WHITE PAPER

Standing At the Crossroads of Residential DSM Lighting Programs

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Key Findings

- The Energy Independence and Security Act (EISA, 2007) continues to affect predictability of utility DSM planning.
- The CFL is on its way out.
- LED market volatility is a challenge for planners and program sponsors.
- Program sponsors should take a page from Wall Street – market disruptions bring risks and provide opportunities:
  - **Risk:** Allowing lower cost, lower quality LED products to gain too much shelf space and market share will lead to further erosion of DSM portfolio performance.
  - **Opportunity:** Out-of-the-box thinking can improve program cost effectiveness.

Introduction

Retail-based lighting programs have been the traditional workhorse for the energy efficiency industry for nearly a decade, contributing between 60% and 80% of savings for the majority of demand side management (DSM) residential portfolios nationwide. As a result, the implementation of EISA and its impact on utility DSM portfolios has been a dominant conversation of late. The effects of EISA have been widely felt, with nearly 30% year-over-year reductions in the claimable savings for lighting measures. This reduction in savings has led to an erosion in portfolio level cost effectiveness and leaves many utilities battling to manage their costs of acquisition for energy savings.

The reduction in savings is further exacerbated by price volatility in the LED market. Prices for ENERGY STAR® qualified LEDs dropped substantially in 2015, making the DSM modeling forecasts that were used to drive program decision-making during even more recent planning cycles irrelevant.

The market entry of non-ENERGY STAR® qualified LEDs—with price points that rival CFLs—also plays a significant role in the future of programs, as customers vote with their wallets and retailers shift shelf space to these faster moving, inexpensive products. These products differ from ENERGY STAR® qualified lamps by having shorter lives, weaker warranties, and sometimes lower lumens per watt. These differences could impact consumers' perceptions on the quality of the entire LED market.

The balance of this white paper will discuss the still pending decision related to EISA that will impact the lighting markets overall, the LED market more specifically, and how price reductions in this category will affect DSM programs.

Change is here, but by remaining nimble and through active involvement, lighting programs will remain a certain, cost effective source of savings for years to come.

Energy Independence and Security Act (EISA, 2007)

In 2017, the U.S. Department of Energy (DOE) is expected to finalize a rule for general service lamps that will continue to raise efficiency levels. The implementation of standards for common wattages is complete, but the full execution of EISA remains in process, and there are potentially significant impacts to come. Of specific interest to DSM programs will be the finalization of the rule that requires any and all general service lamps to meet a minimum efficiency standard of 45 lumens per watt [1]. DOE continues to work on compliance with this EISA requirement and how it will play out is yet to be seen. If DOE is successful in establishing a rule by the deadline, ICF would expect to see a further reduction in savings attributable to lighting programs and continued erosion in program cost effectiveness (if utilities maintain the status quo with their deployment strategies).

ICF is continuing to monitor DOE's rulemaking and will provide additional analysis after DOE publishes its Notice of Proposed Rulemaking in December 2015.

The CFLs Last Stand

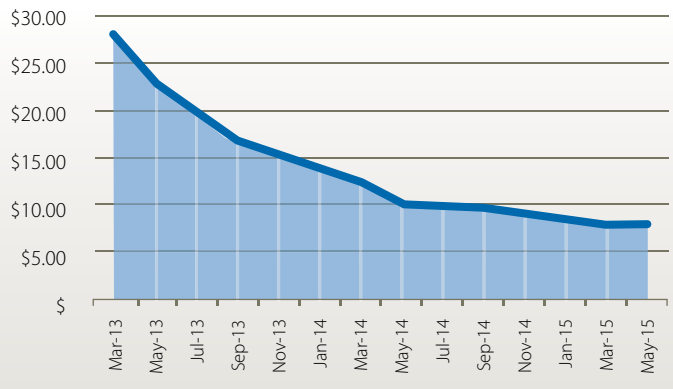
The CFL lamp has been the backbone of lighting programs for close to 10 years, but the frank reality is that CFLs are likely to become obsolete in the next year. Many program sponsors will no longer include the CFL in their measure mix after 2016, and retailers have indicated that they have little desire to sell CFLs after 2015. Ultimately, the DOE rulemaking may set efficiency levels so high that the majority of CFLs may be eliminated after January 2020.

