

# **Defining a Framework for Comprehensive Commercial and Residential Lighting Programs**

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## **ABSTRACT**

In September 2009, President Michael Peevey of the California Public Utilities Commission, stated: "Capturing the full energy efficiency potential in the state requires more than simply providing rebates to support the installation of the latest and greatest widget - broader programs that support holistic approaches to energy efficiency are absolutely essential if we are to achieve the longer term vision and faithfully pursue energy efficiency as the resource of first choice."

While this statement indicates the importance of more comprehensive programs in California, the need expressed for more holistic approaches to energy efficiency are not unique to that state. All efficiency programs are facing the same challenges of anticipating the implications of new federal standards on voluntary efficiency programs as well as increasing efficiency savings goals. And while the movement toward more comprehensive program approaches will impact many end uses, lighting represents an attractive first opportunity. Efficiency programs are already beginning to offer programs that go beyond traditional one-for-one lamp and fixture replacements. Approaches vary but may include incentives or assistance for program elements such as lighting controls, design assistance or other systems approaches. This paper proposes an initial framework that includes core program elements, attributes and metrics that would together constitute a comprehensive lighting program. The intent of the paper is to identify a minimum suite of comprehensive program elements in an effort to help inform the direction and evolution of future programs.

This paper will begin to briefly describe the drivers for moving beyond traditional lighting efficiency programs and the challenges and opportunities these changes present to program administrators. We will then provide a definition and initial framework for a comprehensive program approach that applies in the residential and commercial sectors. The paper will map this framework to several programs that are beginning to offer more comprehensive lighting programs to meet their energy savings goals. Initial data and results will be shared regarding participation rates in the various programs, as well as early successes and lessons learned.

## **Background**

The Consortium for Energy Efficiency (CEE) currently manages the Commercial and Residential Lighting Initiatives, which are intended to support the development and harmonization of voluntary energy efficiency programs for the public benefit. The objectives of the committees, which are comprised of representatives from over 70 member organizations, are to enable CEE members to work together to:

- Develop and share the necessary information and resources to learn about lighting efficiency opportunities, stakeholders and markets;
- Support standard definitions of super efficiency and energy efficiency specifications for lighting products that can be voluntarily adopted by local and regional programs;
- Recommend program approaches and practices that will accelerate the market adoption of energy efficient lighting technologies and practices.

Many CEE members support lighting energy efficiency programs for their customers and these offerings vary by state, province and service territory.<sup>1</sup> These programs have had a substantial impact in the market, and a recent ACEEE report suggests that efficiency programs have saved more energy by installing lighting measures than through all other end-uses combined. For example, lighting accounts for approximately 60-75% of total savings claimed in five states with some of the largest electric program budgets per capita (Kushler, York & Witte 2009).

Recent changes to the lighting landscape have caused many efficiency program managers to question whether traditional measure based approach can scale to meet new goals and challenges and are rethinking their program strategies. These changes include:

1. **More Stringent Lighting Legislation** - The U.S. and Canadian governments have issued minimum federal efficiency performance standards for many lighting products, including general service incandescent and fluorescent lamps. The latest standards will go into effect in 2012, and the respective standard setting agencies are currently considering rulemakings to address additional lighting products, including ballasts, bulged reflector lamps, outdoor light sources and portable light fixtures. In addition, federal, state and provincial building codes are changing and efficiency programs must be able to respond to these changing baselines. One version of the "American Clean Energy and Security Act" (legislation, not law) is considering putting in place a national building code that would achieve a 50% reduction over current codes for both the residential and commercial sectors by 2015.
2. **Increased Energy Efficiency Savings Goals** - The increased price of fuels, growing concerns for global warming and constrained transmission and distribution systems have led states to establish demanding new savings goals for efficiency programs. Although the recent goals set by the California Public Utilities Commission are a good example (CPUC 2009), the trend is not unique to that state. Legislation has been passed in a number of U.S. states, including Minnesota, Illinois and Ohio, which require a specific energy efficiency savings equivalent to a percentage of total sales. Jurisdictions such as British Columbia, Massachusetts and Florida have also set ambitious savings goals for the next 10 years.
3. **Emphasis on Emerging Technologies** - Rapid progress in Solid State Lighting (SSL) research and development (DOE 2009) has resulted in the advent of LED for general lighting applications. Based on expert projections, LEDs and OLEDs have the potential to achieve a two-fold improvement over some of today's most efficacious light sources, while only marginal incremental improvements are expected for incandescent,

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<sup>1</sup> For more information, please see the [Commercial](#) and [Residential](#) Lighting Program Summaries, each of which include details about the prescriptive lighting programs offered by CEE members.

fluorescent and HID sources. In addition, there are many energy saving opportunities available by incorporating advanced lighting controls into lighting installations.

