



Impending EISA Lighting Standards: Impacts on Consumers and Energy Efficiency Lighting Programs

NARUC Presentation

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Presentation Outline

- ▶ Understanding the Standard
- ▶ Consumer Issues
- ▶ Potential Effects on Lighting Market
- ▶ Efficiency Program Impacts
- ▶ Opportunities and Strategies





New Lighting Standards

- ▶ Federal law (EISA 2007) set new efficiency standards for general service light bulbs
- ▶ Tier 1 phased-in between January 2012 and Jan. 2014; Light bulbs **25-30% more efficient** than today's traditional incandescent bulbs
- ▶ Tier 2 will take effect in 2020 and require **45% greater efficiency** than today's bulbs
- ▶ The standards do not ban incandescents; they set performance standards





Over 30 years, the more efficient lighting is expected to save:*

- ▶ 14 quads of energy or the total energy consumption of 75 million homes for one year
- ▶ Between \$25 and \$60 billion in lower energy costs
- ▶ 222 Million metric tons of CO₂ or the annual CO₂ emissions of 57 coal-fired power plants
- ▶ ACEEE estimates annual savings of over 55,000 metric tons of mercury beginning in 2020

*From [DOE Technical Support Document](#)



Which Type of Bulbs Are Affected by the Law?



- ▶ Traditional incandescents
- ▶ Medium screw-based
- ▶ 100, 75, 60 and 40 watt

- ▶ Notable exceptions:
 - Modified spectrum
 - Vibration service
 - Rough service
 - Three-way
 - 2601-3300 lumen
 - Shatter resistant