The industry is at a critical transition point. Leaders and stakeholders will need to adapt and change so that lighting programs can survive the reality of the market as it continues to rapidly evolve. The time to invest in the transition from CFLs to LEDs has come. CFLs have made their last stand.

The Rapidly Evolving LED Market

The LED market is dynamic and in a rapid state of change. Prices are dropping with astonishing speed, the number of choices available to consumers on store shelves is increasing, and non-ENERGY STAR® qualified lamps are appearing in more retailer product line-ups. The drop in LED prices has been significant over the past few years, going from an average of $26/bulb in 2013 to $8/bulb today (Figure 1). Despite this substantial decrease, pricing for ENERGY STAR® qualified LED lamps continues to remain a barrier for some consumers. It is still a relatively new technology and customers are comparing prices to baseline halogen products.

Figure 1: 60W Equivalent A19 ENERGY STAR Historical Retail Prices



Source: ICF

[1] EISA Backstop Requirement states: "If the DOE fails to complete a rulemaking or if a final rule does not produce savings that are greater than or equal to the savings from a minimum efficacy standard of 45 lumens per watt, effective January 1, 2020, the Secretary shall prohibit the sale of any general service lamp that does not meet a minimum efficacy standard of 45 lumens per watt."

In regions where there are residential lighting programs, their success has created a conditioned consumer, one who expects a certain price point for energy efficient lighting. EISA and the phase out of standard wattage incandescent has created a consumer who believes everything is "somewhat" efficient. These two conditions have created a perfect storm that—without support from utility rebate programs and in the absence of competitively priced, program sponsored LEDs—risks moving customers back to the lower priced halogen and/or non-ENERGY STAR® LEDs. Leveraging utility funding to address the incremental cost between the less efficient technologies such as halogen lamps—which took the largest share of incandescent light bulbs after EISA implementation—is critical for maintaining the positive momentum that the utility programs have made in the efficient lighting market.

Non-ENERGY STAR® rated LED lamps pose another challenge for programs: These lamps were developed to hit a specific and deliberately low price point within the technology category. Starting with one retail chain, they have quickly appeared in a myriad of retailer line-ups since. Despite their favorable price point, these lamps lack the same performance metrics as ENERGY STAR® qualified lamps (Figure 2).

Figure 2: Performance Variances between LED and CFL A-Line Lamps

	ENERGY STAR® CFL	Non-ENERGY STAR® LED	ENERGY STAR® LED
Lifetime	10,000 hours	10,000 hours or less	25,000 hours
Omnidirectional	Yes	No, variances from 20 degrees plus	Yes
Dimmable	No	No	Yes

Source: ICF

Lifetime: ENERGY STAR® requires a minimum lifetime of 25,000 hours for LED lamps and 10,000 hours for CFL lamps. The first non-ENERGY STAR® LED lamps had a consistent level at 10,000 hours; however, a model recently introduced to the market has a lifetime of 5,000 hours. There is currently no consistency in the non-ENERGY STAR® technology.

Omnidirectional: ENERGY STAR® has requirements intended to have A-line LED lamps provide omnidirectional output. ENERGY STAR® determined that uplight is important—especially if a lamp is installed in a base up holder or table lamp—and that lamps should have no hotspots or dark spots that are too excessive, resulting in a fairly even light distribution around the lamp. The first non-ENERGY STAR® LEDs were short of the omnidirectional requirement, but not by a large margin.

Dimmable: ENERGY STAR® has requirements that lamps marketed as dimmable provide a satisfactory dimming experience for the consumer.[2] None of the non-ENERGY STAR® LEDs have dimming capabilities.

ICF is concerned about utility programs possibly adopting non-qualified LEDs as part of their program mix. Beyond having fewer features than ENERGY STAR® qualified LEDs, these low-cost products come with a lack of consistency. Continual product modifications intended to drive prices down (such as lifetime, CRI, dimmability, and lumens per watt) means there are no standards in place to ensure quality and high customer satisfaction with the products. As we learned from the early days of CFLs, it takes years to get customers back after they have had a negative experience with a bad lamp. Without an agreed upon quality standard, there are no controls and the industry once again becomes the Wild West, jeopardizing consumer's experiences and risking that the transition to LEDs will be significantly delayed.

