Life After Lighting

How Utilities Should Retool Their Energy Efficiency Portfolios

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Tom Crooks
Ed Schmidt

Life After Lighting: How Utilities Should Retool Their Energy Efficiency Portfolios

By Tom Crooks and Ed Schmidt

Two-thirds or more of the savings from residential energy efficiency ("EE") programs and a similar proportion of commercial and industrial ("C&I") program savings are from general service lighting ("GSL" or common screw-in bulbs). Consequentially, the fate of the technology is never far from the minds of utility EE staff given federal efficiency standards and otherwise rising baselines. Recent actions by the U.S. Department of Energy ("DOE") once again opened consideration of the Energy Independence and Security Act of 2007 ("EISA") standard and its 45 lumen per watt ("lm/w") backstop provision, applicable to GSL, that was triggered in 2017 to become effective in 2020. On May 25th, DOE issued a Request for Information on the availability of screw-in lighting products that meet the 45 lm/w minimum in order to assess its appropriateness. On August 19, a Notice of Proposed Rulemaking ("NOPR") resolved a hotly debated question about whether "specialty bulbs" are exempt from the EISA backstop provision by declaring them to be GSL in a reversal of actions of the Trump Administration that granted them exemption. The recent federal activity presents a timely opportunity to address the standards-setting process by speaking to the GSL situation, and to share observations from MCR's current work on the future of lighting and EE programs in general. Prospective changes to baselines affect not only residential programs, but also those serving C&I sectors.

The current federal action presents a timely opportunity to address the standards-setting process.

DOE Standards Setting Process

There is often some mystery to the process by which federal minimum efficiency standards come to be, and whether such standards are the "end all and be all" of EE program baselines that EE savings are counted against. First, and in general, an EE baseline is either the federal minimum efficiency standard or the efficiency level evaluation, measurement, and verification ("EM&V") of EE programs determined by surveys and other analyses to be dominant in the market, whichever is more stringent.

DOE standards are set in one of two ways:

1) They are written into legislation prescriptively, as in the case of the EISA 45 lm/w backstop.

2) They arise out of a defined rulemaking process.

The legislative path is conceptually straightforward. The rulemaking process is in some ways akin to a utility's EE plan filing process: It can be long and drawn out like a fully adjudicated contested filing, or it can be accelerated by a consensus agreement of the parties through stipulation of settlement. Assuming the path of a fully adjudicated contested filing, a simplified four-step process ensues with a framework, preliminary analysis, NOPR and final rule.

Legislation often directs and informs how complex the rulemaking becomes.

