



**Comments of Northeast Energy Efficiency Partnerships (NEEP)
To the Massachusetts Energy Efficiency Advisory Council (EEAC)
Regarding the Draft 2016-2018 Joint Statewide Plan
May 28, 2015**

On behalf of Northeast Energy Efficiency Partnerships, I am pleased to offer input on the draft of the 2016-18 three-year energy efficiency plan (“the plan” or “joint proposal”).¹ NEEP is a regional non-profit whose mission is to serve the Northeast and Mid-Atlantic to accelerate energy efficiency in the building sector through public policy, program strategies and education.

Our vision is that the region will fully embrace energy efficiency as a cornerstone of sustainable energy policy to help achieve a cleaner environment and a more reliable and affordable energy system. NEEP is designated by the U.S. Department of Energy as the Regional Energy Efficiency Organization (REEO) serving the Northeast and Mid-Atlantic states.

We appreciate the tremendous collaborative work done to develop the first draft of the 2016-18 plan, and are gratified to see that many of the suggestions made through prior public input sessions and EEAC workshops are either in this draft or under consideration. We look forward to seeing more specifics on those innovations in the final plan.

Much to Applaud; Further to Go

NEEP is pleased to see elements such as the Renter Initiative; the increased targeting of outreach and support for specific market sectors; and that the program administrators (PAs) will continue to work with DOER and other stakeholders to develop the technical and economic case for a variety of proposed state-level appliance standards. NEEP has long advocated for the PAs to engage in, and receive credit for, their work to advance building energy codes and appliance efficiency standards.

Massachusetts officials and the program administrators should be proud of their past successes, including being acknowledged as the state with the most aggressive efficiency policies in the nation. While the Commonwealth has had some of the most ambitious program savings goals in the nation, there is always more to be done, as technologies and best practices advance.

That is why we are disappointed to see not only a leveling off of proposed goals by the program administrators, but a marked decrease in savings targets for both gas and electric programs from their 2015 levels.

¹ These comments are offered by NEEP staff and do not necessarily represent the view of NEEP’s Board of Directors, sponsors or underwriters.

While the plan makes note of the fact that it would keep Massachusetts among the nation's leaders in energy efficiency, the fact is that other states – most notably our neighbor to the south, Rhode Island – are aiming for greater efficiency program savings than those proposed by the PAs.² There is no reason to believe that the achievements of 2014 were a high water mark. Even though some savings may, indeed, be tougher to achieve, as technologies advance, there remain plenty of cost-effective savings on the table.

Focus on Efficiency as a Resource

Language in the proposed plan seem to portray energy efficiency as an added “cost” to be borne by ratepayers and other consumers, as opposed to the reliable, affordable, clean and sustainable “resource” it has proven itself to be, and of which the PAs are bound by state law to procure the maximize amount that proves to be cost-effective. Efficiency remains the least-cost resource and can help Massachusetts meet a myriad of statutory goals, including those laid forth the Green Communities and the Global Warming Solutions Acts of 2008.

Upon review, we have some concerns that the PAs have underestimated cost-effective savings potentials, largely by overestimating the costs to deliver the programs. **We believe that more work needs to be done on the input assumptions, with some specific program areas – notably, high efficiency lighting and building energy codes – presenting significant questions.**

NEEP agrees on the importance of keeping the interests of ratepayers in mind when designing and delivering programs. However, we remind the program administrators as that energy efficiency has been, and continues to be, the least-cost energy *resource* available to ratepayers, and the Green Communities Act charges that all cost-effective efficiency be captured before new supply resources are procured.

The current draft plan includes benefit-cost ratios of 2.38:1 for electric and 1.78:1 for gas. Anything better than a one-to-one return on investment is still cost effective, so even with changing baselines, there should still remain considerable cost-effective efficiency potential across sectors and service territories.

The EEAC consultant team has also reviewed the proposal, and, based upon the PA's targets of 2.5 percent electric and 1.08 percent gas savings by 2018, has concluded that those goals are well below what is technically and economically achievable. Based upon the track record of the PAs in delivering innovative, professional and best-in-the-nation efficiency programs, NEEP would agree.

