



Northeast Energy Efficiency Partnerships

2015 NORTHEAST RESIDENTIAL LIGHTING WORKSHOP

Thursday, October 1st, 2015

10am-3:30pm

Northeast Energy Efficiency Partnerships

LightPoint, OSRAM Sylvania

Welcome!

- Goals for the day:
 - Have engaged discussion on timely and key issues impacting residential lighting
 - Expand our understanding of new products, technologies, and research
 - Build relationships and expanded understanding how we can work together to transform this market

All of which will inform development of NEEP's 2015 Residential Lighting Market Strategy Report Update



Thank you to our hosts!



Welcome remarks from Christopher Lubeck, Head -
Utility Sales for Residential and C&I Programs

Let's Dive in

10:00-11:00am—Welcome, Market Transformation, the RLS

11:00-11:15am—Break

11:15-12:15pm—Smart Lighting Roundtable

12:15-1:00pm—Lunch

1:00-1:30pm—Regional Evaluation Findings from REED

1:30-1:45pm—Presentation on the Ish bulb

1:45-2:00pm—Break

2:00-3:15pm—Small and Large Breakout Discussions

3:15-3:30pm—Wrap up and Next Steps

Introductions: NEEP and Around the Room



Mission

Accelerate energy efficiency as an essential part of demand-side solutions that enable a sustainable regional energy system

Approach

Overcome barriers and transform markets via *Collaboration, Education and Enterprise*

Vision

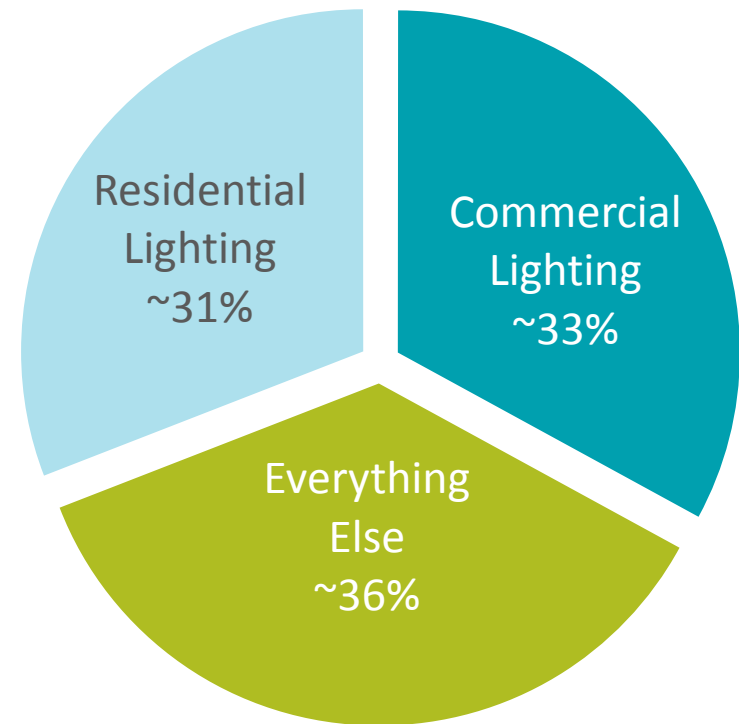
Region embraces **next generation energy efficiency** as a core strategy to meet energy needs in a carbon-constrained world



One of six regional energy efficiency organizations (REEOs) funded by the US Department of Energy (US DOE) to link regions to US DOE guidance, products and programs

Why are we here?

- *NEEP's Mission: Accelerate energy efficiency as an essential part of demand-side solutions that enable a sustainable regional energy system*
- Residential lighting is a source of highly cost effective energy savings
- Residential lighting has been a centerpiece of ratepayer-funded EE programs



Regulatory Pushback

- In 2015, new questions arising:
 - Where is the market headed? What impacts will EISA 2020 have?
 - Has the residential lighting market been transformed?
 - Is there a role for residential lighting programs in the current environment?



THE STATE OF OUR SOCKETS: A REGIONAL ANALYSIS OF THE RESIDENTIAL LIGHTING MARKET

Northeast Energy Efficiency Partnerships, August 2015

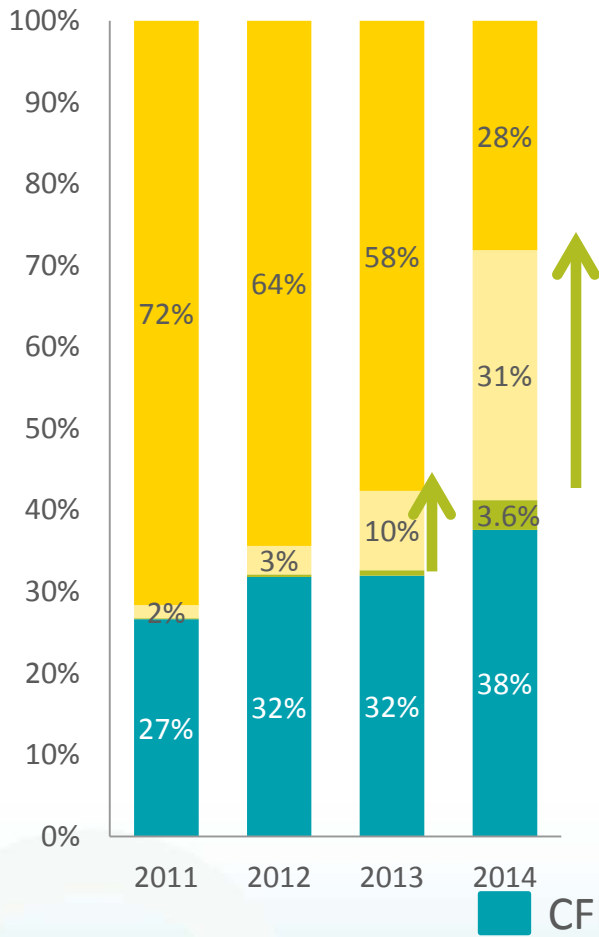
Primary Authors: Claire Miziolek, Patrick Wallace, and David Lis

Residential lighting has long been a centerpiece of ratepayer-funded energy efficiency program portfolios. In New England, residential lighting measures have produced over 30 percent of all efficiency program savings¹

What is the status in the northeast?



National Shipping Data



Regional Limited Sales Data

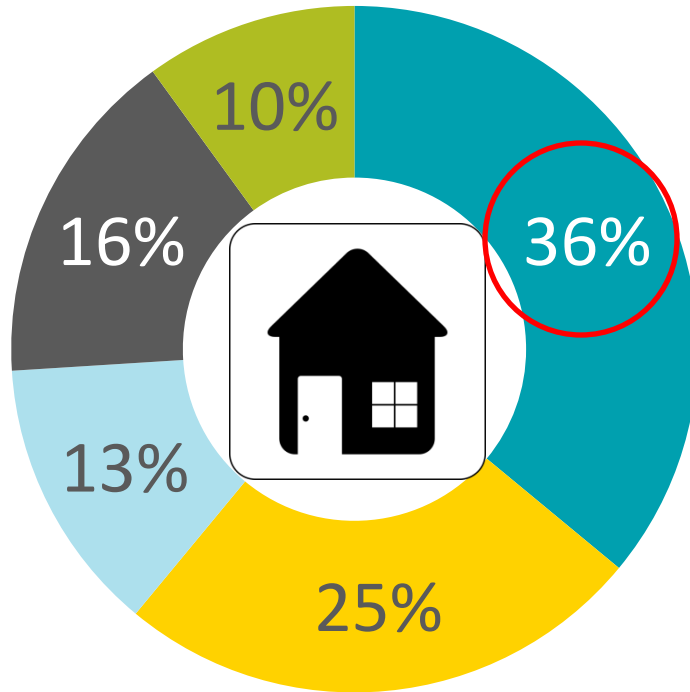


Regional Socket Saturation



Inefficient lighting still fills the majority of sockets in the Northeast. 7

Limitations of EISA



- General Service (covered by EISA)
- General Service (exempt from EISA)
- Directional
- Decorative
- Linear Fluorescent

Scenario	Description
1: Highest Efficiency	Rulemaking is completed, the enforcement rider is repealed, and a strong standard is set starting in 2020 (≥ 45 lpw)
2: Medium Efficiency	Rulemaking is completed, but the congressional rider stays in effect. As such some low-cost halogens continue to be sold.
3: Lowest Efficiency	There is a political change of heart and the EISA standards are repealed.

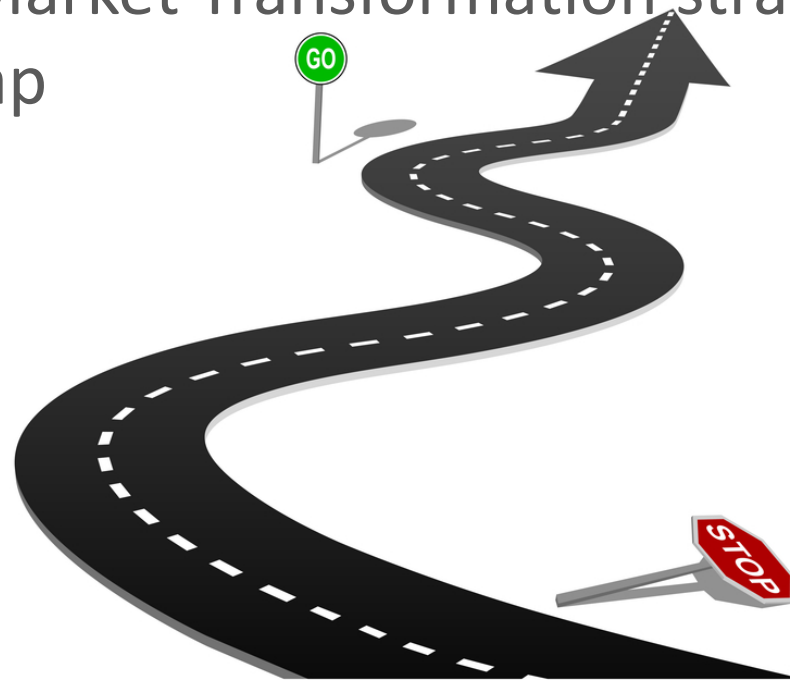
Potential outcomes of EISA 2020: Uncertain

State of the Sockets Conclusions

- The residential lighting market has NOT been transformed
 - Inefficient lighting still fills the **majority of sockets** in the Northeast
 - EISA 2020 only applies to approximately **1/3 of the market** and is **not in place until 2020**. Though important, it will not be the panacea for residential lighting market transformation
 - As efforts continue in this space, there is a strong need for **better and more consistent data** to track progress to allow policy makers and program administrators to make more informed decisions
 - Efficiency programs have an **important role** to help transform this market in both the short and long term

Now what...