The General Service Lighting Saga

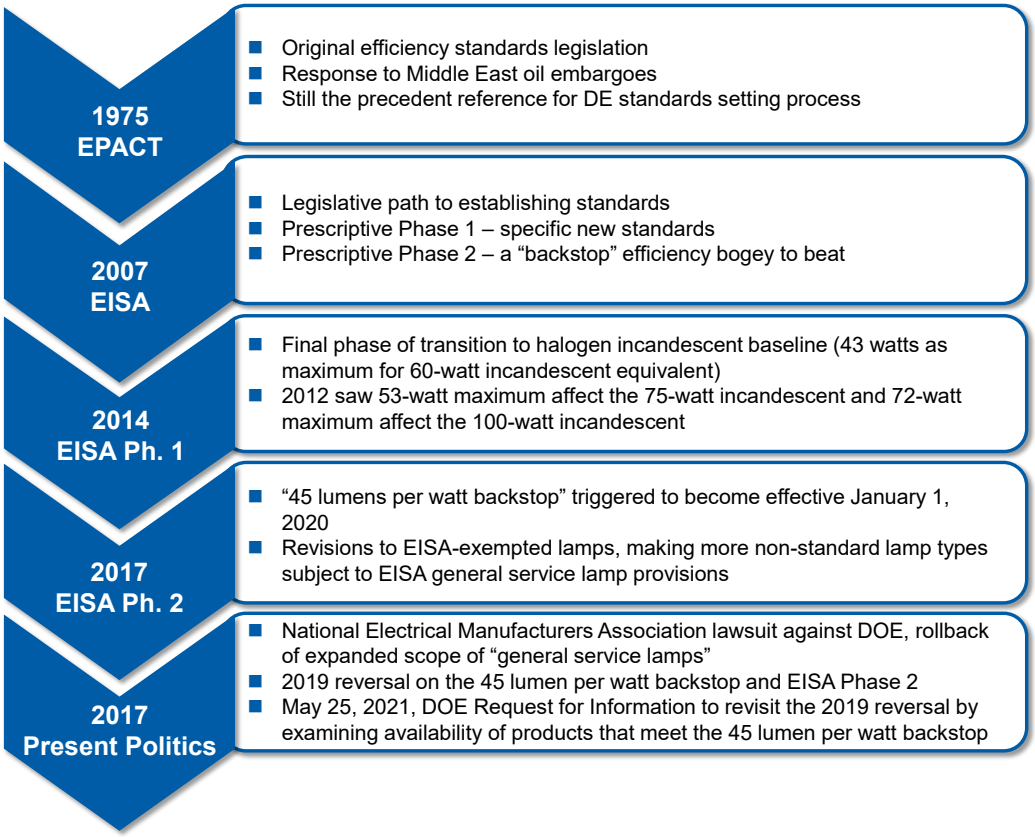
The situation with GSL aptly illustrates how the rulemaking process can be complicated beyond the simplified four-step process. Legislation often directs and informs how complex the rulemaking becomes. For example, the process can entail the establishment of test procedures, data collection activities, public meetings, Advanced Notices of Proposed Rulemaking ("ANOPR"), Notices of Data Availability ("NODA" or other data collection efforts), Supplemental Notices of Proposed Rulemaking ("SNOPR"), Notices of Proposed Determination ("NOPD"), etc. Many of these steps, in addition to a lighting industry lawsuit filed by NEMA (the National Electrical Manufacturers Association), have played out since the 45 lm/w backstop was triggered in 2017. Figure 1 on the next page shows a high-level timeline of standards-related activity affecting general service lighting.

As residential lighting retrofits move from incandescent lights to CFLs to LEDs, the savings and the cost-effectiveness are all but gone.

Where Are We Today?

In many states, EM&V has concluded that regardless of federal standards, the market for GSL is largely transformed and therefore the baseline against which lighting savings must be calculated is now roughly equivalent to a compact fluorescent lamp ("CFL"). Taking the ubiquitous 60-watt incandescent bulb, for example, the 2014 EISA baseline level of 43 watts is a halogen bulb of equivalent lumen output to the 60-watt incandescent, the CFL is 13-15 watts, and an LED can be 9-12 watts. The point is that if residential EE programs get two-thirds or more of their savings from lighting and the "delta watts" savings that once retrofit a 60-watt incandescent bulb to a 15-watt CFL can now only retrofit a 13-watt CFL to a 10-watt LED (at best), then the savings and the cost-effectiveness are all but gone. And there is a market issue as well: CFLs are almost impossible to find at retail anymore. So, a reasonable question

Figure 1: High-Level Timeline of GSL Standards Activity



to ask is, "Is the CFL an artificial baseline, making the 10-watt LED the true baseline since halogen bulbs do not meet the 45 lm/watt backstop?

The May 25 action by DOE to reopen the EISA rulemaking on GSL may serve to begin the institutionalization of what the EM&V community already imposes upon EE programs in many states as a federal standard. Namely, the screw-in lighting market has transformed; and since CFLs are virtually non-existent in the market, LEDs have become the baseline. Given the realities of the market and the findings of EM&V, the bottom-line for EE planners is that lighting savings as we knew them are gone or, will be within a few years depending on where in its "EE program cycle" a particular utility is today. Likewise, the rise of LED fixtures, retrofit kits, and plug & play TLED lamps in the C&I segments is having a similar, though not as drastic effect on the availability of savings from lighting in the C&I markets.

What Should EE Programs Do?

MCR recommends utilities consider the following as they retool their portfolios for "life after lighting:"

- Emphasize direct installation programs for lighting technologies that remain viable; target those segments (e.g., low-income

residential and small business) that otherwise would run existing lighting as long as possible; and leverage stockpiled or otherwise obtained legacy technologies.

