

## **All in on LEDs: The Northeast Residential Lighting Strategy**

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### **ABSTRACT**

As the single largest contributor to energy efficiency program savings, residential lighting is a vitally important resource to efficiency programs. Lighting requires relatively low incentives to move large numbers of units and provides high savings relative to baseline; it is a presence in nearly all residential programs. Program administrators have been enjoying this cost-effective, goal-achieving, and administratively straightforward measure for years, but will it remain a highly valued resource into the future? It is time to examine the outlook for residential lighting efficiency programs and look at their prospects for energy savings from now through the end of the decade. When, how, and to what extent should programs shift their efforts to LEDs? Should programs eliminate support for CFLs? We will present research and analysis from the new Northeast Residential Lighting Strategy: 2013-2014 Update. These insights—informed by industry leaders, efficiency programs administrators, regulators, and independent experts—include projections and case-studies from the Northeast and Mid-Atlantic. We will show that residential lighting savings will not only continue, but increase, and lighting program activity and budgets should continue to rise to claim these savings. Brought on by advancements in LED viability and quality, programs will purposefully shift the majority of their promotions from CFLs to LEDs within five years, coupled with targeted education. This paper will provide critical insights, analysis, and recommendations for the Northeast region and beyond.

### **Introduction**

Residential Lighting has a long history as a very significant measure in efficiency programs. Support for efficient lighting in the Northeast goes back more than 20 years in some states. These efforts have resulted in significant energy efficiency savings, mostly through the promotion of CFLs. Regionally, efficiency program goals and expectations continue to be aggressive, but after years of CFL promotions, a change is necessary to continue the energy savings and efficient product penetration in residential lighting. In many states, CFL savings are decreasing significantly as the free-ridership for these well-established products increases. Additionally, with the EISA phase-out of traditional incandescents (DOE 2007) and the more efficient EISA compliant halogen incandescents taking their place as the inefficient baseline, the savings potential for CFLs is further diminishing. That beckons the question, will efficiency savings from residential lighting continue into the future? Northeast Energy Efficiency Partnerships (NEEP) and our allies on the front lines of efficiency programs have compiled analysis into the Northeast Residential Lighting Strategy (RLS) and annual updates (NEEP 2013). The RLS research demonstrates that through new strategies and a significant shift in product promotion from CFLs to LEDs, significant savings from residential lighting will not

only continue in the next 5 years, but will increase and lighting program activity and budgets should continue to rise to claim these savings.

## Residential Lighting: A Critical Component of Northeast Efficiency Programs

Efficient lighting continues to contribute a disproportionate amount of savings relative to its share of residential electricity usage. In many Northeast states, residential lighting can account for up to 60% of residential program savings. Lighting plays a critical role in retail programs as well as other residential programs, including income eligible, new construction, multifamily, and single family retrofit programs. Table 1 shows the planned 2013 annual savings coming from both retail lighting programs and from all lighting activity in Massachusetts and Rhode Island (NEEP 2013).

Table 1. MA and RI contribution of lighting to 2013 planned residential sector savings

		Total sector annual MWh savings	Lighting annual MWh savings	Lighting % of total savings	Lighting % of total non-behavioral
MA 2013 savings	ENERGY STAR lighting	145,604	145,604	100%	
	Behavior feedback	99,551	0	0%	
	Other residential programs	66,839	36,934	55%	
	Non-income eligible residential total	311,994	182,538	59%	86%
	Income eligible residential total	27,228	17,257	63%	
RI 2013 savings	ENERGY STAR lighting	24,757	24,757	100%	
	Behavior feedback	15,325	0	0%	
	Other residential programs	15,456	8,111	52%	
	Non-income eligible residential total	55,538	32,868	59%	82%
	Income eligible residential total	6,188	3,710	60%	

Note that when behavioral program savings—which currently have a one year measure life—are excluded, lighting represents the vast majority of savings for both Massachusetts and Rhode Island for both income eligible and non-income eligible residential sector savings.

