YET ASSIGNED (Potential new measure): Installing New or Retrofitting Existing Commercial Coolers/Freezers with Doors</a>	<a href="#">Default variables for algorithm, direct load/consumption values, and HVAC interactive effects</a>	<a href="#">This measure has been queued for inclusion into the TRM for the past two years. Currently it has not been drafted into the TRM and its workpaper declined due to significant concerns with a number of the measure's attributes.</a>	High	<a href="#">This measure has high potential, both in reducing direct load consumption of existing coolers and freezers, but also has significant HVAC interactive effects.</a>	2019
<a href="#">5.1.8 Refrigerator and Freezer Recycling</a>	Regression equation	Last performed in 2014. Each year you would expect the efficiency of the units being	High	Suggest considering reperforming regression	2017

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		retired to increase, and so savings decrease. Evaluation should be repeated at regular intervals.		equation as will be 5 years since last study.	
Multiple HVAC measures	Quality Installation impacts	An independent evaluation of savings is highly recommended to support field measurements.	High	VEIC found a lack of independent evaluations of HVAC SAVE QI programs.	2017
5.3.6: Gas High Efficiency Boiler and 5.3.7: Gas High Efficiency Furnace	Baseline efficiency	Particularly furnaces – significant evidence that 80% is not a valid baseline. <a href="#">VEIC understand NTG committee was to review this issue and make determination as to if baseline adjustment is necessary.</a>	High	High impact measures	2015
	EFLH	New methodology uses EFLH directly. Should consider new study to inform EFLH assumptions in appropriate sector categories			2018
5.3.16 Advanced Thermostats	Lifetime / Persistence  Savings Factors	Characterization currently depends upon a number of studies that only lasted a single year or less.  <del>Ongoing Evaluation on key savings factors encouraged to leverage device and interval data to address outstanding uncertainties and non-consensus concerns.</del>	High	High impact measure and key assumptions for cost effectiveness	2017
<del>5.5.6 LED Specialty Lamps and 5.5.8 LED Screw Based Omnidirectional Lamps</del>	<del>Lifetime cap</del>	<del>Rated life of LED bulbs are significantly longer than the lifetime cap imposed on these measures. This decision and its relationship to changing baseline replacements should be reviewed.</del>	<del>High</del>	<del>High impact measure and key assumption for cost effectiveness</del>	<del>2017</del>
<del>5.5.12 Connected LED Lamps</del>	<del>SVGe default</del>	<del>Only aware of 2 evaluations on technology with vastly different findings.</del>	<del>High</del>	<del>Could potentially become a significant measure especially as standard A-lamp LEDs are phased out.</del>	<del>2019</del>
5.6.1-5.6.4: Shell measures	Savings verification	Additional evaluation for TRM algorithms v metered savings, particularly in the northern part of the State and for	High	Algorithms now have significant downward adjustments based on Ameren service territory only.	2014

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		components other than attic insulation/air sealing.			
6.1.1: Adjustments to Behavior Savings to Account for Persistence	Persistence levels, duration, and shape of multiyear persistence curve; Peak-specific persistence	More accurate information on IL-specific persistence levels, duration, and decay function will provide better cost-effectiveness calculations. Little information is currently available for peak persistence.	High	Assumptions of persistence levels, duration, and decay function affect cost-effectiveness and are likely to be significant. Peak persistence should be better understood.	2016
6.1.1: Adjustments to Behavior Savings to Account for Persistence	Proportion of behavior program savings from efficient measures installed on the premises vs. behavior modification	If a non-trivial proportion of program savings comes from efficient measures installed on the premises and not otherwise identified through other direct program participation, this component of saving would likely persist even under new building ownership.	High	No national information available; assessing this impact would likely be a costly undertaking. Adjustments to savings persistence to account for move outs would be affected and, depending on outcome, could be non-trivial.	2018

### Additional Recommendations

Additional suggestions for evaluation are provided below:

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
<a href="#">4.1.7 Milk Pre-Cooler;</a> <a href="#">4.1.8 VSD Milk Pump with Plate Cooler Heat Exchanger;</a> and <a href="#">4.1.9 Scroll Compressor for Dairy Refrigeration</a>	<a href="#">Efficiency of the existing compressor (8.0 EER)</a>	<a href="#">The value is not state specific to Illinois and could benefit from a market assessment of the existing compressors used on dairy farms for bulk milk cooling.</a>	<a href="#">Low</a>	<a href="#">These are newly added measures to the TRM and the assessment is that uptake may be relatively low.</a>	<a href="#">2019</a>
<a href="#">4.1.11 Commercial LED Grow Lights</a>	<a href="#">Savings verification and HVAC interactive effects</a>	<a href="#">The energy savings are impacted directly based on the location, application, and use of the installed LEDs. The measure was originally drafted for a high-intensity, high-use, carefully conditioned indoor space. However, savings can vary widely if use and product grown is seasonal or location is a greenhouse rather than a closed interior space. An</a>	<a href="#">Medium</a>	<a href="#">The majority of the current measure assumptions are being drawn from cannabis cultivation facilities and from other state and jurisdiction resources. Due to Illinois state legislation, these types of facilities require LED lamps and are excluded from participation in this measure. Evaluation work will</a>	<a href="#">2019</a>