- We know the market isn't transformed
- Now we need a Market Transformation strategy to provide a roadmap



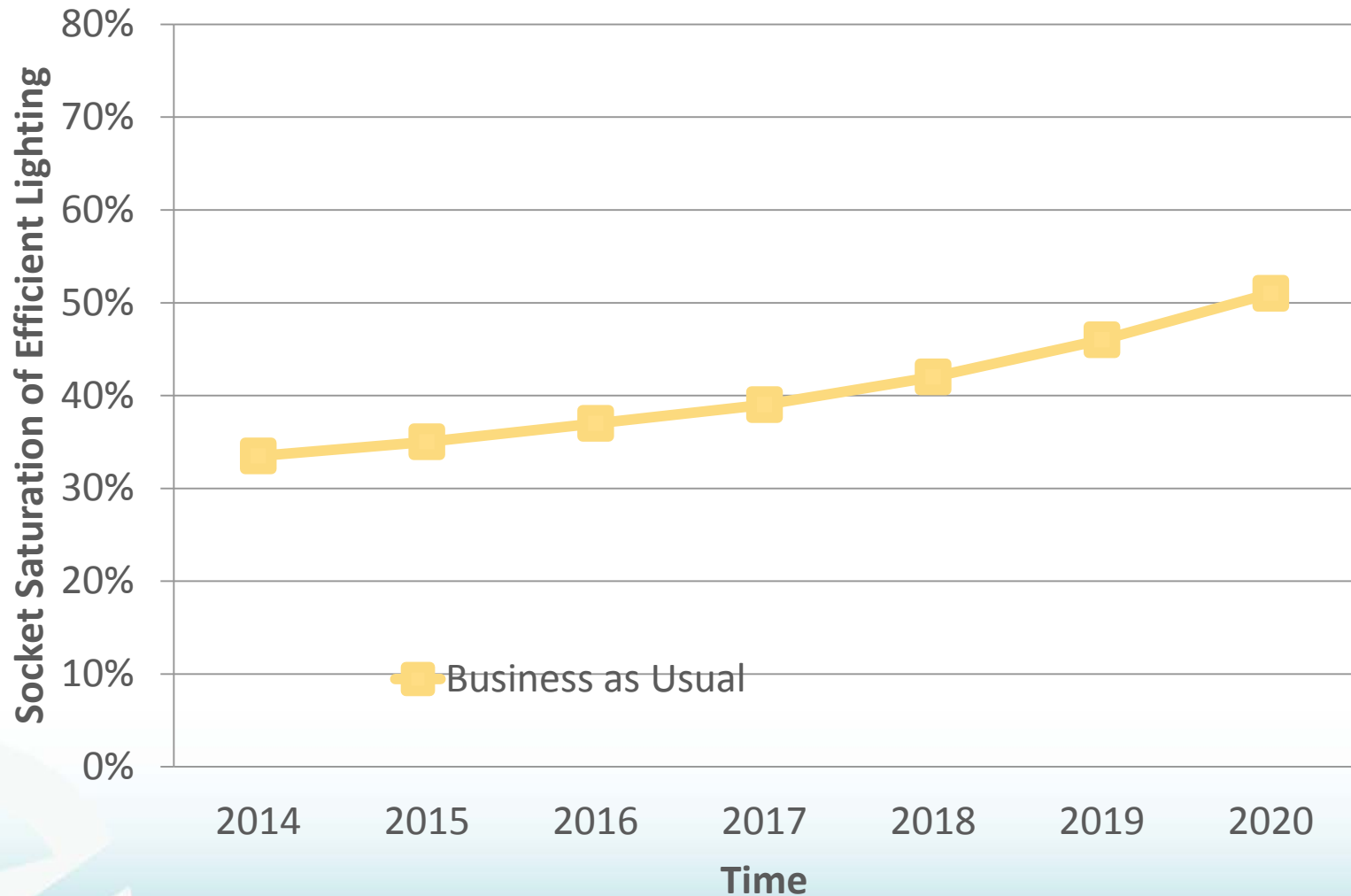
What is Market Transformation?

*The **strategic process** of **intervening in a market** to create **lasting change in market behavior** by **removing identified barriers** and/or **exploiting opportunities** to **accelerate the adoption** of **all** cost-effective energy efficiency as a matter of **standard practice**.*

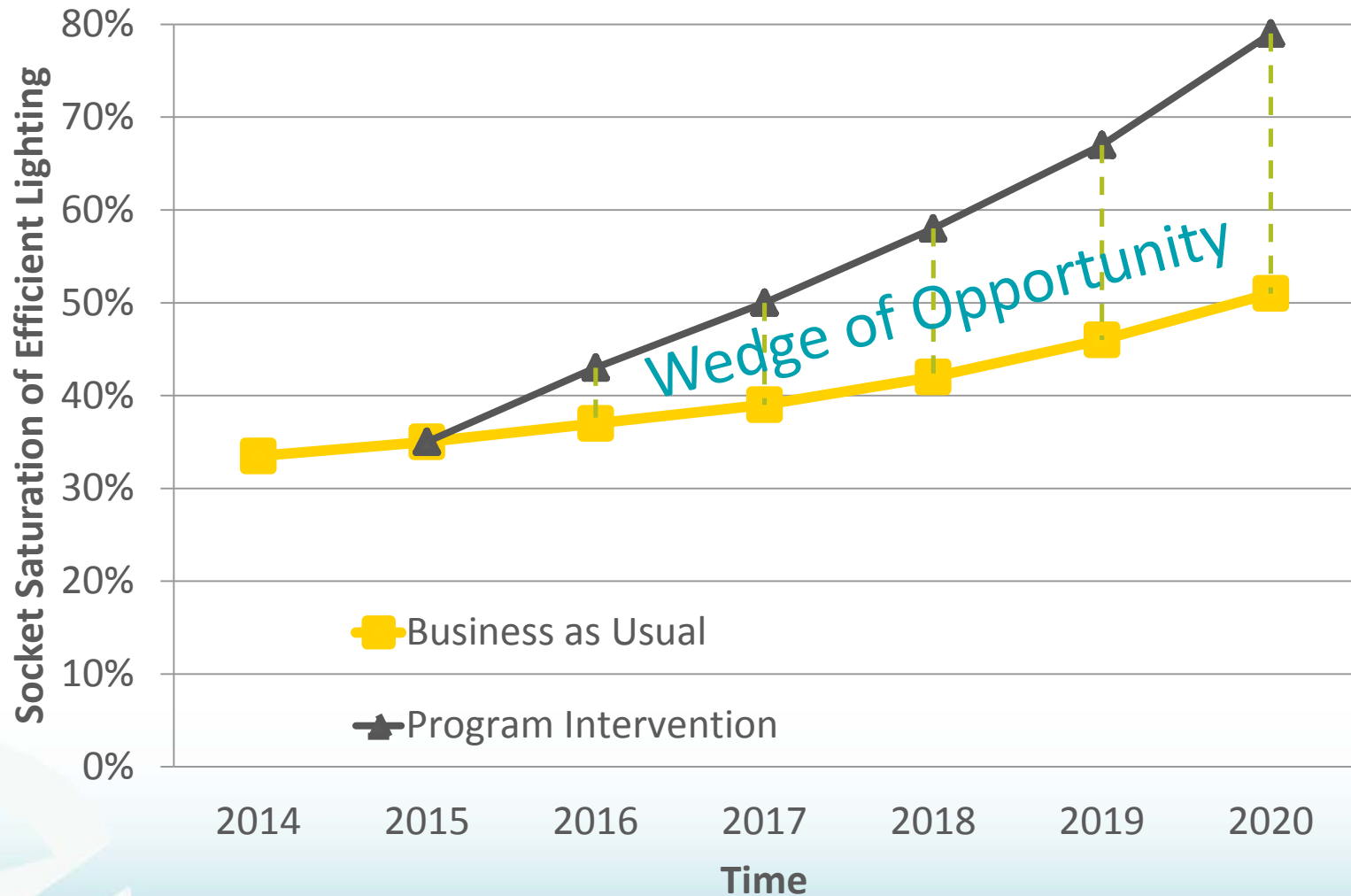
Market Transformation



Market Transformation



Market Transformation



Market Transformation

Barriers & Opportunities

- Which barriers are we trying to remove/overcome?
- What are the points of market leverage?
- What are other market opportunities?

Interventions

- What are the interventions you believe will:
 - overcome those barriers?
 - exploit those points of leverage and opportunities?

Outcomes (Progress Indicators)

- How will we know we're making progress toward our long-term objective?
- What do we need to observe to be confident that the MT theory and strategy are sound?

Goal of 2015 Residential Lighting Strategy



- Quantifying savings potential
- Prioritizing barriers/opportunities
- Developing series of market interventions/strategies to overcome barriers/leverage opportunities
- Communicating a “Theory of change”
- Identifying process to track progress

NEEP's Goal of Residential Lighting Market Transformation



Goal: The residential lighting market should be able to reach a socket saturation of 80-90 percent efficient quality lighting when transformed.



Lot's of history to work off of

We've already....

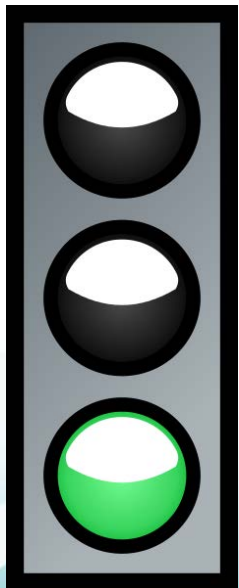
- Provided analysis of Technology and Market Characterization
 - Basics of technology/building type/practice
 - Market Analysis
 - Potential for Energy Savings
 - Existing Efforts to Promote High Efficiency Options
 - Key market barriers to accelerated adoption
 - Market opportunities to leverage
- Developed a Long-term MT goal
- Developed several Interventions and Strategies

BUT, this is a dynamic market, and in 2015 Update will focus on NEEP's Theory of Change to transform the residential lighting market, and address more current and relevant **Barriers** and **Opportunities**.