The draft plan puts a high emphasis on mitigating bill impact. While one important factor to consider, it is the ultimate responsibility of the Department of Public Utilities (DPU) to evaluate bill

² Rhode Island Public Utilities Commission. Docket #4443. [Energy Efficiency and Resource Management Council's Proposed Electric and Natural Gas Energy Efficiency Savings Targets \(2015-17\)](#). Page 27. (Identifying target electric savings as a percent of retail sales for 2015-17 as 2.5 percent, 2.55 percent, and 2.6 percent, respectively)

impacts.³ It is the role of the program administrators to develop and propose plans that identify all cost-effective energy efficiency opportunities, i.e., those programs that have a benefit-cost ratio of greater than 1. Please see our expanded discussion on pg. 6 on short-term bill impacts.

Revisit Assumptions in at Least Four Main Areas

1. Lighting Pricing and Assumption Analysis

NEEP appreciates the program administrators' desire to make upstream lighting programs easy and "plug and play" for the distributors and manufacturers involved in their upstream lighting program (page 150 of the plan), yet covering 100 percent of the incremental cost as proposed may not be necessary to incentivize customers. Retail upstream lighting programs have been successful throughout the country for years that did not cover the entire incremental cost.

This is especially true for LED technology that is more expensive but of higher quality and longer life; consumers have still been making the decision to purchase LEDs at a higher price point. For this analysis, as distributors and manufacturers are adjusting to the upstream model and the LED technology, a higher incentive might be appropriate. However, over the 2016-2018 timeframe of the plan, the need for a higher incentive to cover the entire incremental cost will diminish as the distributors appreciate the higher quality of the LED product.

Challenging Assumptions on LED Costs

The price of LEDs has dropped markedly in recent quarters, and will continue to do so throughout the period of the 2016-18 Plan. As documented in numerous regional and national sources in Appendix 1, including research from the U.S. Department of Energy and NEEP's Northeast Residential Lighting Strategy, the trajectory of LEDs is definitively downwards. Not only are the total product costs decreasing, but the costs of LED components are decreasing across the board.

Flat pricing projections in the PAs analysis will yield distorted prices for Lighting programs, both Residential and C&I, and should be adjusted to the referenced 20 percent reduction per year. Furthermore, the PA assumption of \$15/bulb for LEDs throughout the 2016-2018 Plan is not consistent with many data sources showing much lower prices available already. See Appendix 1 for more details on potential assumptions for prices. NEEP's expert opinion is that the starting point of \$15 is too high.

2. Street Lighting Presents Enhanced Savings Opportunities

- **Street Lighting Retrofits would help PAs achieve C&I targets they've been missing.**

³ Mass. DPU Order 08-50-B <http://web1.env.state.ma.us/DPU/FileRoomAPI/api/Attachments/Get/?path=08-50%2f102609dpuord.pdf>

Cape Light Compact was the only PA that came close to their 2014 C&I goals ([electric summary by PA tab](#)), reaching 157 percent of their goal while none of the others reached the 90 percent mark. Cape Light is currently the only PA actively pursuing street lighting retrofits.