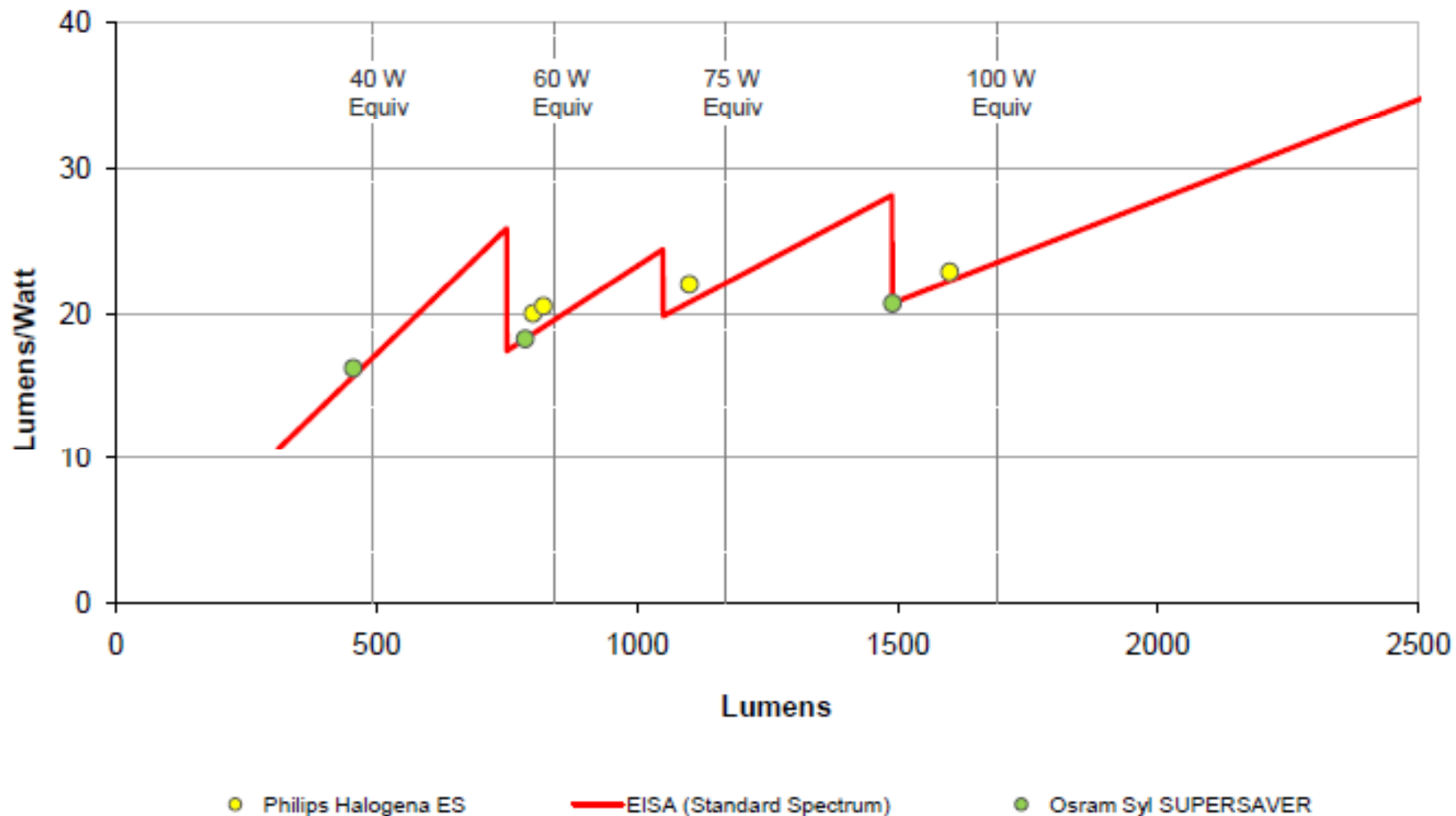




EISA Light Bulb Standards

Tier	Effective Date	EISA-Rated Lumen Ranges	Efficacy Requirement	Major Incandescent Wattage Categories Affected (W)
1	2012	1,490 -2,600	Maximum wattage: 72W ~21-36 lumens/W	100 and 150
	2013	1,050 -1,489	Maximum wattage: 53 W ~20-28 lumens/W	75
	2014	750 -1,049	Maximum wattage: 43 W ~17-24 lumens/W	60
	2014	310-749	Maximum wattage: 29 W ~11-26 lumens/W	40
2	2020	All	No less than 45 lumens/W	All

Products already in homes and stores will not be affected; new standards apply to the manufacture and import of products



Source: Calwell, Chris (2009). —Prospects for Residential Lighting Programs in Light of Federal Lamp Standards. || November. Presented at: Southwest Regional Energy Efficiency Workshop. Phoenix, AZ.



Dimmer Traditional Incandescents

- ▶ Close to lowest efficiency and lumens per watt allowed under EISA
- ▶ 60W 'equivalent' saves about 30% but dimmer than bulb it replaces
- ▶ Halogen capsule
- ▶ Low cost, short life





Halogen Incandescents

- ▶ Similar to traditional incandescents with halogen technology
- ▶ About 30% more efficient than traditional bulbs
- ▶ Higher price
- ▶ Lifetime about 3000 hours





LEDs (Light Emitting Diodes)

- ▶ Rapidly evolving technology
- ▶ Expensive
- ▶ Several on the market but limited choices
 - Mostly 40w and a few 60 watt equivalent
- ▶ Expected lifetimes as high as 25 years
- ▶ Use 80% less energy than traditional incandescents

