

## **“Lifting” the Energy-Efficient Lighting Market**

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### **ABSTRACT**

Reducing cost barriers through rebates and buy-downs—ranging from efforts targeting consumers to manufacturers—have a successful record of stimulating the demand for energy efficient lighting, specifically compact fluorescent lights (CFL). However, market factors – including the expansion of energy efficiency lighting choices now available to consumers, the decline in difference in energy use between high efficient and standard efficient lighting (known as delta watts) as a result of the EISA legislation, and the increase in free ridership and the resulting low attribution in program evaluation in some jurisdictions – call for development of new approaches to continue to move toward transformation of the residential lighting market.

One approach is “market lift”—a time-tested method of moving markets (Bell 2001) in other industries by providing incentives to market actors (retailers/wholesalers/manufacturers) to increase their sales share of equipment above a pre-established baseline. The market lift concept is a “pay-for-performance” model that involves obtaining historic sales data to establish baseline sales figures that approximate the level of sales expected absent an incentive program. The concept has three main distinguishing characteristics: 1) a continuous feedback loop of sales and market data to establish a baseline and track performance; 2) commitment by market actors to achieve sales of energy efficient equipment above their baseline using the mix of promotional approaches they set; and 3) incentives paid only for sales above that baseline. The approach is expected to maximize the net energy savings attributable to a product incentive program while enabling a single program to employ a wide range of energy efficient product and promotional approaches.

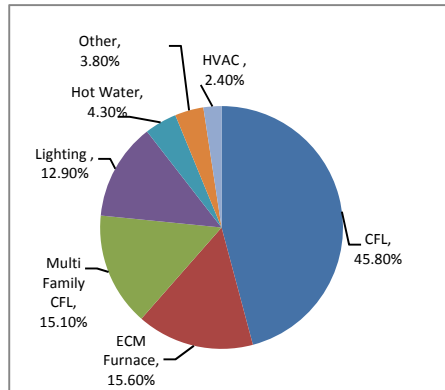
At the 2010 ACEEE Summer Study session, “Higher Savings Goals and the Rebate/Buy-down Elephant in the Room—Recognizing When and How to Move On to Market Lift,” (Winch, Hannigan & Curtis 2010) WECC introduced a framework for examining retail programs. This paper demonstrates the application of that framework to the Wisconsin market and shares lessons learned from the implementation of an initial market lift pilot.

### **Energy Efficient Program Designs Need A Face-“Lift”**

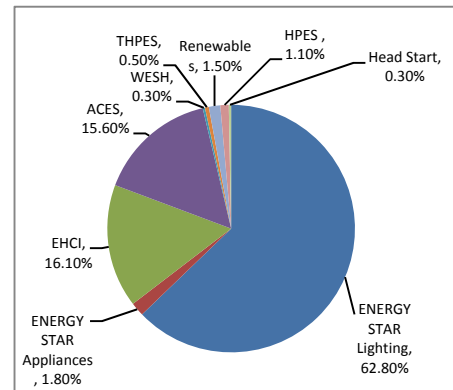
CFL programs have been core to utility energy efficiency portfolios, driving the bulk of portfolio savings extremely cost-effectively. For example, the most recent program evaluations for the Wisconsin Focus on Energy programs report (TetraTech 2011) that compact fluorescent lights (CFLs) represented 63% of the total energy savings by program for the residential portfolio and 61% of the total energy savings by measure category. At 15.5%, the ECM Furnace is the next most common measure in the portfolio. CFLs have been critical to the success of the residential portfolio in terms of both participation and cost effectiveness. The retail CFL program currently reports a benefit cost ratio of 1.9 based on net energy savings (verified gross energy savings less free ridership). Home Performance with Energy Star, another common residential program, delivers a benefit cost ratio of 1.4.