- **The EEAC consultants recommended 60 percent conversion as economically achievable within the next three years.**
Acting on recommendations of NEEP and the DOER, the consultants suggested that 60 percent conversion is economically achievable within the next three years ([pg. 5](#)).
- **The proposed Plan does not envision large-scale conversion, instead citing willingness to work with municipalities seeking to purchase and convert their inventories.**
The draft Plan notes that ([pg. 143](#)) the PAs are “committed to providing their municipal customers with the most up-to-date street lighting technology options – including lighting and controls.” The Plans fall short of a commitment to offering such options, and seem to focus on allowing purchase for conversion. NEEP stresses that **Municipal street light purchase doesn’t need to be a prerequisite for energy savings.**
- **Tariff revisions are necessary.**
The PAs’ response to the consultants recommendations notes that “The PAs are also committed to supporting the conversion of utility-owned streetlights to LED technology once the electric utilities in the state have developed, filed, and had approved the necessary tariffs.” ([pg. 6](#))
- **DOER could petition the Department of Public Utilities to open a docket on Street Lighting Tariffs.**
Last month, Governor Baker’s Administration directed the DOER to open a docket ([15-37](#)) to investigate acquisition of natural gas delivery capacity. The same could be done for street lighting tariffs, possibly as a condition of or contemporaneous with 3 year plan approval. Both utility-owned and customer-owned tariffs should allow for incorporation of wireless controls and individual metering.
- **A docket covering new tariffs should also cover incentives for conversion of company-owned fixtures.**
The PAs’ Q2 2015 progress report states that “Unitil will work with the other PAs to establish a protocol for using energy efficiency funds to incent conversions to LEDs for utility owned lighting,” ([pg. 10](#)) but to NEEP’s understanding, this has not yet happened. This would be a key step forward for lighting conversions.

3. Need to Revisit Assumptions on Building Energy Codes

In proposing their energy efficiency savings targets, the PAs note that “... as baselines continue to increase as the energy efficient measures the PAs incentivize become the industry standard,

available savings decrease.” In their presentation to the EEAC on May 20, the PAs further claimed, under the heading of “New IECC,” (International Energy Conservation Code), on which the Massachusetts building energy code is based, that the “New code has lowered potential savings from 2013-2015 levels by at least 15%.” Initiatives impacted by this code change, according to the PAs, include “Residential New Construction and C&I New Buildings.”

However, NEEP would point out that the assumptions the PAs are using in this regard, are, in fact, inaccurate, which would suggest that the baseline assumptions used by the PAs in identifying potential savings opportunities are, therefore, also inaccurate.

First, the 2015 version of the IECC, which was published in June of 2014, will be the model code on which the next Massachusetts building energy code is based. However, analysis done by the U.S. Department of Energy, as required by federal law, has revealed that the increase in building energy efficiency between the prior version of the model code (2012) and the 2015 version is, in fact, just **1 percent** for residential sector buildings and **8 percent** for commercial buildings.

Note that the commercial figure was calculated from the commensurate increase in efficiency between the analogous versions of ASHRAE Standard 90.1 (2010 and 2013). The changes between the 2012 and 2015 IECC are more related to a change in code compliance mechanisms and methodologies – evolving from a more prescriptive compliance path to a performance-based path – than in actual energy savings advances themselves.

Thus, assuming a building energy code that is 15 percent more efficiency than the prior code, as the PAs have indicated, is simply wrong and will thus affect the baselines on which the PAs are basing their potential energy savings calculations.

Second, the Massachusetts Board of Building Regulations and Standards, which promulgates the Massachusetts building codes, including the energy codes, has yet to schedule hearings to adopt the 2015 IECC as the basis for the statewide building energy code. Therefore, even if a code hearing was scheduled imminently, the public notification and comment period, as well as the mandated adoption period, would mean that Massachusetts would not have in effect a new building energy code until January of 2017, under the most likely adoption scenarios.

It should also be noted that this schedule does not take into account dissensions being raised on the adoption of the new code from fire officials, who have argued against requirements for low-E window glass in the 2015 IECC. The resolution of this issue is highly likely to delay adoption of the next version of the Massachusetts building energy code even further.

In addition, a recent executive order from Gov. Charlie Baker is also requiring all state agencies to undertake a comprehensive review of all state regulations, including the building codes, to determine the extent to which they may exceed any federal regulatory requirements. This development is also likely to push back the adoption of the 2015 model building energy code even further, meaning that for a large share of the 2016-2018 program years, the state will still be operating under the 2012 building energy code.

For these reasons, **NEEP would suggest that the PAs assumptions regarding changes to building energy baselines resulting from code changes is flawed**, with those assumptions also leading to an underestimation of the savings available in residential and commercial new construction and renovation, as well as building retrofits.