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		<u>in-depth study on the HVAC interactive effects will greatly assist the measure characterization as current waste heat factors are being drawn from the unknown building type.</u>		<u>support the transition of this measure and its variables to Illinois sites that can participate in this measure such as greenhouses and other horticulture and floriculture applications.</u>	
4.2.16: Kitchen Demand Ventilation Controls	Deemed electric savings and CFM/HP	Savings are based upon CA workpaper.	Medium	Low confidence in assumption. May be opportunities to make more of a custom calculation.	2017
<u>4.2.20 Efficient Dipper Wells</u>	<u>Baseline Annual Water Usage</u>	<u>Further evaluation will allow for appropriate deemed assumptions for a variety of commercial customers.</u>	<u>Low</u>	<u>Likely low impact measure</u>	<u>2019</u>
<del>4.3.1: Storage Water Heater and, 4.3.5: Tankless Water Heater</del>	Measure cost	Measure cost assumptions are out of date	Medium	Costs do not have a recent or good reference.	2017
4.3.6: Ozone laundry	Savings verification	Relatively new measure with assumptions based upon a small number of projects.	Medium	Evaluate whether metered savings consistent with assumptions.	2014
<u>4.3.11 Tunnel Washers</u>	<u>HotWaterReductionGallon</u>	<u>During the 2019 TRM development session it was decided that a custom input is needed, as minimum evidence available for average hot water reduction with tunnel washers.</u>	<u>Low</u>	<u>Currently a custom input. Unlikely to become a significant measure for some time.</u>	<u>2019</u>
4.4.14: Pipe Insulation and 4.4.14: Small Business Pipe Insulation	Thermal Regain Factor	Assumptions are based upon Residential assumptions. Would be good to investigate commercial applications.	Low	May be difficult to evaluate and may vary significantly.	2014
<u>4.4.46 Server Room Temperature Setback</u>	<u>Savings factor and integration of server room temperature with fan power consumption.</u>	<u>Relatively old basis for savings factor would benefit from evaluation.</u>	<u>Medium</u>	<u>Measure was limited to maximum temperature adjustment of 95F but questions remain about potential savings and interactive effects.</u>	<u>2019</u>
Commercial Lighting Fixtures	Reference tables with wattage and cost assumptions	Tables were based upon VEIC determined values for Efficiency Vermont.	Medium	While it would be a worthwhile exercise, review and evaluation	2017

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		Evaluation of assumptions and appropriateness for Illinois could be performed.		may be lengthy to perform.	
4.6.10: High Speed Rollup Doors	Savings verification	High volume/savings measure based on algorithm. Would be good to compare the resulting savings with metered savings.	Medium	Potentially high savings measure without real application grounding.	2017
<del>5.1.2: ENERGY STAR and ENERGY STAR Most Efficient Clothes Washers and 5.1.10: Residential ENERGY STAR Clothes Dryer</del>	<del>Number of cycles, average capacity</del>	<del>Number of cycles is based upon RECS data, and capacity is an average of available product. Both multipliers within the algorithms</del>	<del>Low</del>	<del>Clothes dryers could be a growing measure. If specific data would improve the assumptions</del>	<del>2015</del>
5.1.7 ENERGY STAR Room Air Conditioner	FLH <sub>RoomAC</sub>	Current assumption is based upon applying the Central AC to Room AC ratio from RLW North Easter study. This multiplier assumption could benefit from IL study	Medium	While we don't have great confidence in the assumption, the savings per unit is low. If significant volume it could be a worth exercise to improve the assumption.	2017
<del>5.1.9 Room Air Conditioner Recycling</del>	<del>Capacity and EERexist</del>	<del>Based on assumptions of prior Federal Standard. Could easily be recorded and updated to reflect actual units being collected.</del>	<del>Medium</del>	<del>Expect to be lower participation than Refrigerator Recycling</del>	<del>2019</del>
5.2.1: Advanced Power Strip Tier 1	Savings assumptions	Would benefit an updated and more local savings assumption.	Low	Suspect this measure is significantly reducing in support/volume.	2017
5.2.2: Advanced Power Strip Tier 2	AV consumption. ISR / Persistence studies. Additional product evaluation.  <del>C&amp;I application for potential new measure</del>	Plan to move to technology based rating rather than product based but requires additional products to be evaluated.  <del>We have not yet been able to develop deemed C&amp;I assumptions due to lack of evaluation.</del>	Medium	<del>Any additional input to move away from technology based assumptions would be beneficial. Additional Massachusetts study appears to support current characterization. Therefore no longer considered high priority.</del>	2017
5.3.8: Ground Source Heat Pump	Savings verification	Algorithms are very complex. An exercise to compare TRM estimates to	Medium	Potentially growing savings measure without real application grounding.	2017

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		actual would help strengthen the measure.			
5.4.6 Water Heater Temperature Setback	Pre and post temperature. ISR for kit programs	Suggestion during v6 development that actual setback may be less than defaulted.	Medium	Low savings measure but If evaluation already exists this would be a good update.	2017
6.1.1: Adjustments to Behavior Savings to Account for Persistence	Cost of behavior change; Move-out rates – to be applied to cost-effectiveness calculations	Little information available for cost of behavioral actions; Move-out rates needed to provide further accuracy for Cost-Effectiveness.	Low	Unclear that these will affect savings materially	2016
Loadshapes		Developed during first round of development. Would be worthwhile <u>to continue to reviewing particularly focusing on</u> the most used loadshapes.	Medium	Loadshapes generally have a smaller impact on cost effectiveness than coincidence factors applied to demand savings. Some key <del>lighting</del> loadshapes improved for v7 <u>and v8</u> TRM.	2017
State Energy Code Enforcement and Compliance	General understanding of statewide practices	Concerns raised during Version 7 development revealed knowledge gaps in this area.	Medium	<del>From a policy standpoint, this topic may not directly influence the TRM, however it is important to give stakeholders a holistic understanding of the EE landscape.</del>	2018