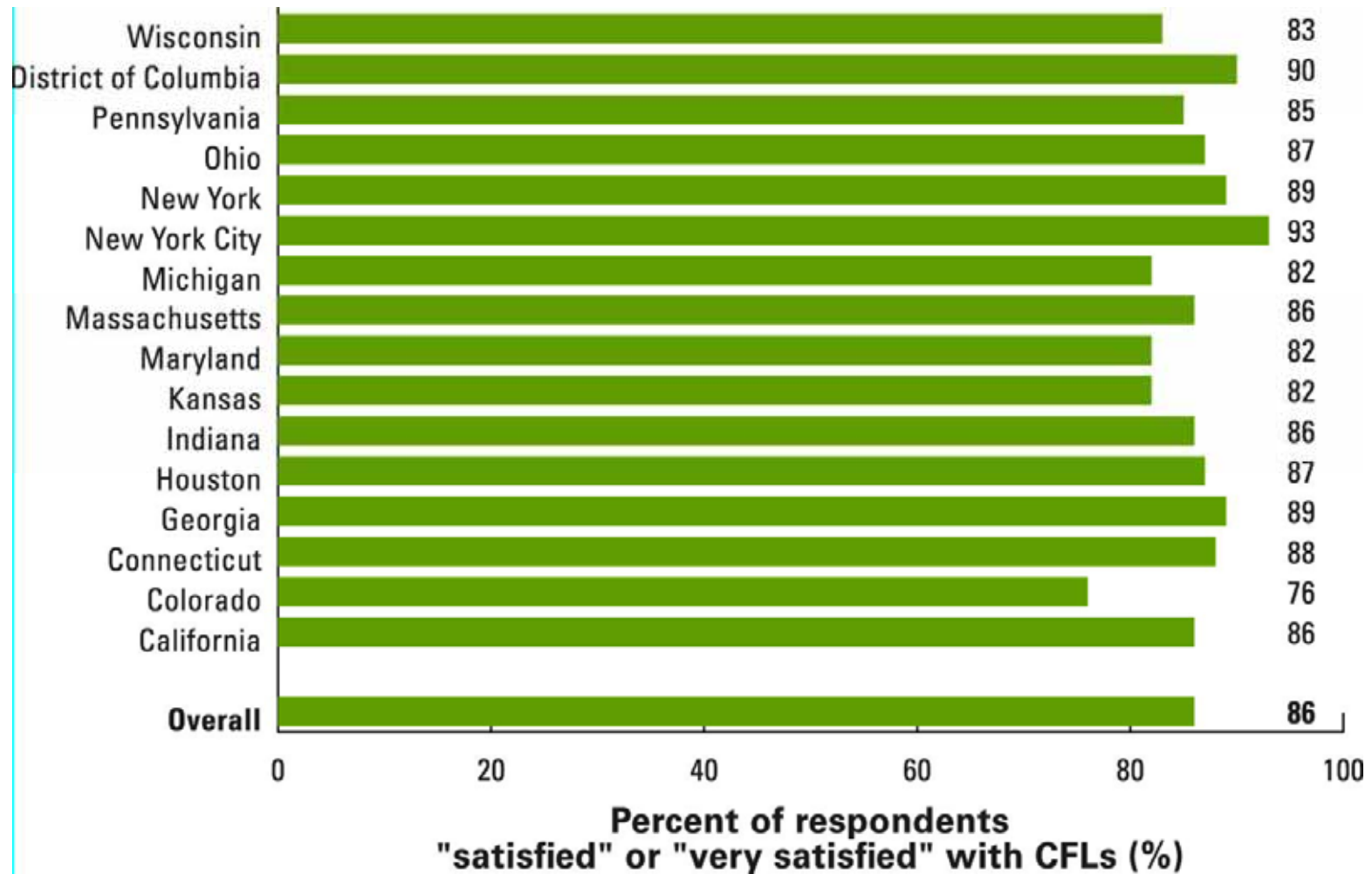


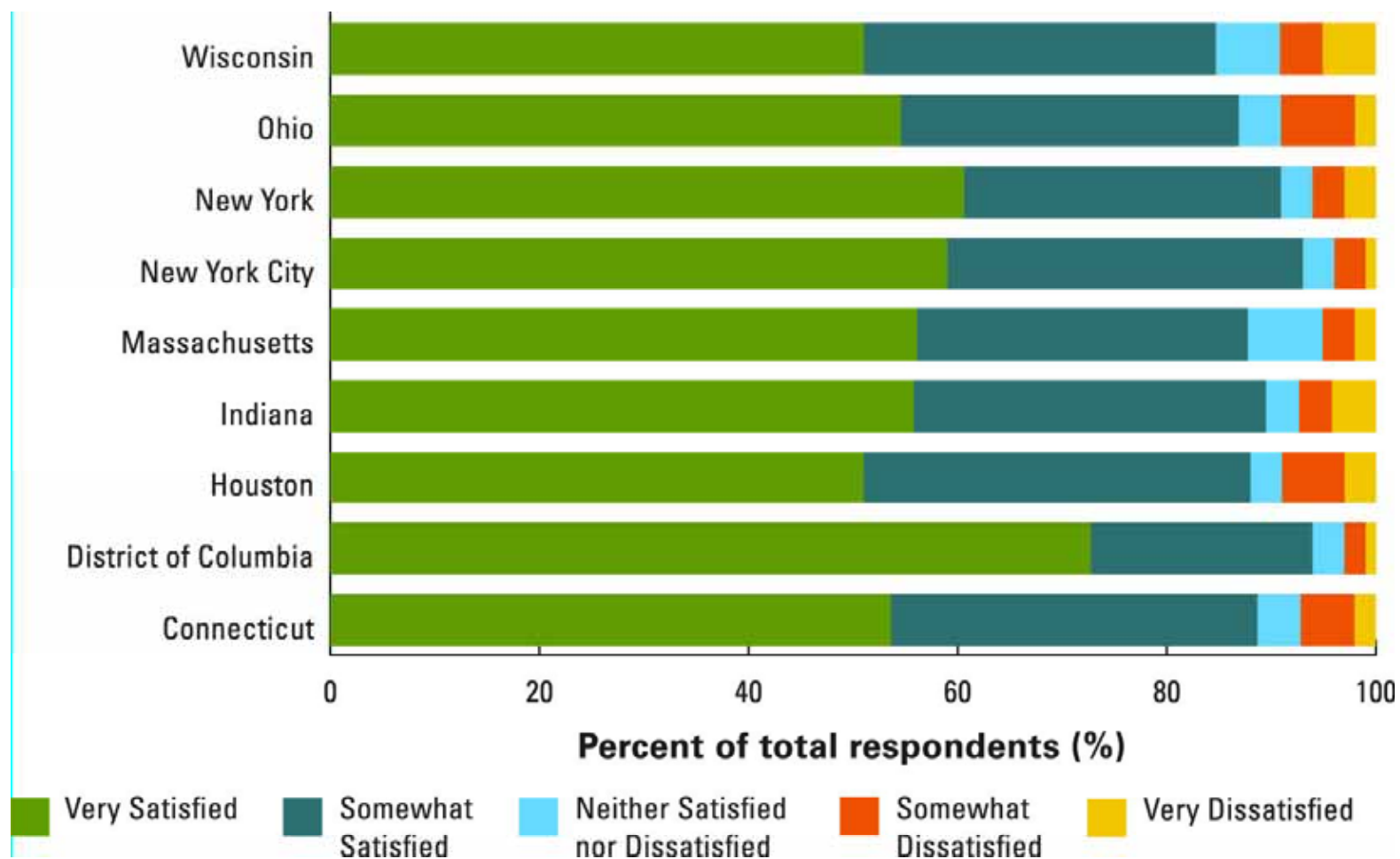


CFLs (Compact Fluorescent Lamps)

- ▶ Use 75% less energy than traditional incandescents
- ▶ Options for brightness, color and size much better than earlier versions
- ▶ Dimming options now available
- ▶ Price higher but short payback in saved energy costs
- ▶ Contain less than 5 mg of mercury per bulb; many now have between 1.5 and 2.5 mg







ENERGY STAR CFL Market Profile – Data Trends and Market Insights”, Prepared by D&R International, Ltd. for the U.S. Department of Energy, September 2010; Figure 13, page 26



How Much Mercury?