## Consumer Education and Efficiency Programs

Consumer understanding of efficient lighting options and the different products available today is still generally low. While 64% of consumers have heard of CFLs, only 41% of consumers reported being aware that after January 1, 2014, 60W and 40W incandescent bulbs were being phased out (OSRAM SYLVANIA 2013). This leaves a great number of consumers who will be faced with an unexpected scenario upon future trips to purchase light bulbs. As an additional challenge, the lighting aisle has never been more complicated, and with new terminology such as lumens and degrees Kelvin, the odds are stacked against the un-informed consumer to be able to make the best choice in efficient lighting. Furthermore, the rapid development of the LED market means that new manufacturers are entering this market with new products, some of which are of poor quality and may derail consumer adoption of LEDs. Promotion of ENERGY STAR certified products is incredibly important to ensure that products consumers are purchasing will meet their quality expectations. As such, the marketing and education work by efficiency programs is critical to successful consumer adoption of efficient

lighting. In addition to the savings potential, consumer education continues to necessitate that efficiency programs have a major role to play in residential lighting.

### **Lighting Program Savings: The Potential Threat of Stagnating Socket Saturations**

Despite more than two decades of CFL programs in Northeast states, most residential sockets are still filled with inefficient lamps. CFL socket saturations in the region currently range from approximately 28% to 35% (NEEP 2013). Socket saturation surveys completed over the last year and half in several Northeast States, including Massachusetts and Connecticut, indicate socket saturations of CFLs have stalled. The Massachusetts study is noteworthy as CFL socket saturation has remained statistically unchanged over four years despite the success of the MA program administrators (PAs) in promoting the sale of approximately 20 million CFLs in that timeframe. The evaluation team concluded that: “Despite high rates of penetration (i.e., households using CFLs), the number of CFLs in use and the percentage of sockets in which they are installed appears to have leveled over the past three years, *and there is evidence that recently purchased CFLs are largely being used to replace installed CFLs that have burned out.* Between 2009 and 2010, statistically significant gains were made in increasing the number of specialty CFLs in homes, but this increase was not repeated between 2010 and 2013” (NMR 2013, 57).

This observed stagnation raises questions as to whether a continued reliance on CFLs for the majority of lighting savings is the best path for PAs to pursue. 2013 saw large increases in the number of LEDs promoted through retail lighting programs. For 2014, several states in the Northeast have LED goals of 20 percent or more of their retail lighting program supported sales and the case studies explored in this paper will demonstrate how this is being achieved. As will be presented, LEDs have the potential to replace most of the holdover incandescent sockets.

### **The Northeast Residential Lighting Strategy: 2013-2014 Update Findings**

Given the importance of residential lighting measures and the complications of socket saturation, NEEP released the original Northeast Residential Lighting Strategy (RLS) in 2012. The RLS was then updated for 2013 and then again for 2013-2014 (NEEP 2013). One of the most important changes from the original RLS to the 2013-2014 Update was the very significant gains LED technology had made and how many more viable LED products there were available for efficiency program promotion, especially in the A-Lamp or standard omnidirectional product category. As such, NEEP and the RLS contractors, Optimal Energy and Energy Futures Group, adjusted our original assumptions to reflect the new advancements and opportunities with LED lighting. The team developed current and forward-looking assumptions for standard and specialty CFLs and LEDs, including net-to-gross (NTG) ratios, savings assumptions, annual hours of use (HOU), and the number of units to move through a program measured in bulbs per household. Table 2 below summarizes the estimates used for standard CFLs and LEDs through 2022. While this analysis was completed in late 2013, the estimates for some factors such as HOU will be updated in the 2014-2015 RLS Update, as a recently completed Northeast HOU Study provided HOU estimates of at least 2.7 hrs/day or 986 hrs/year, a large increase from the 1.9 hrs/day or 694 hrs/year analysis included in the 2013-2014 RLS Update (NMR 2014).

Table 2. Estimates for RLS projections for standard CFLs and standard LEDs

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
CFLs	HOU per year	694	694	694	694	694	694	694	694	694	694
	Effective measure life	7	7	7	6	5	4	3	2	1	0
	NTG ratio	0.50	0.40	0.35	0.30	0.25	0.25	0.25	0	0	0
	Net kWh saved (annual)	13.2	9.0	7.0	6.0	5.0	5.0	5.0	0.0	0.0	0.0
	# bulbs per household	1.80	1.55	0.95	0.55	0.25	0.10	0.10	0.00	0.00	0.00
LEDs	HOU per year	694	694	694	694	694	694	694	694	694	694
	Measure life	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
	NTG ratio	1.1	1.4	1.2	1	0.8	0.6	0.4	0.4	0.4	0.4
	Net kWh saved (annual)	33.7	38.3	30.6	26.0	21.1	16.0	10.8	10.9	6.7	2.5
	# bulbs per household	0.05	0.30	1.00	1.35	1.60	1.90	1.80	0.00	0.00	0.00