[2] ENERGY STAR® requires that if an LED lamp is marketed as dimmable it must dim below 20% of initial light output. Additionally, there are noise and flicker requirements to ensure consumer satisfaction.

A number of manufacturers have openly stated that they will not follow this trend and will only release ENERGY STAR® qualified LEDs. But, market demand is hard to ignore, and there is a risk that potentially all retailers and many major manufacturers will eventually gravitate to the products that are at a price point that is most attractive to their customers' wallets in the short-term.

As retailers provide more shelf space to these lower cost, fast-moving products, ENERGY STAR® qualified lamps that are being promoted via utility programs risk getting crowded out of the aisle and the consumer risks a negative experience with inferior products. This results in a one-two punch for utility programs—the incentivized products lose shelf space and consumer distrust of LEDs increases due to potentially poor quality products.

Opportunities to Improve Program Cost Effectiveness

As the baseline for lighting continues to drop the need to squeeze cost savings from lighting programs has never been stronger. To drive more effective program implementation, ICF believes that programs will need to become more nimble—using robust data analytics that better optimize incentives and target customers more effectively—and consider new approaches to store merchandizing.

Incentive Optimization

Lighting programs have evolved from simple coupon programs, with fixed incentives based on pack size, to markdowns using product Stock Keeping Units (SKU) to allocate incentives. We believe that with the availability of demographic segmentation data along with advanced analytics platforms that identify customer's propensity to participate, utility programs can make much smarter use of their program dollars, working with retailer and manufacturer partners to better target incentives.

Program Implementation

Many programs have invested in an expensive deployment model with fixed infrastructure that cannot modulate based on program needs or shifts in the market. Program sponsors should take a page from other market-based programs—for example by using a model for merchandizing that is similar to the residential audit—to reduce costs by leveraging a contractor's existing local footprint to improve retail execution.

Value of Retail

Use of segmentation data and insights from companies that have large footprints in retail operations allows for the development of a ranking system that prioritizes stores using demographic and program performance metrics, also known as the Value of Retail. This approach allows program sponsors to develop and better track metrics on participating stores, leading to more effective store merchandizing, better service strategies and optimized program participation. For example, by better understanding which customers shop where, we can go beyond the traditional zip code based approach when selecting participating storefronts, and choose only those stores with program targeted customers. Key utility program challenges, such as product leakage, are reduced.

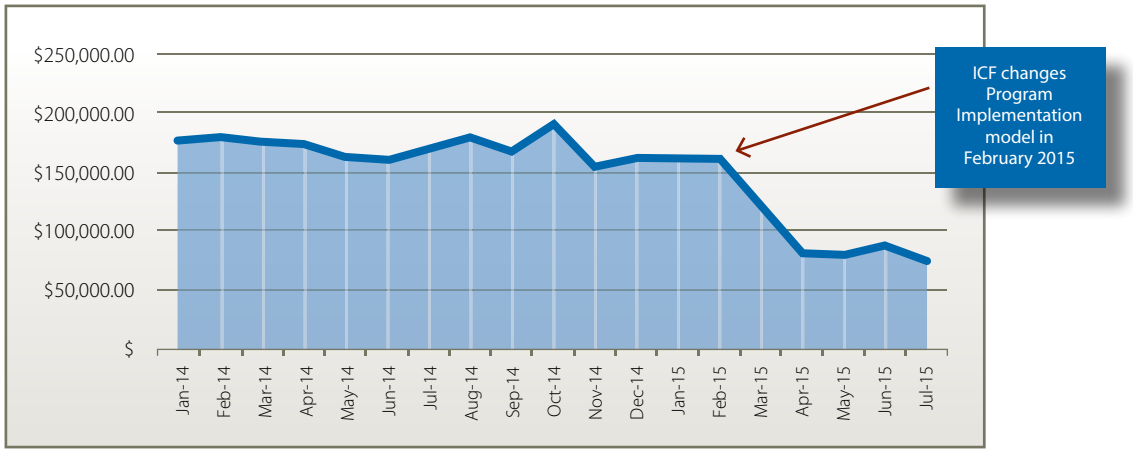
Customer Engagement

New customer engagement platforms and tools are available to help educate customers on LED technologies. Cost savings from incentive optimization and program implementation can be repurposed to improve utility attribution through new engagement strategies like closed loop or targeted marketing tools. This can be taken further to help address concerns around attribution. For example, by using cutting edge approaches--such as attribution modeling that uses data analytics to

predict attribution at the store level--utilities can target where they engage customers. This allows utilities to actively manage the impacts of free-ridership.[3]

