October 9, 2013 Webinar

A Layer Cake of Benefits: Recognizing the Full Value of Energy Efficiency

Q: Interesting. But could you elaborate what is system versus weatherization load factor? [Brian Kauffman]

A: "System Load Factor" meant an energy efficiency measure with the same savings shape as the overall system load factor. "Weatherization load factor" meant the savings shape associated with weatherization of electrically-heated residences. Because the Northwest is winter-peaking, weatherization provides very large peak capacity benefits.

The table below shows the load factor data relied on in the Sixth Power Plan for valuing energy efficiency capacity benefits:

End Use Load Factors				
END-USE	Bulk Power System Extreme Winter Peak	Bulk Power System Winter Peak	Bulk Power System Summer Peak	Group Diversified Peak Load Factor
ResCOOK	0.70	0.92	1.23	0.12
ResDRY	1.43	1.24	0.75	0.24
ResWASH	0.82	0.95	0.75	0.22
ResFRIG	1.12	1.15	0.90	0.66
ResFRZR	1.48	1.36	0.86	0.49
ResLIGHT	0.67	0.73	1.11	0.40
ResDHW	0.65	0.38	1.06	0.29
ResSpHtHP	0.13	0.25	1.23	0.16
ResSpHtHPZ1	0.13	0.25	1.23	0.16
ResSpHtHPZ2	0.13	0.25	1.23	0.16
ResSpHtHPZ3	0.13	0.25	1.23	0.16
ResSpHtFAF	0.18	0.22	2.08	0.19
ResSpHtFAFZ1	0.18	0.22	2.08	0.19
ResSpHtFAFZ2	0.18	0.22	2.08	0.19
ResSpHtFAFZ3	0.18	0.22	2.08	0.19
ResSpHtBB	0.18	0.27	8.93	0.24
ResSpHtBBZ1	0.18	0.27	8.93	0.24
ResSpHtBBZ2	0.18	0.27	8.93	0.24
ResSpHtBBZ3	0.18	0.27	8.93	0.24
ResSHWX	0.17	0.25	2.57	0.21
ResSHNEW	0.15	0.24	3.52	0.18
ResWACZ1	12.00	12.00	0.58	0.17
ResWACZ2	12.00	12.00	0.58	0.17
ResWACZ3	12.00	12.00	0.58	0.17
ResWACPNW	12.00	12.00	0.58	0.17
ResCACZ1	12.00	12.00	0.58	0.17
ResCACZ2	12.00	12.00	0.58	0.17
ResCACZ3	12.00	12.00	0.58	0.17
ResCACPNW	12.00	12.00	0.58	0.17
ResOTHER	0.74	0.84	0.94	0.45
ResTTL	0.32	0.40	1.91	0.31
FLAT	1.00	1.00	1.00	1.00
SysLOAD	NA	NA	NA	0.51
VendContrl	NA	NA	NA	0.17
IrrgAGR	12.00	12.00	0.87	0.30
ExCOMM	NA	NA	NA	0.48
NewCOMM	NA	NA	NA	0.51
ComLight	NA	NA	NA	0.54
SIC20	NA	NA	NA	0.48
SIC24	NA	NA	NA	0.60
SIC26	NA	NA	NA	0.54
DSIAlum	NA	NA	NA	0.57
Load Factor (LF) - Ratio of average energy for the year (annual kWh/8760) to peak demand. Load factors are computed for each time period defined above. Load factors can be greater than 1.0 when the coincident demand for the time period is lower than the average yearly demand.				

Q: What would be an example of a damage cost for mercury? [Janine Migden-Ostrander]

A: Responded to by Ken online. People in the U.S. are primarily exposed to mercury when they eat fish and shellfish that contain methylmercury. According to EPA, the primary health effect of methylmercury for fetuses, infants, and children is impaired neurological development. Methylmercury exposure in the womb can adversely affect a baby's growing brain and nervous system, impacting cognitive thinking, memory, attention, language, and fine motor and visual spatial skills. Symptoms of methylmercury poisoning may also include impairment of the peripheral vision; disturbances in sensations ("pins and needles" feelings, usually in the hands, feet, and around the mouth); lack of coordination of movements; impairment of speech, hearing, walking; muscle weakness; and in very severe cases, death. (See http://www.epa.gov/hg/effects.htm for additional information.)

Q: Question for Q&A: When should a state select to use the Societal test rather than the TRC test? [Josh Craft]

A: This was answered online. At a minimum, states SHOULD at least consider all costs and benefits within the state, which is a partial societal cost test. Ideally, states should consider ALL costs and ALL benefits, meaning a full societal cost test.

Q: There is an error on page 24 of the report. It says that VT doesn't include income low income impacts. Our screening includes an NEB adder for low income. (Ingrid Malmgren) [Greg Fanslow]

Q: Just to clarify it's an ADDITIONAL 15% adder to the 15% NEB adder, so the total NEB for low income would be 30%. (Ingrid) [Greg Fanslow]

A: We appreciate the correction from VEIC.