## Moving toward Comprehensive Programs

In response to this changing lighting landscape, CEE members, the lighting industry and U.S. government convened at several meetings recently to discuss the need for more comprehensive lighting programs (Table 1). Representatives generally agreed that the landscape changes create challenges for efficiency programs to meet new savings goals using one-for-one lamp or fixture replacement approaches. Efficiency programs expressed interest in working together and with lighting and government stakeholders to develop more comprehensive approaches that achieve meaningful savings. Participants also identified some of the challenges to these new program approaches, which include questions about what constitutes a more comprehensive program approach, limited performance metrics for system level efficiency, and a lack of independent studies on savings results.

**Table 1: Participants**

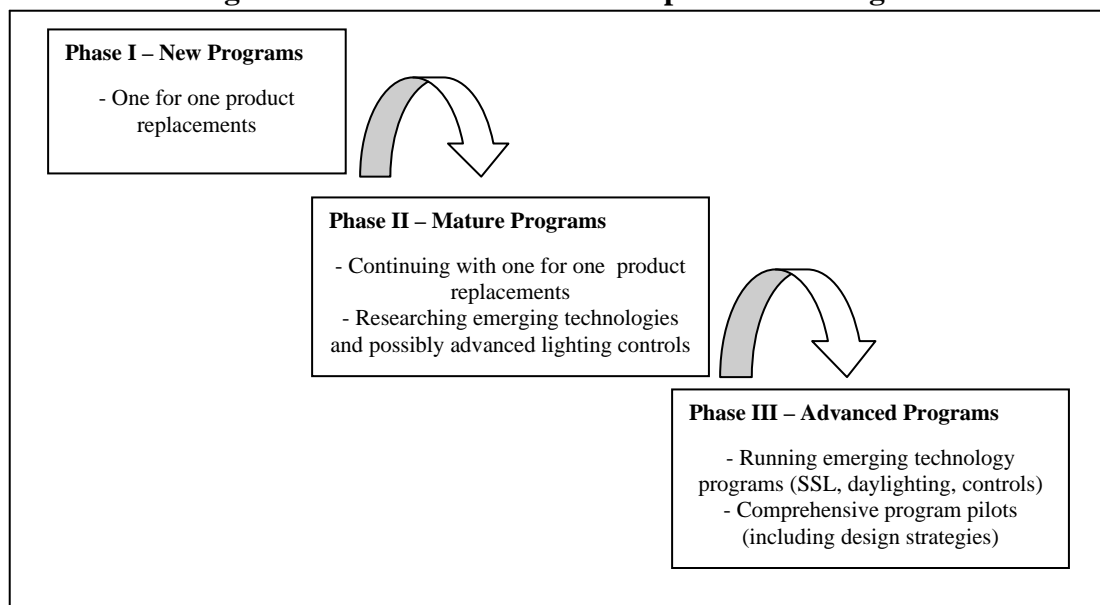
Stakeholder Type	Participating Organization	
CEE Members	Ameren	NYSERDA
	Avista Utilities	Oncor Electric Delivery
	BC Hydro	Ontario Power Authority
	Cape Light Compact	Pacific Gas & Electric
	California Energy Commission	PacifiCorp
	Connecticut Light and Power	Pacific Northwest National Laboratory
	Commonwealth Edison	PNM
	DTE	Progress Energy
	Eugene Water and Electric Board	Southern California Edison
	Efficiency Vermont	Sask Power
	Hydro Quebec	
	National Grid	Seattle City Light
	Natural Resources Defense Council	Sacramento Municipal Utility District
	NBI	Tacoma Power
	Northeast Energy Efficiency Partnerships	Wisconsin Division of Energy Services
	Northeast Utilities	Wisconsin Focus on Energy
	Northwest Energy Efficiency Alliances	Vectren
	NV Energy	
Government	US Department of Energy	NREL
	US Environmental Protection Agency	
Manufacturers	Acuity Brands	Lutron
	Finelite	Maxlite
	GE Lighting	Osram Sylvania
	Globe Electric	Philips Lighting
	Kichler Lighting	Progress Lighting
	Leviton	Satco/Nuvo Lighting
	LiteControl	
Other	American Lighting Association	National Electrical Manufacturers Association
	Integrated Building and Construction Solutions	