Given these assumptions, the RLS projects high levels of savings to remain for efficiency programs in the Northeast and Mid-Atlantic region for many years to come. It should be noted that this analysis assumes a high NTG ratio and implies a high spillover rate for LED technology. There has yet to be a study in the Northeast region to validate or disprove these LED assumptions. Figure 1 below demonstrates the high level of savings expected from residential lighting until 2022, especially significant until 2019. Standard and specialty CFLs both diminish their roles as stronghold program measures, with standard and specialty LEDs capturing a much more significant portion of the savings. While it is clear that the majority of remaining residential lighting program savings are in LEDs, why, when, and how programs should shift their promotions from CFLs to LEDs will be discussed in the following sections.

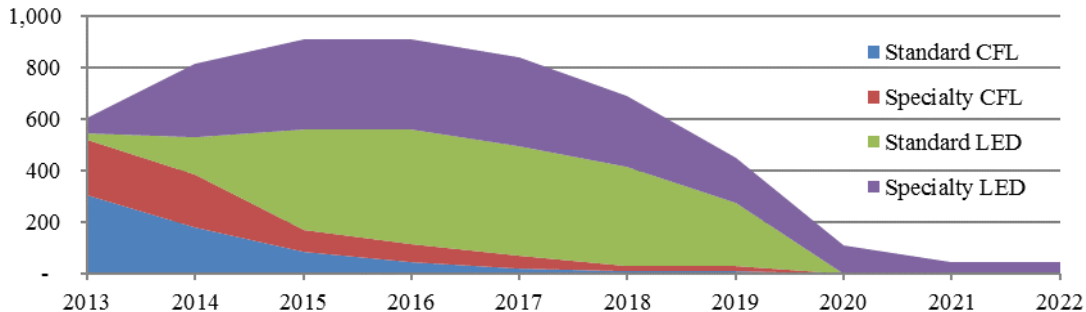


Figure 1. First year savings from residential lighting programs (GWh).

## Why and When Programs Should Shift from CFLs To LEDs

From the perspective of the energy efficiency programs, at what point do LEDs become the preferred technology to promote? At what point should programs eliminate their support of CFLs in favor of LEDs? And from the customer perspective, at what point do LEDs become the preferred technology to purchase and install in a living space? Answering these questions informs when the transition for programs from CFL to LED could and should occur.

### PA Perspective: When Do Leds Become the Preferred Technology Over CFL?

For efficiency programs, the answer as to when LEDs should be promoted over CFLs is best determined by an analysis that considers current and future savings, budget impacts, and

market transformation implications. All programs are driven by energy-savings goals that must be met within a certain budget and by the goal to help their customers successfully save energy and money. The question is: will we reach a point when LEDs deliver the same or greater savings to programs at the same or lower cost than CFLs with products that are as good or better? And if so, when? At this point, LEDs will offer more value to programs than CFLs and programs should purposefully shift their efforts to LEDs. PAs are starting to meet the needs of their customer base in switching to LEDs and supporting the advancements this technology can yield. In the Northeast, with some programs, some bulb types, and with evaluation net-to-gross factors included, we have reached this point. In Table 3, we consider both dimmable and non-dimmable 60W equivalent A-lamps using typical price points from a large home improvement retailer in the Northeast. As the availability of traditional 60W incandescents is diminishing, we used a 43W EISA-compliant halogen incandescent as the baseline for the analysis.

Table 3. Present day comparison of 60W equivalent CFL and LED A-lamp savings

	<b>CFL</b>	<b>LED</b>	<b>Dimmable CFL</b>	<b>Dimmable LED</b>
Product Price	\$2.50	\$9.98	\$11.97	\$9.98
Program Incentive	\$1.25	\$5.00	\$5.00	\$5.00
Net Consumer Price	\$1.25	\$4.98	\$6.97	\$4.98
Baseline Watts (EISA)	43	43	43	43
Efficient Watts	13	11	13	11
Hours per Day	2.8	2.8	2.8	2.8
Gross Annual kWh Saved	31	33	31	33
NTG Factor	0.4	1.0	0.8	1.0
Net kWh Saved	12	33	25	33
Program Net \$/kWh	\$0.10	\$0.15	\$0.20	\$0.15

