MEMORANDUM

TO: STAKEHOLDER ADVISORY GROUP

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

SUBJECT: PROPOSED EVALUATION PRIORITIES FOR THE TRM

DATE: OCTOBER 14, 2020

Cc: JENNIFER MORRIS, ICC; CELIA JOHNSON, SAG

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 v9.0 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
~~4.4.45 Adsorbent Air Cleaning – Provisional Measure~~	~~Savings verification~~	~~Measure requires continued evaluation of savings from pilot program to sure up any deemed assumptions.~~	~~High~~	~~Provisional Measure currently based on a single project.~~	~~2019~~
4.4.47 Air Deflectors for Unit Ventilators – Provisional Measure	Savings verification	Measure requires continued evaluation of savings from installations to sure up any deemed assumptions.	High	Provisional Measure currently based on a small number of projects.	2019
4.4.48: Small Commercial Thermostats – Provisional Measure	Savings verification	~~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~~Evaluation performed informing the cooling % savings. Heating % savings still based on ~~R~~residential ~~%savings~~assumption. Evaluation to determine expected heating savings in commercial applications is needed.	High	Provisional measure with potentially high savings and without real application grounding.	2019
4.8.20 Energy Efficient Hydraulic Oils – Provisional Measure	Savings verification	Evaluation of real-world savings across multiple sites and customer types. Current measures rely heavily on industry sponsored or anecdotal assumptions.	High	Provisional measure without real application grounding.	2020
4.8.21 Energy Efficient Gear Lubricants – Provisional Measure	Savings verification		High		2020
4.8.22 Smart Sockets – Provisional Measure	Savings verification Typical operation and hours of savings	Currently very little literature or existing evaluation on application and savings potential. Metered savings study would help true up the savings.	High	Provisional measure without real application grounding.	2020
4.7.6 Vortex Tube Thermostat – Provisional Measure	Savings verification	Review of savings factor appropriateness with real world applications	High	Provisional measure without real application grounding.	2019
5.3.19 Thermostatic Radiator Valves – Provisional Measure	Savings verification and %TRVSavings	Estimates of savings for IL and for a variety of applications.	High	Provisional measure. Low cost measure with potential high savings.	2020
~~5.3.8 Furnace Filter Alarm – Provisional Measure~~	~~Efficiency Improvement % (both electric fan and gas efficiency)~~	~~Weak basis for electric and gas efficiency improvement.~~	~~High~~	~~Provisional measure requiring better basis for savings and persistence.~~	~~2019~~

		~~Measure life / persistence~~	~~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.~~			

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
~~Lighting Forecast Subcommittee~~	~~To review available data and market forecast projections to estimate future baseline trends and appropriate mid-life adjustments.~~	~~TAC decision for v8 update included assumption that after EISA backstop, CFLs will not be available and LED savings go to zero.~~ ~~In addition, the deferred baseline for linear lamps being 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.~~	~~High~~	~~High saving measures and significant impact on lifetime savings.~~	~~2019~~
~~Income Eligible Lighting Subcommittee~~	~~To review available data and market forecast projections to estimate future baseline trends and appropriate mid-life adjustments specific to this population.~~ ~~Determine if Income Eligible sales in DIY, Warehouse and Big Box retail stores should apply same assumptions as other IE serving retail types.~~	~~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.~~	~~High~~	~~High saving measure~~	~~2019~~