CEE has formed a Working Group to advance this new program model that has developed the following vision statement to help guide the group in its work: *"The working group strives to meet occupants' lighting needs and deliver aggressive lighting energy savings in the U.S. and Canada by supporting comprehensive program approaches that use a combination of traditional technologies, emerging technologies, controls, daylighting and design."*

One of the benefits of the Working Group is that participants have a chance to exchange information on these early program offerings. Program administrators of these comprehensive programs share their knowledge and experience with their colleagues, and all the participants are able to use these findings to inform their own voluntary programs. In addition, representatives of the lighting industry have the opportunity to provide their own input on the various program approaches. The result is better-informed program designs that can achieve a high-level of energy savings while supporting a combination of lighting technologies.

The group is working to develop a program pathway and guidance document called a "Program Guide" that will detail the transition to more comprehensive lighting programs and support efficiency programs in their attempts to deploy this approach in their local or regional efficiency pilots or programs. This document will likely include the savings potential, costs and benefits of including various technologies into comprehensive programs along with program delivery strategies to help identify key players and develop different messages for the various stakeholders. Figure 1 shows one example of the components addressed in each phase of lighting efficiency programs.

**Figure 1: Transition to More Comprehensive Programs**



The Working Group has made development of the Program Guide a priority for 2010, as participants would like to begin to launch more comprehensive programs in place by 2011 (before new federal minimum standards begin to take effect).

In addition to its work on the Program Guide, the Working Group will also be developing a "mass market" low ambient and task lighting retrofit offering for commercial offices. This is seen as an important addition to the Program Guide because it will provide an example of how the principles in the Program Guide could be made concrete. The end result will likely be a

formulaic set of resources to help lighting contractors focus on task lighting and decrease the overall amount of ambient watts in an office space.

While the content of the Program Guide is still under development, it is informed by the experience of energy efficiency programs that are already piloting more comprehensive approaches. The next section of the paper presents information on a few of these early efforts. These individual member pilots provide concrete examples of what comprehensive programs can look like and will be important in defining the larger effort. Table 2 details some of the core program elements of these early comprehensive pilots that will be considered as part of the Working Group effort.

## **Early Program Efforts**

### **Efficiency Vermont: RELIGHT PROGRAM**

Efficiency Vermont, the nation's first statewide provider of energy efficiency services (EV 2010), has historically offered prescriptive and custom project routes for a number of energy efficient lighting technologies. In recent years, the Business Energy Services commercial lighting technology initiative has implemented several programs in an attempt to address the lighting market comprehensively. These programs include incentives for "upstream" supply chain partners, performance-based commercial LED lighting, and most recently an initiative that involves professional lighting designers on commercial retrofit projects. The aforementioned programs were all complemented by extensive outreach and education efforts throughout the state of Vermont.

Recently, a number of factors – both market based and economic – have resulted in a significant decline in the program's commercial lighting energy savings. For instance, in 2009, Efficiency Vermont Business Energy Services experienced a drop of 35% in lighting measure energy savings vs. the prior year. There are several possible explanations for this decline. The first and most obvious reason is the downturn in the state and national economy. Businesses were less likely to invest in lighting upgrades at a time when sales were down and jobs were being cut. Beyond the economy, Efficiency Vermont's own success likely played a role. An Account Management program was highly successful in 2007 and 2008, resulting in the competition of many large lighting retrofit projects. Thus, projects with considerable lighting savings diminished significantly in 2009. Looking forward, sustaining high levels of savings in the commercial lighting market at Efficiency Vermont presents a daunting challenge due to increasing baselines that will result from upcoming changes in federal standards and progressively more stringent state regulation (as described in the background above).