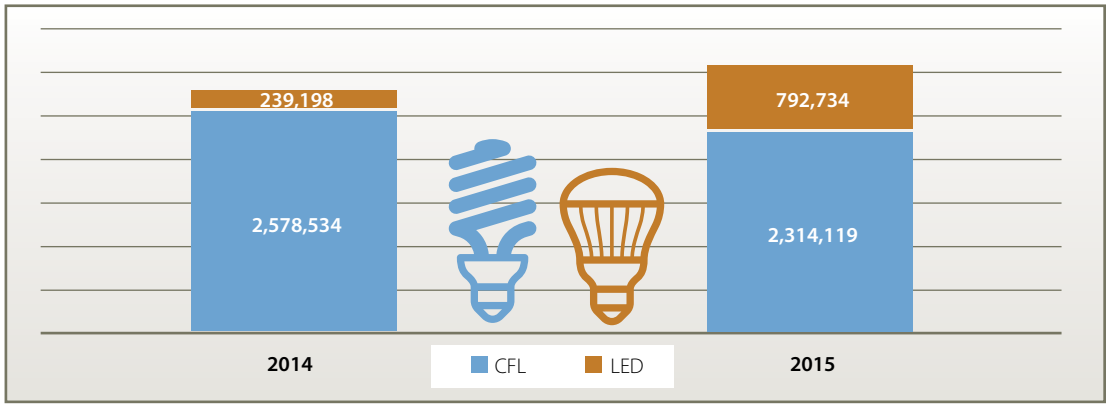
As illustrated in Figures 3 and 4, ICF has successfully used these approaches to reduce program administration costs for some of our clients by 50% while at the same time increasing overall volume by as much as 10% and LED uptake by greater than 50%.

Figure 3: Midwest Utility Residential Lighting Program Administration Costs 2014 – 2015 YTD



Source: ICF

Figure 4: Midwest Utility Program Sales January – September 2014 and 2015



Source: ICF

[3] This model was discussed during a presentation by Sara Conzemius of Illume Advising during ICF's Lighting Workshop held in Bentonville, AR, June 24, 2015

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About ICF International

ICF International (NASDAQ:ICFI) provides professional services and technology solutions that deliver beneficial impact in areas critical to the world's future. ICF is fluent in the language of change, whether driven by markets, technology, or policy. Since 1969, we have combined a passion for our work with deep industry expertise to tackle our clients' most important challenges. We partner with clients around the globe—advising, executing, innovating—to help them define and achieve success. Our more than 5,000 employees serve government and commercial clients from more than 70 offices worldwide. ICF's website is www.icfi.com.

Conclusion

ICF believes there are still plenty of opportunities for savings in lighting programs. To fully capture these savings, the industry will need to quickly come together around the rapidly changing dynamics of this market so that together we can ensure the needs of customers, utilities, manufacturers, and retailers are met.

About the Author

Catul Kiti has more than 20 years of experience in program and project management. He provides strategic advisory and demand side management (DSM) program design support for various utility clients in the United States and Canada. Clients in the Mid-Atlantic and Southeast include Baltimore Gas & Electric (BGE), Pepco Holdings Inc. (comprising Pepco and Delmarva Power), Southern Maryland Electric Coop (SMECO), South Carolina Electric & Gas, Georgia Power, and Entergy Mississippi.

Prior to joining ICF, Mr. Kiti worked extensively with the national ENERGY STAR® program providing support to both the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) efforts to develop public-private partnerships with utilities, retailers, manufacturers, state governments, and regional market transformation organizations.

Mr. Kiti holds an M.B.A. from the Georgetown University McDonough School of Business and a B.Ed. in Communications and Technology from Kenyatta University in Nairobi, Kenya.

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