Most CFLs	Less than 5 mg
Button cell batteries	9 mg
Street lighting	30 mg
Dental amalgam	83 mg per filling
Fever thermometer	Up to 1000 mg
Old style residential thermostats	Up to 4500 mg
Mercury barometers	500,000 mg

Source: Consortium for Energy Efficiency Website

Lifetime mercury emissions - 13 W CFL	1.8 mg
Lifetime mercury emissions – 60 W Inc	5.8 mg





Mercury Disposal and Recycling

- ▶ Several large retailers (Ikea, many Home Depot and Lowe's stores) now accept CFLs for disposal/recycling
- ▶ The U.S. Environmental Protection Agency provides detailed info on the proper disposal of CFLs
- ▶ No consolidated effort yet





State Legislators Address Mercury in CFLs

- ▶ CA passed law in 2007 to limit the amount of lead and mercury in light bulbs
- ▶ Maine enacted a product stewardship law in 2009; also includes a mercury limit similar to CA
- ▶ Washington passed similar law in 2010; also bans disposal in landfills
- ▶ Illinois – CFL public education law in 2009

[National Council of Environmental Legislators press release: Legislators Address Mercury in CFLs](#)





EPA - CFL Disposal and Recycling Info by State

Michigan sample <http://www.epa.gov/waste/hazard/wastetypes/universal/lamps/live.htm>

▶ **Additional information for Michigan**

▶ [MDEQ: General information about recycling](#)

▶ [MDEQ: Bright Ideas - general information on compact fluorescent light bulbs \(CFLs\)](#)

▶ [Household Hazardous Waste Collection](#)

▶ The Michigan Department of Environmental Quality (MDEQ) maintains a list of household hazardous waste collection facilities and contact names by county. Call a facility located near you to determine availability and hours of operation.

▶ **Ace Hardware**

The following Ace Hardware locations offers free CFL recycling to its customers.

▶ Ace Hardware, 734 West Front st. Traverse City, MI 49684, (231) 946-2140

▶ Ace Hardware, 3597 Bunkerhill Rd Acme, MI 49610, (231) 938-2021

▶ Ace Hardware, 4106 US 31 South Traverse City , MI 49684, (231) 943-8288



Phase-in Around the World

- ▶ EU and Australia have begun phase-in of new standards
 - consumer and media education very important
 - working with retailers at point of sale effective
 - health-related opposition (lupus, autism)

- ▶ California begins phase-in Jan 2011
 - Limited outreach to date

- ▶ Canada begins same year as US – has been meeting with retailers and utilities for 3 years





Consumer Education in the U.S.

- ▶ Ad hoc group formed in August 2010 –
 - efficiency, consumer, and environmental advocates and National Electrical Manufacturing Assoc (NEMA)
 - urged DOE to fund an education campaign and address mercury concerns
 - Alliance to Save Energy and NEMA hosted a summit with above plus manufacturers, retailers, NARUC, DOE, EPA, and FTC
 - Group plans to formalize and seek funding


- ▶ DOE preparing campaign but limited funding






New FTC Lighting Labels Will Aid Consumers

(CFL on left, traditional incandescent on right)

Lighting Facts Per Bulb	
Brightness	870 lumens
Estimated Yearly Energy Cost	\$1.57
Based on 3 hrs/day, 11¢/kWh Cost depends on rates and use	
Life	5.5 years
Based on 3 hrs/day	
Light Appearance	
Warm Cool	
	
Energy Used	13 watts
Contains Mercury	
For more on clean up and safe disposal, visit epa.gov/cfl .	

Lighting Facts Per Bulb	
Brightness	820 lumens
Estimated Yearly Energy Cost	\$7.23
Based on 3 hrs/day, 11¢/kWh Cost depends on rates and use	
Life	1.4 years
Based on 3 hrs/day	
Light Appearance	
Warm Cool	
	