As a result of the changing lighting market, Efficiency Vermont developed the RELIGHT program to seek additional energy savings through the inclusion of professional lighting designers on commercial lighting retrofit projects. Lighting retrofits have successfully been completed for years, resulting in significant energy savings. However, simple one-for-one retrofits that match new lighting equipment to the layout and light level of a previous lighting installation may not always achieve the maximum available energy savings. In fact, past Efficiency Vermont projects have shown that lighting designer involvement can significantly increase energy savings compared to standard one-for-one retrofits. Lighting designers have the ability to address not only the efficiency of the lighting equipment, but also the lighting layout, the light level suitable to the application, and the appropriate integration of lighting controls.

Beyond increased energy savings, redesign often also improves the project economics and the customer's lighting quality – uniformity, light level, and color – appropriate to the application.

Despite the tangible benefits recognized when working with a professional lighting designer, these services were infrequently utilized on lighting retrofit projects. The additional cost associated with hiring a designer for a lighting audit and/or design is often considered too great a barrier in a market where low- or no-cost audits and “design” services are offered by contractors, lighting distributors and manufacturer representatives. To address the cost barrier, the RELIGHT program offers a cost share agreement with customers to cover up to the full cost of a lighting audit, capped at \$2,000 per facility. Efficiency Vermont pays the customer 50% of the audit fee up front, and the remaining 50% is paid if the customer completes at least a subset of the designer recommendations.

The second component of the RELIGHT incentive structure is based on the energy savings obtained based on the designer's proposal. A designer's recommendation is measured against a pre-defined prescribed one-for-one retrofit measure as a baseline. The baseline determination and savings calculations are handled automatically by a RELIGHT Analysis Tool developed by Efficiency Vermont. A participating designer is required to input the customer audit results and their proposed changes. The tool is not a design tool, but rather an analysis tool for determining the appropriate baseline, the total customer energy savings, the design savings beyond the baseline, and the associated RELIGHT design incentive. The design incentive was structured to cover a significant portion of a designer's fees beyond the audit – in some cases up to 50% – assuming a design that goes well beyond the prescribed baseline. Each design is measured against both kW and kWh savings vs. the prescribed baseline. Regardless of the designer's involvement or design success, Efficiency Vermont downstream commercial lighting equipment rebates still apply for customers.

In order to participate in the Efficiency Vermont RELIGHT program, a lighting designer must be either Lighting Certified (LC) by the National Council on Qualifications for the Lighting Professions (NCQLP) or a licensed Professional Engineer (PE) in the state of Vermont. Further, designers are required to sign a Design Agreement that outlines the programs goals, requirements and restrictions. The agreement covers, in great detail, expectations regarding professional behavior, code compliance, non-proprietary recommendations and conflicts of interest.

RELIGHT was announced to the design community and the public at the annual Efficiency Vermont Better Buildings by Design conference on February 11, 2010. The program is being promoted through the Efficiency Vermont website, the *Lighting eNews* electronic newsletter, and through Efficiency Vermont field staff. Efficiency Vermont began enrolling qualified professional designers into the RELIGHT program in March 2010. Business Energy Services intends to channel 10% of 2010 commercial lighting retrofit projects through RELIGHT, with the goal of those projects experiencing an increase of 40% in energy savings vs. a standard one-for-one retrofit. In 2011, the RELIGHT program is expected to cover 15% of lighting retrofit projects.

As opportunities to obtain energy savings become more challenging, Efficiency Vermont is continually seeking out new energy efficiency markets and technology opportunities. Efficiency Vermont is willing to commit resources to gaining additional savings through RELIGHT - an innovative lighting design/retrofit initiative now available to Vermont businesses.

## Massachusetts

The Massachusetts energy efficiency service providers and utilities (known hereafter as the "Sponsors") have decided to explore an effort that would promote comprehensive lighting solutions for residential customers. The programs have traditionally focused their efforts on affecting market transformation from incandescent lighting to compact fluorescent lamp (CFL) technology.

With this concentration on sales and direct installation of CFLs, a recent study on socket saturation in Massachusetts (Ledyard et al. 2009), has indicated that approximately 30% of available sockets have been filled since the programs launched in the early 90s. The programs garnered success, especially in terms of the upstream promotions, to achieve a higher number of CFL sales at lower pricing to the customer. However, this model has become increasingly challenged as questions arise about the lack of pricing differentials and sales in the participating and non-participating markets.