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
4.4.16: Steam Trap Replacement or Repair	Savings verification Potential for useful heat regain, condensate return and other interactive impacts.	High volume/savings measure based on algorithm. V9 updates to multifamily low-pressure steam systems. There remains a need ~~Would be good~~ to compare the resulting savings with metered or billing – based savings. ~~VEIC understand that Kristofer Kisynski of Elevate Energy will be providing a white paper on this measure for v9.~~	High	Potentially high savings measure without real application grounding.	2016
4.5.4 LED Bulbs and Fixtures	Incremental costs	Rapidly changing market and costs are multiple years old now	High	High savings measure and key assumption for cost effectiveness	2017
4.5.10 Lighting Controls	NLC/LLLC savings and applications: kW controlled, ESF, costs	New addition to measure for networked lighting controls. Evaluation to support the savings and costs associated to this emerging technology.	High	Potentially high impact measure and limited evaluation.	2020
4.8.12 Spring-Loaded Garage Door Hinge	Savings Verification	A limited number of pilot projects currently form the basis of the savings. Lack of third party verification to validate deemed savings.	High	Potentially high savings measure without real application grounding.	2019
4.8.16 Commercial Weather Stripping	Rx savings per weatherstrip	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.	High	New very low cost measure that could easily become high volume measure.	2019
~~NOT YET ASSIGNED (Potential new measure): Installing New or Retrofitting Existing Commercial Coolers/Freezers with Doors~~	~~Default variables for algorithm, direct load/consumption values, and HVAC interactive effects~~	~~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.~~	~~High~~	~~This measure has high potential, both in reducing direct load consumption of existing coolers and freezers, but also has significant HVAC interactive effects.~~	~~2019~~
5.1.8 Refrigerator and Freezer Recycling	Regression equation	Last performed in 2014. Each year you would expect the efficiency of the units being retired to increase, and so savings decrease. Evaluation	High	Suggest considering reperforming regression equation as will be ~~5~~ 7 years since last study.	2017

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		should be repeated at regular intervals.			
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
Multiple HVAC measures	EFLHs	Residential EFLHs are based upon climate normal data that is increasingly out of date. Any evaluation effort that can help inform new assumptions would be helpful.	High	Impacts many measures. Climate is changing and should be regularly reflected in the TRM.	2020
~~5.3.6: Gas High Efficiency Boiler and 5.3.7: Gas High Efficiency Furnace~~	~~Baseline efficiency~~ ~~EFLH~~	~~Particularly furnaces – significant evidence that 80% is not a valid baseline. VEIC understand NTG committee was to review this issue and make determination as to if baseline adjustment is necessary.~~ ~~New methodology uses EFLH directly. Should consider new study to inform EFLH assumptions in appropriate sector categories~~	~~High~~	~~High impact measures~~	~~2015~~ ~~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. ~~Ongoing evaluation on key savings factors.~~	High	High impact measure and key assumptions for cost effectiveness	2017
5.5.12 Connected LED Lamps	SVGe default	Only aware of ~~2~~ 3 evaluations on technology with vastly different findings.	High	Could potentially become a significant measure especially as standard A-lamp LEDs are phased out.	2019
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 components other than attic insulation/air sealing.	High	Algorithms now have significant downward adjustments based on Ameren service territory only.	2014
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.	High	Assumptions of persistence levels, duration, and decay function affect cost-effectiveness and are likely to be significant. Peak	2016

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		Little information is currently available for peak persistence.		persistence should be better understood.	
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 could likely persist even under new building ownership.	High	No national information available, so impact is unclear; 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
~~4.1.7 Milk Pre-Cooler; 4.1.8 VSD Milk Pump with Plate Cooler Heat Exchanger; and 4.1.9 Scroll Compressor for Dairy Refrigeration~~	~~Efficiency of the existing compressor (8.0 EER)~~	~~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.~~	~~Low~~	~~These are newly added measures to the TRM and the assessment is that uptake may be relatively low.~~	~~2019~~
~~4.1.11 Commercial LED Grow Lights~~	~~Savings verification and HVAC interactive effects~~	~~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 in-depth study on the HVAC interactive effects will greatly assist the measure characterization as current waste heat factors are being drawn~~	~~Medium~~	~~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 support the transition of this measure and its variables to Illinois sites that can participate in this measure such as greenhouses and other~~	~~2019~~