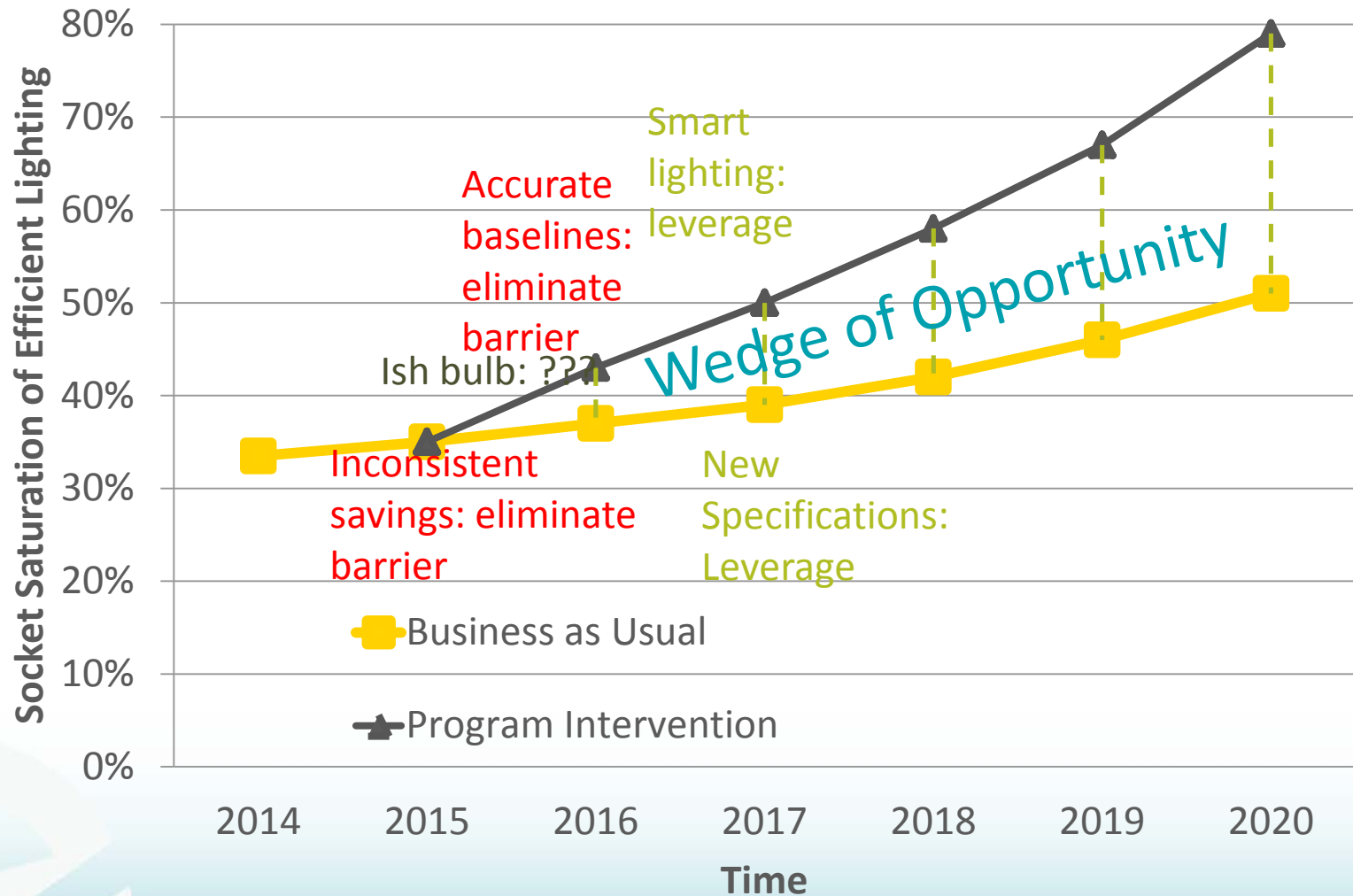
Key Opportunities and Barriers We're Exploring today



- Lack of accurate baselines: potential program barrier
- Potentially inconsistent savings from evaluation assumptions lighting: program barrier
- New Specifications: market and program opportunity
- Smart lighting: market and program opportunity
- Cost and Quality, the “Ish” bulb: TBD

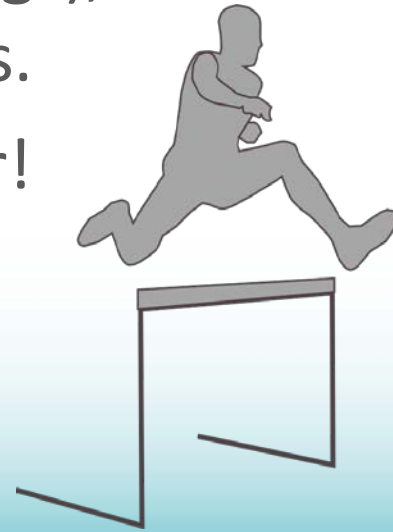


Market Transformation



Overcoming a Barrier: Inaccurate Baselines

- With halogen sales increasing, LED and CFL baselines for the future are a moving target
- Technological advances continue, and methodologies to determine baselines vary across states
- If programs do not establish the appropriate baseline (and therefore delta watt of savings), that will mean an inaccurate calculation of savings.
- We want to overcome this barrier!



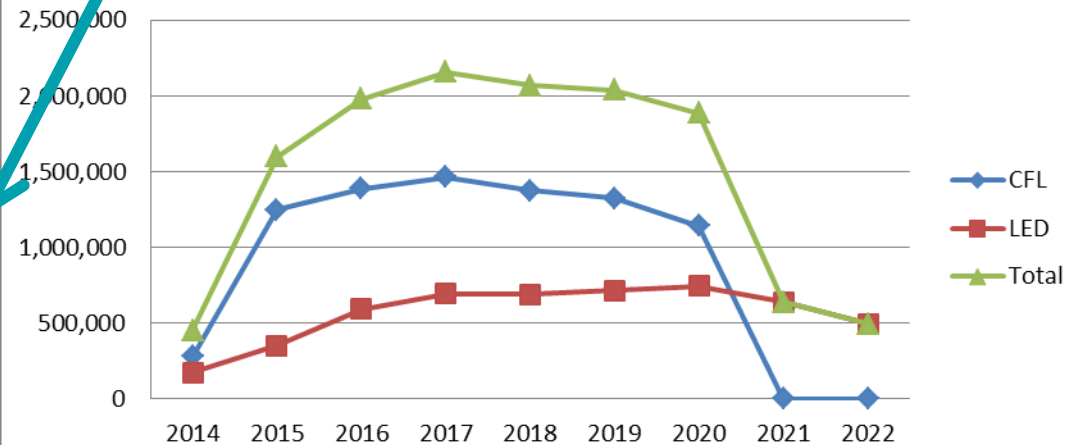
Baseline Research

- Ran analysis using NMR's Market Adoption Model
- Included regional inputs

GROSS Delta Watts: Average Delta Watts based on four incandescent replacement categories (weighted by sales weighting)

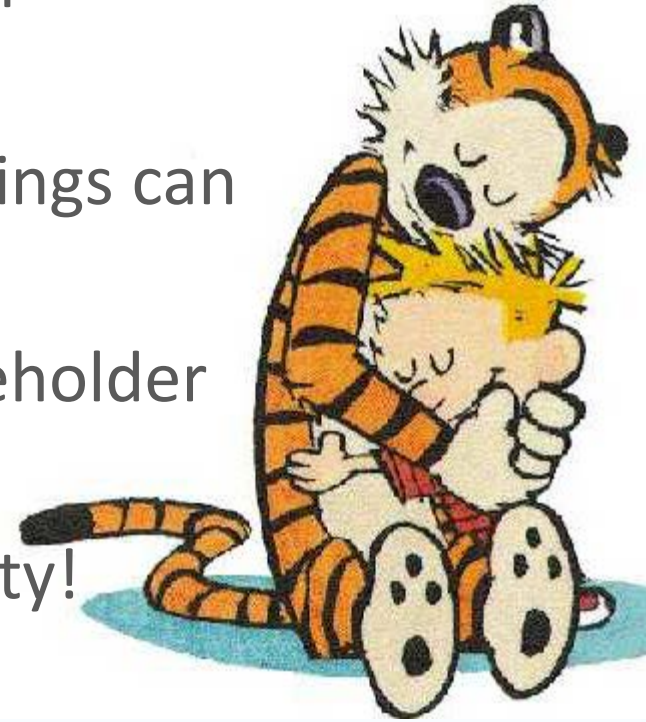
	CFLs	LEDs	CFLs	LEDs
	High Program	High Program	Very High Program	Very High Program
2014	45	34	46	33
2015	43	32	47	31
2016	38	29	47	31
2017	35	25	45	28
2018	34	24	43	25
2019	32	23	39	23
2020	32	24	36	21
2021	32	25	32	16
2022	31	25	32	13

GROSS Program Induced Savings (MWh)



ENERGY STAR Specifications: Opportunity for Savings

- The ENERGY STAR Program ensures only highly efficient quality products gain certification
- New specifications means more savings can be claim for each incented product
- Specification is meant to meet stakeholder needs
- We want to embrace this opportunity!



ENERGY STAR Specifications



- Luminaires spec
 - V 2.0 Finalized in May, effective June 2016
 - Efficacy improvements across the board
 - Big change: allows for shipping with an ENERGY STAR Lamp, doesn't have to be pin-based or integrated
 - Puts additional pressures on...
- Lamp spec:
 - Not yet finalized! Draft 3 released over summer
 - Increases efficacy, cuts out many CFLs, especially directional, decorative, and covered
 - Not many major other changes from 1.1 to current draft

Working Together to Transform this Market



Activity!

1. Each person should have 2 lightbulbs, one red, one green
2. Write down the most important barrier or opportunity you see to transform this market
3. Stick your bulb on the Market Transformation curve
 1. Opportunities inside the curve
 2. Barriers outside

Highest priority Opportunities and Barriers?