**Figure 1. Verified Gross Electric Energy Impacts by Program, Wisconsin Focus on Energy Residential Programs CY10 (January 1-December 31, 2010)**

Source:  
TetraTech.  
Wisconsin  
Service



State



of  
Public

Commission, Focus on Energy Evaluation Annual Report (2010). June 17, 2011

Despite their popularity, and historic effectiveness, utility funded CFL programs are facing challenges. The expansion of energy efficient lighting choices now available to consumers is creating complexity for both program and consumers. The decline in the difference in energy use between high efficiency and standard efficiency lighting (known as delta watts), resulting from the market impact of the EISA legislation, is reducing the energy savings available through CFL programs. The increased availability and lower cost of CFLs is leading to increased free ridership (customers who would have purchased the product without program support) resulting in low attribution in program evaluations in some jurisdictions, most notably states with a long history of energy efficiency programs.

*Increased choice:* Lighting manufacturers have responded to continually growing consumer demand for higher efficiency products with an ever growing menu of alternatives to standard incandescent bulbs. From the 2X incandescent, the halogen bulbs being introduced to replace the standard incandescent, to advanced CFLs featuring improved color, dimmability, lower mercury, and a more incandescent look to lower priced LEDs, efficiency programs and consumers face a myriad of choices (Esource 2010). Each product has its own benefits and limitations. This continually growing range of product choices introduces a level of complexity to program design. Programs need increased expertise to determine which product or mix of products to incent from a rapidly changing list of alternatives. Programs also need to address increased complexity in their relationships with retailers and manufacturers, as well as the risks that come with selecting specific products from a large pool of options. By selecting specific products, utility funded programs require additional effort and cost, in program implementation, to help consumers identify and select participating product.

*Decreased delta watts:* The Energy Independence and Security Act of 2007 (EISA) requires general purpose lighting to achieve a 25 to 30% power reduction. Utility program energy savings are measured as the difference between the standard efficiency product and the energy efficient alternative promoted by the program. Decreasing the allowed energy use for the standard program decreases the energy savings available from the same high efficiency lighting alternative directly impacting utility programs, as they will now claim less energy savings between an efficient product and a new EISA compliant, non-efficient product. For example, the Wisconsin Focus on Energy CFL savings analysis reports that pre-EISA CFL energy savings per bulb in participating programs at 52.3 watts and the post-EISA value at 32.8 watts, reducing the

savings available to the program by 37% (TetraTech 2011). Where programs are still incenting product at similar levels, this reduction in energy savings will also reduce the cost effectiveness of utility lighting programs. The result is that the same investment required to drive program participation delivers lower savings results, and the cost per kilowatt-hour saved is higher.

*Increased market size:* Free-ridership, attribution, and measurement of the net-to-gross (NTG) ratio is a complex issue within the energy efficiency industry. There is broad debate on how to best measure these, with no single standard in existence. With many approaches available, none provides a calculation all stakeholders are comfortable with (NMR Group 2011).

But regardless of the specific measurement approach applied, there is evidence that growing free ridership is reducing the effectiveness of traditional retail lighting programs. Retailer sales data is proprietary and difficult to obtain. However, an available review of sales data for the state of Wisconsin for 2005-2007 (Winch & Talerico 2008) illustrates the trend towards rapidly growing CFL sales and a maturing market. By 2007, CFL sales for participating retailers in the home improvement channel stood at nearly 3.2 million units while the efficiency program incented 796,295 units. When sales volumes by non-participating retailers, including some of the largest in the market, were taken into consideration, over 8 million bulbs had been sold statewide in that time frame. Not surprising, the program evaluation assessed a 27% net-to-gross ratio (PA Consulting and NMR Group 2010) and the program was discontinued in that market channel.

A review of program evaluation results across the country illustrates a similar trend (Table A). Program evaluations are assessing low net-to-gross ratios, most notably in jurisdictions with long standing utility programming, reducing the claimed savings for these programs.