Energy Used	60 watts



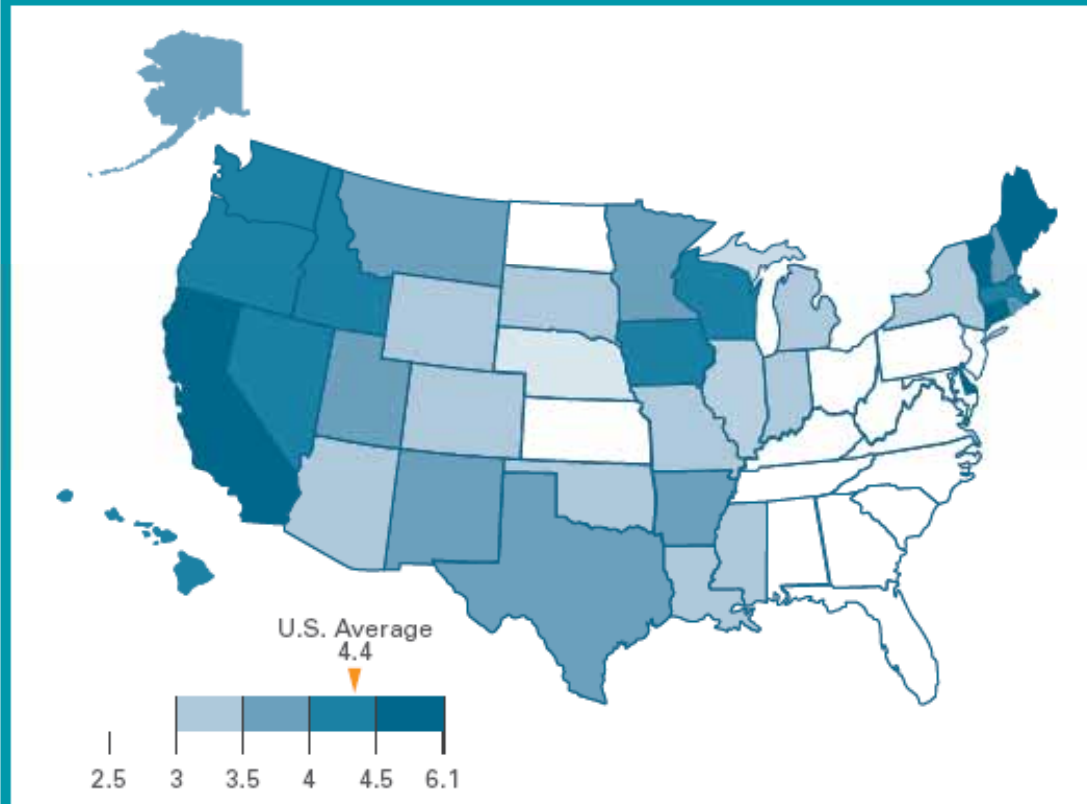
Current Market for CFLs

- ▶ Low overall saturation
- ▶ Not preferentially installed in high-use sockets
- ▶ Consumers are buying fewer CFLs
 - Total sales are a function of how quickly lamps burn out.
 - Longer Life = Fewer Replacements = Lower Demand
- ▶ Vast majority of consumers are satisfied with CFLs

Source: Massachusetts: NMR Group, Inc. "The Market for CFLs in Massachusetts."
Prepared for Cape Light Compact, NSTAR Electric, National Grid, Unitil, and
Western Massachusetts Electric. January 28, 2010.



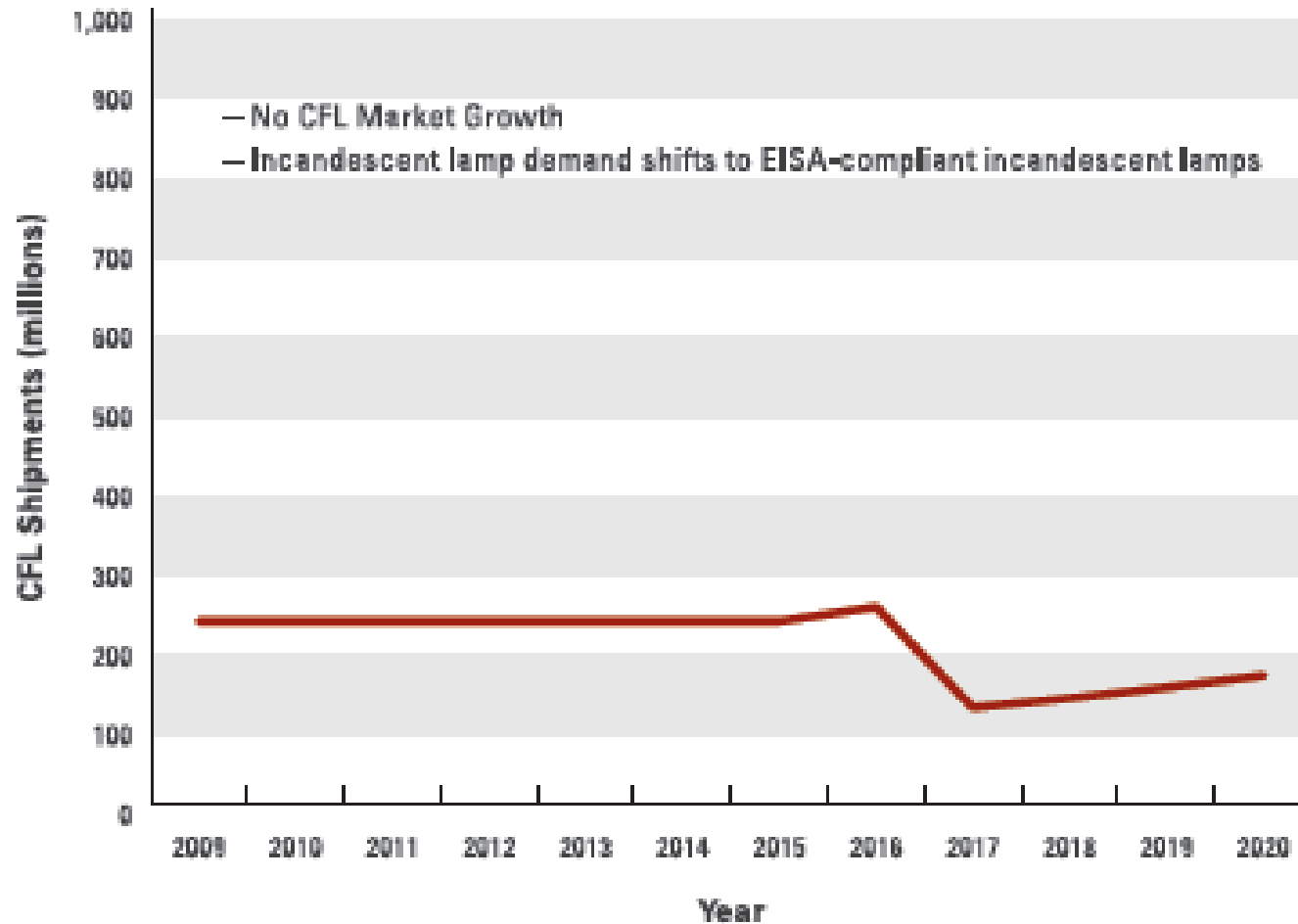
CFL Residential Saturation by State



Source: Michael Reid, E Source, "Who's Buying CFLs? Who's Not Buying Them? Findings from a Large-Scale, Nationwide Survey," 2008 ACEEE Summer Study on Energy Efficiency in Buildings. Results based on self-reported survey data.