Q: Could the presenters speak a bit more about which of these benefits should be considered in integrated resource planning and which should be considered when using cost effectiveness tests to determine the best mix of EE programs within a particular resource plan?[Nick Dahlberg]

A: *All benefits should be used in screening measures within an IRP, so that the optimal measures are selected in determining the best mix of EE programs within a resource plan. There is a sound argument for limiting utility-paid incentives to no more than the utility-system, which is why we recommend recruiting partners from outside the electric or gas utilities, such as water, sewer, and health providers.*

Q: How does Vermont quantify NEB for e.g. externalities or health and social benefits? Is there a standard for doing this? [Surya Swamy]

VEIC responded: A: This is Ingrid, I can briefly respond to the NEB quantification question for Vermont. There are a number of ways to measure and quantify Non-Energy Benefits, including participant surveys, valuation from existing programs and literature, in addition to other methods. In Vermont, we examined the research regarding NEBs as well as looked at how other states quantify them. We chose to use an adder, which is not super precise

(it most likely undervalues the benefits), but was relatively inexpensive to determine and is a widely used option in other jurisdictions. [Greg Fanslow]

Q: On this topic, can you provide any examples where comfort was valued and counted in the cost benefit calculation [Jan Harris]

A: This was answered online, with Vermont's specific recognition of difficult-to-quantify non-energy benefits being identified. Other examples include the Washington low-income weatherization evaluation. The Northwest Power Act originally required consideration of quantifiable environmental and social costs and benefits; this was simplified to quantifiable environmental costs plus a 10% conservation credit, which is a bit vague, but comfort falls in the category of social (as opposed to environmental) benefits. A big part of this may be health, however, and that's separately quantifiable.

We suggest you look at:

Skumatz, Lisa, M. Sami Khawaga, and Richard Krop. Non-Energy Benefits: Status, Findings, Next Steps, and Implications for Low Income Program Analyses in California. Prepared for Sempra Utilities, May 2010.

Q: Question on intra-program effects: how does test scope (i.e., UTC vs SCT) impact the relative benefit:cost ratio of sector-focused programs (i.e., residential vs. commercial vs. industrial)? [Nate Aden]

A: Including additional benefits (in the TRC and SCT) will improve the benefit:cost ratio. Excluding some costs (in the UCT) will improve the benefit:cost ratio, but the UCT benefit:cost ratio is really meaningless, because the utility is not actually a funder of these measures – they are funded by consumers through a system benefit or similar charge, and excluding the participant co-funding makes no sense at all. Basically, the only thing that the UCT measures is whether the utility revenue requirement goes down. Under that test, it's always cost-effective for the electric utility to pay a customer to switch to gas (since the substitute energy costs will not appear in their revenue requirement), and for the gas utility to pay a customer to switch to electricity for the same reason. Neither of those measures makes the customer or the society (the parties paying the bill) better off.

Q: Are there any measured, monetized benefits related to HVAC equipment lasting longer in a home that has been properly retrofitted compared to a non-retrofitted home? [Ely Jacobsohn]

A: REALLY good question. Presumably a furnace or heat pump will have fewer run-hours per year, and if a good thermostat is installed at the same time, will have less cycling. Both should extend lifetime. I'm unaware of any analysis of this.

Q: What is the title of the paper he is referring to? [Jan Harris]

A: The paper is called Recognizing the Full Value of Energy Efficiency.

Q: Shouldn't we also be looking at the benefits of demand response and customer generation? For example, recent research shows that the DR benefits of electric water heating are probably greater than the EE benefits of switching to gas.[Joy Morgenstern]

YES. I mentioned at one point that most of these benefits applied equally to demand response (DR) and renewable energy. I did not mention customer generation, but that is also true, subject to the fuel impacts of customer generation. The DR benefits of grid-integrated water heaters are indeed very substantial, but the comparison between gas water heaters, heat pump water heaters, and grid-integrated electric resistance water heaters is very complex, and deserving of a lot of detailed research. Interesting that this question is coming from California, where the electric water heater saturation is among the lowest in the country; it's the REST OF US who should really be focused on this. I'll note the PLMA (Peak Load Management Alliance) is having a half-day workshop on this on October 31 in Atlanta, on the tail of their annual meeting.

Q: Clarifying question on the calculation of CO2 costs based on 25% likelihood of legislation: I understand using $2 for the allowance cost, as the price is either $8 or $0. Could you explain why the societal damage component is $60? Under the 75% likely 'no legislation' scenario, the cost is $80, but why is the cost assumed to be $0 under the 25% likely 'legislation' scenario? Thanks. [Jordan Stutt]

A: The assumed mitigation cost of $8 x 25%, plus the assumed damage cost of $80 x 75% = $62. That is the weighted societal cost value – a 25% chance of mitigation costs being incurred, plus a 75% chance of damage costs being incurred. Under the UCT/PACT or TRC tests, the valuation would have stopped at the $8 x 25% figure, or $2.

Q: Thank you so much! Love the pinwheel [Holly Meyer]

The full proceedings of the IEA conference are available at:

http://www.iea.org/media/workshops/2012/energyefficiency/WorkshopSummary.pdf