**Table A. Net-to-Gross Ratios by State<sup>1</sup>**

Location	2008 Net-to-Gross		
	Recommended or Official	Low	High
Wisconsin	0.62	0.36	1.69
Massachusetts	0.41	0.19	0.74
Connecticut	0.81	0.22	0.91
New York	1.60	0.93	9.17
New York City	1.60	0.93	6.73
Vermont	1.09	1.06	1.57
California	0.65	0.23	0.65

Source: ENERGY STAR® CFL Market Profile – US Department of Energy, September 2010

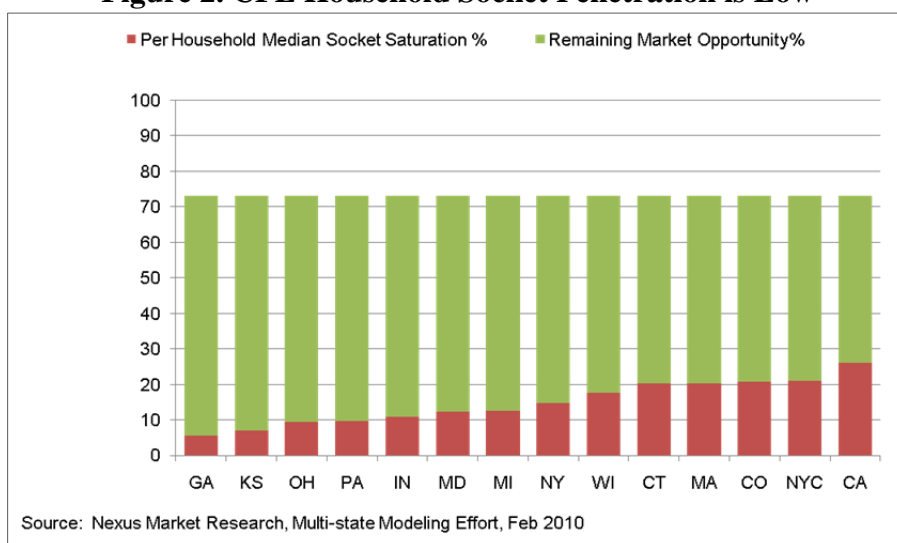
Regardless of the specifics of how free ridership and attribution are defined and measured, utility-funded, retail-based energy efficiency programs, that incent every bulb sold,

<sup>1</sup> A net-to-gross value is the ratio of the energy savings that can be directly attributed to an energy efficiency program. Factors that affect net-to-gross include free ridership, which decreases net-to-gross values, and spillover, which increases net-to-gross values. A net-to-gross value greater than 1 signifies program energy savings plus spillover, or additional savings that a program may have influenced, from change in customer behavior to the purchase of additional energy saving products that were not part of the program.

are faced with the challenge that given the size of the market, in comparison to the size of the program, free ridership is inevitable. Program budgets and their ability to shift consumer behavior, by incenting CFLs, are beginning to pale in comparison to the overall size of the existing CFL market. Therefore, the ability of programs to impact some channels, specifically big box retail markets, is diminishing.

As illustrated in Figure 2, market potential for CFLs continues to be very high. Lighting represents approximately 12% of household electricity consumption (Lawrence Berkeley National Laboratory 2009). The 2011 ESource Residential End Use Study (Esource 2011) reports 20% of survey participants use zero (0) CFLs, with an additional 38% having five (5) or fewer. With so many sockets still using standard efficiency lighting, the residential lighting market is far from transformed. CFLs and energy efficiency lighting continue to be a viable source of energy savings.

**Figure 2. CFL Household Socket Penetration is Low**



## What Is Market Lift

The remaining market potential in the high efficiency lighting market, combined with the above limitations experienced by existing program designs in some jurisdictions, require the development of new program approaches to enable utility funded, energy efficiency programs to both continue to garner cost effective energy savings and contribute to transformation of the residential lighting market.

Market lift offers one such approach. It is a concept understood by manufacturers, distributors, and retailers that has not yet been applied to energy efficiency programs. Market lift, or growth incentives as it is also called, refers to a time-tested method of moving markets in other industries by providing upstream incentives to retailers/ wholesalers/ manufacturers that increase their sales share of energy efficient equipment above a pre-established baseline.