Further, NEEP is also disappointed that there is not mention in the draft Plan of enhanced training to increase code compliance such that the PAs may claim energy savings credit from such training. By way of background: in February 2013, NEEP's EM&V Forum published a report on "Attributing Building Energy Code Savings to Energy Efficiency Programs," which included an inventory of efficiency programs across the country that support code activities; assessments of the evaluation and attribution methodologies for supporting code activities; and recommended pathways for PAs to pursue in order to claim savings from code support activities. As the report noted, in summary, "By receiving credit for energy savings, PA efforts become directed towards positively impacting code adoption and maximizing compliance."

Shortly after the publication of this report, the state of Rhode Island ordered its program administrator, National Grid, to develop a methodology and plan for supporting both building energy code and appliance standards advancement activities in the state. That methodology and plan was approved by state regulators in 2013.

As National Grid is positioned to offer a similar initiative in Massachusetts, a pilot version of this project was also approved, ostensibly to lead the way to allowing PAs in Massachusetts to also claim savings from enhanced code development, adoption and compliance activities. The state would have already benefited from the Rhode Island efforts by allowing the PAs to emulate the work that was done there in establishing a code attribution evaluation framework.

However, the 2016-2018 proposed joint statewide plans make no mention of adopting the Rhode Island framework to allow the PAs to claim savings from code or standards activities. NEEP would suggest that this is a significant missed opportunity, one that has already been proven in a neighboring state, and would join two primary functions – ratepayer-funded efficiency programs and building energy code regulations – in a complementary and beneficial fashion.

4. Short-Term Bill Impacts

The Green Communities Act requires that "electric and natural gas resource needs shall first be met through all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply."⁴ This requirement – which mandates energy efficiency and demand reduction as a first order energy resource – is justified by a plethora of analyses stating that energy

⁴ G.L. c. 25, § 21(a)

efficiency and demand side management programs deliver kWhs to customers at a rate below that of conventional energy supply.⁵

The joint proposal notes in several places that the above-mentioned mandate must be balanced with “short-term customer bill impacts.”⁶ The plan cites several sources for this balancing test, which we examine below.

Lowest Reasonable Customer Contribution

The proposed plan cites a requirement within the Green Communities Act that programs deliver energy efficiency via the “lowest reasonable customer contribution.”⁷ Indeed, the Green Communities Act states:

“Each plan shall provide for the acquisition, with the lowest reasonable customer contribution, of all of the cost effective energy efficiency and demand reduction resources *that are available from municipalities and other governmental bodies.*”⁸

The language cited within the joint proposal disregards the final clause of the sentence, which narrowly applies the “lowest reasonable customer contribution” requirement toward governmental bodies only. Accordingly, a precedent for such a balancing test cannot be found within the Green Communities Act’s “lowest reasonable customer contribution” requirement.

The Effect of Rate Increases on Residential and Commercial Customer Bills

The proposed plan cites a requirement within the Green Communities Act that “the Department consider the effect of any rate increases on residential and commercial customer bills before approving ratepayer funding of energy efficiency programs.”⁹ Indeed, the Green Communities Act states:

“[P]rograms shall be funded, without further appropriation, by...other funding as approved by the department after consideration of:

- (i) The effect of any rate increases on residential and commercial customers;
- (ii) The availability of other private or public funds, utility administered or otherwise, that may be available for energy efficiency or demand resources; and
- (iii) Whether past programs have lowered the cost of electricity to residential and consumer customers.”¹⁰

⁵ See generally, Lazard’s [Levelized Cost of Energy Analysis—Version 8.0](#) (September 2014); and ACEEE’s [The Best Value for America’s Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs](#). (March 2014).

⁶ 2016-18 Joint Proposal, Pages 16, 194, and 219.

⁷ 2016-18 Joint Proposal, Page 193.

⁸ G.L. c. 25, § 21(b)(1) *emphasis added*.

⁹ 2016-18 Joint Proposal, Page 194.

