Subcommittee Objectives & Timing

* What is in scope and not in scope for this white paper
	+ Try to focus on savings
	+ There are borderline items (data collection / permutations)
	+ There are off-topic but related items (measure life, cost effectiveness, NTG, …etc)
	+ Certainly all inter-related

Tom E – what are the uses of savings?

AA: Focus on savings methodologies for IOU measures, or POU-only measures. Document accurate savings for statewide approved measures. Savings fed into CE and other systems. Could be used for planning, potential & goals studies.

Measure Savings Methodology

* Categorization
	+ Compare to RTF categorizations as a reference
		- VALUE: new developers will need to make a conscience choice to do something different from the other approved measures.
	+ *Are these the "right" categories?*
		- *Align with RTF?*
	+ *Should the Study category be renamed/redistributed?*
		- Taking results from another source and using them without changing.
		- Randomized Control Trials (RCT)
		- DOE rulemaking / Energy Star regressions
		- ET Results
		- Custom Project Collections
	+ *Should other outliers be addressed (like modeled appliances)?*
		- Or further documented

Armen: Recommendation or protocol to follow particular methods?

AA: Intended to be guidance for first take so future measure savings are estimated consistently with other similar measures. Guidance based on historical but doesn’t have to be. Departures are OK. The best way might be a departure from what’s done today.

Modeled: no comments

Calc Tool: no comments

Calculated:

Appliances: Should we move away from more opaque to a more calculated method?

Jay M: Yes, especially if updates to modeling/MASControl approach is not supported. We shouldn’t ask 3Ps for transparency if IOU/DEER measures are not transparent. Agree that EAR team is working to be more transparent

Armen: Look at reason why it’s modeled. To what extent could the approach be changed and still account for reasons why it was modeled. If a small value, might be justified. Might be a case by case justification. If one method enables certain considerations and another method simplifies. Should be considered in decision to change approach.

Study approach

Martin: Hi Ayad, IPMVP and ASHRAE 14 are examples that provide guidance on sampling and data collection. Will these recommended calculation methods have guidance on minimum sampling rates or data collection periods for both baseline and measure case to calibrate energy models or for calculation approaches?

AA: Want to leverage on existing/standard guidelines. Not every measure is created equally. We want to be able to document values for HIMs in a more robust way. We need some way to understand how good the data is. The RTF has different ratings/categories for measures that dictates level of rigor. (Applies to cost too) How good does the best available data need to be?

Armen: Martin might be implying the minimal # of examples to utilize. Best available data definition could be different paths. Actual observations vs other data. From a direct measurement standpoint, the statistical sampling protocol .. best available while minimizing costs vs best available “reference”

AA: go back to this when we talk about sensitive variables, the risk associated with estimates and precision.

* Interactive Effects - Reduction in waste heat results in increased primary heating and decreased primary cooling consumption.
	+ Consistency
		- Review a general rule (>10%).
		- Basic question: How do we ensure that they are applied when we want them to be applied and not applied when we don't want them
			* Avoid false precision issues / over-complicating
		- *Can interactive effects be considered generally at the end use level?*
		- Related issue regarding interactions between measures.
			* Feedback on how to address for next meeting
	+ Simplifications (Examples)
		- Basic question: Is it worth trying to avoid false precision issues to drive simplicity?
		- Commercial Refrigeration
			* *How should modeled results be addressed?*
			* May need to model for each climate zone first to determine if needed.
		- Lighting
			* Before we get into calculation methodology to explain this, I wanted to ask the general question of if this is something to pursue (and under which conditions)
			* *NOTE: precision of Annual Hours is good: (pg 26 for # of loggers; precision pg 51)*
				+ *Hours of operation do have a large standard deviation / variation*
				+ *However, the calculated precision of this data is overall good (I have not seen it expressed by bldg type, just by IOU*
			* *How should calculated results be addressed?*
		- *What are the Guidelines that should be considered?*

**Interactive Effects w/ waste heat**

Jay Madden: 10% is a reasonable rule.

Adan: What is goal?

AA: Put # to what is significantly affecting measure. Drawing line to document if something is significant or not.

Tom Eckhart: Haven’t seen 10% used in recent years. It was helpful to have review of a measure if needed.

Adan:

Armen: Threshold for interactive effects to be included?

AA: Correct. 10% appears in several different places.

Armen: 10% across board might not be appropriate. Consider different % for HIM.

Adan: Agrees with Armen.

AA: Agrees with Tom – guideline to look into it more. Perspective of risk to the portfolio is an important consideration.

Vrushali (chat): 10% of EUI?

AA: 10% of savings

Bob R (chat): Depends just as much (maybe more) on the uncertainty as the value: IHVAC for commercial is pretty certain but IHVAC in residential not so much. (A residential HVAC system may simply not be turned on.)

Armen: Add criteria if IE has high variability relative to other characteristics. So look at magnitude but also variability.

Chas: Evaluation framework provides guidelines on uncertainty (caenergyefficiencyevaluationprotocols 2006.pdf).

**Interactive Effects between measures**

Should this be another guideline?

Armen: stipulates bundling of measures in a particular application.

AA: bundling gets really complex. We have some today: Package units can have controls for economizers, etc.