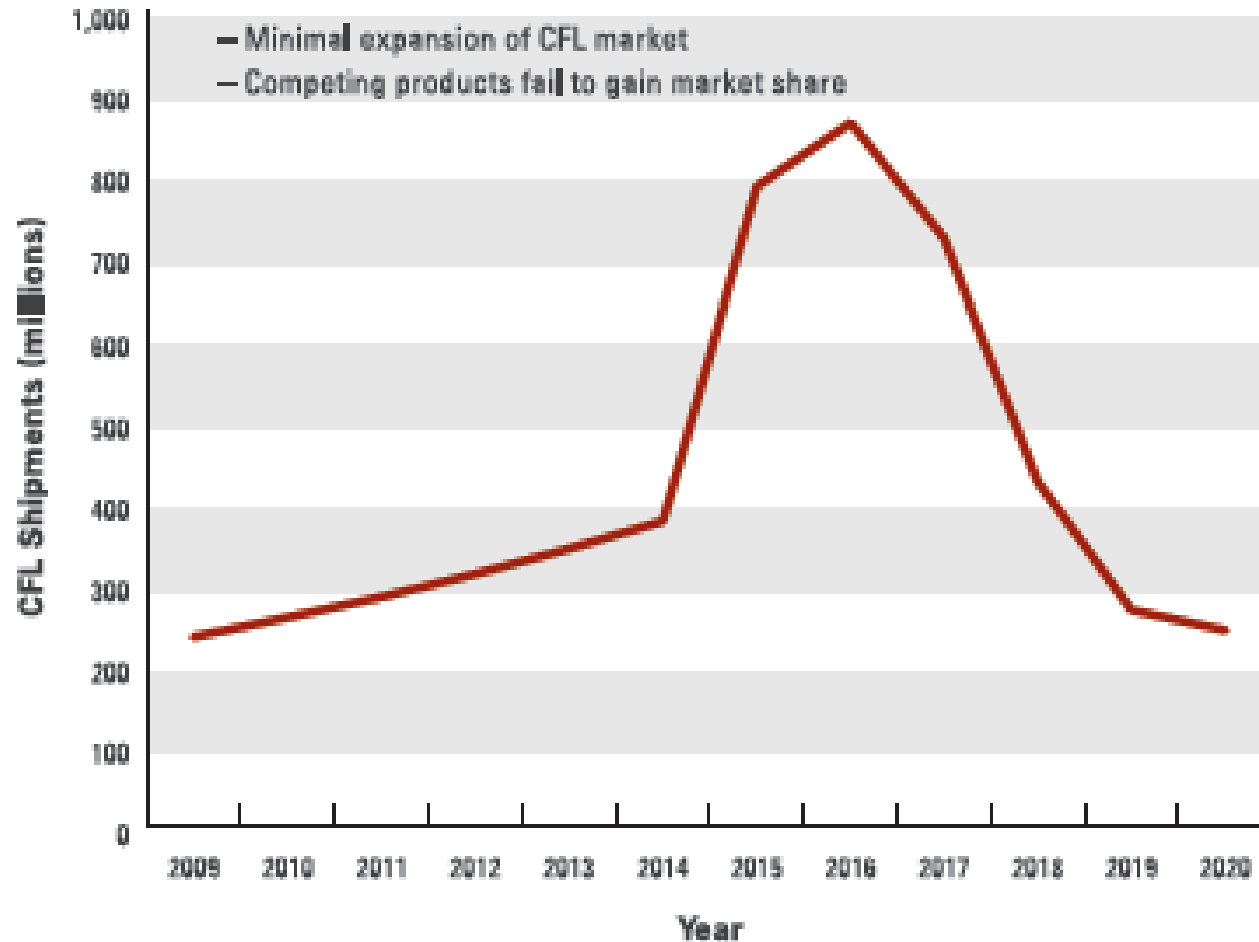
Scenario 1 – No Change



Source: DOE (2010). "ENERGY STAR CFL Market Profile – Data Trends and Market Insights". September. Washington DC: Department of Energy.