¹⁰ G.L. c. 25, § 19(a)

There is wide agreement that amongst interested parties that bill impacts should be considered when determining program savings potential and targets. However, the language cited within the joint proposal disregards the third factor within this test, which explicitly requires that the department balance any rate increases with whether past programs have lowered the cost of electricity. In requiring the analysis of past programs' impact, this language conclusively directs consideration of long-term bill impacts, rather than short-term impacts. Decreasing support for energy efficiency within today's bills – which currently benefit from bill impacts of the past – will only increase bill impacts in the future.¹¹

Bill Impacts and Rising Supply Costs

The proposed plan notes that electric customer bills have recently seen increased volatility due to winter gas constraints and their effect on electric supply components.¹² The plan then concludes that – within the context of increasing supply costs – electric energy efficiency bill impacts deserve increased scrutiny to avoid customer backlash against energy efficiency programs that may be increasing as a percentage of a customer's total bill.¹³

The logic behind this assertion fails to acknowledge that **energy efficiency serves to insulate ratepayers from supply increases associated with natural gas constraints and winter peaks.** For example, a recent report by the Acadia Center notes that but for investments in energy efficiency, the price of wholesale electricity in New England would have been 24 percent higher.¹⁴

Conclusion

Thank you for the opportunity to comment on the draft 2016-18 three year plan. Please consider NEEP a resource to provide advice and support to the state as you pursue clean, efficient energy solutions for Massachusetts' long-term future. I am happy to connect you with any of my colleagues at NEEP if you have questions on any of the policy or program strategies mentioned above.



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¹¹ US Department of Energy. State and Local Energy Efficiency Action Network. [Analyzing Bill Impacts of Energy Efficiency Programs: Principles and Recommendations](#). Page 3. (Stating: “[R]egulators, utilities and other stakeholders [should] recognize that the short-term increases in prices due to energy efficiency are typically offset with long-term reduction in bills.”)

¹² 2016-18 Joint Proposal, Page 198.

¹³ *id.*

¹⁴ Acadia Center. [Winter Impacts of Energy Efficiency in New England](#). (April 2015)

Appendix 1: Supporting Info on Commercial Lighting Trends

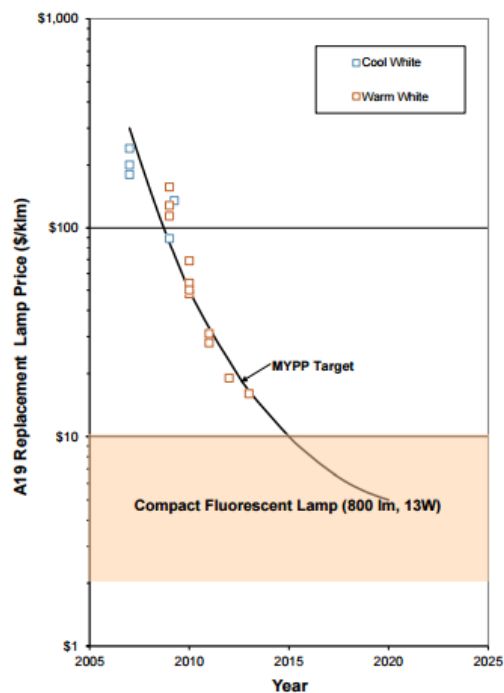
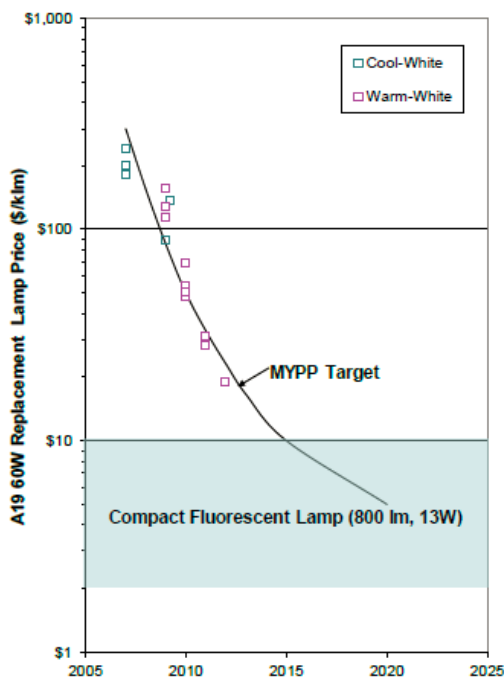
Evidence showing decreasing LED prices that have been seen running analysis over multiple years