- Accurate program baselines
- Potentially inconsistent savings from evaluation assumptions
- Smart lighting
- New Specifications
- Reforming the Energy Vision in NY
- EISA gets repealed
- EPA's Clean Power Plan (111-d)
- Ish bulb
- 2X Halogens enter the market
- Rough service bulbs
- OLEDs enter the market
- Retailers stop selling CFLs
- Low awareness of efficient lighting
- High cost of efficient lighting
- Quality concerns
- Early adopters
- Laggards
- New bulbs are un-familiar
- Directional and/or decorative LEDS

GREEN = Opportunity

RED = Barrier

COFFEE BREAK 11:00-11:15am





Northeast Energy Efficiency Partnerships

Smart Lighting Roundtable

2015 Northeast Residential Lighting
Workshop

Thursday, October 1st, 2015

11:15am-12:15pm

Background

- NEEP is looking at:

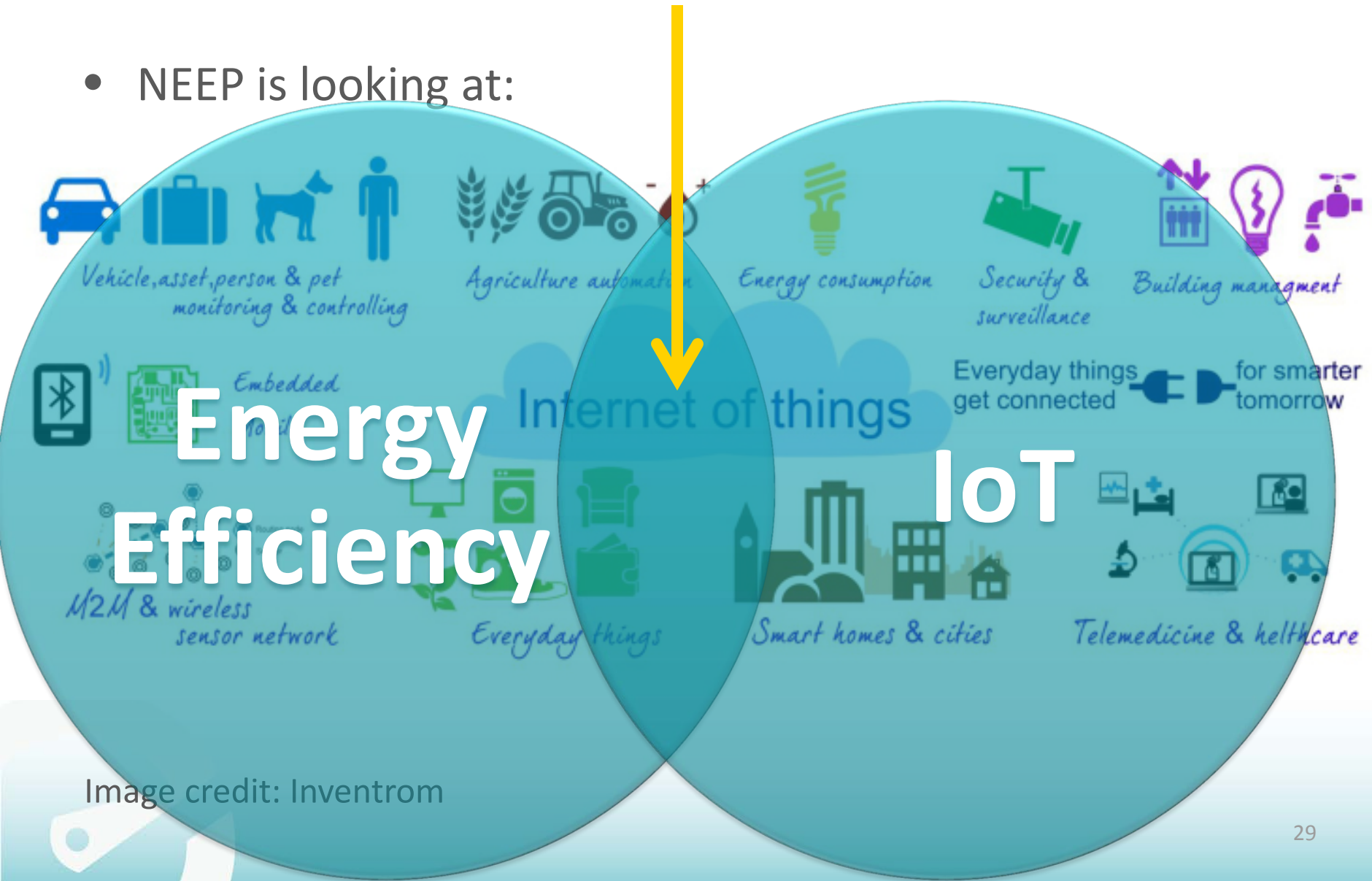


Image credit: Inventrom

Background



Format

- Aaron Ganick presents the OSRAM Lightify
- Rene Burger presents the Philips Hue
- Lisa McLeer presents the GE Link

- Notes from the field: Lara Bonn and Jasmine Rivest present their Efficiency Vermont Pilot

- Discussion, Q&A



Northeast Energy Efficiency Partnerships

Smart Lighting Roundtable:



2015 Northeast Residential Lighting Workshop

October 1st, 2015



Range of Products Offered

Good



Function: on/off/dim
Uses: basic wireless lighting, safety & security applications, provides grouping across several electrical circuits

Better



Function: tunable white (TW)
Uses: personalized color temperature, “one size fits all” white choice, circadian tuned scheduling

Best



Function: full color + tunable white (RGBW)
Uses: experiential/mood lighting, entertainment & theater, outdoor decorations, party lighting

Range of Products Offered



Range of Products Offered



Energy Concerns

- Industry average standby power ranges from .5W to 1W. Lightify meets or is less than the average across all products.
- Answer the question: Do you expect your products would gain ENERGY STAR Certification when Lamps 3.0 is released? If not, why not? Yes, with careful consideration across product value lines.
- **Caution:** innovation requires margins for energy consumption. We need to be careful to not overly burden the nascent market.



Product Features

- High Definition Color (fully saturated RGBW)
- Color Temperature (adjustable warm to cool white)
- Dimming at each color temperature or color
- Fast and responsive scene control
- Scheduling of groups and scenes
- Home/Away integration with Nest Thermostat
- Works with Wink, SmartThings, WeMo, and many other ZigBee based hubs

Customers Love Them, Because...

1. Lighting first, connectivity second

- LIGHTIFY light sources are designed to provide functional lighting for our customers; the right amount of lumens, efficiency, etc. For instance, many connected A19 lamps are not true 60W equivalents and output far less than 800 lumens.

2. Breadth of portfolio

- LIGHTIFY provides a variety of retrofit options (A19, BR, RT), luminaires (flex, garden, pendant), and switches. LIGHTIFY is also the first ever connected lighting portfolio to have outdoor product options.

3. Open ecosystem partnership approach

- Many customers already have a chosen favorite Smart Home ecosystem (Wemo, Wink, SmartThings, etc.) and LIGHTIFY is excited to offer lighting options to customers to use with these ecosystems right out of the box, meaning the LIGHTIFY gateway is not required. This is different than other products which require additional gateways or messy cloud based connections.

Inclusion in Efficiency Programs?

- Connected lighting offers an affordable and approachable entry point into the smart home
- Allows for wireless dimming in previously “undimmed” environments
- The data and analytics gained from the systems will help to define and improve the usage and efficiency of future smart home systems
- By including smart systems into energy and rebate programs, we can increase awareness, adoption, and energy savings



Northeast Energy Efficiency Partnerships

Smart Lighting Roundtable: GE Lighting



2015 Northeast Residential Lighting Workshop
October 1st, 2015

Range of Products Offered

GE Link Bulbs



Life: 25,000
 CRI: 80
 Connected Home Protocol: ZigBee HA1.2
 Home Automation Platform: Wink
 Warranty: Limited 2 year warranty

Energy Concerns

Stand-by power levels:

<.5 watts

- A-Line: GE Link 12w, ENERGY STAR[®] version 11w
- BR30: GE Link and ENERGY STAR[®] 10w
- PAR38: GE Link 13w and ENERGY STAR[®] 12w.







ENERGY STAR[®] Certification:

- Under current 2.0 draft, our new Daylight A19 would qualify.
- Others would not, does not meet required light distribution.



Product Features

- Dimming and on/off
- Controlling one or groups of bulbs
- Scheduling
- Geo-fencing

 <p>Remote Lighting Control Consumers can control lighting from anywhere in the world and can receive notifications when lights are left on while away.</p>	 <p>Interoperability Consumers can pair lighting with other intelligent devices—window shades, ceiling fans, thermostat, garage door—creating scenes based on your preferences for movie night or morning routine.</p>	 <p>Honey, I'm Home! Using geofencing technology, your home senses your arrival and welcomes you home by turning on the lights, adjusting room temperature and unlocking the door.</p>	 <p>Automated Lifestyle Imagine never using a traditional light switch again. Instead, your lighting automatically adjusts based on time of day, your schedule, the weather outside and daily tasks—like cooking and entertaining.</p>
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Compatible with Wink Hub and Link Hub

Use Wink Hub to connect:

- Lighting
- Smoke Alarms
- Air Conditioners
- Dimmers
- Door Locks
- Thermostats and more!



Wink Hub supported protocols: Wi-Fi, Z-Wave, ZigBee, Lutron, Clear Connect and Bluetooth

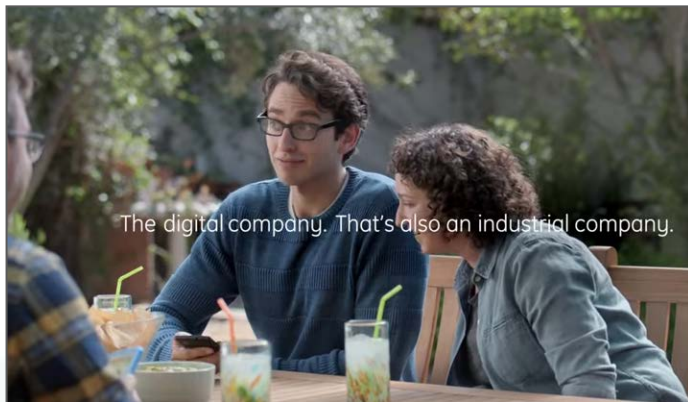


Link Hub – For lighting only ZigBee and Wi-Fi enabled

Customers Love Them, Because...



- They are cool and on trend!
- Provide security and convenience
- Good price/value - \$14.97 for an energy efficient LED, with remote control and dimming (vs. buying and installing a dimmer)
- Family of products, not just one type
- Allows for more than lighting products, many add-ons available



Intelligent Environments for Homes

Moving Beyond Basic Illumination:
LED lighting is the gateway to the smart home, and it is how many consumers first experiment with this new idea. GE Intelligent LED lighting makes everyday life simpler. Empowering consumers to control their lighting from anywhere in the world via their smartphones provides convenience and peace of mind.

Intelligent Home Experience:

- Remote Lighting Control**
Consumers can control lighting from anywhere in the world and can receive notifications when lights are left on while away.
- Interoperability**
Consumers can pair lighting with other intelligent devices—wireless routers, ceiling fans, thermostats, garage door—existing wires based on your preferences for peace of mind or energy savings.
- Honey, I'm Home!**
Using geofencing technology, your home senses your arrival and welcomes you. Hello by turning on the lights, adjusting the room temperature and unlocking the door.
- Automated Lifestyle**
Imagine never using a traditional light switch again. Instead, your lighting automatically adjusts based on some of the things you love: the weather outside and daily tasks—like cooking and entertaining.



Inclusion in Efficiency Programs?

YES!