From Table 3, it can be seen that with dimmable 60W equivalent A-lamps, and with NTG included, LEDs already offer a higher net savings and lower \$/kwh to energy efficiency programs than their CFL counterpart, at equivalent or lower consumer cost. Programs should shift their promotions to LEDs for this bulb type. For the non-dimmable type, LEDs offer much higher net savings than CFLs, but still at a higher \$/kWh. For these bulb types, programs have begun the transition to LEDs, but with an eye on budget impacts due to the LED's higher cost. In the non-dimming A-lamp scenario, programs must continue to direct a large portion of their portfolio to CFLs due to their lower cost. How long these CFL promotions must continue depends on many factors, including how quickly the price of LEDs continues to fall and individual program and market characteristics. With incentive included, the RLS review of LED pricing projections shows their cost becoming comparable to CFLs as early as 2015 for a 60W equivalent non-dimmable A-lamp (NEEP 2013).

### **Consumer Perspective: When Do LEDs Become the Preferred Technology?**

Whether or not consumers prefer or are willing to purchase LEDs must also be considered in the value LEDs deliver to the programs. When making light bulb purchasing decisions, consumers rate the performance (specifically brightness, lifetime, and energy use) and price of a light bulb as the most important factors (OSRAM SYLVANIA 2013). Performance can include many considerations, from brightness (light output), to efficacy, to longevity. It can include other features such as how quickly a bulb “warms up” or the color appearance of a bulb

(warm vs. cool). It may include whether a bulb is dimmable and how well it dims. It can include aesthetic considerations (will this bulb look good in my chandelier? Can I create a nice ambiance with this bulb?). Some consumers may even consider whether a bulb has a toxic material within it (i.e. mercury). When performance characteristics between halogen incandescents, CFL, and LED are considered in Table 4, LED is already the clear winner for consumers:

Table 4. Comparison of performance characteristics for residential lighting sources

Measure	Advantage	Description
Brightness/ light output	Tie: halogen, CFL, and LED	Halogen, LEDs, and CFLs are all available in a range of light outputs up to 100W equivalent.
Efficacy	LEDs	While EISA-compliant halogens are 28% more efficient than traditional incandescent, their efficacy is much lower than CFLs or LEDs. Many ENERGY STAR LEDs already far exceed the efficacy of the best CFLs. LED efficacy continues to improve while CFL and halogen efficacy has largely reached its maximum
Lifetime	LEDs	The ENERGY STAR Lamps specification V1.0 (ENERGY STAR 2013) requires a lifetime of 10,000 hours for CFLs and 15-25,000 hours for LEDs. Halogen lifetimes are typically around 2500 hours.
Warm-up	Tie: LEDs and halogen	Many CFLs require a warm-up period before they reach full brightness, in some cases taking several minutes. LEDs and halogens reach full brightness instantly.
Dimmability	Tie: LEDs (with correct dimmers) and halogen	Due to technological challenges, most dimmable CFLs dim to only 10-30% of their light output, while many dimmable LEDs on the market dim to 5-15% of their light output. Halogens are able to dim comparably to traditional incandescents
Aesthetics	LEDs for variety, LEDs tie halogen if goal to mimic incandescents	As a fluorescent technology, CFLs are not a point source and produce a “blob” of light. They are unable to produce “sparkle”, a desirable feature with some consumers, especially with decorative luminaires where the bulb is visible. As a small, directional source, LEDs are able to better mimic the “sparkle” of incandescent bulbs. The form factor of halogens is similar to incandescents.
Beam control	Tie: LEDs and halogen	Because CFLs are not a point source, manufacturers are unable to produce CFLs that precisely control the direction or “beam” of light. Alternatively LEDs can be designed with precise optics to precisely control the direction of light in the same way that incandescents or halogens are able to.
Hazards	LED	While both CFLs and LEDs contain electronic components and should be recycled, CFLs contain mercury, a dangerous neurotoxin. While toxic material is not a concern with halogens, they do get extremely hot and can be a concern for burns or fires.
Durability/ cold weather	LED	CFLs have poor performance in cold weather and Halogens are not much more durable than incandescents. LEDs are very durable and perform very well in cold weather.

This only leaves the price. While halogens are relatively inexpensive, their inefficiency and short lifetime leaves them out of the running for a long term option and off the table for efficiency program promotions. Will LEDs always cost more than CFLs? If they do cost more, will a consumer pay more for the better performance of LEDs? With rebates, we expect some programs in the Northeast will be able to reduce the price of LED non-dimmable lamps in the next few years to be a cost-competitive \$2-5. At this price, LEDs will continue to be slightly above the expected price of CFLs (\$1-3) and EISA-compliant halogen (\$0.50-\$1.50), but within range for many consumers. Low-income consumers may require additional incentives or other mechanisms to overcome the higher price hurdle.