Sources: US Department Of Energy’s Solid State Lighting Multi-Year Program Plan in years 2013 and 2014 http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2014_web.pdf and http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2013_web.pdf

Analysis showing the price per kWh of A19 60W equivalent, consistently showing costs dipping below \$10 in 2015 and towards \$5 in 2020:

MYPP 2013:

MYPP 2014:



Also from US Department of Energy’s Solid State Lighting Multi-Year Program Plan in years 2013 and 2014 http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2014_web.pdf and http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2013_web.pdf

The charts below show comparative pricing inputs for that analysis year, with prices remaining constant for all products besides those that are LED or OLED. In 2014, the assumed price of a 60W equivalent A19 is \$16, demonstrating the PA assumption of \$15 for years 2016-2018 is very high if it’s already \$16 in 2014, and is projected to have a significant year over year drop off.

2013

2014

TABLE 2.2 COMPARISON OF TYPICAL MARKET PRICES FOR VARIOUS LIGHTING SOURCES

Lighting Source	Price (\$/klm)
Halogen Lamp (A19 43W; 750 lumens)	\$2.5
CFL (13W; 800 lumens)	\$2
CFL (13W; 800 lumens dimmable)	\$10
Fluorescent Lamp and Ballast System (F32T8)	\$4
LED Lamp (A19 12W; 800 lumens dimmable)	\$19
CFL 6" Downlight (13 W; T4; ~500 lumens)	\$10
LED 6" Downlight (10.5 W; 575 lumens)	\$50
OLED Panel	\$800
OLED Luminaire	\$2,400

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LED Lamp (A19 12W; 800 lumens, dimmable)	\$16
CFL 6" Downlight (13W; T4; ~500 lumens)	\$10
LED 6" Downlight (11.5W; 625 lumens)	\$43
OLED Panel	\$500
OLED Luminaire	\$1,400

From NEEP’s 2014-2015 Update to the Residential Lighting Strategy

<http://www.neep.org/sites/default/files/resources/2014-2015%20RLS%20Update.pdf>, estimated low-cost ENERGY STAR LED products for the end of 2015, to provide more accurate estimates than a flat \$15 throughout 2016-2018

Table 7: LED Pricing Trends Summary Table

Lamp Type	Average Low-Cost price in August 2014	Expected average low-cost price in end of 2015
A19 40W Equivalent	\$8.89	\$6.11
A19 60W Equivalent	\$9.12	\$6.81
BR30	\$15.07	\$12.18
PAR30	\$25.89	\$21.13
PAR38	\$23.46	\$19.59

From DOE’s 2014 CALiPER Retail Lamp Study

http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/caliper_retail-lamps-study3.pdf

Page 2 demonstrated expected increased efficiency moving forward for LED Technology:

“At the same price point, lamps purchased in 2013 tended to have higher output and slightly higher efficacy than in 2011 or 2010.”

“More than 30% of the products purchased in 2013 exceeded the maximum efficacy measured in 2011 (71 lm/W), with the most efficacious product measured at 105 lm/W.”