- They are LEDs, therefore inherently a more energy efficient technology.
- Entry into “smart home”, with future opportunities for utility involvement and data
- Positive PR for Utilities, supports latest technology



Northeast Energy Efficiency Partnerships

Smart Lighting Roundtable: **PHILIPS**

2015 Northeast Residential Lighting Workshop

October 1st, 2015

Range of Products Offered



Philips Hue White and Color
16M Colors



Philips Hue White Dimmable White



Philips Hue Lightstrip +
Ultimate Flexibility



Philips Hue Go
Portable Connected Lighting

Energy Concerns



will be Energy Star
Rated in 2016





Product Features



PHILIPS

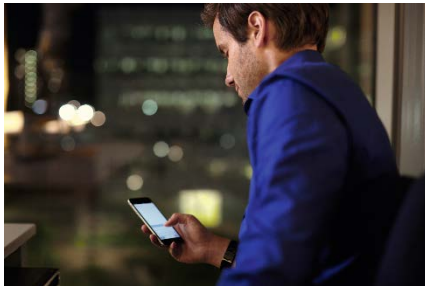
Customers Love Them, Because...

- Lighting made cool
 - 300+ Apps from 3rd Party Developers
- Efficiency
 - Save Money
- Easy to Use
- Great Design
- Program to your lifestyle
 - Turn on Living



Inclusion in Efficiency Programs?

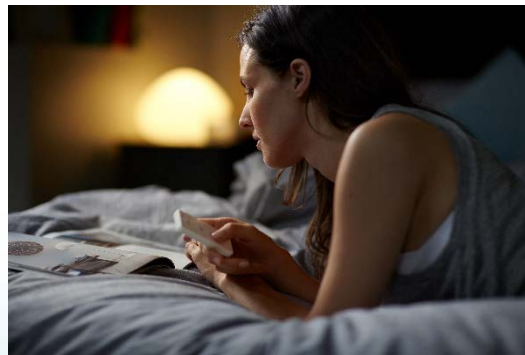
Efficiency through Value Added Functionality for Users



Remotely Controlled



Lights Only when you Need them



Easy Dimming



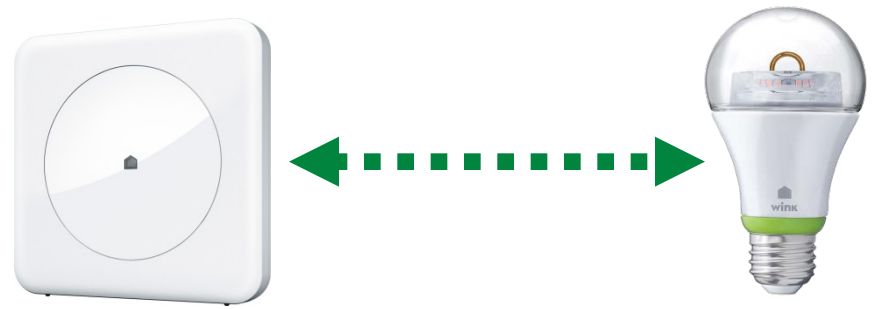
Efficiency Vermont 2015 R&D Project: Smart Lighting & HEMS Hubs

Jasmine Rivest
Lara Bonn

In Coordination with:
Claire Miziolek (NEEP)

September 2015

Project Goals



Begin to map, define, and measure the interactions of Home Energy Management System (HEMS) hubs and their connected devices.

- Map the baseline energy usage of smart lighting controlled by HEMS hubs
- Catalogue consumer usage of smart plugs

Secondary goal

- Understand the consumer experience with set-up, engagement, and use of HEMS devices.

Program/Pilot Design

- Assess DIY-nature of HEMS hubs & smart lighting
- No EEU instruction regarding set-up, or use of product
 1. Participant attempts to install product on their own
 2. Contractor verifies/adjusts install at initial visit to ensure basic functionality
 3. Participant uses products over 3 month period
- Light Loggers record data
 - 5 smart LED bulbs, 5 regular LED bulbs
- Smart Plugs
 - Record devices plugged into smart plug 3x throughout study

Participant Selection

Open recruitment to Vermonters

- Social Media: Facebook, Front Porch Forum

Two Screening Efforts

- 1st – General Eligibility
 - Geographic location, Smart Ready, # of available sockets, etc.
- 2nd – Additional Sample Group Refiners
 - % wall-space devoted to windows, weekday hours home, # of occupants, tech savvy



Participant Selection: Demographics

Respondents all self-reported as Average - Very Tech Savvy (on a 1-5 scale)

- Tried to balance sample with as many average to above-average as possible

of Occupants

- 27% single occupant homes (only able to get 2, or 13%)
- 25% 2-person homes (40% due to lack of single occupancy)
- 48% families

Time Occupied on Weekdays

- 39% participants work 9-5
- 41% spend 1-4 hours home between 9-5
- 20% occupy the home between 9-5



Initial Survey Results: Installation Experience



What if anything surprised you about the installation process?

“That I wasn't able to do it easily, as I'm usually somewhat tech-savvy.”

“That I could invite another person to join the hub via their email address; that products made by different companies could work so well together”

What features of the smart lighting are you most excited about?

“Dimming lights that don't have dimmers”

“... we can turn on one light at a time. Our switches normally turn on sets of lights so this will be a great feature.



Food for Thought

Some participants had trouble self-reporting # of sockets available:

- i.e. Edison based sockets, linear tubes, pin-based
- Had to install some smart bulbs in lower HOU areas than initially intended.
 - 81% of smart bulbs were installed in Kitchen or Living Room

One participant set up a rule to turn off lights when she left the house, leaving other occupant in the dark.

Some participants had no trouble with install, others had extensive difficulty with particular bulbs.

- No bulb-based connection/diagnostic troubleshooting tool to pinpoint problem (i.e. bulb doesn't detect Wi-Fi, try moving closer to router)

The Switch to Smart Bulbs



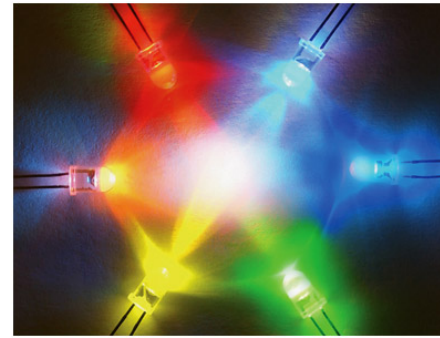
The smart bulbs replaced:

- 51% CFLs
- 26% Incandescents
- 22% LEDs
- 1% Halogens

What was your initial impression of the quality of light?

- “Good, the LEDs have a warmer color than the fluorescents I replaced.”
- “Good. I especially like that I can change the wattage to exactly what one needs without changing the bulb, ambient light to reading light to ...”
- “I was actually impressed with the quality because I was not sure how well they would work.”

Next Steps



Product is currently actively metered in homes. We plan to remove the meters from homes by Mid-November!

2015

01 January M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	04 April M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	07 July M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	10 October M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
02 February M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	05 May M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	08 August M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	11 November M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
03 March M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	06 June M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	09 September M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	12 December M T W T F S S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Stay tuned for additional results!

Discussion Questions



- Are these products ready for prime time?
- What features are most important for smart lighting products?
- Would you consider including smart lighting into your program portfolio?
- How can we leverage excitement of smart lighting to expand penetration of Home Energy Management Systems?

LUNCH 12:15-1:00PM





Northeast Energy Efficiency Partnerships

Regional Similarities & Differences:

An Analysis of Residential Lighting Evaluation Assumptions in the Regional Energy Efficiency Database (REED)

Patrick Wallace

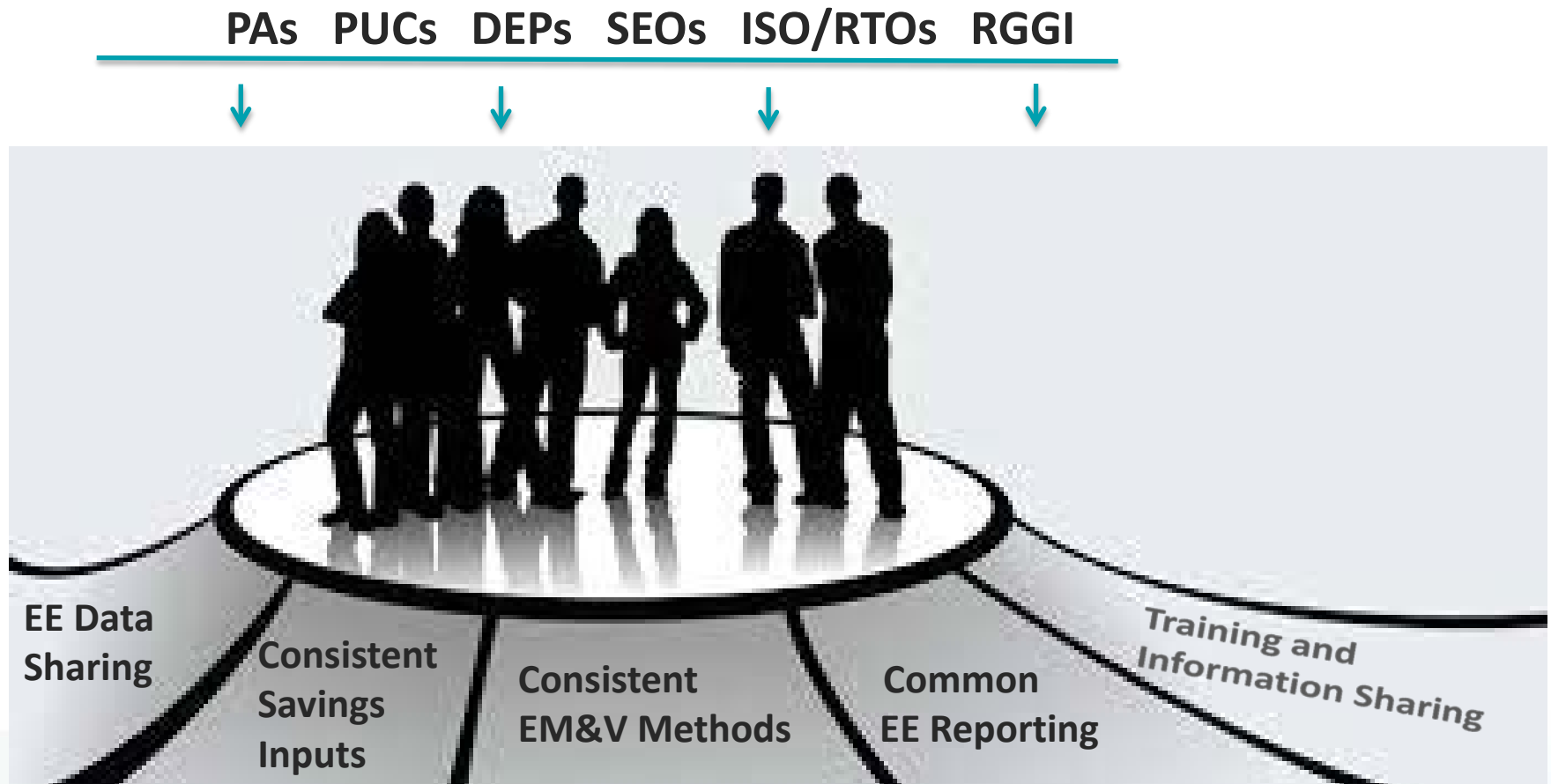
Regional EM&V Forum Manager

pwallace@neep.org

Regional EM&V Forum



Goal: Build a Transparent and Common EM&V Platform (per NECPUC/MACRUC Resolutions)



REED Overview

- **What is it?:** REED serves as a dashboard for the consistent and transparent reporting of electric and natural gas energy efficiency program information including energy and demand savings and associated costs, avoided emissions, and job impacts across the Northeast and Mid-Atlantic region.
- **REED's Purpose:** Develop transparency and consistency in reporting of EE impacts across the region in order to increase the credibility and understanding of the EE resource to support state and regional energy, economic and environmental policies.