ACT: discuss next week to frame to specific guideline

**Simplify interactive effects:**

Examples where simplification can apply

Commercial Refrigeration Example

Jay Madden: Commercial refrigeration – can predict some ahead of time, but will not know until after. CR007 know it will be weather dependent. Separate CZ are needed.

Interactive effects refer to interaction between systems? This slide refers to the same system?

Armen: Good point. Interaction within the system should already be accounted for in the calculation itself. Do we want to differentiate that at all?

Martin: Jay and Armen good points. Jay is correct. Lighting reduce AC load. For refrigeration – impacts on AC. Armen is referring to historical point, widget, when every measure is separate (QI measures). Savings of measures added on are not necessarily additive. Both relevant topics, should be considered separately.

Armen: Graphs showing results to provide insight if measure is weather sensitive or not. If methodology is the same, OK. Make clear that results of clustering are not result of how calculation is framed. Might get false impression/clustering.

AA: Powers of modeling tool – prototypes, consistent methodologies. How to frame Armen’s point so we are looking at the weather considerations more consistently. Recommendations?

Armen: Narrative to describe the methods would be appropriate. Analysis can be done if considering switching methods. Compare w/ and w/out weather considerations.

BobR: Also HIM consideration.

Lighting Example

Armen: Need to consider expected volume. Hone in on operating hours because more variable.

Andrew Parker: Operating hours as input. Savings per operating hour – the band changes.

Armen: Have an understanding of distribution.

Andrew Parker: if plotted bell curve, pick more conservative spot on the curve to calc savings. Can offset precision lost.

BobR: From ex post perspective – it’s all about risk. How close does the IOU want to get to real rate of 1.0? If the values are available for building type, the EM&V team will use the detailed values not the average/simplified approach. Actual participant mix is going to add some risk already.

Armen: yes, that’s the trade off.

BobR: HIM also.

AndrewP: Building type is proxy for op hours. Not crazy to say let’s acknowledge that and pick something more conservative.

BobR: Consider rebates too, if rebates based on savings.

Armen: a lot of this depends on how administer program. Methodologies get determined .. collecting onsite data vs deemed assumption/value. Deemed values – represent population. Consider hybrid instead of wedging into deemed.

Summary points:

1. Consideration – if simplification made, important to remember detailed values used in EM&V
2. Looking at distribution, if wide consider choosing more conservative rather than average to hedge against some of the variation.
3. Simplification might not be approach to HIM

Andrew P: Reason to use modeling if doing many other measures, if already using 1 tool with all assumptions, it may be easier to keep in same calculation approach rather than mixing methods.

Armen: good point. Method might be determined by convenience and consistency.

Is there value in combining CZ values or keeping them separate?

AndrewP: value in simplicity

Armen: counter. Many measures in same system, might as well do the same for all measures. It might be problem if tracking systems are set up to consider CZ, can establish for other measure.

Documentation

* Inputs and Outputs
	+ *Review approach to ensure that we are clear on how this is done.*
		- *How to document is not explicit*
		- *Modeled - does not yet state "Hourly results"*

CD Nayak: End use reporting is important.

BobR: Some work re: load shapes. Eventually to TDV as well. Will be more emphasis on load shapes. Guidance coming out in the future.

Martin: Will workpapers need to specify that loadshape? SW template does not have loadshape.

BR: In DEER scoping memo, what guidance is TBD.

Ayad: Can document load shape in energy savings section. Currently specify loadshape for permutations. There can be different shapes, guidance appreciated.

BobR: Suggestions – to Jessica Allen, CPUC.

AA: Value documenting inputs varies by methodology. Guidance for how to do that in measure characterization. Need to document how IE are applied.

Armen: For study type, an area where there is a documentation gap. Studies vary widely, need minimal requirements. Ex: What data to collect in the first place. If pursuing a study, here’s the information you want to collect and document …

* Sensitive Variables
	+ Understand which permutations will be more cost-effective
	+ Identify evaluation variables
	+ *What is the best way to document sensitive variables (list or visually)?*
		- *Range of values, typical values, 1 std dev?*
	+ *Is there a systematic way to evaluate risk of measures?*
		- *Are there more reasons for doing this?*
* **Documenting Sensitive Variables**
* Only one measure sensitivity analysis was documented.
* What variable drive savings?
* What is the best way to document sensitivity analysis and key drivers?
* Armen: tornado charts are revealing. Each study would have to make judgement on this. Guidance on factors to look into.
* Martin: Guiding documents (IPMVP, etc.) to determine what is acceptable data collection.
* AA: How do we take sensitivity analysis and use it?
* Armen: If new technology, difficult to determine up front, with big assumptions.
* AA: Evaluating risk for a new measure may need to be “provisional” w/ short term life and data will be collected to refine assumptions.
* Armen: Need guidance for measure developers on what variables to include in analysis.
* Data Collection
	+ NOTE: I thought this draft guideline was borderline to be included as a savings methodology best practice. Ultimately, I felt that it described a way to justify a streamlined methodology for certain types of measures.
	+ *When does it makes sense to include Program Data Collection?*
		- *AOE - existing conditions = to code*
* Permutation Number
	+ *When and how should permutations be collapsed?*
	+ Help program designers understand which measures are most valuable

High Impact Measures

* *Should there be additional considerations for HIMs?*