When both the program and consumer aspects are considered, the time for the LED transition is already here for some bulb types and will be for many more over the next few years. The RLS analysis predicts that by 2018, CFLs will be only a small fraction of program portfolios in the Northeast. Figure 2 provides estimates from the RLS of In-Program bulbs by technology in each year to 2019 (NEEP 2013). As shown, LEDs will account for larger portions of program portfolios over time, potentially exceeding the volume of in-program CFLs as early as 2015.

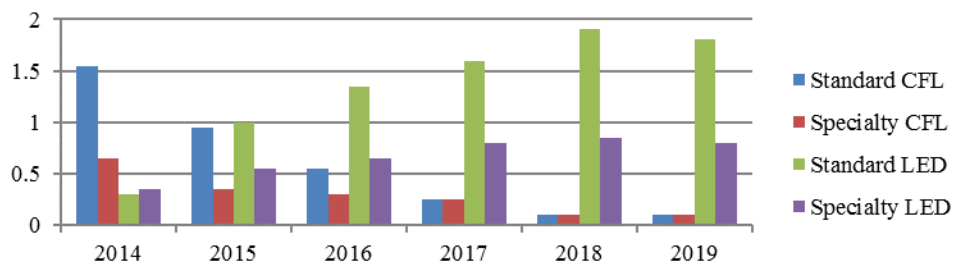


Figure 2. Predicted rate of bulbs moving through efficiency programs (# per household).

## Case Studies

In order to demonstrate the wide variety of programs, priorities, and opportunities in the Northeast and Mid-Atlantic region, five states were profiled to give a deeper understanding of their residential lighting programs now and into the future. In Vermont, Connecticut, Massachusetts and Rhode Island (National Grid), the opportunity and current scenario for successful integration of LEDs into residential lighting programs is becoming the priority. In New York, they are promoting LEDs in significant ways and also piloting a program to extract the last remaining savings from standards CFLs after having been faced with significant net-to-gross ratio challenges. The case studies outlined below demonstrate some of the breadth of activities in the residential lighting program space.

### The Vermont Case Study: LEDs and Retail Relations

Efficiency Vermont's (EVT) residential lighting programs are designed to have a dual impact: maximize holistic market transformation as well as increase immediate, cost-effective participation in Vermont. To do that, we engage with customers through traditional midstream retail markdowns as well as non-traditional outreach methods. Vermont has been incentivizing efficient lighting since the late 1980s, with EVT managing this effort starting in the year 2000. The vast majority of our promotions have moved from in-store coupons to midstream markdowns requiring effective partnerships with retailers and manufacturers across the state. These midstream promotions provide customers already discounted bulbs, requiring little effort from the customer. The 2010 implementation of a \$.99 campaign for CFLs across the state was very successful and yielded better product placement, new marketing approaches, and stronger retail partnerships, especially with independent retailers who are able to serve all of Vermont. According to an evaluation conducted every three years, in 2012, 33.4% of sockets were reported to be filled with CFLs or LEDs. That is an increase from a 19% socket saturation in 2009.

Over the last few years, we have also started to expand outside the typical engagement models. In 2009, Efficiency Vermont started a partnership with the Vermont Foodbank. This partnership allowed us to match a manufacturer with the Foodbank network to distribute light

bulbs to low-income Vermonters. In 2013 and 2014, we have started new partnerships with community groups, associations, senior centers, and ethnic groceries to work with existing community engagement networks and trusted sources. These trusted sources range from the Vermont Refugee Resettlement Program to the Korean Peoples Association to fourteen senior centers and these new outreach models are helping reach underserved Vermonters and fill new sockets. This further connection will allow EVT to continue to engage and transform the market for long-term sustainable impacts and reach more of our customers.

Efficiency Vermont has moved from just standard CFLs to a wide range of efficient lighting and increasingly toward LEDs. We have been incentivizing LEDs since 2008 starting with only instant coupons for LED downlights. The program now includes markdowns and buydowns on LED downlights, A19 omnidirectional bulbs, L-Prize A-Style winners, screw-based directional LEDs, and decorative LEDs. EVT has been both aggressive and cautious with LEDs. We set robust, bulb-type incentives to start, but limited our general incentives to omnidirectional bulbs (not non-standard) to ensure our customers have a great first experience. We are also continuing to maintain lumen minimums on decorative bulbs and give higher incentives for greater lumen bulbs. This structure has had a resounding impact on manufacturers; they have moved more premium products into Vermont as well as taken these requirements into account for future designs, model development, and bulb production.