REED Overview

Home
Reports ▶
Glossary
State Documents & Key Info ▶
Cost Effectiveness Screening
Energy Efficiency Forecasts

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Energy Savings
Demand Savings
Peak to Energy
Avoided Emissions
Savings as Percent of Sales
Total Annual Expenditures
Exp...

Energy Savings
Gross Annual Energy Savings Electric Meter Level (MWh) for 2013
 States: Connecticut, Delaware, District of Columbia, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, Vermont
 Program Sectors: All
 Program Types: All

Region	State	Gross Annual Energy Savings Electric Meter Level (MWh)
ISO-NE	Connecticut	~250K
	Massachusetts	~1250K
	New Hampshire	~50K
	Rhode Island	~180K
	Vermont	~100K
NY-ISO	New York	~1350K
PJM	Delaware	~120K
	District of Columb..	~40K
	Maryland	~950K

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See the [Glossary](http://reed.neep.org/Glossary.aspx) page (<http://reed.neep.org/Glossary.aspx>) for definitions of all REED program type categories and the [Report Footnotes](http://reed.neep.org/Footnotes.aspx#energy_savings) page (http://reed.neep.org/Footnotes.aspx#energy_savings) for more information

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Supporting Documents

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Home Reports State Documents & Key Info Cost Effectiveness Screening Energy Efficiency Forecasts

STATE DOCUMENTS & KEY INFO

The State Documents and Key Information pages provide a comprehensive overview of the energy efficiency programs, reports, and technical reference manuals to name a few, and the savings estimates for energy efficiency programs in each state. These pages aim to provide you with a deeper understanding of the data found in REED to help you answer your energy efficiency questions. For questions about specific reports in REED, please visit the [Report Footnotes](#) page.

The information on these pages is presented in a multiple choice format for those that are not highlighted were selected by the respondent and those that are not highlighted were not selected by the respondent.

You may also view a [comparison](#) of the data from the Northeast and Mid-Atlantic answered these questions. Please take a look around and email reed@neep.org if you have any questions or comments on these pages.

- [Connecticut](#)
- [Delaware](#)
- [District of Columbia](#)
- [Maine](#)
- [Maryland](#)
- [Massachusetts](#)
- [New Hampshire](#)
- [New Jersey](#)
- [New York](#)
- [Pennsylvania](#)
- [Rhode Island](#)
- [Vermont](#)

reed.neep.org/StateDocs.aspx

<http://reed.neep.org/StateDocs.aspx>

REED Overview



How Energy Efficiency Stakeholders Can Use REED Data

Compare program impacts to help identify best practices



Aggregate results to inform regional and national impacts / policies



Support system & transmission planning, forecasting



Incorporate EE data into air quality plans



Deeper Dive Analysis

Residential Lighting

Purpose:

- Understand how similar or different evaluation assumptions or approaches are and how that might affect variation in residential lighting program impacts in REED
- Dig into the cause of the similarities or difference and bring those to light
- Facilitate information sharing and possibly offer recommendations



Purpose (not porpoise)

Deeper Dive Analysis

Residential Lighting

- Research Approach (publicly available data):
 - Find values in technical reference manuals (TRMs)
 - Line them up side-by-side to look for similarities and differences
 - Dig into the TRM footnotes and the underlying studies to understand the reasons for the differences
- Research Approach (expert interviews):
 - Gain more context for differences
 - Obtain more information that may not be publicly available
 - Understand whether PAs are using data other than what's in TRMs or if current studies are underway

REED Data Show...

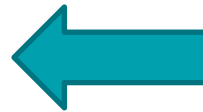


Differences of ~65% Percent

Deeper Dive Analysis

Many potential reasons for similarities and differences...

- Regulatory policy
- Goal of the program
- Program design
- Length of time program has been in the market
- How program is evaluated
- Demographics
- Building stock
- Geography
- Weather
- And so on...



Deeper Dive Analysis

- Program Type: Residential retail lighting programs
- Bulb Types: (Standard CFL & LED, Directional & Decorative LED, Specialty CFL's, LED fixtures)
- Evaluation Assumptions:
 - Gross savings adjustments
 - Delta watt
 - Hours of use
 - Measure life
 - Net savings adjustments

Gross Savings Formulas

Prevailing KWh Savings Algorithm:

$$\text{KWh Saved} = \text{Watts}_{\text{baseline}} - \text{Watts}_{\text{installed}} / 1,000 \times (\text{Annual Hours})$$

x In-Service Rate x Interactive Effects Factor

Prevailing KW Savings Algorithm:

$$\text{KW Saved} = \text{Watts}_{\text{baseline}} - \text{Watts}_{\text{installed}} / 1,000 \times (\text{Coincidence Factor})$$

x In-Service Rate x Interactive Effects Factor

Gross Savings Formulas

- Interactive effects are very close to 1 for all states
- In-service rates are generally lower and vary more for CFLs than for LEDs
 - CFLs range: 0.77 to 1.00
 - LEDs range: 0.87 to 1.00
 - Reason: LEDs more expensive so more likely to be installed

Deeper Dive Analysis

- Program Type: Residential retail lighting programs
- Bulb Types: (Standard CFL & LED, Directional & Decorative LED, Specialty CFL's, LED fixtures)
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 - Measure life
 - Net savings adjustments

Delta Watt



Two basic ways that states
we looked at calculate delta
watt

1. Deemed Value

Delta Watt

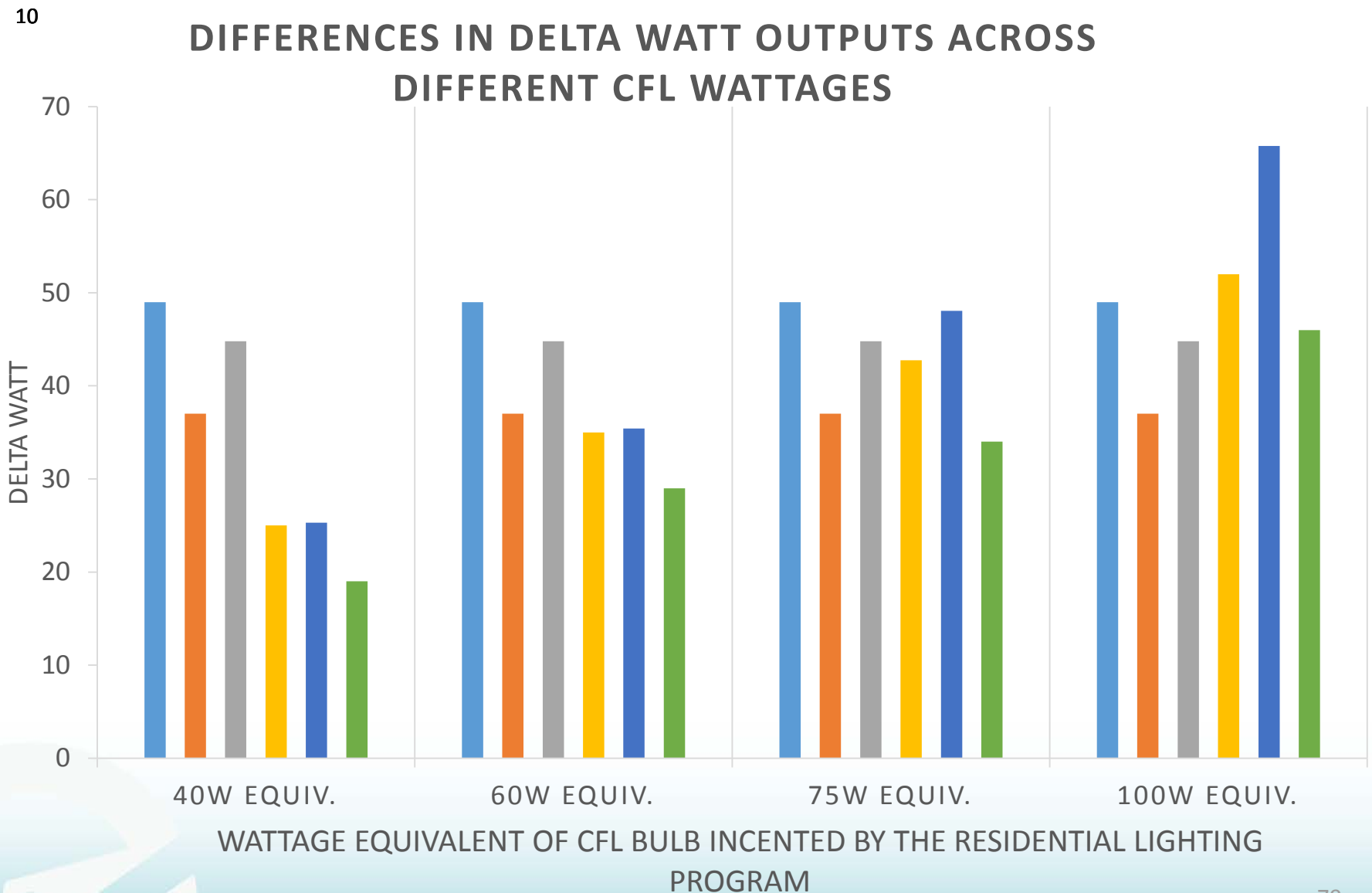


Minimum Lumens	Maximum Lumens	Watts _{Base}
4000	6000	300
3001	3999	200
2550	3000	150
2000	2549	125
1600	1999	72
1100	1599	53
800	1099	43
450	799	29
250	449	25

2.