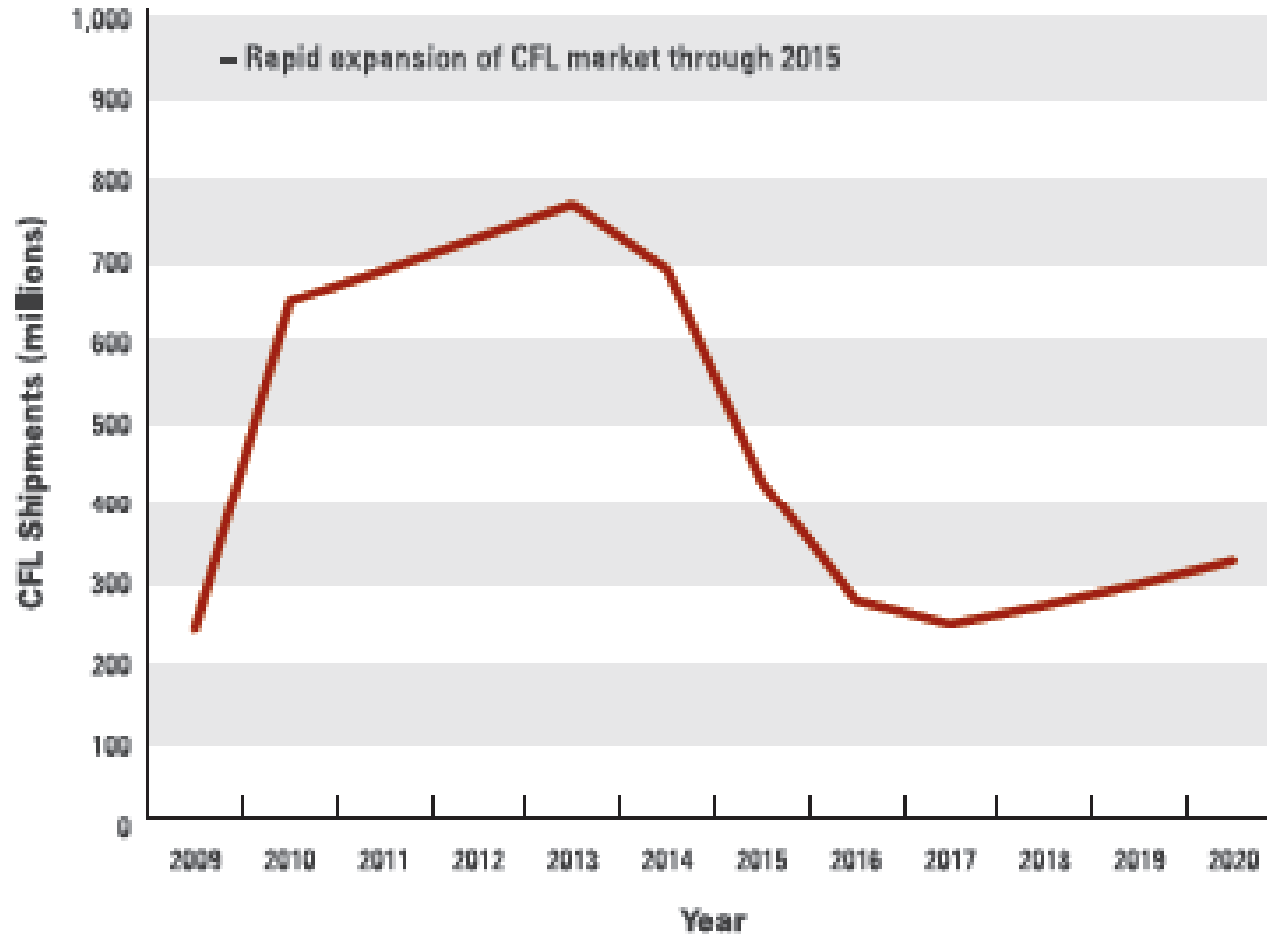
Scenario 2 – Delayed Impact



Source: DOE (2010). "ENERGY STAR CFL Market Profile – Data Trends and Market Insights". September. Washington DC: Department of Energy.



Scenario 3 – Rapid Growth



Source: DOE (2010). “ENERGY STAR CFL Market Profile – Data Trends and Market Insights”. September. Washington DC: Department of Energy.