We have also just piloted an additional outreach method targeting LEDs. In 2013, Efficiency Vermont was chosen (one of two programs in the nation) to participate in a Community-Based Social Marketing pilot hosted by the EPA. EVT and the EPA team co-designed the pilot, maximizing the ideas and contributions of both organizations in an effort to reduce electricity demand in one of Vermont's larger towns, Essex. The pilot, designed to be a school fundraiser, inspired students grades K-8 to sell ENERGY STAR certified LEDs for recessed cans to their friends and neighbors in order to save energy, save money, and raise for their school. While school fundraisers have been done before, the unique focus of this pilot was to design the program with the tenets of Community-Based Social Marketing keenly in mind, with carefully crafted messages and engagement tactics in order to tackle this community's market barriers in particular as well as focus on an extremely challenging socket that is not easy to discuss nor to replace: the downlight. Students in 3 schools elected to sell recessed cans, resulting in the impressive sale of over 1,000 LEDs in one month.

In 2013, Efficiency Vermont sold over 130,200 LED bulbs in a state with a population of just 626,000. LEDs made up 3.2% of the lighting portfolio in January 2013, but 38.6% of the portfolio in December. Normalized across the year, the average trend line for the year was 6% growth. CFLs still make up the bulk of the portfolio and continue to be reactive to our outreach methods. Overall in the efficient lighting market, there is still a great deal of engagement and influence we can have in moving the needle toward energy savings for Vermonters and we are continuing to try new methods of to make sure we reach customers across the state.

### **The Connecticut Case Study**

Through the Connecticut Energy Efficiency Fund programs offered under the Energize Connecticut initiative, lighting accounts for more than half of Connecticut's residential energy efficiency portfolio and is largely recognized as an important and achievable opportunity for utility programs to claim electric savings. The Department of Energy and Environmental Protection (DEEP) and the Connecticut electric distribution companies (EDCs)—Connecticut



Light & Power and The United Illuminating Company—acknowledge that lighting is essential to the overall success of CT’s residential energy efficiency programs. Furthermore, it provides a significant opportunity to connect with and influence a large portion of the customer base.

In response to Connecticut’s maturing residential lighting market and with the support of DEEP, the EDC’s have made a concerted effort to shift focus away from CFLs and heavily promote the stocking and sale of LED lighting. As part of Connecticut’s 2013-2015 Conservation and Load Management Plan, DEEP approved a significantly larger 2014 budget to allow for a concerted educational and marketing effort to increase the promotion and market penetration of LEDs. The EDCs are targeting an aggressive LED percentage of overall utility sponsored lighting sales. In 2013, LEDs accounted for 13.6% of sales. In 2014 and 2015, the EDCs are targeting 22% and 32.2% respectively and are expected to influence the sale of nearly 5.5 million CFLs and more than 2 million LEDs over the next two years.

To meet these lofty goals and influence the customer’s purchasing decision, the EDCs will continue to provide incentives for CFL and LED bulbs and fixtures; however, incentives have been adjusted to heavily favor LED products. In order to adapt to rapidly changing market conditions, the EDCs will continue to monitor the market and adjust rebate levels throughout the year as needed, hoping to impact the sale of LEDs, while strategically monitoring and adjusting incentives of CFLs downward such that they remain competitive compared to their EISA compliant alternatives. Furthermore, in response to declining retail prices of energy-efficient lighting and the desire to achieve maximum program cost-effectiveness, incentives have been reduced across the board and funding reallocated to support marketing and outreach efforts. Table 5 portrays the reduction in planned per/unit incentive levels from 2013 to 2014. In an effort to point customers to better-quality LED options, the EDCs will not provide incentives for any dimmable CFL products, but will continue to promote CFLs where LED alternatives are not yet widely available (e.g. three-way, high-lumen candelabra, etc.).