△ Watt based on a multiplier or equivalent lumen bins

Delta Watt



Deeper Dive Analysis

- Program Type: Residential retail lighting programs
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 - Measure life
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Hours of Use (HOU)

- HOUs range from:
 - CFLs 2.5 to 3.2 hours/day
 - LEDs 2.5 to 3.3 hours/day
- Regional HOU Study presented at RLS Workshop last year
- Appears that the states involved are using the study (MA, RI, CT, Upstate & Downstate New York)
- Study recommended a higher value for NY which we see reflected in their assumptions
- MD did their own HOU study and their numbers are based on that study

Deeper Dive Analysis

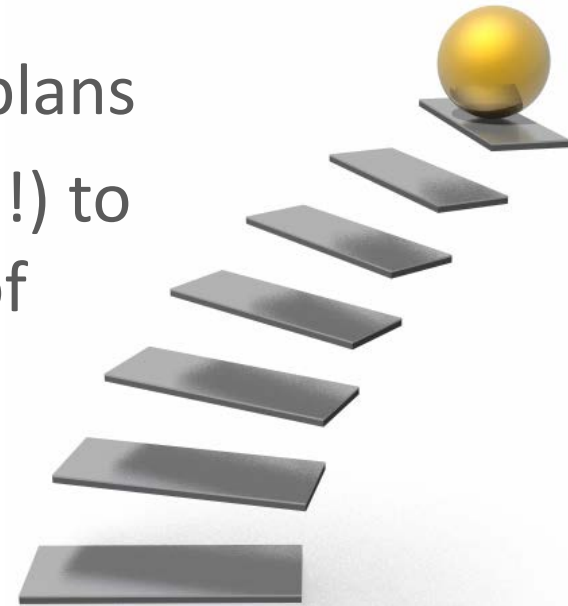
- Program Type: Residential retail lighting programs
- Bulb Types: (Standard CFL & LED, Directional & Decorative LED, Specialty CFL's, LED fixtures)
- Evaluation Assumptions:
 - Gross savings adjustments
 - Delta watt
 - Hours of use
 - Measure life
 - Net savings adjustments

Measure Life

- Accounting for the EISA standard for CFL bulbs is occurring in a similar way across states
 - A few exceptions
- Larger differences in measure lives for LEDs
 - Standard LED: 10 – 20.1
 - Decorative LED: 10 – 19
 - Directional LED: 10 – 20.1

Next Steps for REED Lighting Research

- Continue collecting publicly available information from TRMs and program plans
- Begin reaching out to experts (like you!) to get more context and understanding of these differences
- Planning to include a portion of this research in next RLS update
- Full lighting analysis due out later this fall



Discussion Questions

- Anything in particular strike you?
- Any questions or comments?
- Do we need more research?
- More information sharing?
- More engagement?

THANK YOU



Northeast Energy Efficiency Partnerships

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Northeast Energy Efficiency Partnerships

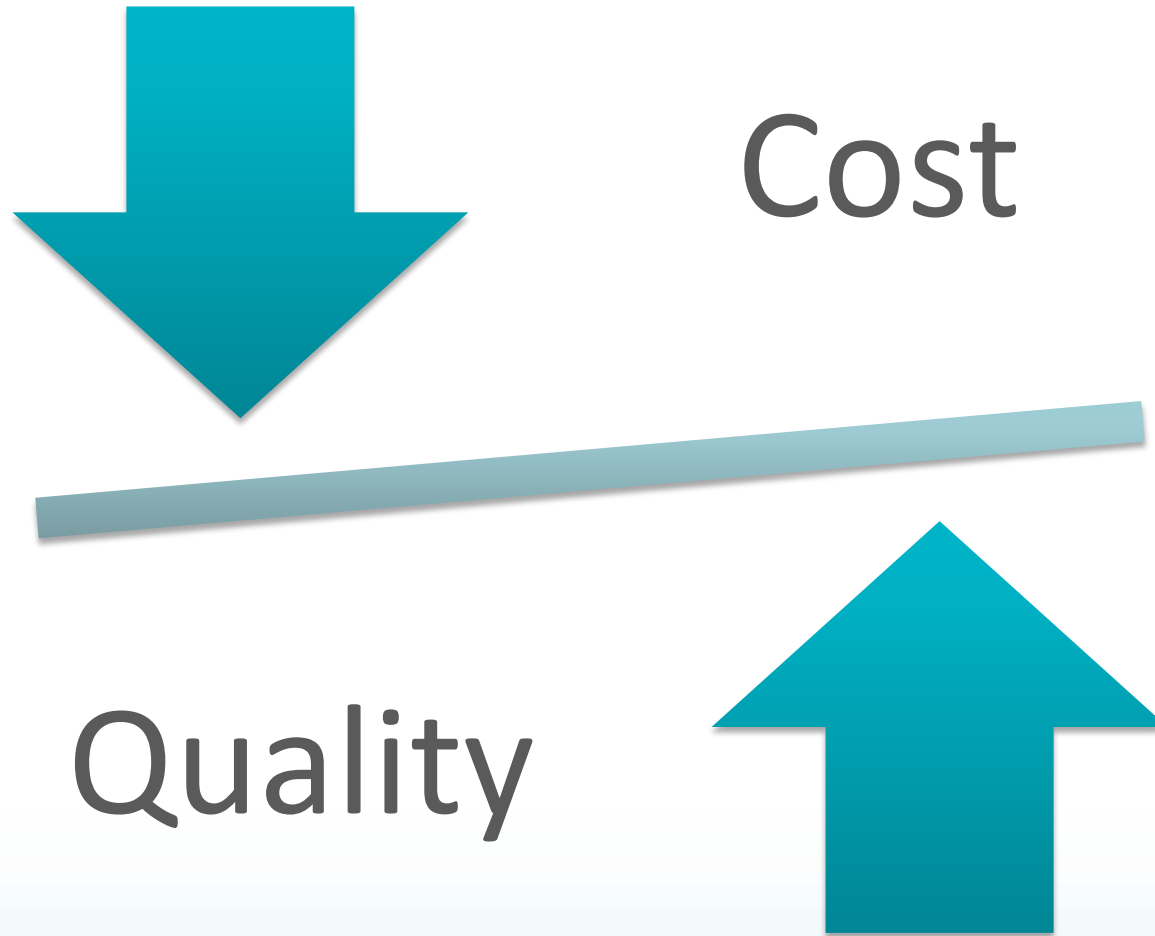
The “ISH” Bulb: Discussion of New Players and Strategies

2015 Northeast Residential Lighting
Workshop

Thursday, October 1st, 2015

1:30pm-3:15pm (with a break!)

Background



CLEAResult



Energy Efficiency LED Programs



2015 NORTHEAST
RESIDENTIAL
LIGHTING WORKSHOP

There is now a new kid on the block.....

Stanley Mertz

Director of Retail Strategies

Direct 413.731.6546 ext. 231 • Mobile
413.348.9772

CLEAResult

413.731.6546 • clearesult.com

146 Chestnut Street • Springfield, MA 01103

We change the way
people use energy™

We change the way people use energy™

Role of ENERGY STAR Brand

- Energy Efficient lighting programs have seen revolutionary changes over the many years of their existence. We have seen lighting technology advance over the years by leaps and bounds. LED technology has brought additional savings and significant lifetime increases over CFLs.
- During this time, there has been one constant in all EE Lighting programs, ENERGY STAR certification was the main qualifier for products to be included in programs.
- It also allowed programs to filter out those substandard products that do not meet the ENERGY STAR testing criteria.
- This has helped to drive the energy efficiency market to new levels and has been instrumental for keeping higher quality and well tested products in the programs.

Available Products

There is now a new kid on the block.....

- Many retailers have begun to introduce a value line of LEDs
- Response to customers that were looking to purchase an LED but were concerned about cost
- These customers were less concerned with other attributes such as dimmability, omni-directionality, etc.



Available Products

There is now a new kid on the block.....



- Retailers were now able to meet that customer demand
 - Customers that wanted an LED
 - Low cost
 - A product that looks like a traditional lightbulb
 - A product that turns on as soon as they flip the switch



Let's compare....

What's the difference?



- ← **8.5** Wattage? **10** →
- ← **20K** Lifetime? **25K** →
- ← **NO** Omni-directional? **YES** →
- ← **NO** Dimmable? **YES** →
- ← **NO** ENERGY STAR Certified? **YES** →
- ← **800** Lumens? **800** →



\$2.44 EACH

Price?

\$5.88 EACH

What's the difference? CFL vs. Energy Star LED



More saving.
More doing.



\$1.75 EACH

← 14	Wattage?	→ 10
← 10K	Lifetime?	→ 25K
← YES?	Omni-directional?	→ YES
← NO	Dimmable?	→ YES
← 800	Lumens?	→ 800
← YES	ENERGY STAR Certified?	→ YES
	Price?	



\$4.99 EACH

What's the difference? CFL vs. Value LED



More saving.
More doing.



\$1.75 EACH

← 14	Wattage?	8.5 →
← 10K	Lifetime?	10K →
← YES?	Omni-directional?	NO →
← NO	Dimmable?	NO →
← 800	Lumens?	800 →
← YES	ENERGY STAR Certified?	NO →

Price?



\$2.49 EACH

Specifics



More saving.
More doing.

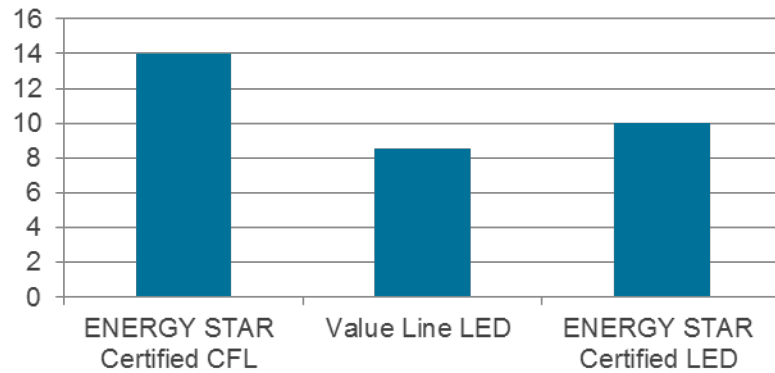


DETAILS

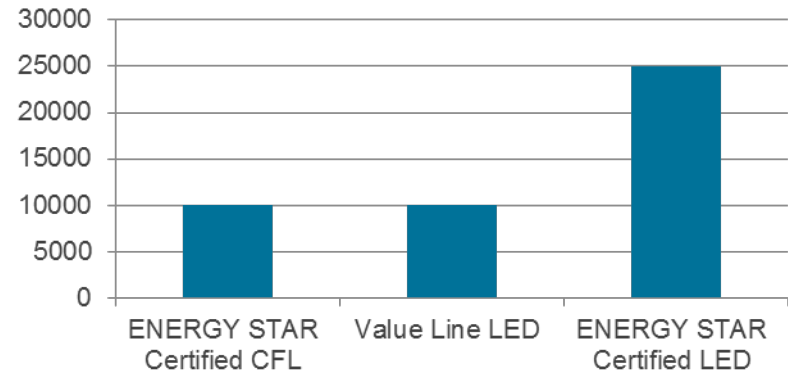
Actual Color Temperature (K)	2700	2700	2700
Average Life (hours)	10000	10000	25000
Color Rendering Index	82	80	80
Dimmable	No	No	Dimmable
Light Bulb Shape Code	T2	A19	A19
Light Output (lumens)	800	800	800
Lighting Technology	CFL	LED	LED
Watt Equivalence	60	60	60
Wattage (watts)	14	8.5	9
ENERGY STAR Certified	Yes	No	Yes
Price each	\$1.75	\$2.50	\$4.99

Let's compare....