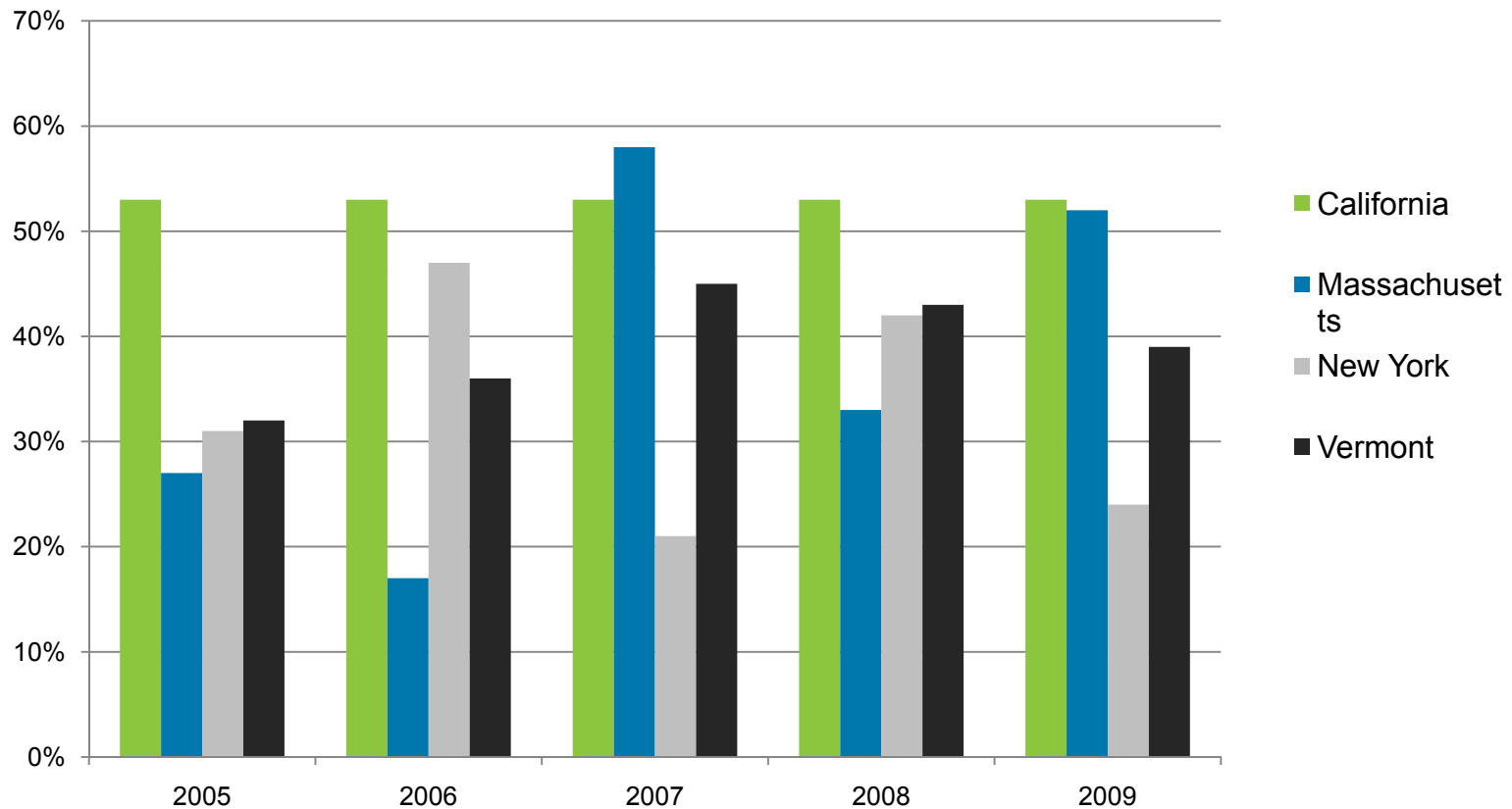


Phase-Out Experience in Other Countries

- ▶ Australia and Europe: significant switching to halogen products over CFLs
 - CFLs 14%
 - Halogen 33%
 - Clear-glass incandescent 53%
- ▶ Public outcry and hoarding of incandescents reported in UK and Germany
- ▶ Shortages of CFLs as manufacturers had limited output capacity



Efficiency Program Impacts



Source: DOE (2010). "ENERGY STAR CFL Market Profile – Data Trends and Market Insights". September. Washington DC: Department of Energy.



CFL NTG ratios around the country - 2008

Location	Recommended or Official	Low	High
Wisconsin	0.62	0.36	1.69
Massachusetts	0.41	0.19	0.74
Connecticut	0.81	0.22	0.91
New York	1.6	0.93	9.17
New York City	1.6	0.93	6.73
Vermont	1.09	1.06	1.57
California	0.65	0.23	0.65

Source: DOE (2010). "ENERGY STAR CFL Market Profile – Data Trends and Market Insights".
September. Washington DC: Department of Energy.



Possible Paths for PAs

- ▶ Shift emphasis away from CFLs as NTG drives up cost?
- ▶ Shift emphasis toward above-ENERGY STAR CFLs and LEDs?
- ▶ Rebate above-minimum incandescents?
- ▶ Focus on education and labeling to help consumers make informed decisions?





The Next Four Years are Important

- ▶ A crucial time to reach consumers at a decision point
- ▶ Manage towards Scenario 3
- ▶ PA's should promote CFLs even more strongly to transform lighting markets





Market Transformation Depends on Big Ifs...

- ▶ If product development continues, and alleviates some of the shortcomings consumers continue to perceive with CFLs...
- ▶ If the mercury issue can be addressed...
- ▶ If retailers devote a reasonable amount of shelf space to CFL products...
- ▶ If retailers allow the placement of display material that will help guide consumers through the process of selecting a new type of lamp...
- ▶ If salespeople are willing to help consumers understand why this is happening and the key factors that should go into their purchase decision ...





Summary

- ▶ Consumers will have several options when new lighting standards phased in
- ▶ Consumer education is essential
- ▶ Reduced savings from residential lighting, but not zero.
- ▶ Baseline likely to be EC Halogen, if support for CFLs wanes.
- ▶ Still large potential for CFLs.
- ▶ EE programs can help consumers adopt more efficient options.
- ▶ Incandescents are not disappearing from the market, yet.





Resources: Mercury Disposal and Recycling

- ▶ Energy Star
 - [Information on CFLs and Mercury](#)
- ▶ NEMA (lighting manufacturers)
 - [Voluntary Commitment on Mercury](#)
- ▶ Natural Resources of Canada
 - [Questions and Answers on CFLs](#)
 - [UV and Electromagnetic Radiation](#)
- ▶ [EPA - Mercury-Containing Light Bulb Collection and Recycling Programs](#)
- ▶ [Association of Lighting and Mercury recyclers](#)
- ▶ [Mercury Policy Project](#)





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