These questions have led Sponsors to supplement their traditional programs with an exploratory effort that promotes comprehensive lighting for residential customers. For the initial phase, the Sponsors decided to focus their efforts on residential new construction projects. In the residential new construction arena, specifically the ENERGY STAR Homes Program, the Sponsors have the ability to affect the home in the design phase. Additionally, at the time of the lighting design, the incremental cost to upgrade may be small or non-existent.

Traditional lighting programs have previously been constrained to hard-wired and portable fixtures and screw-based CFLs. However, residential end-users do not typically confine themselves to the same boundaries, and installed fixtures can range from the traditional lighting types mentioned earlier to more commercial fixtures such as linear fluorescents. The Massachusetts program pilot considers all lighting eligible as long as it's more efficient than the lighting within the original plan. Although controls have become a staple in commercial and industrial energy efficiency programs, there have not been many studies to verify savings associated with lighting controls in the residential market. While the Sponsors do not have a prescriptive list of controls, they are interested in evaluating the impacts of daylighting, occupancy, dimming and automation through this pilot.

The Sponsors have been targeting motivated design/build teams and/or owners that have an interest in reviewing their lighting plans. The Sponsors and design/build teams will then work to choose a compatible NCQLP lighting certified designer. This integrated team approach has been proven to be effective in projects undertaken by the US Green Building Council, and helps to ensure that the lighting solution will satisfy the homeowners needs.

Rather than measuring savings based upon sockets, as is traditionally the case in Residential lighting programs, this pilot will emulate many of the commercial and industrial custom programs that review total energy savings. In this pilot effort, the Sponsors have offered to pay for the services of the lighting designer and then pay incentives based upon the estimated energy savings from the original to the proposed plans for the entire lighting package. Although this does take more time to execute as a custom savings measure, the Sponsors hope to begin creating more prescriptive recommendations for certain rooms that may be leveraged to help with future homes.

The pilot effort began late in 2009, and many of the efforts will take place in 2010. At this point, one project in Boston has been identified, assessed, and awaits their proposed incentive package. As well, two projects in Martha's Vineyard will be assessed within the first

two quarters of 2010, and others are being identified. Initial results show that the design/build teams are enthusiastic about learning more about their lighting and that there are some energy savings to be realized through this approach. With more projects and monitoring, the Sponsors hope to more fully flesh out this program element.

### **Wisconsin Focus on Energy**

The Focus on Energy was created by Wisconsin state legislature in 1999 and is the statewide energy efficiency and renewable energy program. The goal of the program is to achieve direct energy savings (kW and kWh) and market impact by implementing energy efficient projects that would not otherwise occur.

Focus programs have a strong market component and strive to work within the existing market delivery structure to shape the demand for specific products and services so that energy efficiency becomes an integral part of the sales process. Like the previous programs, the Focus Business Programs prescriptive lighting incentives have been structured around one-for-one simple replacement products with fast paybacks that are very effective in achieving energy savings. However, these programs can result in less comprehensive overall design and leave opportunities for additional savings on the table.

In early 2009, Focus on Energy rolled out a pilot program to evaluate a "Whole Building Lighting" retrofit offer, which encouraged customers to consider an entire facility's lighting system when making upgrades to an existing building. The pilot program was focused on school and government buildings, as Focus had found that these customers had taken advantage of earlier incentives for specific fixtures, but had passed over other parts of the building because of the longer payback period. Focus staff identified that lighting systems in many existing school and government facilities were built to meet a "lowest first cost" requirement with little emphasis on a comprehensive lighting design. Program staff also observed that many buildings were built prior to publication of the Illuminating Engineering Society of North America's (IESNA) Lighting Handbook in 1979, and incorporated light levels that were much higher than what is acceptable today.

The Focus Program worked with trade allies to develop a structure that encouraged a team approach with the customer, trade ally and Focus program to evaluate and maximize the design process for the entire building. The pilot provided a financial incentive to the customer and the project's professional lighting designer based on the energy efficiency potential of the design. One goal of the program was to minimize the lighting power density (LPD) by designing to the specific task and activities in each zone, while using the most efficient technologies available. The incentive calculation was based on a LPD reduction below ASHRAE 90.1-2004 requirements (current Wisconsin energy code), and to be considered, the design was required to be 10% lower than code. In order to stimulate aggressive design, the incentives were set to increase in a non-linear method, so that more energy efficient designs were rewarded at a higher level than the traditional replacement approaches. The designer was required to be a NCQLP certified lighting designer (LC), a PE trained in lighting design, or equivalent, and was awarded 10% of the total incentive to off-set the cost of the increased design time and for additional motivation to participate.