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		~~from the unknown building type.~~		~~horticulture and floriculture applications.~~	
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
4.2.20 Efficient Dipper Wells	Baseline Annual Water Usage	Further evaluation will allow for appropriate deemed assumptions for a variety of commercial customers.	Low	Likely low impact measure	2019
4.3.1: Water Heater	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
4.3.11 Tunnel Washers	HotWaterReductionGallon	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.	Low	Currently a custom input. Unlikely to become a significant measure for some time.	2019
4.4.14: Pipe Insulation and 4.4.~~1~~2~~1~~4: 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
4.4.52 Hydronic Heating Radiator Replacement	Savings Verification	In principal, the savings characterization use sound engineering judgement. But looking at a building/system comprehensively could result in different savings as there may be interactive factors not being considered. An evaluation can also call into question the effectiveness of the testing requirements on identifying improperly functioning radiators.	Medium	Potentially high savings measure that could benefit from real-world application grounding.	2020

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
4.4.46 Server Room Temperature Setback	Savings factor and integration of server room temperature with fan power consumption.	Relatively old basis for savings factor would benefit from evaluation.	Medium	Measure was limited to maximum temperature adjustment of 95F but questions remain about potential savings and interactive effects.	2019
Commercial Lighting Fixtures	Reference tables with wattage and cost assumptions	Tables were based upon VEIC determined values for Efficiency Vermont. Evaluation of assumptions and appropriateness for Illinois could be performed.	Medium	While it would be a worthwhile exercise, review and evaluation may be lengthy to perform.	2017
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
4.8.5 High Speed Clothes Washer	Market/baseline study on existing equipment Savings verification and mid-life savings adjustments	Measure details savings for gas dryers only. Electric dryers and accompanied savings characteristics can be included if electric dryers have enough of a saturation in the commercial marketplace. Evaluate if an electric penalty should be applied for high speed clothes washers and if there are negative O&M implications for the measure.	Low	Potentially under-estimating market potential. Potentially overestimating annual and lifetime savings.	2020
4.8.19 Energy Efficient Rectifier	Savings verification: Load, waste heat impacts	New measure without the ENERGY STAR framework of Uninterruptible Power Supplies.	Medium	New measure with limited real world evaluation	2020
5.1.7 ENERGY STAR Room Air Conditioner	FLH_{RoomAC}	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

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
5.1.9 Room Air Conditioner Recycling	Capacity and EERexist	Based on assumptions of prior Federal Standard. Could easily be recorded and updated to reflect actual units being collected.	Medium	Expect to be lower participation than Refrigerator Recycling	2019
5.1.13 Income Qualified: ENERGY STAR Room AC	EFLH and baseline assumption for IQ participants.	Income qualified assumptions were made for this new measure that could use corroboration.	Medium	New measure with potential high impact.	2020
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.	~~Plan to move to~~v9 moved to ~~-~~technology based ~~rating~~ rather than product based rating ~~but requires additional products to be evaluated~~as additional product evaluation had not been forthcoming.	Medium	Any additional input to ~~move away from~~support technology based assumptions would be beneficial.	2017
5.3.8: Ground Source Heat Pump	Savings verification	Algorithms are very complex. An exercise to compare TRM estimates to actual would help strengthen the measure.	Medium	Potentially growing savings measure without real application grounding.	2017
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
5.7.3 Level 2 Electric Vehicle Charger	Base and Efficient standby power and Incremental cost	Power consumption and incremental cost was based on limited secondary and out of date information.	Medium	Likely a low savings measure but updated assumptions would improve measure	2020
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 to continue to review~~ing~~	Medium	Loadshapes generally have a smaller impact on cost effectiveness than coincidence factors applied to demand	2017

Measure #: Measure Name	Parameter Recommended for Evaluation	Reason for Concern in Parameter	Priority Level	Reason for Priority Assignment	Year added
		focusing on the most used loadshapes.		savings. Some key loadshapes improved ~~for v7 and v8~~in v7-9 TRM.	