Market lift is a “*Pay for Performance*” program approach. The program is designed to pay for all sales above a pre-determined baseline. It rewards retailers for increasing category penetration of energy efficient lighting alternatives. The utility rebate program pays the retailer to increase the market share of energy efficient lighting (or a specified subset of energy efficient

lighting such as CFLs), rather than paying for all the efficient products sold. The market lift program differs from a markdown program design in three significant ways:

- It measures the impact of high efficiency product sales, as part of the entire lighting category.
- It relies on the retailer to recommend the market approach for driving sales in their stores.
- It only incentivizes sales above the “baseline” category sales (that is increase in market penetration).

This structure mitigates the challenges of increased choice, decreased unit savings, and increased market size. By developing the program around the energy efficient product category, the program is not limited to a specific technology. A wide range of high efficiency lighting can be incorporated into one program. This mitigates the risk of utility programs driving sales from one energy efficient product to another, rather than from an inefficient to efficient product, while removing responsibility from program sponsors to “pick” the winning technology. Because the program only pays for a change in market share, program sponsors are able to claim 100% of savings on the measures that are incentivized, eliminating free ridership. While market lift does not change the reduction in energy savings that can be allocated to each bulb, the higher attribution does mean more bulbs are contributing savings.

Market lift can also create opportunity to strengthen the relationship between retailers and the program implementer/sponsor. It is built on the premise that retailers can drive sales of products in their stores by many means, and that they have the expertise and control to deliver a successful program. The program does not require retailers to reduce the retail price of the bulbs.

Market lift does require retailers to provide whole category data up-front. This data is used to calculate and determine accurate baselines. The program design is modeled to have the retailer own how they will reach the agreed upon goals with little to no intervention by the utility partner. The program design is collaborative in that it provides the retailer the opportunity to discuss baseline assumptions, identify challenges, and negotiate a fair baseline.

As outlined above, market lift offers several benefits to program implementers and sponsors. But why would retailers participate in this type program? Opportunities for retailers (Curtis, Montgomery, Smith, Swope 2011) include:

- A collaborative approach to baseline development,
- An ability to determine the qualified product and merchandising approach to be included in the program in their stores, giving the retailer full control in how to reach the sales goals,
- Clean accounting, and
- Continued, or renewed, access to participate in programs.

Understanding and managing market share is core to retail operations. A market lift approach enables retailers to integrate energy efficiency programs into their standard business, driving the merchandising approaches, promotional timing and product mix. It can also simplify tracking of program product and dollars within retail operations, as utility rebate payments are tied to standard category reporting. This can simplify participation for the retailer while providing program sponsors with a more robust program.

In mature efficiency markets, utility program evaluations have shown increasing free ridership, resulting in lower attribution and net-to-gross ratios. As a result, some utilities are reducing or eliminating their investment in CFL programs. Some have shifted funding to focus rebates on “hard-to-reach” markets or on specific retail sectors (The Cadmus Group 2008). This is making it more difficult for high-volume big box retailers to participate in utility lighting programs. While loss of these high volume retailers significantly impacts program reach, the loss of utility program dollars also affects these retailers. A market lift program captures full savings for every bulb incentivized and leverages the expertise of retail partners enabling big box retailers to once again participate cost-effectively in retail lighting programs, providing a win/win program for retailers, utility sponsors, and their shared customers.

The market lift approach can also simplify program evaluation, measurement, and verification (EM&V). As the same market data is required to establish the baseline, pay retailers, and determine program participation, ultimately demonstrating the high attribution rates the program was designed to secure.

## **When To Move To Market Lift**

As outlined above, the market lift program approach is applicable in markets where the overall size of the market dwarfs the ability of the program to impact that market, and/or where free ridership is reducing the effectiveness of the program in delivering cost effective energy savings. Therefore, market lift is most appropriate for maturing energy efficiency markets whose programs are evaluated using net savings.