After verifying that the candidate was appropriate for the pilot, program staff provided the customer with tools to assist with the audit process and calculation of the existing LPD in the space. The customer would then obtain proposals from lighting designers and installers, who



were required to indicate how they proposed to reduce the LPD and were required to document both initial and maintained foot-candle levels of their design as well as proposed changes in space use or redesign. Lastly, design professionals were required to provide appropriate lighting levels and verify that in any spaces that levels were reduced, the reduction is acceptable to the customer. Evaluation of the proposals was made by the end user based on the energy reduction, cost, and proposed design components.

**Table 2: Core Comprehensive Program Elements of Early Pilots**

<b>Program Elements</b>	<b>Massachusetts Sponsors</b>	<b>Efficiency Vermont</b>	<b>Wisconsin FOE</b>
1. Incorporates existing technologies, emerging technologies, controls and/or daylighting	✓	✓	✓
2. Lighting designers involved in each project	✓	✓	✓
3. Promotes whole house and full facility upgrades (70% of qualified floor area)	✓		✓
4. Promoted to lighting providers and end users	✓	✓	✓
5. Non-linear incentive approach		✓	✓
6. Baseline assessments of spaces required	✓	✓	✓
7. Incentive based on performance compared to code			✓

## Program Results and Early Lessons Learned

The Efficiency Vermont, Massachusetts and Wisconsin Focus on Energy programs are less than one year old, and at this time, only Focus on Energy has preliminary energy and market transformation results to report. This section includes those energy savings results provided to date as well as some common lessons learned as the program administrators develop their programs.

### Focus on Energy Program Results

The pilot produced projects in nine buildings, ranging from 40,000-235,000 square feet which resulted in 23% reduction in annual operating hours and a total of 767.9 kW total demand reduction and 2,095,592 annual kWh reduction. This translates to \$187,552 in annual total energy costs savings (or \$0.24 per square foot) for the school districts, and an average of 36.5% reduction of lighting power density below ASHRAE 90.1. Savings were achieved without reduction in the light levels in classrooms and office spaces below IESNA recommended light levels; in fact, some spaces that initially were under-lit were re-designed so that they now meet current recommendations. The implementation costs averaged \$1.27 per square foot and the program provided an average incentive of \$0.39 per square foot, resulting in an average payback

of 4.2 years. The Focus on Energy pilot program generated \$1,785,976 of work for trade allies and resulted in environmental reductions of 2,183,963 tons of CO<sub>2</sub>, 5,824 tons of N<sub>2</sub>O, and 9,828 tons of SO<sub>2</sub>.

## Early Lessons Learned

The three pilot programs have reported several key program considerations and lessons learned thus far:

- It is important to identify a metric that can incorporate a range of lighting technologies (including controls) while being easily measured. A main goal of the Efficiency Vermont RELIGHT program is to heavily emphasize and encourage the use of lighting controls, and that program deemed it necessary to define a baseline other than LPD. It was important for their program to account for lighting controls without accounting for hours, as operating hours can vary dramatically and they didn't want to penalize facilities that were supporting fewer shifts. Efficiency Vermont determined that calculating the percent improvement in annual kWh use vs. the prescribed baseline would be the best metric for their pilot. In doing so LPD and controls reductions can be accounted for without any influence of the facility operating schedule, assuming the schedule remains the same pre- and post-retrofit.
- It is essential to choose a proper baseline and set the requirements accordingly to ensure an aggressive amount of savings from each project. The 2009 Focus on Energy pilot included a requirement that the proposed design be at least 10% lower than the current Wisconsin energy code. In evaluating the 2009 projects, Focus on Energy found that projects were able to achieve that requirement and have modified the requirement to be a more stringent 20% below code for 2010. Efficiency Vermont found that many common retrofit measures could easily exceed their code baseline, and that this baseline would not work for their program.
- To avoid confusion during or after the project completion, it may be necessary to plan for heavy efficiency program staff effort up front to focus support of customers and designers at the beginning of the project to assure that all parties understand the program parameters. Initially, Efficiency Vermont considered excluding designers who were also involved in the sale of lighting equipment due to the potential conflict of interest. Upon further consideration, it was decided that such designers could participate assuming that they agreed to a Designer Participation Agreement which addressed, among other items, those conflicts of interest. Although the development of these types of agreements up front may be time consuming, they can help to ensure that all parties are satisfied. Focus on Energy is planning for an increased amount of up front staff time for their 2010 program.
- Develop partnerships with or seek the endorsement of local or regional trade ally organizations to gain an audience with key influencers of this market. For example, Efficiency Vermont arranged to sponsor a local test site for the 2010 NCQLP Lighting Certification exam as one way to increase the number of designers eligible for the RELIGHT program and to increase the lighting knowledge and experience of the Vermont lighting market as a whole. In addition, some contractors indicated their hesitation in recommending the RELIGHT program to customers as they feared that once