From DOE’s Solid State Lighting Manufacturer R&D Roadmap:

http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mfg_roadmap_aug2014.pdf

Chart demonstrating the diminishing cost of all components for LED lamps over time:

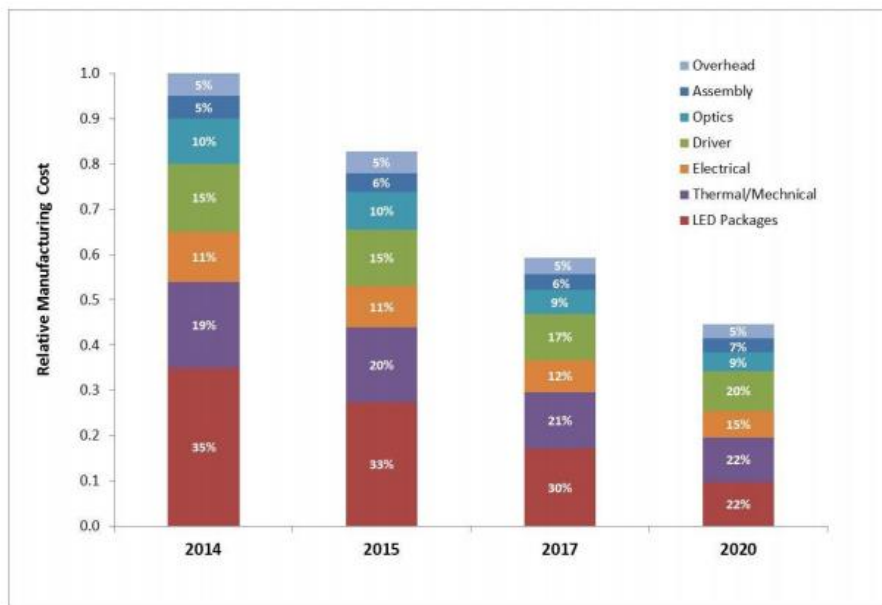
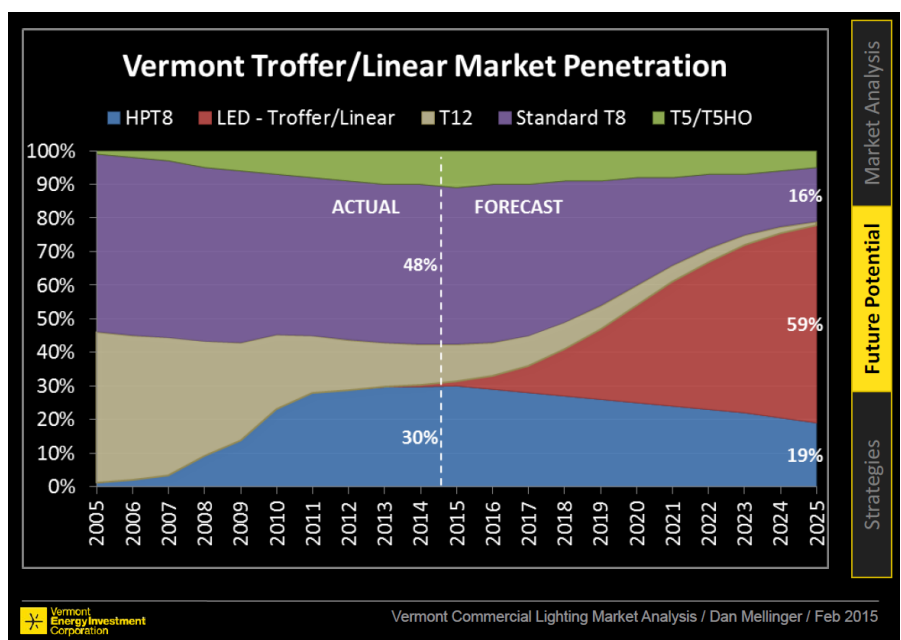
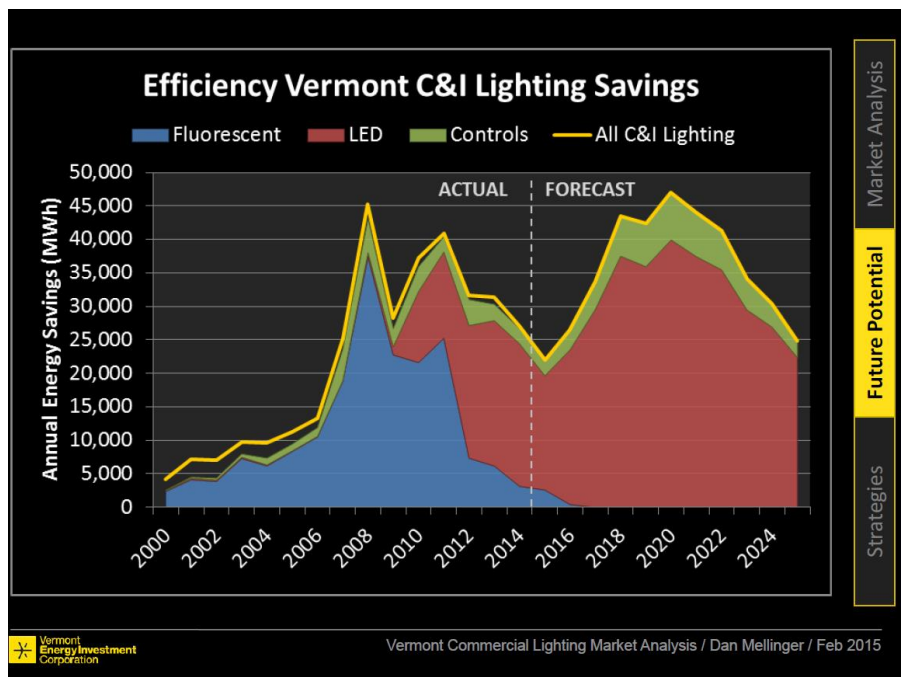