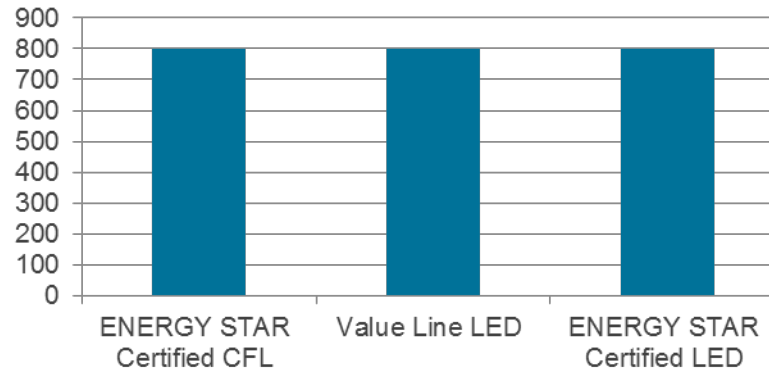
Watts



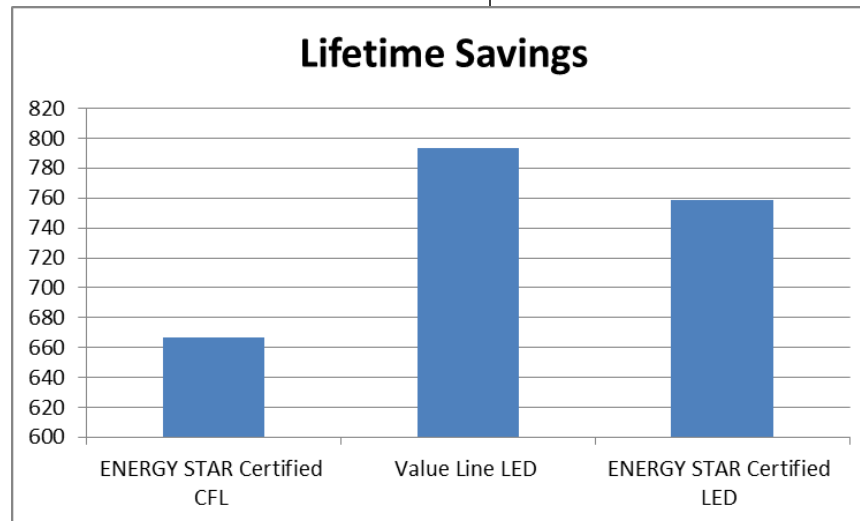
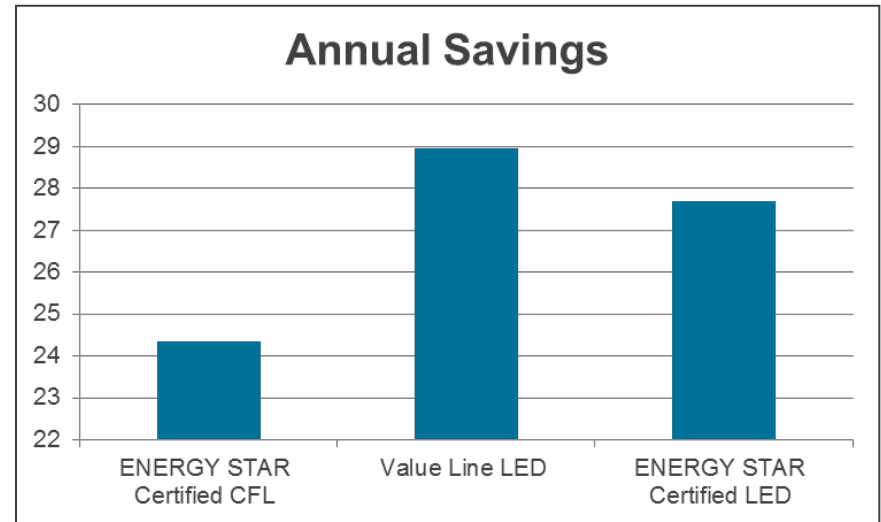
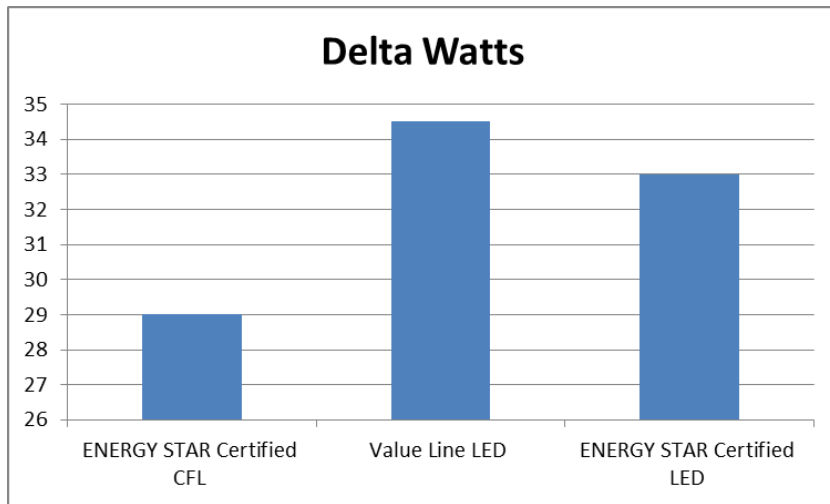
Lifetime



Lumens



Starting to see a pattern?



With this new product, are we now in a good, better, best scenario?



General Consumer Questions During Purchase Decision


Customer needs:



General Questions	CFL	VALUE LED	ENERGY STAR CERTIFIED LED
Is it energy saving?	✓	✓	✓
Appearance (does it look like a light bulb?)		✓	✓
Does it come on when I flip the switch?		✓	✓
I want the lowest cost	✓		
I want a dimmable bulb			✓
It needs to be ENERGY STAR Certified	✓		✓
I'm concerned about mercury		✓	✓
	GOOD	BETTER	BEST

General Consumer Questions During LED Specific Purchase Decision

Customer needs:

LED ONLY	VALUE LED	ENERGY STAR CERTIFIED LED
I want an LED at the lowest cost	✓	
I want a dimmable bulb		✓
I want it to be fully Omni-directional		✓
It needs to be ENERGY STAR Certified		✓ 
I want an LED but I don't really want to pay more for a 22 year life	✓	

So What Should We Do Now?

Value LEDs meet or exceed the current ENERGY STAR CFL Specifications

	Current Spec	CFL Average	Value line Average
LM 79 Report - lamp wattage	<14.5	13.4	8.7
LM 79 Report - power factor	>.5	0.6375	0.6589
LM 79 Report - initial lumen output	800	800	800
LM 79 Report - efficacy (LPW)	65	70.8	96.6
LM 79 Report - CRI	>80	82	81
LM 79 Report - CCT (Kelvin)	2700	2700	2700
LM 79 Report - Beam Angle	No Spec	No Spec	221.4
LM 79 Report - Run Up Time (sec)	29.5	29.5	0
Mercury?	Yes	Yes	No
Lifetime	10,000	11,000	13,750
Dimmable?	No	No	No

Why we need a specification....

There are now 5,000 hour products hitting the market.....

- Half the life of an ENERGY STAR certified CFL!!!
- Does NOT meet the lumens requirement!!
- Does NOT meet the ENERGY STAR certified CFL specifications



Options to Consider?

How can we be assured of higher quality and well tested products in the programs?

- Is there a testing protocol that can be accepted?
- Who can we all agree to accept certification?



Options to Consider?

If there now exists a product that does meet or exceed the current CFL specifications, should we?

- Provide incentives to the Value Line LED
- Use current CFL incentive levels
- Shift funding from CFL to this Value LED
- Cost per kWh is better even on annual basis

Stay Tuned.....



CLEARResult is currently working on a whitepaper that will be released later this year to provide further insight into this issue.

COFFEE BREAK: 10 MINUTES



Small Group Discussion

- Groups have been assigned—find the color on your nametag
- Facilitators:
 - Chris Lubeck, OSRAM Sylvania meeting in Cafeteria
 - Rene Burger, Philips meeting in middle room
 - Briana Kane, Cape Light Compact meeting in this room

Large Group Discussion

- What concerns do you have about these bulbs?
- What opportunities do you see these bulbs presenting?
- What metrics are you most concerned with?
 - Efficacy? Lifetime? Omnidirectionality? CRI? Power Factor? Others?
- What actions or steps should be taken moving forward?





Northeast Energy Efficiency Partnerships

Conclusions/Wrap-up/Next Steps

2015 Northeast Residential Lighting
Workshop

Thursday, October 1st, 2015

3:15pm-3:30pm

Housekeeping

- Please complete the evaluation form—your feedback is extremely valuable!
- Please return your lanyard at the front of the room
- Thank you to members of the Leadership Advisory Committee who helped to raise these key issues
- Thanks again to our hosts

OSRAM
SYLVANIA



Concluding Thoughts

- We have gotten a lot of good feedback on key barriers and opportunities
 - we will review these and use to inform the development of the RLS
- We will organize the strategies into the Theory of Change framework to achieve the Market Transformation we hope for
- We will be continuing our residential lighting efforts into 2016, but welcome your feedback on what is most valuable

Next Steps

- Slides will be available online soon
- Please look out for follow up communications including a brief survey on the role NEEP could play moving forward
- Contact Claire (cmiziolek@neep.org) if you'd like to be involved in the review of the draft RLS
- Expect the RLS to be released this fall!

Final Questions or Considerations?





Northeast Energy Efficiency Partnerships

MEETING ADJOURNED

Thank you!

Claire Miziolek, Market Strategies Program Manager
cmiziolek@neep.org

2015 Northeast Residential Lighting Workshop
Thursday, October 1st, 2015