a lighting designer became involved, the project may be put out to bid and they'd lose the work. In an attempt to maximize project opportunities while providing a benefit to referring partners, Efficiency Vermont will be implementing a referral bonus to any trade ally.

- Make use of proper design to secure energy savings by lighting the space to the task requirements and reducing the light levels in over-lit areas. Focus on Energy found that many offices were lit to support paper based tasks that have since moved to computers. The Massachusetts Sponsors note that many residential stock lighting plans have a set number of fixtures and sockets for certain areas, and residents may not use the lighting in the same manner that it was intended. The Massachusetts program believes that it can achieve additional savings by matching the design to the functionality required in the home. Improving the luminaire optics and components can also provide higher efficiencies at lower wattages. Focus found that several projects in the 2009 pilot achieved 0.55 W/sq ft, and the program will be responding by lowering the demand evaluation curve to a maximum value of 0.55 watts/sq. ft. rather than the 0.7 watts/sq. ft in the pilot.
- Explore use of building management systems control technologies. These offer the potential to allow sophisticated scheduling of lighting equipment and integration of lighting system control with HVAC and security system operations.

## Next Steps

As mentioned previously, the Working Group plans to capture these program designs in a Program Guide. In addition to information on lighting technologies and the various market segments, the Program Guide will outline the core elements of comprehensive program approaches, as well as the appropriate evaluation measures and messaging to support the program designs.

CEE's work will focus on supporting programs as they transition to comprehensive approaches by developing the necessary tools, such as the Program Guidance document and "mass market" low ambient and task lighting retrofit offering, to help them move forward more quickly and enable them to capture the significant energy savings opportunities available in the lighting arena. Specific next steps for CEE's work in this area are listed below.

- Independent Work - Comprehensive Lighting Working Group participants will share the outcomes of their early program efforts to help inform the collective knowledge of the group. They will also share any local drivers or regulatory concerns that arise related to their individual programs.
- Collective Work - The Working Group will continue to meet regularly throughout 2010 to continue progress on the Program Guide. The first task (already complete) was to define the high-level topics for that guide and to identify the data and research needed to populate the content of each section. The Working Group will also focus in 2010 on developing a formulaic low ambient and task lighting retrofit offering for the office market. Eventually, this type of approach would be used in place of the standard one-for-one replacement programs. As progress is made on both of these fronts, news will be posted on the CEE Web site and presented in relevant forums such as CEE's three annual

Program Meetings and the CEE-ACEEE National Symposium on Market Transformation.

- Outstanding Data Needs- The discussions in this group also suggest a number of other areas where gaps exist and the Working Group will assess the best ways to address these over time. Participants have specifically identified the need for 1) More independent controls studies and market research on the energy savings potential of lighting controls within various commercial and residential space types to make it easier to justify programs 2) Definitions of component and device interoperability to enable more integrated lighting systems 3) Industry accepted system-level energy efficiency performance metrics to facilitate the use of advanced lighting controls and design in projects and 4) Better consumer education pieces to help choose between light sources and make decisions based on lumens rather than watts.

## Conclusion

The challenges and opportunities facing lighting program managers today require a new approach that is long-term, well-informed, and leveraged. Working together with other efficiency program managers, manufacturers, and industry stakeholders is a critical part of successfully transitioning to more comprehensive lighting program approaches. The Comprehensive Lighting Working Group has already begun to serve as the forum for that cross-industry dialogue and is well positioned to deliver resources to the efficiency community that will enable greater lighting energy savings to be achieved well into the future.

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