A relatively simple, though often hard to obtain, set of data is needed to assess the relative size of the program capacity against the overall market for a given program and market (Winch, Hannigan & Curtis 2010):

- Size of overall market - This refers to the overall size of the market the program seeks to influence. For a product category, this is the total of both standard and energy efficient units sold. For a sales channel or customer segment this is the total number of units sold through that channel or to that segment.
- Size of energy efficient market - This refers to the number of energy efficient units currently sold in that product category, channel, or segment.
- Program capacity - This refers to the capacity of the program to influence the market. This can be calculated using the maximum program budget and the resulting forecast for the number of energy efficient units to be incented as a percentage of the number of energy efficient units currently sold in that market.
- Baseline or comparison area - *Size of Overall Market* and *Size of Energy Efficiency Market* for a comparable area that does not offer such programs. In absence of a suitable control or comparison area, pre-program sales data may be used to estimate what the market might look like in the absence of a program.

The market lift program design can be utilized for other products, not just lighting. There is opportunity to use this approach when incenting Air Conditioners, Water Heaters, and any number of measures that have lower net attribution rates in their jurisdiction.

As noted above, this set of data was collected and analyzed for the compact fluorescent lighting market in Wisconsin (Winch, Hannigan & Curtis 2010). That analysis showed that

traditional program models were still effective in hardware, grocery, drug, and discount channels, but that in the home improvement (big-box) market the program capacity was no longer meaningful in comparison to the size of the overall market, or the energy efficient market, in that channel.

## **Data Gathering and Baseline Development**

To establish the market baseline, determine suitable lift targets, and evaluate progress toward those targets, market lift programs require the collection of full category sales information from participating retailers. Full category sales information is needed to properly “bin” lighting products into measurement categories. In general, products are binned into three categories: A) products to be lifted; B) competing products to category A; and C) non-competing products to category A.

Outside of the calculation of penetration, full category sales information provides additional benefits. Using the full category information, program sponsors can calculate regional and comparator region unit’s sales and penetration by: wattage, lumen output, lamp base type, lamp shape type, rated lifetime, and compliance with EISA standards, among other categories. Using the results of these analyses enables the program sponsor to target future programs to specific underperforming lamp categories, and evaluate market transformation at the specific product category level.

After historic sales information is collected and all products are binned into their respective categories, baseline penetration for products to be lifted is calculated as the historic sale of category A products compared to the total historic sale of category A and category B products. Category C products are tracked separately, and represent a control group to adjust for overall changes in sales volumes outside of the lift. Using this baseline penetration for category A products, suitable penetration targets can be established. Once a lift program begins, periodic sales data is then evaluated for the penetration of category A products, and the results compared directly to the targets established beforehand.

The table below (Table B) presents a simplified overview of the calculation of penetration for the baseline, target setting, and lift period of a market lift program. In this case, a baseline penetration is calculated at 25%, and a lift target penetration of 30% is established. During the first month of the lift program, a penetration of 32% is observed, indicating a successful month. Subsequent months yield penetrations of 29% and 31%, indicating non-successful and successful months, respectively.

**Table B. Example of Baseline, Target, and Lift Period Penetration Calculation**

	Baseline Average Monthly Sales	Market Lift Target Monthly Sales	Actual Lift Period Monthly Sales Month 1	Actual Lift Period Monthly Sales Month 2	Actual Lift Period Monthly Sales Month 3
<b>Category A: Efficient (Units)</b>	1,500	1,800	1,900	1,750	1,850
<b>Category B: Non-Efficient (Units)</b>	4,500	4,200	4,100	4,250	4,150
<b>Category A: Efficient (% Penetration)</b>	25%	30%	32%	29%	31%
<b>Category B: Non-Efficient (%Penetration)</b>	75%	70%	68%	71%	69%

In this program model, any sales above the baseline would be captured and measured at 100% attribution. The retailer would be paid a pre-negotiated price on each bulb above the baseline. This eliminates the need to pay on every bulb sold, even if they would have been sold without a program.

### **Establishing the Pilot**

In Wisconsin, the home improvement (big-box) retail channel had been shut out of participating in retail lighting programs in the state since 2008 due to very low attribution rates assigned to that channel during past evaluations. With the understanding that Home Centers drive a significant amount of energy efficient lighting sales, a new approach was needed for the energy efficiency program to leverage this channel. To re-engage big box retailers in Wisconsin, WECC worked with the Focus on Energy program and a major Home Center retailer to pilot a market lift program in 2011.