- Continue to promote eligible lighting technologies (such as reflectors and globes) through upstream delivery channels before the Rule in the August 19, 2021 NOPR becomes effective, and especially those, such as fixtures, that are unaffected by the EISA backstop despite the August 19, 2021 NOPR.
- Increase availability and prominence within the EE portfolio of behavior-oriented programs, including not only "home energy reports," but various types of price-response and power supply status-response.
- Consider, pilot, and eventually launch at scale altogether new EE programs that are data-driven and reliant on strong back-office procedures, data systems, and data management to measure savings (e.g., whole building measurement that includes programming of internet-connected lighting controls).
- Consider, pilot, and eventually launch at scale emerging types of programs at the nexus of renewable energy, energy storage, demand response, and energy efficiency (e.g., use of batteries to offset peak in pockets of high-demand growth on the local distribution system while also providing peak/off-peak energy arbitrage opportunities).

Utilities can take action to field effective and cost-effective EE programs even as codes, standards and baselines evolve.

By taking into consideration and executing some of the five actions above, utilities will be prepared to continue fielding effective and cost-effective EE programs going-forward even as codes, standards, and baselines evolve.

MCR's Approach to Pilots

MCR's Approach to Energy Efficiency Pilots & the Questions It Addresses

Design

- What are the objectives of the pilot? What are the measurable hypotheses to be tested?
- What is the overall test design?
- How long will the pilot last?
- How will the pilot be funded?

Administration

- What internal organizations need to be engaged?
- What customers, if any, need to be involved and how will they be engaged?
- Which stakeholders need to be kept informed; which have approval and/or veto authority?
- How will the pilot be managed? What resources will be used?

Analysis & Reporting

- What data will be collected and where will it be stored?
- What analytics will be run?
- How will the data and results be verified?
- How will the results be assessed?
- What decisions will be made from the assessment?

Example: Using Batteries to Support EV Charging

DESIGN: MCR designed and now coordinates and analyzes a multi-year EE-funded pilot to explore utility-owned and dispatched batteries as a solution to the emergence of large pockets of electric vehicle charging load. This pilot is testing the following hypotheses:

1. Battery systems can be a cost-effective EE measure per the Total Resource Cost ("TRC") test and thus be leveraged.
2. Battery systems can be safely and effectively deployed and operated on the utility's distribution system.
3. Battery systems can improve load factor on those parts of the utility grid to which they are connected by offsetting demand for power from the grid.
4. Battery systems can enable material energy cost arbitrage by charging off-peak and discharging on-peak.

ADMINISTRATION: MCR is assisting our client with identifying all internal functional areas that need to be involved and engaging them. We co-manage the pilot with the client's product development team.

ANALYSIS & REPORTING: MCR developed the required data queries of AMI and other data, manages the data in its secure cloud environment, and performs the required statistical and cost-effectiveness analyses. We lead reporting of progress and analytic results to the regulator and external stakeholders.

About MCR's EE Practice

The Energy Efficiency practice provides support to IOUs, municipal utilities, and G&T cooperatives. Our services include:

Strategy & Program Design

- Energy efficiency strategy
- Program planning and design
- Pilot planning and design

Process & Data Management

- Operational process improvement
- Data management, modeling/analysis, and reporting
- Stakeholder interface and communication management

Program Implementation

- Program management
- Program development
- Pilot administration

Key Staff

Tom Crooks
(530) 313-3384
tcrooks@mcr-group.com

Tom is a Vice President of Energy Efficiency at MCR has more than 35 years of experience in the energy industry serving in diverse capacities beginning with technology manufacturing, leading to energy utility planning and governmental research. In these areas, he provided services under contract to state commissions, electric utilities, transmission system operators, local governments and large end-users located throughout the United States and Canada.

Ed Schmidt
(203) 427-1115
eschmidt@mcr-group.com

Ed is a Director at MCR with 30 years of experience in energy efficiency and resource planning, forecasting, rates and regulation in gas and electric utilities as well as brief tenures at an energy/environmental advocacy non-profit and as an indigent healthcare social services provider. His utility expertise includes all aspects of energy efficiency program policy, planning, program design and implementation, as well as utility regulatory policy analysis and testimony in support of rate, forecasting and EE matters.

Contact Information

MCR PERFORMANCE SOLUTIONS
www.mcr-group.com
847-562-0066

155 N. Pfingsten Rd., Suite 155
Deerfield, IL 60015