Table 5. Reduction in planned per-unit incentives from 2013 to 2014

<b>Technology</b>	<b>Classification</b>	<b>Incentive (2013)</b>	<b>Incentive (2014)</b>
CFL	General Service (Bare Spiral)	\$1.00	\$0.75
CFL	General Service (Covered)	\$1.26	\$1.00
CFL	Non-General Service	\$3.50	\$2.00
CFL	Fixture	\$10.00	\$10.00
LED	General Service	\$15.00	\$8.00
LED	Non-General Service	\$15.00	\$8.00
LED	Directional/Downlight	\$15.00	\$10.00
LED	Fixture	\$15.00	\$10.00

While DEEP supports the continued use of incentives for CFL and LED products to transform the residential lighting market, the greater focus will be on consumer education, outreach and cooperative marketing with industry. The EDCs are actively redesigning their strategic plan to comply with the regulatory direction established by DEEP which includes the following: better targeting of the market segment that has not yet replaced incandescent bulbs throughout their home as well as the market segment that is unlikely to invest in energy-efficient lighting (e.g. elderly, low-income, bi-lingual, etc.); increasing point-of-purchase education during high-traffic periods at as many retail outlets as possible; offering more comprehensive programmatic and technical training to retail associates and store managers; redesigning corporate and community lighting fairs to focus on educating customers about LEDs and provide

affordable LED product offerings; and leveraging industry partnerships with retailers and manufacturers in new and innovative ways to maximize the scope and cost-effectiveness of promotions. The hope is that with enough progress in market movement, ratepayer support for residential lighting might be able to be reduced in 2016, thus allowing funding to be shifted to support the adoption of other efficient measures.

### **The Massachusetts and Rhode Island Case Study: LEDs and Education**

An important component of successfully implementing LED promotions is educating the customer on their benefits, since they are a much different technology in comparison to CFL and incandescent bulbs. National Grid combines consumer education with program incentives as its strategy to incite customer trial. In addition to the more traditional sales approach—which includes buydowns and markdowns, school fundraisers, and an online catalog—National Grid has utilized short-term online sales promotions through media vendors and social media to introduce LED technology to its customers in Massachusetts and Rhode Island.

In 2013, National Grid developed a partnership with the Providence (RI) Journal’s online daily deal site, Deals in RI, to execute unique short-term sales promotions on energy efficient products in Rhode Island. National Grid piloted this effort because it was felt a partnership with a credible media vendor would be an effective way to educate customers regarding the benefits of LED technology. National Grid’s short-term sales promotion through Deals in RI in October was one of the top five most successful sales promotions in 2013 for the Providence Journal. National Grid partnered with Greenlite Lighting to offer six LED BR30 bulbs for \$20 and sold 4,158 bulbs in a week. The promotion was marketed through radio advertisements in the Providence DMA, four strip advertisement insertions in the Providence Journal newspaper, and three blast emails sent to an 85,000 person customer list. The marketing was focused on the deal National Grid was offering to its Rhode Island customers, in addition to the long life of the LED bulbs – a major selling point to customers.

As part of the Mass Save Lighting & Consumer Products collaborative (including Cape Light Compact, National Grid, NSTAR, Unitil, and Western Massachusetts Electric), MA PAs use the same marketing tactics to promote LED bulbs, but National Grid uses a different approach. Instead of working directly with a media vendor like Providence Journal, National Grid utilizes the Mass Save Facebook page ([Facebook.com/MassSave](https://www.facebook.com/MassSave)) to execute short-term sales promotions, sweepstakes, contests, and other customer engagement strategies. National Grid and the MA PAs partnered with an e-commerce retailer to execute a short-term sales promotion that included three Philips 830 lumen omnidirectional A-Lamps and one TrickleStar advanced power strip for a ten day sales period. The sales promotion exceeded expectations and sold a total of 7,500 LED A-Lamps and 2,500 advanced power strips in seven days, of which 4,389 LED A-Lamps were sold to National Grid customers. Over 7.8 million impressions were achieved through radio and Facebook ads, Facebook posts and tweets, and a blast email.

Promoting LED technology online has been an effective strategy for National Grid; however, using a direct sales approach is just as effective and provides National Grid with an opportunity to educate the customer to help overcome barriers to purchase. National Grid has partnered with TechniArt, a company that pioneered the concept of “pop up” retail within the energy efficiency industry, to implement short-term sales promotions at malls and at corporate energy fairs. TechniArt’s sales force is able to interface with customers, using an interactive lighting booth, to educate them about the benefits of energy efficient lighting and how to select

the right bulb for the right application. This approach works; during 2013, TechniArt sold a combined 26,176 LED bulbs to National Grid customers in Massachusetts and Rhode Island.