The pilot ran for 3 months, July to September 2011, with one retailer and nine stores geographically dispersed across Wisconsin. The long term objective is to establish a program model that would enable a program to claim full savings (100% attribution) on every incentivized bulb while motivating retailers to participate. The goal of the 3-month pilot was to understand the data requirements and analysis needed for baseline development, assess data availability, test specific methodology for baseline development, and identify factors affecting implementation for both the program and the participating retailer that would need to be addressed in future program design.

### **A Pilot in Action**

The first challenge in implementing a market lift program is establishing an implementation partnership with the retailer. As outlined above, full category sales information



is needed from participating retailers for the program to determine suitable lift targets, evaluate progress towards those targets and pay incentives based on change in market share/penetration. This requires participating retailers to providing the program with access to their highly confidential and proprietary sales data. The pilot leveraged a solid, existing retailer relationship, supported by appropriate legal and data security safeguards, to acquire retailer category sales data.

The retailer actively partnered with the program, participating in the methodology review to clearly understand the information needed to develop the baseline (define data requirements), and selecting the qualifying product. The retailer business representative and IT department worked with the program to identify the relevant data points within the retailer information systems, and extract and transfer the required fields. The methodology outlined above was applied to the specific retailer data. For the pilot, qualifying product consisted of standard and specialty CFLs and medium base LEDs. The data categories consisted of: A) Efficient Products – medium and candelabra screw based CFL and LED lamps; B) Non-efficient Products – medium and candelabra screw based incandescent and halogen lamps; and C) Non-Tracked Products – all other products, including pin-based lamps, linear fluorescent lamps, appliance lamps, and night lights. The baseline was calculated using 2 years of past point-of-sale (POS) data.

While specific market share/penetration data and target information is proprietary and confidential to the participating retailer, Table B above illustrates how the retail sales data was used and Table C below outlines the lift structure that was established. A Level 1 target was established that represents the Market Lift Target (minimum lift in unit sales for program to pay the incentive). Incentives were then stepped up at specified targets to drive greater incentive opportunity for the retailer to drive to higher goals.

**Table C. Lift Targets**

Lift Target (Efficient Category)	Stepped Incentive Structure	Claimed Savings
<b>Level 1 (minimum % lift in unit sales/ penetration over baseline)</b>	Payment A on each bulb over baseline	All products over baseline
<b>Level 2 (% lift over Level 1 unit sales/ penetration)</b>	Payment A on each bulb over baseline plus Payment B on all bulbs over Level 2 target	All products over baseline
<b>Level 3 (% lift over Level 2 unit sales/penetration)</b>	Payment A on each bulb over baseline plus Payment B on all bulbs over Level 2 target plus Payment C on all bulbs over Level 3 target	All products over baseline

While the market lift approach does rely on the retailer to recommend the marketing approach for driving sales in their stores, it is important utility sponsors are recognized. The pilot program provided branded in-store marketing materials, including point of purchase education and in-store events. The retailer rolled out a new planogram, (how the lighting category is merchandised) with strong graphics and consumer education, as well as a larger selection of

LED bulbs. The retailer merchandising included end cap and pallet displays in some stores. Staff training for the new planogram included program training.

## **Pilot Program Learning**

The pilot program did not achieve an adequate increase in market share/penetration to meet the minimum increase in market share/penetration, for an incentive to be paid. The pilot did provide valuable insight into data requirements and analysis needed for baseline development, data availability, and baseline development methodology; program timing; and program implementation considerations.

*Data:* Post analysis of the performance of specific bulb types and SKU's within both the Efficient Product and Non-efficient Product bins clearly reveals that a more robust analysis of the past POS data is needed to identify underlying market conditions and confirm that those conditions can reasonably be expected to continue. Two specific changes affecting the baseline data appear to have had a significant impact on the program results.

There was a large increase in incandescent shipments in the July to September 2011 timeframe over the previous several quarters that appeared to have been in response to intense, and often negative, media surrounding EISA regulations, driving up consumer demand for incandescent bulbs. This increased the percent penetration of the Category B Non Efficient above the Baseline Average Monthly Sales. This had the effect of increasing the energy efficient sales needed to meet the same market lift target. In a three-month pilot, there was not adequate time to react to this short term market shift.

