MEASURE DECAY in EVT FORECASTING

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REPORTING:

Efficiency Vermont (EVT) tracks and reports annual incremental savings (MWh, winter coincident peak kW savings, summer peak kW savings) for measures installed during a specified reporting period.

EVT also reports cumulative *ADJUSTED* annual savings (MWh, winter coincident peak kW savings, summer peak kW savings) in the EVT Savings Claim Summary and the EVT Annual Report. These reflect savings for measures that have not expired during the reporting period and exclude savings for measures that have reached the end of their lifetime. The measure life values are negotiated with the Department of Public Service and documented in the EVT Technical Reference Manual (TRM). The measure life values differs from the Effective Useful Life[1] (EUL) of a measure in that the measure life is based upon an EUL model adjusted, e.g. shortened, to recognize the reduced economic benefits resulting from the implementation of new appliance standards and/or codes. Thus, *ADJUSTED* annual savings as reported in the EVT Annual Report do not accurately reflect the measure's longer-term grid effects.

The chart below demonstrates the percent of EVT savings reduction (due to measure decay) for measures installed during the 2000-2010 period.

	EVT Decay Rates									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Summer Peak kW Savings	0.35%	0.38%	0.42%	0.77%	1.32%	2.75%	4.97%	8.36%	10.52%	12.97%
Winter Peak kW Savings	0.41%	0.34%	0.28%	1.03%	1.54%	3.07%	5.34%	7.55%	8.95%	10.81%

FORECASTING:

In the Demand Resource Plan (DRP) forecast, the following methodology was used when a measure's life expires.

For the Residential sector forecast, measures that have expired are captured in a 'measure mortality' calculation. Each year, a certain amount is assumed to decay and thus need replacement. These replaced measures are added to the pool of new measures for a total count of the measure that would be replaced in a home each year. A savings reduction can also be attributed to baseline changes in the middle of a measure's life. That is, a *baseline* replacement measure may shift to a higher qualified measure in which case a reduction in savings is recorded even though the life of the measure has not expired.

Comment [t1]: I would like to discuss this further. I think the adjusted annual savings might reflect the measure's longer-term grid effects, and the measure life might be recognizing not only the reduced economic effects, but the reduced grid effects. For example, EVT encourages installation of a 13W CFL in 2019, replacing a 60W incandescent. The 60W incandescent, with an engineering rated average lifetime of 1 year, needs to be replaced again in 2020. However, in 2020, because of EISA standards, the only bulb available to purchase is 13W. So, if nothing happened, the consumer would have had a 60 W bulb for 1 year, then a 13W bulb in 2020. The effect on the grid is the one year of savings. *Importantly, this assumes that the underlying forecast incorporates the 13W bulb being put into effect.*

One other note – I would characterize the measure life values being engineering estimates based on testing by Energy Star and other. The application of these engineering estimates are discussed by the EEUs and the PSD. Would you agree?

Comment [CH2]: This assumes someone is not installing a horded incandescent in 202 0 or a specialty bulb that uses more energy than a standard cfl.

I would agree with your last paragraph.

Comment [t3]: I'm not sure I understand this table. Discussion at the meeting would be helpful.

Comment [CH4]: Sure, we can discuss Thursday. This illustrates % adjusted savings (for measure life) to non-adjusted savings

[1] The Effective Useful Life (EUL) of a measure is the median number of years that the measure installed under the program is still in place, operable, and providing savings. (CA 2006 Energy Efficiency Evaluation Protocols)

For savings in the C&I sector forecast, VEIC assumes that, at the end of a measure's life, a new efficiency measure is installed to replace the measure whose life has expired. A measure's future savings are reduced to account for changes in codes and standards.

Comment [t5]: Is this reduction done by adjusting the measure life or another way?

Comment [CH6]: Adjusting measure life.

From a cost-effectiveness perspective, measures that have reached the end of their economic or measure lifetime are no longer included in the forecast of cumulative efficiency savings. If one combines, e.g. subtracts, this reduced estimate of efficiency savings from a base load forecast, the resulting forecast could overestimate load growth. That is, from a load forecast framework, the impact on load does not change because the economic value of the measure has expired. The load is only affected when the EUL expires.

The most dramatic illustration of the error of using the measure life versus the EUL to forecast efficiency effects on load growth occurs in 2020. In this case, the federal lighting standards taking effect in year 2020 ~~lighting standard~~ requires lighting efficacy levels equivalent to CFLs mandatory (effectively making~~es~~ the sale of current efficacy ~~inefficient~~ incandescent bulbs illegal). For EEU savings claims, ~~T~~this has the effect of ending the economic measure life of most CFL replacements that will have been installed over the last several years resulting in a dramatic reduction to year 2020 cumulative energy savings. Adjusting the base load forecast by this estimate of efficiency savings results in an increase in projected load growth, the opposite effect if one uses the EUL to determine efficiency savings. That is, from a load forecasting perspective, the EUL of the CFLs has not been dramatically shortened due to this change in standard, and thus there is no sudden decrease in cumulative energy efficiency savings.

Comment [t7]: Is it possible, then, to report savings for purposes of grid impacts, using EUL as the measure life, instead of the economic (A better term might be regulatory) measure life? Would that help, or create double counting the other direction if some or all of the EISA standards impact are counted?

Comment [CH8]: Good question and discussion point for Thursday's meeting.

Comment [t9]: Does EVT have a number for the magnitude of savings in kW or kWh? That would be helpful to frame the conversation.

Comment [CH10]: In the DRP forecast, RES annual incremental savings drop by 1% from 2019 to 2020, C&I by 12 % and overall combined by 8% (9,000 MWh). Overall (Res and C&I) cumulative energy savings drops by 4% from 2019-2020 (30,600 MWh).