LEDs will continue to be a significant part of the MA and RI retail residential lighting programs. In 2013 in MA, LEDs represented 12.7% of the residential lighting measure mix (actual year end results), which equates to 23% of the savings. In RI in 2013, LEDs were 23% of the residential lighting measure mix (actual year end results), which equates to 31% of the savings. In 2014 in MA, LEDs will represent 15% of the measure mix of bulbs, which equates to 31% of the Residential Lighting annual MWh savings goal. In RI in 2014, LEDs are 14% of measure mix which represents 21% of the annual MWh savings goal.

### **The New York Case Study: LEDs and the Statewide CFL Sale Performance Program**

With the lighting industry in the midst of tremendous change with new standards, labels and technologies, the New York State Energy Research and Development Authority (NYSERDA) continues to focus on increasing the availability of next-generation lighting as part of its Residential Lighting Statewide Point-of-Sale (POS) Program. Funded through New York's Energy Efficiency Portfolio Standard (EEPS), the POS Program is made up of two separate approaches to promote ENERGY STAR® certified lighting; a market-lift style program for CFLs and upstream incentives for specialty CFLs and LEDs.

NYSERDA's POS program budget is approximately \$16.8 million (2012-2015) with a target goal of 1.3 million MWh of savings, which accounts for 25% of the overall target goal for the entire EEPS program portfolio. The POS Program takes a market transformation approach by providing retail and manufacturer partners buydown/markdown incentives. However, NYSEDA only provides upstream incentives for specialty CFLs (SCFLs) and LEDs. In 2012, NYSEDA incentives originally began at \$8/LED and \$3/SCFL, but were significantly lowered to \$3/LED and \$1.50/SCFL due to the high demand and reduced bulb prices, especially for LEDs. Building upon the success of the previous POS Program, which strictly focused on standard CFLs, NYSEDA transitioned to promoting LEDs and SCFLs. This was due to declining net-to-gross (NTG) ratios for standard CFLs due to increasing free-ridership and market transformation. However, recent findings of low socket saturation indicate significant savings potential for standard CFLs and that there is still a role for them in the POS Program.

To avoid the low NTG of upstream incentives for standard CFLs, NYSEDA created the CFL Sales Performance Program (SPP), a market-lift style initiative that rewards retailers or manufacturers for selling above their historical baseline sales. Launched in 2013, the SPP is different from other market-lift style programs in that it requires proposers to competitively bid on the available funding, so the lower the dollar per-bulb requested, the better. It also pays partial incentives even if the market lift goal is not met, reducing the financial risk for the retailer/manufacturer. NYSEDA's SPP is the first in the nation, at this large of a scale, to provide incentives to retailers and manufacturers for increasing sales of CFLs. This approach is more cost-efficient than relying on rebates or buydowns, which often include purchases that may have occurred without an incentive. Megalight, Inc., a U.S. based lighting manufacturer, was the first manufacturer competitively selected to participate in the program, with a goal to expand sales by one million bulbs. Under its agreement with NYSEDA, Megalight is partnering with discount retail stores across the state and several independent grocery/hardware stores in hard-to-reach markets. The project is expected to save at least 55 million kWh annually. In addition to the SCFL and LED incentives, NYSEDA is expected to save more than 980,000 MWh, for a

total POS Program savings of 1.2 million MWh. That equates to saving the energy needed to provide electricity for more than 184,000 homes over ten years. NYSERDA issued a second solicitation for proposals for the SPP which closed in early 2014. Proposals are under evaluation.

Since 2012, NYSERDA has sold a total of 941,440 bulbs, 440,157 of which were LEDs. There are currently a dozen other promotions expected to sell at least another 330,000 LEDs through the rest of 2014. Moving forward, as LED technology evolves and prices continue drop, NYSERDA anticipates future lighting initiatives to focus solely on LEDs. It is also evident that to increase socket saturation and customer satisfaction of next-generation lighting, outreach, awareness, and education are critical to ensure consumers choose the right bulb for the right use.

## Conclusion

In conclusion, efficiency program savings from residential lighting are not only persisting, but are projected to grow over the next five years, driven in large part by an increased focus on LEDs. As efficiency programs use innovative approaches to extract the last remaining savings from CFLs and begin to strategically shift their portfolio composition from CFLs to LEDs, these savings will be achieved. While the second phase of the EISA standard for general service lamps will affect program savings beyond 2020, for the medium term, residential lighting is a program measure that is alive and doing well.

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