Given the short duration of the pilot, and the retailer's new planogram (visual representation of the store's merchandise), which was expected to have a positive effect on the market lift program, resulted in distorting the Category A: Efficient (Units). The planogram introduced a larger selection of LED bulbs, which increased the number of eligible products used to calculate the program penetration rates (Category A Efficient % Penetration) increasing the forecast market lift target. It takes time to set up a new planogram in stores. During the set up period, clearance of old products took shelf space away from new product, and the expansion of LEDs on retail shelf took additional shelf space, further reducing shelf space for CFLs. Due to the higher price point, most LEDs sell in single packs, while CFLs are commonly sold in multi-packs. This combination of factors resulted in lower product availability than had been forecast when calculating the Market Lift target. Longer term the new planogram can reasonably be expected to increase availability and sales of efficient product. However, the three month period for the pilot coincided with the transition period for the planogram, negatively affecting product availability.

*Program Timing:* The pilot took place over an eight month period with three months for pre-launch data collection and analysis and development of the baseline and incentive structure, three months in field and two months for post pilot data collection and analysis. The pilot results demonstrate that a longer time frame is needed. The retailer needs more time to create and execute plans that can affect inventory and merchandising. There also needs to be more robust analysis of assumptions impacting the baseline and lift target. And in-field activities require adequate time to identify and adjust the program when it isn't performing to expectations.

*Program implementation:* The pilot program design included several assumptions regarding program implementation and the nature of the relationship between the program and the retailer, specifically that the baseline and lift target development required collaboration, and the retailer would plan and manage in-store implementation with little program intervention. The

following summarizes the observations and recommendations from the in-field component of the pilot program.

As expected, a collaborative approach between the program and the retailer is crucial to accessing category sales data, developing a good understanding of the data and establishing a meaningful baseline and lift target. That level of collaboration extends into program planning and implementation. There are multiple stakeholders in the retail channel that must be recognized to ensure a comprehensive program plan and execution. This involves engaging not only the traditional key utility contact within the retailer, but the lighting buyer, the corporate merchandising team, and district/regional/store level management. This will also help with building buy-in to the program approach, an understanding of the program goals, and the commitment to the role and responsibility of the retailer in meeting those goals. Program implementers need a solid understanding of the retailer structure, and how to appropriately engage the various parts of the organization, to secure program success.

While the original program design assumed retailers can, and want to, shift market share without interference from the utility we believe a balanced approach is needed. Retailers contend with a lot of “noise” from corporate directives, category performance expectations, local factors and other competing promotions and priorities. Keeping them focused on, and committed to, your program will require active support. A wait and see approach will not provide the results needed to make the program successful for both the retailer and utility. Retail priorities may also conflict with utility priorities (such as increasing shipments of 100W incandescent bulbs in the lead up to EISA deadlines). Providing support through customer education, POP, retailer training and cross-promotional messaging can both support utility objectives and help drive a more successful market lift program.

Retailers include a wide range of technologies and manufacturers as qualifying efficient product category. As such, the pilot program did not directly engage manufacturers. While early assumptions differed, we believe there is still a role for manufacturers. The market lift program benefits from the inclusion of multiple manufacturers. Finding ways to involve manufacturers to leverage promotions, coordinate events, and incorporate planogram suggestions could help the program reach its goals.

## **Conclusion**

As programs mature, additional program approaches will be needed to secure continued energy savings. So, program implementers need multiple programs in their toolbox.

The Wisconsin market lift pilot program did not deliver the increase in market share/penetration targeted. The limited time frame for both planning and execution proved too short to move market share. As the first in-field implementation of this program design, the pilot did confirm that the continuous feedback loop of sales and market data needed to establish a baseline and track performance can be secured, and that market actors, specifically retailers, will take on increased responsibility for program outcomes when offered increased control over product and merchandising. Additional research, including a more comprehensive and longer pilot, is needed to further develop this program approach.

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