Figure 1.8 Cost Breakdown Projection for a Typical A19 Replacement Lamp
 Source: DOE SSL Roundtable and Workshop attendees

Look to Neighboring States' Methodology for Projected Lighting Opportunities

The following slides from VEIC depict projections on C&I lighting and controls savings opportunities in nearby Vermont. We believe there remains substantial opportunity for LEDs in commercial spaces, especially in troffers, and big opportunity to leverage regional work to drive down costs even further.



Integrated Lighting Controls - Another area to note is the enormous potential of integrated lighting controls, which the PAs could assess based on past participation as well as cost compared to more traditional control systems. Data shows that costs can be lower than what we have been installing.

Manufacturer Reported Pricing of Advanced Lighting Control Systems (\$ per Sq. Ft.)¹⁵

<u>New Construction</u>	Equipment Costs (Avg)	Installation Costs (Avg)	Commissioning Costs (Avg)	Total
Luminaire Integrated Systems	\$0.87	\$0.16	\$0.08	\$1.11
Traditional Systems	\$1.21	\$0.71	\$0.31	\$2.23
All Systems	\$1.09	\$0.53	\$0.21	\$1.83

<u>Retrofit</u>	Equipment Costs (Avg)	Installation Costs (Avg)	Commissioning Costs (Avg)	Total
Luminaire Integrated Systems	\$0.87	\$0.21	\$0.08	\$1.16
Traditional Systems	\$1.27	\$0.84	\$0.33	\$2.44
All Systems	\$1.09	\$0.60	\$0.22	\$1.91

Over time, costs are expected to continue to decline as components become less expensive and as systems are designed for greater simplicity in installation and commissioning. For example, Navigant Research predicts a -5 percent compound annual growth rate (CAGR) reduction in networked controls each year through 2020:

Equipment Costs Used in Navigant Forecast Model: 2015-2020

<u>Component</u>	Units	2015	2016	2017	2018	2019	2020
Dimming LED Driver	\$	\$13.54	\$12.86	\$12.22	\$11.61	\$11.03	\$10.48
Switches within Networked Building	\$	\$32.93	\$31.94	\$30.99	\$30.06	\$29.15	\$28.28
Networked Controls	\$/SF	\$0.11	\$0.10	\$0.10	\$0.09	\$0.09	\$0.08

¹⁵ Tables above are from “Intelligent Lighting Controls for Commercial Buildings: Sensors, Ballasts, Drivers, Switches, Relays, Controllers, and Communications Technologies for Networked Lighting Control: Market Analysis and Forecasts,” Navigant Consulting, 2013.